

Appendix U

Air Particulate Composite Laboratory Records



Date: 5/1/2015

CLIENT: Cameco Resources, Crow Butte Operation
Project: Marshland Expansion Area
Lab Order: S1301108

CASE NARRATIVE

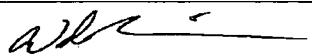
Report ID: S1301108002
(Replaces S1301108001)

Samples MA-1, MA-2, MA-3, MA-4, and MA-5 were received on January 9, 2013.

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

NRC radiological air particulate filters, animal, vegetation, soil and sediment samples may be composited by date and location per client's monitoring program requirements. Highly carbonaceous samples may require ashing. Samples are subjected to a modified USEPA SW-846 Method 3050B mineral acid digestion as appropriate. Analysis of the resulting solutions and digestates is performed using approved TNI, USEPA, and industry recognized analytical techniques. Where client-provided air volumes corresponding to the air filter composites exist, aqueous digestate results are converted to radiological particulate concentrations in air (e.g. $\mu\text{Ci/mL}$). Quality control parameters acceptance criteria are defined by USEPA programs, and in USNRC Regulatory Guide 4.14 (Radiological Effluent and Environmental Monitoring at Uranium Mills), USNRC Regulatory Guide 4.15 (Quality Assurance for Radiological Monitoring Programs – Effluent Streams and the Environment), the TNI Standard EL-V1-2009, and Inter-Mountain Labs internal quality procedures.

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

Reviewed by: 
Wade Nieuwsma, Assistant Laboratory Manager



Inter-Mountain Labs

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

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Sample Analysis Report

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

Date Reported 2/8/2013
Report ID: S1301108001

ProjectName: Marshland Expansion Area
Lab ID: S1301108-001
ClientSample ID: MA-1
COC:

WorkOrder: S1301108
CollectionDate: 1/2/2013
DateReceived: 1/9/2013 10:30:00 AM
FieldSampler: RG
Matrix: Filter

Comments Sampled 10/1/2012-1/2/2013 (2012 4th Qtr)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
Field						
Actual Volume	6682410	Liters			Field	01/02/2013 000
Radionuclides - Filter						
Lead 210	129	pCi/Filter		2	OTW01	01/29/2013 1055 SH
Lead 210 Precision (±)	5.8	pCi/Filter			OTW01	01/29/2013 1055 SH
Lead 210	1.9E-14	µCi/mL		2.0E-15	Calculation	02/08/2013 1100 WN
Lead 210 Precision (±)	8.7E-16	µCi/mL			Calculation	02/08/2013 1100 WN
Radium 226	0.3	pCi/Filter		0.3	SM 7500RAB	01/22/2013 1611 SH
Radium 226 Precision (±)	0.1	pCi/Filter			SM 7500RAB	01/22/2013 1611 SH
Radium 226	ND	µCi/mL		1.0E-16	Calculation	02/08/2013 1100 WN
Radium 226 Precision (±)	NA	µCi/mL			Calculation	02/08/2013 1100 WN
Thorium 230	ND	pCi/Filter		0.2	ACW10	01/31/2013 905 MB
Thorium 230 Precision (±)	NA	pCi/Filter			ACW10	01/31/2013 905 MB
Thorium 230	ND	µCi/mL		1.0E-16	Calculation	02/08/2013 1100 WN
Thorium 230 Precision (±)	NA	µCi/mL			Calculation	02/08/2013 1100 WN
Uranium	0.4	pCi/Filter		0.3	EPA 200.8	01/14/2013 1726 MS
Uranium	ND	µCi/mL		1.0E-16	Calculation	02/08/2013 1100 WN

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



Inter-Mountain Labs

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Your Environmental Monitoring Partner

Sample Analysis Report

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

Date Reported 2/8/2013
Report ID: S1301108001

ProjectName: Marshland Expansion Area
Lab ID: S1301108-002
ClientSample ID: MA-2
COC:

WorkOrder: S1301108
CollectionDate: 1/2/2013
DateReceived: 1/9/2013 10:30:00 AM
FieldSampler: RG
Matrix: Filter

Comments Sampled 10/1/2012-1/2/2013 (2012 4th Qtr)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
Field						
Actual Volume	6581476	Liters			Field	01/02/2013 000
Radionuclides - Filter						
Lead 210	128	pCi/Filter		2	OTW01	01/29/2013 1055 SH
Lead 210 Precision (±)	6.1	pCi/Filter			OTW01	01/29/2013 1055 SH
Lead 210	1.9E-14	µCi/mL		2.0E-15	Calculation	02/08/2013 1100 WN
Lead 210 Precision (±)	9.3E-16	µCi/mL			Calculation	02/08/2013 1100 WN
Radium 226	ND	pCi/Filter		0.3	SM 7500RAB	01/22/2013 1611 SH
Radium 226 Precision (±)	NA	pCi/Filter			SM 7500RAB	01/22/2013 1611 SH
Radium 226	ND	µCi/mL		1.0E-16	Calculation	02/08/2013 1100 WN
Radium 226 Precision (±)	NA	µCi/mL			Calculation	02/08/2013 1100 WN
Thorium 230	0.2	pCi/Filter		0.2	ACW10	01/31/2013 905 MB
Thorium 230 Precision (±)	0.2	pCi/Filter			ACW10	01/31/2013 905 MB
Thorium 230	ND	µCi/mL		1.0E-16	Calculation	02/08/2013 1100 WN
Thorium 230 Precision (±)	NA	µCi/mL			Calculation	02/08/2013 1100 WN
Uranium	ND	pCi/Filter		0.3	EPA 200.8	01/14/2013 1731 MS
Uranium	ND	µCi/mL		1.0E-16	Calculation	02/08/2013 1100 WN

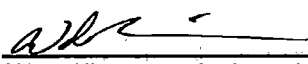
These results apply only to the samples tested.

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, Assistant Laboratory Manager

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Sample Analysis Report

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

Date Reported 2/8/2013
Report ID: S1301108001

ProjectName: Marshland Expansion Area
Lab ID: S1301108-003
ClientSample ID: MA-3
COC:

WorkOrder: S1301108
CollectionDate: 1/2/2013
DateReceived: 1/9/2013 10:30:00 AM
FieldSampler: RG
Matrix: Filter

Comments Sampled 10/1/2012-1/2/2013 (2012 4th Qtr)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
Field						
Actual Volume	6575697	Liters			Field	01/02/2013 000
Radionuclides - Filter						
Lead 210	128	pCi/Filter		2	OTW01	01/29/2013 1055 SH
Lead 210 Precision (±)	5.8	pCi/Filter			OTW01	01/29/2013 1055 SH
Lead 210	2.0E-14	µCi/mL		2.0E-15	Calculation	02/08/2013 1100 WN
Lead 210 Precision (±)	8.8E-16	µCi/mL			Calculation	02/08/2013 1100 WN
Radium 226	ND	pCi/Filter		0.3	SM 7500RAB	01/22/2013 1611 SH
Radium 226 Precision (±)	NA	pCi/Filter			SM 7500RAB	01/22/2013 1611 SH
Radium 226	ND	µCi/mL		1.0E-16	Calculation	02/08/2013 1100 WN
Radium 226 Precision (±)	NA	µCi/mL			Calculation	02/08/2013 1100 WN
Thorium 230	ND	pCi/Filter		0.2	ACW10	01/31/2013 905 MB
Thorium 230 Precision (±)	NA	pCi/Filter			ACW10	01/31/2013 905 MB
Thorium 230	ND	µCi/mL		1.0E-16	Calculation	02/08/2013 1100 WN
Thorium 230 Precision (±)	NA	µCi/mL			Calculation	02/08/2013 1100 WN
Uranium	ND	pCi/Filter		0.3	EPA 200.8	01/14/2013 1736 MS
Uranium	ND	µCi/mL		1.0E-16	Calculation	02/08/2013 1100 WN

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, Assistant Laboratory Manager



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Sample Analysis Report

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

Date Reported 2/8/2013
Report ID: S1301108001

ProjectName: Marshland Expansion Area
Lab ID: S1301108-004
ClientSample ID: MA-4
COC:

WorkOrder: S1301108
CollectionDate: 1/2/2013
DateReceived: 1/9/2013 10:30:00 AM
FieldSampler: RG
Matrix: Filter

Comments Sampled 10/1/2012-1/2/2013 (2012 4th Qtr)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
Field						
Actual Volume	6582882	Liters			Field	01/02/2013 000
Radionuclides - Filter						
Lead 210	132	pCi/Filter		2	OTW01	01/29/2013 1055 SH
Lead 210 Precision (±)	5.8	pCi/Filter			OTW01	01/29/2013 1055 SH
Lead 210	2.0E-14	µCi/mL		2.0E-15	Calculation	02/08/2013 1100 WN
Lead 210 Precision (±)	8.8E-16	µCi/mL			Calculation	02/08/2013 1100 WN
Radium 226	0.4	pCi/Filter		0.3	SM 7500RAB	01/23/2013 903 SH
Radium 226 Precision (±)	0.1	pCi/Filter			SM 7500RAB	01/23/2013 903 SH
Radium 226	ND	µCi/mL		1.0E-16	Calculation	02/08/2013 1100 WN
Radium 226 Precision (±)	NA	µCi/mL			Calculation	02/08/2013 1100 WN
Thorium 230	ND	pCi/Filter		0.2	ACW10	01/31/2013 905 MB
Thorium 230 Precision (±)	NA	pCi/Filter			ACW10	01/31/2013 905 MB
Thorium 230	ND	µCi/mL		1.0E-16	Calculation	02/08/2013 1100 WN
Thorium 230 Precision (±)	NA	µCi/mL			Calculation	02/08/2013 1100 WN
Uranium	ND	pCi/Filter		0.3	EPA 200.8	01/14/2013 1741 MS
Uranium	ND	µCi/mL		1.0E-16	Calculation	02/08/2013 1100 WN

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

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Sample Analysis Report

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

Date Reported 2/8/2013
Report ID: S1301108001

ProjectName: Marshland Expansion Area
Lab ID: S1301108-005
ClientSample ID: MA-5
COC:

WorkOrder: S1301108
CollectionDate: 1/2/2013
DateReceived: 1/9/2013 10:30:00 AM
FieldSampler: RG
Matrix: Filter

Comments Sampled 10/1/2012-1/2/2013 (2012 4th Qtr)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Field							
Actual Volume	6584474	Liters			Field	01/02/2013 000	
Radionuclides - Filter							
Lead 210	134	pCi/Filter		2	OTW01	01/29/2013 1055	SH
Lead 210 Precision (±)	6.1	pCi/Filter			OTW01	01/29/2013 1055	SH
Lead 210	2.0E-14	µCi/mL		2.0E-15	Calculation	02/08/2013 1100	WN
Lead 210 Precision (±)	9.3E-16	µCi/mL			Calculation	02/08/2013 1100	WN
Radium 226	ND	pCi/Filter		0.3	SM 7500RAB	01/23/2013 903	SH
Radium 226 Precision (±)	NA	pCi/Filter			SM 7500RAB	01/23/2013 903	SH
Radium 226	ND	µCi/mL		1.0E-16	Calculation	02/08/2013 1100	WN
Radium 226 Precision (±)	NA	µCi/mL			Calculation	02/08/2013 1100	WN
Thorium 230	ND	pCi/Filter		0.2	ACW10	01/31/2013 905	MB
Thorium 230 Precision (±)	NA	pCi/Filter			ACW10	01/31/2013 905	MB
Thorium 230	ND	µCi/mL		1.0E-16	Calculation	02/08/2013 1100	WN
Thorium 230 Precision (±)	NA	µCi/mL			Calculation	02/08/2013 1100	WN
Uranium	ND	pCi/Filter		0.3	EPA 200.8	01/14/2013 1746	MS
Uranium	ND	µCi/mL		1.0E-16	Calculation	02/08/2013 1100	WN

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



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ANALYTICAL QC SUMMARY REPORT

CLIENT: Cameco Resources, Crow Butte Operation
Work Order: S1301108
Project: Marshland Expansion Area

Date: 2/8/2013
Report ID: S1301108001

Uranium, Air Filter AnalysisSample Type **MBLK** Units: pCi/Filter

Sample ID	RunNo: 91354	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
MBLK	01/14/13 13:34	Uranium	ND	0.3					

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

Sample ID	RunNo: 91354	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
LCS	01/14/13 13:30	Uranium	70.4	0.3	67.7		104	85 - 115	

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

Sample ID	RunNo: 91354	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
S1301107-004AS	01/14/13 17:06	Uranium	795	0.3	745	0.6	107	70 - 130	

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

Sample ID	RunNo: 91354	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
S1301107-004AMSD	01/14/13 17:21	Uranium	770	0.3	795	3.10	103	20	

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

Sample ID	RunNo: 91354	Analyte	Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual
S1301107-004AD	01/14/13 17:01	Uranium	0.7	0.3	0.6	8.25		20	

Lead 210 in FiltersSample Type **MBLK** Units: pCi/Filter

Sample ID	RunNo: 91970	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
MB13-017	01/28/13 13:34	Lead 210	ND	2					

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

Sample ID	RunNo: 91970	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
LCS13-017	01/28/13 13:34	Lead 210	13	2	12.4		103	70 - 130	

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

Sample ID	RunNo: 91970	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
TAP WATER MS	01/29/13 10:55	Lead 210	13	2	12.2	ND	108	70 - 130	

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



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ANALYTICAL QC SUMMARY REPORT

CLIENT: Cameco Resources, Crow Butte Operation
Work Order: S1301108
Project: Marshland Expansion Area

Date: 2/8/2013
Report ID: S1301108001

Radium 226 Air Filter AnalysisSample Type **MBLK** Units: pCi/Filter

Sample ID	RunNo: 91591	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
MB13-016	01/22/13 16:11	Radium 226	ND	0.3					

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

Sample ID	RunNo: 91591	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
LCS13-016	01/22/13 16:11	Radium 226	5.0	0.3	5.08		99.2	70 - 130	

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

Sample ID	RunNo: 91591	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
TAP WATER MS	01/23/13 9:03	Radium 226	5.5	0.3	5.08	ND	108	70 - 130	

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

Sample ID	RunNo: 91591	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
TAP WATER MSD	01/23/13 9:03	Radium 226	5.9	0.3	5.5	7.38	116	30	

Thorium Air Filter AnalysisSample Type **MBLK** Units: pCi/Filter

Sample ID	RunNo: 91911	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
MB13-021	01/31/13 9:05	Thorium-230	ND	0.2					

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

Sample ID	RunNo: 91911	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
LCS13-021	01/31/13 9:05	Thorium-230	12.9	0.2	12.5		103	70 - 130	

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

Sample ID	RunNo: 91911	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
LCSD13-021	01/31/13 9:05	Thorium-230	11.7	0.2	12.9	8.64	94.0	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

**Air Filter Summary Report****Client: Cameco Resources, Crow Butte Operation****Client Sample ID: MA-1****Lab ID: S1301108-001****Sampled 10/1/2012-1/2/2013 (2012 4th Qtr)****Sample Air Volume: 6682410 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	129	5.8	2E-14	9E-16	2E-15	6 E-13	Day	3.33
Radium 226	0.3	0.1	<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	0.4		<1E-16		1E-16	9 E-14	Year	0.00

Lab ID: S1210132-001**Sampled 6/29/2012-10/1/2012 (2012 3rd Qtr)****Sample Air Volume: 6108764 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	116	7.0	2E-14	1E-15	2E-15	6 E-13	Day	3.33
Radium 226	0.4	0.1	<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	0.3		<1E-16		1E-16	9 E-14	Year	0.00

Lab ID: S1207116-001**Sampled 4/2/2012-6/29/2012 (2012 2nd Qtr)****Sample Air Volume: 6196200 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	68.9	6.1	1E-14	1E-15	2E-15	6 E-13	Day	1.67
Radium 226	<0.3		<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	<0.3		<1E-16		1E-16	9 E-14	Year	0.00

Lab ID: S1204105-001**Sampled 1/4/12 to 4/2/12 (2012 1st Qtr)****Sample Air Volume: 6334637 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	115	7.5	2E-14	1E-15	2E-15	6 E-13	Day	3.33
Radium 226	<0.3		<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	1.4		2E-16		1E-16	9 E-14	Year	0.22

**Air Filter Summary Report****Client: Cameco Resources, Crow Butte Operation****Client Sample ID: MA-2****Lab ID: S1301108-002****Sampled 10/1/2012-1/2/2013 (2012 4th Qtr)****Sample Air Volume: 6581476 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	128	6.1	2E-14	9E-16	2E-15	6 E-13	Day	3.33
Radium 226	<0.3		<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	0.2	.2	<1E-16		1E-16	3 E-14	Year	0.00
Uranium	<0.3		<1E-16		1E-16	9 E-14	Year	0.00

Lab ID: S1210132-002**Sampled 6/29/2012-10/1/2012 (2012 3rd Qtr)****Sample Air Volume: 6002630 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	122	7.4	2E-14	1E-15	2E-15	6 E-13	Day	3.33
Radium 226	3.0	0.4	5E-16	7E-17	1E-16	9 E-13	Week	0.06
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	<0.3		<1E-16		1E-16	9 E-14	Year	0.00

Lab ID: S1207116-002**Sampled 4/2/2012-6/29/2012 (2012 2nd Qtr)****Sample Air Volume: 6203400 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	82.7	5.4	1E-14	9E-16	2E-15	6 E-13	Day	1.67
Radium 226	<0.3		<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	<0.3		<1E-16		1E-16	9 E-14	Year	0.00

Lab ID: S1204105-002**Sampled 1/4/12 to 4/2/12 (2012 1st Qtr)****Sample Air Volume: 6337547 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	108	7.7	2E-14	1E-15	2E-15	6 E-13	Day	3.33
Radium 226	<0.3		<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	1.8		3E-16		1E-16	9 E-14	Year	0.33

**Air Filter Summary Report**

Client: Cameco Resources, Crow Butte Operation

Client Sample ID: MA-3

Lab ID: S1301108-003			Sampled 10/1/2012-1/2/2013 (2012 4th Qtr)					
			Sample Air Volume: 6575697 Liters					
Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	128	5.8	2E-14	9E-16	2E-15	6 E-13	Day	3.33
Radium 226	<0.3		<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	<0.3		<1E-16		1E-16	9 E-14	Year	0.00

Lab ID: S1210132-003			Sampled 6/29/2012-10/1/2012 (2012 3rd Qtr)					
			Sample Air Volume: 6532003 Liters					
Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	129	7.6	2E-14	1E-15	2E-15	6 E-13	Day	3.33
Radium 226	0.9	0.2	1E-16	3E-17	1E-16	9 E-13	Week	0.01
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	0.4		<1E-16		1E-16	9 E-14	Year	0.00

Lab ID: S1207116-003			Sampled 4/2/2012-6/29/2012 (2012 2nd Qtr)					
			Sample Air Volume: 6067000 Liters					
Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	75.7	5.1	1E-14	8E-16	2E-15	6 E-13	Day	1.67
Radium 226	0.5	0.1	<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	0.3		<1E-16		1E-16	9 E-14	Year	0.00

Lab ID: S1204105-003			Sampled 1/4/12 to 4/2/12 (2012 1st Qtr)					
			Sample Air Volume: 6322001 Liters					
Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	109	7.0	2E-14	1E-15	2E-15	6 E-13	Day	3.33
Radium 226	0.6	0.2	1E-16	3E-17	1E-16	9 E-13	Week	0.01
Thorium 230	1.0	0.4	2E-16	6E-17	1E-16	3 E-14	Year	0.67
Uranium	1.9		3E-16		1E-16	9 E-14	Year	0.33

**Air Filter Summary Report****Client: Cameco Resources, Crow Butte Operation****Client Sample ID: MA-4****Lab ID: S1301108-004****Sampled 10/1/2012-1/2/2013 (2012 4th Qtr)****Sample Air Volume: 6582882 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	132	5.8	2E-14	9E-16	2E-15	6 E-13	Day	3.33
Radium 226	0.4	0.1	<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	<0.3		<1E-16		1E-16	9 E-14	Year	0.00

Lab ID: S1210132-004**Sampled 6/29/2012-10/1/2012 (2012 3rd Qtr)****Sample Air Volume: 5889397 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	103	6.3	2E-14	1E-15	2E-15	6 E-13	Day	3.33
Radium 226	0.6	0.2	1E-16	3E-17	1E-16	9 E-13	Week	0.01
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	0.5		<1E-16		1E-16	9 E-14	Year	0.00

Lab ID: S1207116-004**Sampled 4/2/2012-6/29/2012 (2012 2nd Qtr)****Sample Air Volume: 6049000 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	78.2	5.2	1E-14	9E-16	2E-15	6 E-13	Day	1.67
Radium 226	0.3	0.1	<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	0.4		<1E-16		1E-16	9 E-14	Year	0.00

Lab ID: S1204105-004**Sampled 1/4/12 to 4/2/12 (2012 1st Qtr)****Sample Air Volume: 6333500 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	120	7.9	2E-14	1E-15	2E-15	6 E-13	Day	3.33
Radium 226	0.4	0.1	<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	0.3	0.2	<1E-16		1E-16	3 E-14	Year	0.00
Uranium	1.6		3E-16		1E-16	9 E-14	Year	0.33

**Air Filter Summary Report****Client: Cameco Resources, Crow Butte Operation****Client Sample ID: MA-5****Lab ID: S1301108-005****Sampled 10/1/2012-1/2/2013 (2012 4th Qtr)****Sample Air Volume: 6584474 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	134	6.1	2E-14	9E-16	2E-15	6 E-13	Day	3.33
Radium 226	<0.3		<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	<0.3		<1E-16		1E-16	9 E-14	Year	0.00

Lab ID: S1210132-005**Sampled 6/29/2012-10/1/2012 (2012 3rd Qtr)****Sample Air Volume: 5337479 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	103	6.6	2E-14	1E-15	2E-15	6 E-13	Day	3.33
Radium 226	<0.3		<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	<0.3		<1E-16		1E-16	9 E-14	Year	0.00

Lab ID: S1207116-005**Sampled 4/2/2012-6/29/2012 (2012 2nd Qtr)****Sample Air Volume: 5575200 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	62.2	4.8	1E-14	9E-16	2E-15	6 E-13	Day	1.67
Radium 226	<0.3		<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	<0.3		<1E-16		1E-16	9 E-14	Year	0.00

Lab ID: S1204105-005**Sampled 1/4/12 to 4/2/12 (2012 1st Qtr)****Sample Air Volume: 6338171 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	116	7.2	2E-14	1E-15	2E-15	6 E-13	Day	3.33
Radium 226	<0.3		<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	0.2	0.2	<1E-16		1E-16	3 E-14	Year	0.00
Uranium	1.4		2E-16		1E-16	9 E-14	Year	0.22



Inter-Mountain Labs

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Your Environmental Monitoring Partner

Date: 5/1/2015

CLIENT: Cameco Resources, Crow Butte Operation
Project: Marshland Expansion Area
Lab Order: S1210132

CASE NARRATIVE

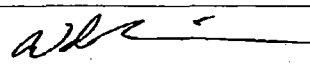
Report ID: S1210132002
(Replaces S1210132001)

Samples MA-1, MA-2, MA-3, MA-4, and MA-5 were received on October 8, 2012.

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

NRC radiological air particulate filters, animal, vegetation, soil and sediment samples may be composited by date and location per client's monitoring program requirements. Highly carbonaceous samples may require ashing. Samples are subjected to a modified USEPA SW-846 Method 3050B mineral acid digestion as appropriate. Analysis of the resulting solutions and digestates is performed using approved TNI, USEPA, and industry recognized analytical techniques. Where client-provided air volumes corresponding to the air filter composites exist, aqueous digestate results are converted to radiological particulate concentrations in air (e.g. $\mu\text{Ci/mL}$). Quality control parameters acceptance criteria are defined by USEPA programs, and in USNRC Regulatory Guide 4.14 (Radiological Effluent and Environmental Monitoring at Uranium Mills), USNRC Regulatory Guide 4.15 (Quality Assurance for Radiological Monitoring Programs – Effluent Streams and the Environment), the TNI Standard EL-V1-2009, and Inter-Mountain Labs internal quality procedures.

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

Reviewed by: 

Wade Nieuwsma, Assistant Laboratory Manager



Inter-Mountain Labs

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Sample Analysis Report

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

Date Reported 10/29/2012
Report ID: S1210132001

ProjectName: Marshland Expansion Area
Lab ID: S1210132-001
ClientSample ID: MA-1
COC:

WorkOrder: S1210132
CollectionDate:
DateReceived: 10/8/2012 9:30:00 AM
FieldSampler:
Matrix: Filter

Comments Sampled 6/29/2012-10/1/2012 (2012 3rd Qtr)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
Field						
Actual Volume	6108764	Liters			Field	
Radionuclides - Filter						
Lead 210	116	pCi/Filter		2	OTW01	10/25/2012 1407 SH
Lead 210 Precision (±)	7.0	pCi/Filter			OTW01	10/25/2012 1407 SH
Lead 210	1.9E-14	µCi/mL		2.0E-15	Calculation	10/29/2012 1517 WN
Lead 210 Precision (±)	1.1E-15	µCi/mL			Calculation	10/29/2012 1517 WN
Radium 226	0.4	pCi/Filter		0.3	SM 7500RAB	10/22/2012 1040 SH
Radium 226 Precision (±)	0.1	pCi/Filter			SM 7500RAB	10/22/2012 1040 SH
Radium 226	ND	µCi/mL		1.0E-16	Calculation	10/29/2012 1517 WN
Radium 226 Precision (±)	NA	µCi/mL			Calculation	10/29/2012 1517 WN
Thorium 230	ND	pCi/Filter		0.2	ACW10	10/23/2012 900 MB
Thorium 230 Precision (±)	NA	pCi/Filter			ACW10	10/23/2012 900 MB
Thorium 230	ND	µCi/mL		1.0E-16	Calculation	10/29/2012 1517 WN
Thorium 230 Precision (±)	NA	µCi/mL			Calculation	10/29/2012 1517 WN
Thorium-229 Tracer (30-120)	86.9	%		0.2	ACW10	10/23/2012 900 MB
Uranium	0.3	pCi/Filter		0.3	EPA 200.8	10/09/2012 1554 MS
Uranium	ND	µCi/mL		1.0E-16	Calculation	10/29/2012 1517 WN

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, Assistant Laboratory Manager

Page 1 of 5



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Your Environmental Monitoring Partner

Sample Analysis Report

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

Date Reported 10/29/2012
Report ID: S1210132001

ProjectName: Marshland Expansion Area
Lab ID: S1210132-002
ClientSample ID: MA-2
COC:

WorkOrder: S1210132
CollectionDate:
DateReceived: 10/8/2012 9:30:00 AM
FieldSampler:
Matrix: Filter

Comments Sampled 6/29/2012-10/1/2012 (2012 3rd Qtr)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
Field						
Actual Volume	6002630	Liters			Field	
Radionuclides - Filter						
Lead 210	122	pCi/Filter		2	OTW01	10/25/2012 1407 SH
Lead 210 Precision (±)	7.4	pCi/Filter			OTW01	10/25/2012 1407 SH
Lead 210	2.0E-14	µCi/mL		2.0E-15	Calculation	10/29/2012 1517 WN
Lead 210 Precision (±)	1.2E-15	µCi/mL			Calculation	10/29/2012 1517 WN
Radium 226	3.0	pCi/Filter		0.3	SM 7500RAB	10/22/2012 1040 SH
Radium 226 Precision (±)	0.4	pCi/Filter			SM 7500RAB	10/22/2012 1040 SH
Radium 226	5.0E-16	µCi/mL		1.0E-16	Calculation	10/29/2012 1517 WN
Radium 226 Precision (±)	6.7E-17	µCi/mL			Calculation	10/29/2012 1517 WN
Thorium 230	ND	pCi/Filter		0.2	ACW10	10/23/2012 900 MB
Thorium 230 Precision (±)	NA	pCi/Filter			ACW10	10/23/2012 900 MB
Thorium 230	ND	µCi/mL		1.0E-16	Calculation	10/29/2012 1517 WN
Thorium 230 Precision (±)	NA	µCi/mL			Calculation	10/29/2012 1517 WN
Thorium-229 Tracer (30-120)	96.8	%		0.2	ACW10	10/23/2012 900 MB
Uranium	ND	pCi/Filter		0.3	EPA 200.8	10/09/2012 1623 MS
Uranium	ND	µCi/mL		1.0E-16	Calculation	10/29/2012 1517 WN

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



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Your Environmental Monitoring Partner

Sample Analysis Report

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

Date Reported 10/29/2012
Report ID: S1210132001

ProjectName: Marshland Expansion Area
Lab ID: S1210132-003
ClientSample ID: MA-3
COC:

WorkOrder: S1210132
CollectionDate:
DateReceived: 10/8/2012 9:30:00 AM
FieldSampler:
Matrix: Filter

Comments Sampled 6/29/2012-10/1/2012 (2012 3rd Qtr)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
Field						
Actual Volume	6532003	Liters			Field	
Radionuclides - Filter						
Lead 210	129	pCi/Filter		2	OTW01	10/25/2012 1407 SH
Lead 210 Precision (±)	7.6	pCi/Filter			OTW01	10/25/2012 1407 SH
Lead 210	2.0E-14	µCi/mL		2.0E-15	Calculation	10/29/2012 1517 WN
Lead 210 Precision (±)	1.2E-15	µCi/mL			Calculation	10/29/2012 1517 WN
Radium 226	0.9	pCi/Filter		0.3	SM 7500RAB	10/22/2012 1040 SH
Radium 226 Precision (±)	0.2	pCi/Filter			SM 7500RAB	10/22/2012 1040 SH
Radium 226	1.3E-16	µCi/mL		1.0E-16	Calculation	10/29/2012 1517 WN
Radium 226 Precision (±)	3.1E-17	µCi/mL			Calculation	10/29/2012 1517 WN
Thorium 230	ND	pCi/Filter		0.2	ACW10	10/23/2012 900 MB
Thorium 230 Precision (±)	NA	pCi/Filter			ACW10	10/23/2012 900 MB
Thorium 230	ND	µCi/mL		1.0E-16	Calculation	10/29/2012 1517 WN
Thorium 230 Precision (±)	NA	µCi/mL			Calculation	10/29/2012 1517 WN
Thorium-229 Tracer (30-120)	95.0	%		0.2	ACW10	10/23/2012 900 MB
Uranium	0.4	pCi/Filter		0.3	EPA 200.8	10/09/2012 1628 MS
Uranium	ND	µCi/mL		1.0E-16	Calculation	10/29/2012 1517 WN

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, Assistant Laboratory Manager

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Sample Analysis Report

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

Date Reported 10/29/2012
Report ID: S1210132001

ProjectName: Marshland Expansion Area
Lab ID: S1210132-004
ClientSample ID: MA-4
COC:

WorkOrder: S1210132
CollectionDate:
DateReceived: 10/8/2012 9:30:00 AM
FieldSampler:
Matrix: Filter

Comments Sampled 6/29/2012-10/1/2012 (2012 3rd Qtr)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
Field						
Actual Volume	5889397	Liters			Field	
Radionuclides - Filter						
Lead 210	103	pCi/Filter		2	OTW01	10/25/2012 1407 SH
Lead 210 Precision (±)	6.3	pCi/Filter			OTW01	10/25/2012 1407 SH
Lead 210	1.8E-14	µCi/mL		2.0E-15	Calculation	10/29/2012 1517 WN
Lead 210 Precision (±)	1.1E-15	µCi/mL			Calculation	10/29/2012 1517 WN
Radium 226	0.6	pCi/Filter		0.3	SM 7500RAB	10/22/2012 1040 SH
Radium 226 Precision (±)	0.2	pCi/Filter			SM 7500RAB	10/22/2012 1040 SH
Radium 226	1.0E-16	µCi/mL		1.0E-16	Calculation	10/29/2012 1517 WN
Radium 226 Precision (±)	3.4E-17	µCi/mL			Calculation	10/29/2012 1517 WN
Thorium 230	ND	pCi/Filter		0.2	ACW10	10/23/2012 900 MB
Thorium 230 Precision (±)	NA	pCi/Filter			ACW10	10/23/2012 900 MB
Thorium 230	ND	µCi/mL		1.0E-16	Calculation	10/29/2012 1517 WN
Thorium 230 Precision (±)	NA	µCi/mL			Calculation	10/29/2012 1517 WN
Thorium-229 Tracer (30-120)	89.7	%		0.2	ACW10	10/23/2012 900 MB
Uranium	0.5	pCi/Filter		0.3	EPA 200.8	10/09/2012 1633 MS
Uranium	ND	µCi/mL		1.0E-16	Calculation	10/29/2012 1517 WN

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



Inter-Mountain Labs

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Your Environmental Monitoring Partner

Sample Analysis Report

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

Date Reported 10/29/2012
Report ID: S1210132001

ProjectName: Marshland Expansion Area
Lab ID: S1210132-005
ClientSample ID: MA-5
COC:

WorkOrder: S1210132
CollectionDate:
DateReceived: 10/8/2012 9:30:00 AM
FieldSampler:
Matrix: Filter

Comments Sampled 6/29/2012-10/1/2012 (2012 3rd Qtr)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
Field						
Actual Volume	5337479	Liters			Field	
Radionuclides - Filter						
Lead 210	103	pCi/Filter		2	OTW01	10/25/2012 1407 SH
Lead 210 Precision (±)	6.6	pCi/Filter			OTW01	10/25/2012 1407 SH
Lead 210	1.9E-14	µCi/mL		2.0E-15	Calculation	10/29/2012 1517 WN
Lead 210 Precision (±)	1.2E-15	µCi/mL			Calculation	10/29/2012 1517 WN
Radium 226	ND	pCi/Filter		0.3	SM 7500RAB	10/22/2012 1040 SH
Radium 226 Precision (±)	NA	pCi/Filter			SM 7500RAB	10/22/2012 1040 SH
Radium 226	ND	µCi/mL		1.0E-16	Calculation	10/29/2012 1517 WN
Radium 226 Precision (±)	NA	µCi/mL			Calculation	10/29/2012 1517 WN
Thorium 230	ND	pCi/Filter		0.2	ACW10	10/23/2012 900 MB
Thorium 230 Precision (±)	NA	pCi/Filter			ACW10	10/23/2012 900 MB
Thorium 230	ND	µCi/mL		1.0E-16	Calculation	10/29/2012 1517 WN
Thorium 230 Precision (±)	NA	µCi/mL			Calculation	10/29/2012 1517 WN
Thorium-229 Tracer (30-120)	96.5	%		0.2	ACW10	10/23/2012 900 MB
Uranium	ND	pCi/Filter		0.3	EPA 200.8	10/09/2012 1638 MS
Uranium	ND	µCi/mL		1.0E-16	Calculation	10/29/2012 1517 WN

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

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Inter-Mountain Labs

Your Environmental Monitoring Partner

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

ANALYTICAL QC SUMMARY REPORT

CLIENT: Cameco Resources, Crow Butte Operation
Work Order: S1210132
Project: Marshland Expansion Area

Date: 10/29/2012
Report ID: S1210132001

Uranium, Air Filter AnalysisSample Type **MBLK**

Units: pCi/Filter

Sample ID	RunNo: 88118	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
MBLK	10/09/12 12:27	Uranium	ND	0.3					

Sample Type **LCS**

Units: pCi/Filter

Sample ID	RunNo: 88118	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
LCS	10/09/12 12:23	Uranium	69.7	0.3	67.7		103	85 - 115	

Sample Type **MS**

Units: pCi/Filter

Sample ID	RunNo: 88118	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
S1210132-001BS	10/09/12 16:14	Uranium	760	0.3	745	0.3	102	70 - 130	

Sample Type **MSD**

Units: pCi/Filter

Sample ID	RunNo: 88118	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
S1210132-001BMSD	10/09/12 16:18	Uranium	805	0.3	760	5.89	108	20	

Sample Type **DUP**

Units: pCi/Filter

Sample ID	RunNo: 88118	Analyte	Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual
S1210132-001BD	10/09/12 15:59	Uranium	0.3	0.3	0.3	3.67		20	

Lead 210 in FiltersSample Type **MBLK**

Units: pCi/Filter

Sample ID	RunNo: 88835	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
MB12-284	10/25/12 14:07	Lead 210	ND	2					

Sample Type **LCS**

Units: pCi/Filter

Sample ID	RunNo: 88835	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
LCS12-284	10/25/12 14:07	Lead 210	14	2	12.5		108	70 - 130	

Sample Type **MS**

Units: pCi/Filter

Sample ID	RunNo: 88835	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
TAP WATER MS	10/25/12 14:07	Lead 210	13	2	12.5	ND	98.4	70 - 130	

Sample Type **MSD**

Units: pCi/Filter

Sample ID	RunNo: 88835	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
TAP WATER MSD	10/25/12 14:07	Lead 210	13	2	13	3.36	102	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



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ANALYTICAL QC SUMMARY REPORT**CLIENT:** Cameco Resources, Crow Butte Operation**Date:** 10/29/2012**Work Order:** S1210132**Report ID:** S1210132001**Project:** Marshland Expansion Area**Radium 226 Air Filter Analysis**Sample Type **MBLK**

Units: pCi/Filter

Sample ID	RunNo: 88678	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
MB12-291	10/22/12 10:40	Radium 226	ND	0.3					

Sample Type **LCS**

Units: pCi/Filter

Sample ID	RunNo: 88678	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
LCS12-291	10/22/12 10:40	Radium 226	5.2	0.3	5.06		103	70 - 130	

Sample Type **MS**

Units: pCi/Filter

Sample ID	RunNo: 88678	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
TAP WATER MS	10/22/12 13:56	Radium 226	5.0	0.3	5.06	ND	99.4	70 - 130	

Sample Type **MSD**

Units: pCi/Filter

Sample ID	RunNo: 88678	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
TAP WATER MSD	10/22/12 13:56	Radium 226	5.2	0.3	5.0	3.25	103	30	

Thorium Air Filter AnalysisSample Type **MBLK**

Units: pCi/Filter

Sample ID	RunNo: 88786	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
MB12- 284	10/23/12 9:00	Thorium-230	ND	0.2					

Sample Type **LCS**

Units: pCi/Filter

Sample ID	RunNo: 88786	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
LCS12- 284	10/23/12 9:00	Thorium-230	13.2	0.2	12.5		105	70 - 130	

Sample Type **LCSD**

Units: pCi/Filter

Sample ID	RunNo: 88786	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
LCSD12- 284	10/23/12 9:00	Thorium-230	12.5	0.2	13.2	5.11	100	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

**Air Filter Summary Report****Client: Cameco Resources, Crow Butte Operation****Client Sample ID: MA-1****Lab ID: S1210132-001****Sampled 6/29/2012-10/1/2012 (2012 3rd Qtr)****Sample Air Volume: 6108764 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	116	7.0	2E-14	1E-15	2E-15	6 E-13	Day	3.33
Radium 226	0.4	0.1	<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	0.3		<1E-16		1E-16	9 E-14	Year	0.00

Lab ID: S1207116-001**Sampled 4/2/2012-6/29/2012 (2012 2nd Qtr)****Sample Air Volume: 6196200 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	68.9	6.1	1E-14	1E-15	2E-15	6 E-13	Day	1.67
Radium 226	<0.3		<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	<0.3		<1E-16		1E-16	9 E-14	Year	0.00

Lab ID: S1204105-001**Sampled 1/4/12 to 4/2/12 (2012 1st Qtr)****Sample Air Volume: 6334637 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	115	7.5	2E-14	1E-15	2E-15	6 E-13	Day	3.33
Radium 226	<0.3		<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	1.4		2E-16		1E-16	9 E-14	Year	0.22

**Air Filter Summary Report****Client: Cameco Resources, Crow Butte Operation****Client Sample ID: MA-2**

Lab ID: S1210132-002 Sampled 6/29/2012-10/1/2012 (2012 3rd Qtr)					Sample Air Volume: 6002630 Liters			
Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	122	7.4	2E-14	1E-15	2E-15	6 E-13	Day	3.33
Radium 226	3.0	0.4	5E-16	7E-17	1E-16	9 E-13	Week	0.06
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	<0.3		<1E-16		1E-16	9 E-14	Year	0.00

Lab ID: S1207116-002 Sampled 4/2/2012-6/29/2012 (2012 2nd Qtr)					Sample Air Volume: 6203400 Liters			
Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	82.7	5.4	1E-14	9E-16	2E-15	6 E-13	Day	1.67
Radium 226	<0.3		<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	<0.3		<1E-16		1E-16	9 E-14	Year	0.00

Lab ID: S1204105-002 Sampled 1/4/12 to 4/2/12 (2012 1st Qtr)					Sample Air Volume: 6337547 Liters			
Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	108	7.7	2E-14	1E-15	2E-15	6 E-13	Day	3.33
Radium 226	<0.3		<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	1.8		3E-16		1E-16	9 E-14	Year	0.33

**Air Filter Summary Report****Client: Cameco Resources, Crow Butte Operation****Client Sample ID: MA-3****Lab ID: S1210132-003****Sampled 6/29/2012-10/1/2012 (2012 3rd Qtr)****Sample Air Volume: 6532003 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	129	7.6	2E-14	1E-15	2E-15	6 E-13	Day	3.33
Radium 226	0.9	0.2	1E-16	3E-17	1E-16	9 E-13	Week	0.01
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	0.4		<1E-16		1E-16	9 E-14	Year	0.00

Lab ID: S1207116-003**Sampled 4/2/2012-6/29/2012 (2012 2nd Qtr)****Sample Air Volume: 6067000 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	75.7	5.1	1E-14	8E-16	2E-15	6 E-13	Day	1.67
Radium 226	0.5	0.1	<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	0.3		<1E-16		1E-16	9 E-14	Year	0.00

Lab ID: S1204105-003**Sampled 1/4/12 to 4/2/12 (2012 1st Qtr)****Sample Air Volume: 6322001 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	109	7.0	2E-14	1E-15	2E-15	6 E-13	Day	3.33
Radium 226	0.6	0.2	1E-16	3E-17	1E-16	9 E-13	Week	0.01
Thorium 230	1.0	0.4	2E-16	6E-17	1E-16	3 E-14	Year	0.67
Uranium	1.9		3E-16		1E-16	9 E-14	Year	0.33

**Air Filter Summary Report**

Client: Cameco Resources, Crow Butte Operation

Client Sample ID: MA-4

Lab ID: S1210132-004

Sampled 6/29/2012-10/1/2012 (2012 3rd Qtr)

Sample Air Volume: 5889397 Liters

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	103	6.3	2E-14	1E-15	2E-15	6 E-13	Day	3.33
Radium 226	0.6	0.2	1E-16	3E-17	1E-16	9 E-13	Week	0.01
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	0.5		<1E-16		1E-16	9 E-14	Year	0.00

Lab ID: S1207116-004

Sampled 4/2/2012-6/29/2012 (2012 2nd Qtr)

Sample Air Volume: 6049000 Liters

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	78.2	5.2	1E-14	9E-16	2E-15	6 E-13	Day	1.67
Radium 226	0.3	0.1	<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	0.4		<1E-16		1E-16	9 E-14	Year	0.00

Lab ID: S1204105-004

Sampled 1/4/12 to 4/2/12 (2012 1st Qtr)

Sample Air Volume: 6333500 Liters

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	120	7.9	2E-14	1E-15	2E-15	6 E-13	Day	3.33
Radium 226	0.4	0.1	<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	0.3	0.2	<1E-16		1E-16	3 E-14	Year	0.00
Uranium	1.6		3E-16		1E-16	9 E-14	Year	0.33

**Air Filter Summary Report****Client: Cameco Resources, Crow Butte Operation****Client Sample ID: MA-5**

Lab ID: S1210132-005								
Sampled 6/29/2012-10/1/2012 (2012 3rd Qtr)								
Sample Air Volume: 5337479 Liters								
Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	103	6.6	2E-14	1E-15	2E-15	6 E-13	Day	3.33
Radium 226	<0.3		<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	<0.3		<1E-16		1E-16	9 E-14	Year	0.00

Lab ID: S1207116-005								
Sampled 4/2/2012-6/29/2012 (2012 2nd Qtr)								
Sample Air Volume: 5575200 Liters								
Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	62.2	4.8	1E-14	9E-16	2E-15	6 E-13	Day	1.67
Radium 226	<0.3		<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	<0.3		<1E-16		1E-16	9 E-14	Year	0.00

Lab ID: S1204105-005								
Sampled 1/4/12 to 4/2/12 (2012 1st Qtr)								
Sample Air Volume: 6338171 Liters								
Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	116	7.2	2E-14	1E-15	2E-15	6 E-13	Day	3.33
Radium 226	<0.3		<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	0.2	0.2	<1E-16		1E-16	3 E-14	Year	0.00
Uranium	1.4		2E-16		1E-16	9 E-14	Year	0.22



Date: 5/1/2015

CLIENT: Cameco Resources, Crow Butte Operation
Project: 2nd Quarter Composite Marshland Expansion Area
Lab Order: S1207116

CASE NARRATIVE

Report ID: S1207116002
(Replaces S1207116001)

Samples MA-1, MA-2, MA-3, MA-4, and MA-5 were received on July 9, 2012.

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

NRC radiological air particulate filters, animal, vegetation, soil and sediment samples may be composited by date and location per client's monitoring program requirements. Highly carbonaceous samples may require ashing. Samples are subjected to a modified USEPA SW-846 Method 3050B mineral acid digestion as appropriate. Analysis of the resulting solutions and digestates is performed using approved TNI, USEPA, and industry recognized analytical techniques. Where client-provided air volumes corresponding to the air filter composites exist, aqueous digestate results are converted to radiological particulate concentrations in air (e.g. $\mu\text{Ci/mL}$). Quality control parameters acceptance criteria are defined by USEPA programs, and in USNRC Regulatory Guide 4.14 (Radiological Effluent and Environmental Monitoring at Uranium Mills), USNRC Regulatory Guide 4.15 (Quality Assurance for Radiological Monitoring Programs – Effluent Streams and the Environment), the TNI Standard EL-V1-2009, and Inter-Mountain Labs internal quality procedures.

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

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager



Inter-Mountain Labs

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Your Environmental Monitoring Partner

Sample Analysis Report

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

Date Reported 8/14/2012
Report ID: S1207116001

ProjectName: 2nd Quarter Composite Marshland Expansion Area
Lab ID: S1207116-001
ClientSample ID: MA-1
COC:

WorkOrder: S1207116
CollectionDate: 4/18/2012
DateReceived: 7/9/2012 10:49:00 AM
FieldSampler:
Matrix: Filter

Comments Sampled 4/2/2012-6/29/2012 (2012 2nd Qtr)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
Field						
Actual Volume	6196200	Liters			Field	04/18/2012 000
Radionuclides - Filter						
Lead 210	68.9	pCi/Filter		2	OTW01	08/07/2012 1700 SH
Lead 210 Precision (±)	6.1	pCi/Filter			OTW01	08/07/2012 1700 SH
Lead 210	1.1E-14	µCi/mL		2.0E-15	Calculation	08/14/2012 1303 WN
Lead 210 Precision (±)	9.8E-16	µCi/mL			Calculation	08/14/2012 1303 WN
Radium 226	ND	pCi/Filter		0.3	SM 7500RAB	07/24/2012 1334 SH
Radium 226 Precision (±)	NA	pCi/Filter			SM 7500RAB	07/24/2012 1334 SH
Radium 226	ND	µCi/mL		1.0E-16	Calculation	08/14/2012 1303 WN
Radium 226 Precision (±)	NA	µCi/mL			Calculation	08/14/2012 1303 WN
Thorium 230	ND	pCi/Filter		0.2	ACW10	07/27/2012 828 SH
Thorium 230 Precision (±)	NA	pCi/Filter			ACW10	07/27/2012 828 SH
Thorium 230	ND	µCi/mL		1.0E-16	Calculation	08/14/2012 1303 WN
Thorium 230 Precision (±)	NA	µCi/mL			Calculation	08/14/2012 1303 WN
Uranium	ND	pCi/Filter		0.3	EPA 200.8	07/12/2012 1942 MS
Uranium	ND	µCi/mL		1.0E-16	Calculation	08/14/2012 1303 WN

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, Assistant Laboratory Manager

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Sample Analysis Report

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

ProjectName: 2nd Quarter Composite Marshland Expansion Area
Lab ID: S1207116-002
ClientSample ID: MA-2
COC:

Date Reported: 8/14/2012
Report ID: S1207116001

WorkOrder: S1207116
CollectionDate: 4/18/2012
DateReceived: 7/9/2012 10:49:00 AM
FieldSampler:
Matrix: Filter

Comments Sampled 4/2/2012-6/29/2012 (2012 2nd Qtr)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
Field						
Actual Volume	6203400	Liters			Field	04/18/2012 000
Radionuclides - Filter						
Lead 210	82.7	pCi/Filter		2	OTW01	08/07/2012 1700 SH
Lead 210 Precision (±)	5.4	pCi/Filter			OTW01	08/07/2012 1700 SH
Lead 210	1.3E-14	µCi/mL		2.0E-15	Calculation	08/14/2012 1303 WN
Lead 210 Precision (±)	8.7E-16	µCi/mL			Calculation	08/14/2012 1303 WN
Radium 226	ND	pCi/Filter		0.3	SM 7500RAB	07/24/2012 1334 SH
Radium 226 Precision (±)	NA	pCi/Filter			SM 7500RAB	07/24/2012 1334 SH
Radium 226	ND	µCi/mL		1.0E-16	Calculation	08/14/2012 1303 WN
Radium 226 Precision (±)	NA	µCi/mL			Calculation	08/14/2012 1303 WN
Thorium 230	ND	pCi/Filter		0.2	ACW10	07/30/2012 1132 SH
Thorium 230 Precision (±)	NA	pCi/Filter			ACW10	07/30/2012 1132 SH
Thorium 230	ND	µCi/mL		1.0E-16	Calculation	08/14/2012 1303 WN
Thorium 230 Precision (±)	NA	µCi/mL			Calculation	08/14/2012 1303 WN
Uranium	ND	pCi/Filter		0.3	EPA 200.8	07/12/2012 2001 MS
Uranium	ND	µCi/mL		1.0E-16	Calculation	08/14/2012 1303 WN

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, Assistant Laboratory Manager

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Sample Analysis Report

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

Date Reported 8/14/2012
Report ID: S1207116001

ProjectName: 2nd Quarter Composite Marshland Expansion Area
Lab ID: S1207116-003
ClientSample ID: MA-3
COC:

WorkOrder: S1207116
CollectionDate: 4/18/2012
DateReceived: 7/9/2012 10:49:00 AM
FieldSampler:
Matrix: Filter

Comments Sampled 4/2/2012-6/29/2012 (2012 2nd Qtr)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Field							
Actual Volume	6067000	Liters			Field	04/18/2012 000	
Radionuclides - Filter							
Lead 210	75.7	pCi/Filter		2	OTW01	08/07/2012 1700	SH
Lead 210 Precision (±)	5.1	pCi/Filter			OTW01	08/07/2012 1700	SH
Lead 210	1.2E-14	µCi/mL		2.0E-15	Calculation	08/14/2012 1303	WN
Lead 210 Precision (±)	8.4E-16	µCi/mL			Calculation	08/14/2012 1303	WN
Radium 226	0.5	pCi/Filter		0.3	SM 7500RAB	07/24/2012 1334	SH
Radium 226 Precision (±)	0.1	pCi/Filter			SM 7500RAB	07/24/2012 1334	SH
Radium 226	ND	µCi/mL		1.0E-16	Calculation	08/14/2012 1303	WN
Radium 226 Precision (±)	NA	µCi/mL			Calculation	08/14/2012 1303	WN
Thorium 230	ND	pCi/Filter		0.2	ACW10	07/30/2012 1132	SH
Thorium 230 Precision (±)	NA	pCi/Filter			ACW10	07/30/2012 1132	SH
Thorium 230	ND	µCi/mL		1.0E-16	Calculation	08/14/2012 1303	WN
Thorium 230 Precision (±)	NA	µCi/mL			Calculation	08/14/2012 1303	WN
Uranium	0.3	pCi/Filter		0.3	EPA 200.8	07/12/2012 2006	MS
Uranium	ND	µCi/mL		1.0E-16	Calculation	08/14/2012 1303	WN

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, Assistant Laboratory Manager

Page 3 of 5



Inter-Mountain Labs

Your Environmental Monitoring Partner

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Sample Analysis Report

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

ProjectName: 2nd Quarter Composite Marshland Expansion Area
Lab ID: S1207116-004
ClientSample ID: MA-4
COC:

Date Reported: 8/14/2012
Report ID: S1207116001

WorkOrder: S1207116
CollectionDate: 4/18/2012
DateReceived: 7/9/2012 10:49:00 AM
FieldSampler:
Matrix: Filter

Comments Sampled 4/2/2012-6/29/2012 (2012 2nd Qtr)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
Field						
Actual Volume	6049000	Liters			Field	04/18/2012 000
Radionuclides - Filter						
Lead 210	78.2	pCi/Filter		2	OTW01	08/07/2012 1700 SH
Lead 210 Precision (±)	5.2	pCi/Filter			OTW01	08/07/2012 1700 SH
Lead 210	1.3E-14	µCi/mL		2.0E-15	Calculation	08/14/2012 1303 WN
Lead 210 Precision (±)	8.6E-16	µCi/mL			Calculation	08/14/2012 1303 WN
Radium 226	0.3	pCi/Filter		0.3	SM 7500RAB	07/24/2012 1334 SH
Radium 226 Precision (±)	0.1	pCi/Filter			SM 7500RAB	07/24/2012 1334 SH
Radium 226	ND	µCi/mL		1.0E-16	Calculation	08/14/2012 1303 WN
Radium 226 Precision (±)	NA	µCi/mL			Calculation	08/14/2012 1303 WN
Thorium 230	ND	pCi/Filter		0.2	ACW10	07/30/2012 1132 SH
Thorium 230 Precision (±)	NA	pCi/Filter			ACW10	07/30/2012 1132 SH
Thorium 230	ND	µCi/mL		1.0E-16	Calculation	08/14/2012 1303 WN
Thorium 230 Precision (±)	NA	µCi/mL			Calculation	08/14/2012 1303 WN
Uranium	0.4	pCi/Filter		0.3	EPA 200.8	07/12/2012 2011 MS
Uranium	ND	µCi/mL		1.0E-16	Calculation	08/14/2012 1303 WN

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, Assistant Laboratory Manager

Page 4 of 5



Inter-Mountain Labs

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Your Environmental Monitoring Partner

Sample Analysis Report

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

Date Reported 8/14/2012
Report ID: S1207116001

ProjectName: 2nd Quarter Composite Marshland Expansion Area
Lab ID: S1207116-005
ClientSample ID: MA-5
COC:

WorkOrder: S1207116
CollectionDate: 4/18/2012
DateReceived: 7/9/2012 10:49:00 AM
FieldSampler:
Matrix: Filter

Comments Sampled 4/2/2012-6/29/2012 (2012 2nd Qtr)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
Field						
Actual Volume	5575200	Liters			Field	04/18/2012 000
Radionuclides - Filter						
Lead 210	62.2	pCi/Filter		2	OTW01	08/07/2012 1700 SH
Lead 210 Precision (±)	4.8	pCi/Filter			OTW01	08/07/2012 1700 SH
Lead 210	1.1E-14	µCi/mL		2.0E-15	Calculation	08/14/2012 1303 WN
Lead 210 Precision (±)	8.6E-16	µCi/mL			Calculation	08/14/2012 1303 WN
Radium 226	ND	pCi/Filter		0.3	SM 7500RAB	07/24/2012 1334 SH
Radium 226 Precision (±)	NA	pCi/Filter			SM 7500RAB	07/24/2012 1334 SH
Radium 226	ND	µCi/mL		1.0E-16	Calculation	08/14/2012 1303 WN
Radium 226 Precision (±)	NA	µCi/mL			Calculation	08/14/2012 1303 WN
Thorium 230	ND	pCi/Filter		0.2	ACW10	07/30/2012 1132 SH
Thorium 230 Precision (±)	NA	pCi/Filter			ACW10	07/30/2012 1132 SH
Thorium 230	ND	µCi/mL		1.0E-16	Calculation	08/14/2012 1303 WN
Thorium 230 Precision (±)	NA	µCi/mL			Calculation	08/14/2012 1303 WN
Uranium	ND	pCi/Filter		0.3	EPA 200.8	07/12/2012 2016 MS
Uranium	ND	µCi/mL		1.0E-16	Calculation	08/14/2012 1303 WN

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



Inter-Mountain Labs

Your Environmental Monitoring Partner

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

ANALYTICAL QC SUMMARY REPORT

CLIENT: Cameco Resources, Crow Butte Operation
Work Order: S1207116
Project: 2nd Quarter Composite Marshland Expansion Area

Date: 8/14/2012
Report ID: S1207116001

Uranium, Air Filter AnalysisSample Type **MBLK**

Units: pCi/Filter

Sample ID	RunNo: 84790	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
MBLK	07/12/12 12:48	Uranium	ND	0.003					

Sample Type **LCS**

Units: pCi/Filter

Sample ID	RunNo: 84790	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
LCS	07/12/12 12:43	Uranium	68.2	0.3	67.7		101	85 - 115	

Sample Type **MS**

Units: pCi/Filter

Sample ID	RunNo: 84790	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
S1207116-001BS	07/12/12 19:52	Uranium	726	0.3	745	ND	97.4	70 - 130	

Sample Type **MSD**

Units: pCi/Filter

Sample ID	RunNo: 84790	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
S1207116-001BMSD	07/12/12 19:56	Uranium	736	0.3	726	1.43	98.8	20	

Sample Type **DUP**

Units: pCi/Filter

Sample ID	RunNo: 84790	Analyte	Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual
S1207116-001BD	07/12/12 19:47	Uranium	ND	0.3	ND			20	

Lead 210 in FiltersSample Type **MBLK**

Units: pCi/Filter

Sample ID	RunNo: 85717	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
MB12-207	08/07/12 14:14	Lead 210	ND	2					

Sample Type **LCS**

Units: pCi/Filter

Sample ID	RunNo: 85717	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
LCS12-207	08/07/12 14:14	Lead 210	11	2	12.6		87.1	70 - 130	

Sample Type **MS**

Units: pCi/Filter

Sample ID	RunNo: 85717	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
TAP WATER MS	08/07/12 17:00	Lead 210	15	2	12.4	ND	111	70 - 130	

Sample Type **MSD**

Units: pCi/Filter

Sample ID	RunNo: 85717	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
TAP WATER MSD	08/07/12 17:00	Lead 210	14	2	15	5.45	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



Inter-Mountain Labs

Your Environmental Monitoring Partner

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

ANALYTICAL QC SUMMARY REPORT

CLIENT: Cameco Resources, Crow Butte Operation
Work Order: S1207116
Project: 2nd Quarter Composite Marshland Expansion Area

Date: 8/14/2012
Report ID: S1207116001

Radium 226 Air Filter AnalysisSample Type **MBLK** Units: pCi/Filter

Sample ID	RunNo: 85444	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
MB12-198	07/24/12 13:34	Radium 226	ND	0.3					

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

Sample ID	RunNo: 85444	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
LCS12-198	07/24/12 13:34	Radium 226	5.3	0.3	5.06		104	70 - 130	

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

Sample ID	RunNo: 85444	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
TAP WATER MS	07/24/12 17:41	Radium 226	5.1	0.3	5.06	ND	101	70 - 130	

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

Sample ID	RunNo: 85444	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
TAP WATER MSD	07/24/12 17:41	Radium 226	5.0	0.3	5.1	1.89	99.2	30	

Thorium Air Filter AnalysisSample Type **MBLK** Units: pCi/Filter

Sample ID	RunNo: 85772	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
AMB12-199	07/27/12 8:28	Thorium-230	ND	0.2					

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

Sample ID	RunNo: 85772	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
LCS	07/26/12 0:00	Thorium-230	12.4	0.2	12.5		99.3	70 - 130	

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

**Air Filter Summary Report****Client: Cameco Resources, Crow Butte Operation****Client Sample ID: MA-1****Lab ID: S1207116-001****Sampled 4/2/2012-6/29/2012 (2012 2nd Qtr)****Sample Air Volume: 6196200 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	68.9	6.1	1E-14	1E-15	2E-15	6 E-13	Day	1.67
Radium 226	<0.3		<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	<0.3		<1E-16		1E-16	9 E-14	Year	0.00

Lab ID: S1204105-001**Sampled 1/4/12 to 4/2/12 (2012 1st Qtr)****Sample Air Volume: 6334637 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	115	7.5	2E-14	1E-15	2E-15	6 E-13	Day	3.33
Radium 226	<0.3		<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	1.4		2E-16		1E-16	9 E-14	Year	0.22

**Air Filter Summary Report****Client: Cameco Resources, Crow Butte Operation****Client Sample ID: MA-2****Lab ID: S1207116-002****Sampled 4/2/2012-6/29/2012 (2012 2nd Qtr)****Sample Air Volume: 6203400 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	82.7	5.4	1E-14	9E-16	2E-15	6 E-13	Day	1.67
Radium 226	<0.3		<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	<0.3		<1E-16		1E-16	9 E-14	Year	0.00

Lab ID: S1204105-002**Sampled 1/4/12 to 4/2/12 (2012 1st Qtr)****Sample Air Volume: 6337547 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	108	7.7	2E-14	1E-15	2E-15	6 E-13	Day	3.33
Radium 226	<0.3		<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	1.8		3E-16		1E-16	9 E-14	Year	0.33

**Air Filter Summary Report****Client: Cameco Resources, Crow Butte Operation****Client Sample ID: MA-3****Lab ID: S1207116-003****Sampled 4/2/2012-6/29/2012 (2012 2nd Qtr)****Sample Air Volume: 6067000 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	75.7	5.1	1E-14	8E-16	2E-15	6 E-13	Day	1.67
Radium 226	0.5	0.1	<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	0.3		<1E-16		1E-16	9 E-14	Year	0.00

Lab ID: S1204105-003**Sampled 1/4/12 to 4/2/12 (2012 1st Qtr)****Sample Air Volume: 6322001 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	109	7.0	2E-14	1E-15	2E-15	6 E-13	Day	3.33
Radium 226	0.6	0.2	1E-16	3E-17	1E-16	9 E-13	Week	0.01
Thorium 230	1.0	0.4	2E-16	6E-17	1E-16	3 E-14	Year	0.67
Uranium	1.9		3E-16		1E-16	9 E-14	Year	0.33

**Air Filter Summary Report****Client: Cameco Resources, Crow Butte Operation****Client Sample ID: MA-4****Lab ID: S1207116-004****Sampled 4/2/2012-6/29/2012 (2012 2nd Qtr)****Sample Air Volume: 6049000 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	78.2	5.2	1E-14	9E-16	2E-15	6 E-13	Day	1.67
Radium 226	0.3	0.1	<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	0.4		<1E-16		1E-16	9 E-14	Year	0.00

Lab ID: S1204105-004**Sampled 1/4/12 to 4/2/12 (2012 1st Qtr)****Sample Air Volume: 6333500 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	120	7.9	2E-14	1E-15	2E-15	6 E-13	Day	3.33
Radium 226	0.4	0.1	<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	0.3	0.2	<1E-16		1E-16	3 E-14	Year	0.00
Uranium	1.6		3E-16		1E-16	9 E-14	Year	0.33

**Air Filter Summary Report****Client: Cameco Resources, Crow Butte Operation****Client Sample ID: MA-5****Lab ID: S1207116-005****Sampled 4/2/2012-6/29/2012 (2012 2nd Qtr)****Sample Air Volume: 5575200 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result μCi/ml	Precision ± μCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	62.2	4.8	1E-14	9E-16	2E-15	6 E-13	Day	1.67
Radium 226	<0.3		<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	<0.3		<1E-16		1E-16	9 E-14	Year	0.00

Lab ID: S1204105-005**Sampled 1/4/12 to 4/2/12 (2012 1st Qtr)****Sample Air Volume: 6338171 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result μCi/ml	Precision ± μCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	116	7.2	2E-14	1E-15	2E-15	6 E-13	Day	3.33
Radium 226	<0.3		<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	0.2	0.2	<1E-16		1E-16	3 E-14	Year	0.00
Uranium	1.4		2E-16		1E-16	9 E-14	Year	0.22



Inter-Mountain Labs

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Your Environmental Monitoring Partner

Date: 5/1/2015

CLIENT: Cameco Resources, Crow Butte Operation
Project: Marsland Expansion Area
Lab Order: S1204105

CASE NARRATIVE

Report ID: S1204105002
(Replaces S1204105001)

Samples MA-1, MA-2, MA-3, MA-4, and MA-5 were received on April 9, 2012.

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

NRC radiological air particulate filters, animal, vegetation, soil and sediment samples may be composited by date and location per client's monitoring program requirements. Highly carbonaceous samples may require ashing. Samples are subjected to a modified USEPA SW-846 Method 3050B mineral acid digestion as appropriate. Analysis of the resulting solutions and digestates is performed using approved TNI, USEPA, and industry recognized analytical techniques. Where client-provided air volumes corresponding to the air filter composites exist, aqueous digestate results are converted to radiological particulate concentrations in air (e.g. $\mu\text{Ci/mL}$). Quality control parameters acceptance criteria are defined by USEPA programs, and in USNRC Regulatory Guide 4.14 (Radiological Effluent and Environmental Monitoring at Uranium Mills), USNRC Regulatory Guide 4.15 (Quality Assurance for Radiological Monitoring Programs – Effluent Streams and the Environment), the TNI Standard EL-V1-2009, and Inter-Mountain Labs internal quality procedures.

All Quality Control parameters met the acceptance criteria defined by EPA, NRC guidance, 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: 5/18/2012
Report ID: S1204105001

ProjectName: Marsland Expansion Area
Lab ID: S1204105-001
ClientSample ID: MA-1
COC:

WorkOrder: S1204105
CollectionDate: 1/18/2012
DateReceived: 4/9/2012 3:51:00 PM
FieldSampler: RG
Matrix: Filter

Comments: Sampled 1/4/12 to 4/2/12 (2012 1st Qtr)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
Field						
Actual Volume	6334637	Liters			Field	01/18/2012 000
Radionuclides - Filter						
Lead 210	115	pCi/Filter		2	OTW01	04/26/2012 1154 SH
Lead 210 Precision (±)	7.5	pCi/Filter			OTW01	04/26/2012 1154 SH
Lead 210	1.8E-14	µCi/mL		2.0E-15	Calculation	05/18/2012 1304 WN
Lead 210 Precision (±)	1.2E-15	µCi/mL			Calculation	05/18/2012 1304 WN
Radium 226	ND	pCi/Filter		0.3	SM 7500RAB	04/23/2012 1210 SH
Radium 226 Precision (±)	NA	pCi/Filter			SM 7500RAB	04/23/2012 1210 SH
Radium 226	ND	µCi/mL		1.0E-16	Calculation	05/18/2012 1304 WN
Radium 226 Precision (±)	NA	µCi/mL			Calculation	05/18/2012 1304 WN
Thorium 230	ND	pCi/Filter		0.2	ACW10	04/19/2012 1335 WL
Thorium 230 Precision (±)	NA	pCi/Filter			ACW10	04/19/2012 1335 WL
Thorium 230	ND	µCi/mL		1.0E-16	Calculation	05/18/2012 1304 WN
Thorium 230 Precision (±)	NA	µCi/mL			Calculation	05/18/2012 1304 WN
Thorium-229 Tracer (30-120)	81.0	%		0.2	ACW10	04/19/2012 1335 WL
Uranium	1.4	pCi/Filter		0.3	EPA 200.8	04/12/2012 1032 MS
Uranium	2.3E-16	µCi/mL		1.0E-16	Calculation	05/18/2012 1304 WN

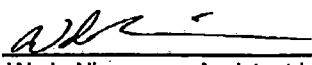
These results apply only to the samples tested.

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, Assistant Laboratory Manager



Inter-Mountain Labs

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Your Environmental Monitoring Partner

Sample Analysis Report

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

Date Reported 5/18/2012
Report ID: S1204105001

ProjectName: Marsland Expansion Area
Lab ID: S1204105-002
ClientSample ID: MA-2
COC:

WorkOrder: S1204105
CollectionDate: 1/18/2012
DateReceived: 4/9/2012 3:51:00 PM
FieldSampler: RG
Matrix: Filter

Comments Sampled 1/4/12 to 4/2/12 (2012 1st Qtr)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
Field						
Actual Volume	6337547	Liters			Field	01/18/2012 000
Radionuclides - Filter						
Lead 210	108	pCi/Filter		2	OTW01	04/26/2012 1154 SH
Lead 210 Precision (±)	7.7	pCi/Filter			OTW01	04/26/2012 1154 SH
Lead 210	1.7E-14	µCi/mL		2.0E-15	Calculation	05/18/2012 1304 WN
Lead 210 Precision (±)	1.2E-15	µCi/mL			Calculation	05/18/2012 1304 WN
Radium 226	ND	pCi/Filter		0.3	SM 7500RAB	04/23/2012 1210 SH
Radium 226 Precision (±)	NA	pCi/Filter			SM 7500RAB	04/23/2012 1210 SH
Radium 226	ND	µCi/mL		1.0E-16	Calculation	05/18/2012 1304 WN
Radium 226 Precision (±)	NA	µCi/mL			Calculation	05/18/2012 1304 WN
Thorium 230	ND	pCi/Filter		0.2	ACW10	04/19/2012 1335 WL
Thorium 230 Precision (±)	NA	pCi/Filter			ACW10	04/19/2012 1335 WL
Thorium 230	ND	µCi/mL		1.0E-16	Calculation	05/18/2012 1304 WN
Thorium 230 Precision (±)	NA	µCi/mL			Calculation	05/18/2012 1304 WN
Thorium-229 Tracer (30-120)	79.8	%		0.2	ACW10	04/19/2012 1335 WL
Uranium	1.8	pCi/Filter		0.3	EPA 200.8	04/12/2012 1051 MS
Uranium	2.8E-16	µCi/mL		1.0E-16	Calculation	05/18/2012 1304 WN

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, Assistant Laboratory Manager

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Sample Analysis Report

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

Date Reported: 5/18/2012
Report ID: S1204105001

ProjectName: Marsland Expansion Area
Lab ID: S1204105-003
ClientSample ID: MA-3
COC:

WorkOrder: S1204105
CollectionDate: 1/18/2012
DateReceived: 4/9/2012 3:51:00 PM
FieldSampler: RG
Matrix: Filter

Comments: Sampled 1/4/12 to 4/2/12 (2012 1st Qtr)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
Field						
Actual Volume	6322001	Liters			Field	01/18/2012 000
Radionuclides - Filter						
Lead 210	109	pCi/Filter		2	OTW01	04/27/2012 1218 SH
Lead 210 Precision (±)	7.0	pCi/Filter			OTW01	04/27/2012 1218 SH
Lead 210	1.7E-14	µCi/mL		2.0E-15	Calculation	05/18/2012 1304 WN
Lead 210 Precision (±)	1.1E-15	µCi/mL			Calculation	05/18/2012 1304 WN
Radium 226	0.6	pCi/Filter		0.3	SM 7500RAB	04/23/2012 1210 SH
Radium 226 Precision (±)	0.2	pCi/Filter			SM 7500RAB	04/23/2012 1210 SH
Radium 226	1.0E-16	µCi/mL		1.0E-16	Calculation	05/18/2012 1304 WN
Radium 226 Precision (±)	3.2E-17	µCi/mL			Calculation	05/18/2012 1304 WN
Thorium 230	1.0	pCi/Filter		0.2	ACW10	04/19/2012 1335 WL
Thorium 230 Precision (±)	0.4	pCi/Filter			ACW10	04/19/2012 1335 WL
Thorium 230	1.5E-16	µCi/mL		1.0E-16	Calculation	05/18/2012 1304 WN
Thorium 230 Precision (±)	6.3E-17	µCi/mL			Calculation	05/18/2012 1304 WN
Thorium-229 Tracer (30-120)	79.6	%		0.2	ACW10	04/19/2012 1335 WL
Uranium	1.9	pCi/Filter		0.3	EPA 200.8	04/12/2012 1056 MS
Uranium	2.9E-16	µCi/mL		1.0E-16	Calculation	05/18/2012 1304 WN

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, Assistant Laboratory Manager



Inter-Mountain Labs

Your Environmental Monitoring Partner

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Sample Analysis Report

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

Date Reported 5/18/2012
Report ID: S1204105001

ProjectName: Marsland Expansion Area
Lab ID: S1204105-004
ClientSample ID: MA-4
COC:

WorkOrder: S1204105
CollectionDate: 1/18/2012
DateReceived: 4/9/2012 3:51:00 PM
FieldSampler: RG
Matrix: Filter

Comments Sampled 1/4/12 to 4/2/12 (2012 1st Qtr)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
Field						
Actual Volume	6333500	Liters			Field	01/18/2012 000
Radionuclides - Filter						
Lead 210	120	pCi/Filter		2	OTW01	04/27/2012 1218 SH
Lead 210 Precision (±)	7.9	pCi/Filter			OTW01	04/27/2012 1218 SH
Lead 210	1.9E-14	µCi/mL		2.0E-15	Calculation	05/18/2012 1304 WN
Lead 210 Precision (±)	1.2E-15	µCi/mL			Calculation	05/18/2012 1304 WN
Radium 226	0.4	pCi/Filter		0.3	SM 7500RAB	04/23/2012 1210 SH
Radium 226 Precision (±)	0.1	pCi/Filter			SM 7500RAB	04/23/2012 1210 SH
Radium 226	ND	µCi/mL		1.0E-16	Calculation	05/18/2012 1304 WN
Radium 226 Precision (±)	NA	µCi/mL			Calculation	05/18/2012 1304 WN
Thorium 230	0.3	pCi/Filter		0.2	ACW10	04/19/2012 1335 WL
Thorium 230 Precision (±)	0.2	pCi/Filter			ACW10	04/19/2012 1335 WL
Thorium 230	ND	µCi/mL		1.0E-16	Calculation	05/18/2012 1304 WN
Thorium 230 Precision (±)	NA	µCi/mL			Calculation	05/18/2012 1304 WN
Thorium-229 Tracer (30-120)	80	%		0	ACW10	04/19/2012 1335 WL
Uranium	1.6	pCi/Filter		0.3	EPA 200.8	04/12/2012 1111 MS
Uranium	2.5E-16	µCi/mL		1.0E-16	Calculation	05/18/2012 1304 WN

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

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Sample Analysis Report

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

Date Reported: 5/18/2012
Report ID: S1204105001

ProjectName: Marsland Expansion Area
Lab ID: S1204105-005
ClientSample ID: MA-5
COC:

WorkOrder: S1204105
CollectionDate: 1/18/2012
DateReceived: 4/9/2012 3:51:00 PM
FieldSampler: RG
Matrix: Filter

Comments: Sampled 1/4/12 to 4/2/12 (2012 1st Qtr)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
Field						
Actual Volume	6338171	Liters			Field	01/18/2012 000
Radionuclides - Filter						
Lead 210	116	pCi/Filter		2	OTW01	04/27/2012 1218 SH
Lead 210 Precision (±)	7.2	pCi/Filter			OTW01	04/27/2012 1218 SH
Lead 210	1.8E-14	µCi/mL		2.0E-15	Calculation	05/18/2012 1304 WN
Lead 210 Precision (±)	1.1E-15	µCi/mL			Calculation	05/18/2012 1304 WN
Radium 226	ND	pCi/Filter		0.3	SM 7500RAB	04/23/2012 1210 SH
Radium 226 Precision (±)	NA	pCi/Filter			SM 7500RAB	04/23/2012 1210 SH
Radium 226	ND	µCi/mL		1.0E-16	Calculation	05/18/2012 1304 WN
Radium 226 Precision (±)	NA	µCi/mL			Calculation	05/18/2012 1304 WN
Thorium 230	0.2	pCi/Filter		0.2	ACW10	04/19/2012 1335 WL
Thorium 230 Precision (±)	0.2	pCi/Filter			ACW10	04/19/2012 1335 WL
Thorium 230	ND	µCi/mL		1.0E-16	Calculation	05/18/2012 1304 WN
Thorium 230 Precision (±)	NA	µCi/mL			Calculation	05/18/2012 1304 WN
Thorium-229 Tracer (30-120)	86.7	%		0.2	ACW10	04/19/2012 1335 WL
Uranium	1.4	pCi/Filter		0.3	EPA 200.8	04/12/2012 1116 MS
Uranium	2.2E-16	µCi/mL		1.0E-16	Calculation	05/18/2012 1304 WN

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, Assistant Laboratory Manager



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Air Filter Summary Report**Client: Cameco Resources, Crow Butte Operation****Client Sample ID: MA-1****Lab ID: S1204105-001****Sampled 1/4/12 to 4/2/12 (2012 1st Qtr)****Sample Air Volume: 6334637 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	115	7.5	2E-14	1E-15	2E-15	6 E-13	Day	3.33
Radium 226	<0.3		<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	1.4		2E-16		1E-16	9 E-14	Year	0.22

**Air Filter Summary Report****Client: Cameco Resources, Crow Butte Operation****Client Sample ID: MA-2****Lab ID: S1204105-002****Sampled 1/4/12 to 4/2/12 (2012 1st Qtr)****Sample Air Volume: 6337547 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	108	7.7	2E-14	1E-15	2E-15	6 E-13	Day	3.33
Radium 226	<0.3		<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.2		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	1.8		3E-16		1E-16	9 E-14	Year	0.33

**Air Filter Summary Report****Client: Cameco Resources, Crow Butte Operation****Client Sample ID: MA-3****Lab ID: S1204105-003****Sampled 1/4/12 to 4/2/12 (2012 1st Qtr)****Sample Air Volume: 6322001 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	109	7.0	2E-14	1E-15	2E-15	6 E-13	Day	3.33
Radium 226	0.6	0.2	1E-16	3E-17	1E-16	9 E-13	Week	0.01
Thorium 230	1.0	0.4	2E-16	6E-17	1E-16	3 E-14	Year	0.67
Uranium	1.9		3E-16		1E-16	9 E-14	Year	0.33

**Air Filter Summary Report****Client: Cameco Resources, Crow Butte Operation****Client Sample ID: MA-4****Lab ID: S1204105-004****Sampled 1/4/12 to 4/2/12 (2012 1st Qtr)****Sample Air Volume: 6333500 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	120	7.9	2E-14	1E-15	2E-15	6 E-13	Day	3.33
Radium 226	0.4	0.1	<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	0.3	0.2	<1E-16		1E-16	3 E-14	Year	0.00
Uranium	1.6		3E-16		1E-16	9 E-14	Year	0.33

**Air Filter Summary Report****Client: Cameco Resources, Crow Butte Operation****Client Sample ID: MA-5****Lab ID: S1204105-005****Sampled 1/4/12 to 4/2/12 (2012 1st Qtr)****Sample Air Volume: 6338171 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	116	7.2	2E-14	1E-15	2E-15	6 E-13	Day	3.33
Radium 226	<0.3		<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	0.2	0.2	<1E-16		1E-16	3 E-14	Year	0.00
Uranium	1.4		2E-16		1E-16	9 E-14	Year	0.22



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ANALYTICAL QC SUMMARY REPORT

CLIENT: Cameco Resources, Crow Butte Operation
Work Order: S1204105
Project: Marsland Expansion Area

Date: 5/18/2012**Report ID:** S1204105001**Uranium, Air Filter Analysis**Sample Type **MBLK**

Units: pCi/Filter

Sample ID	RunNo: 81642	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
BLK	04/12/12 10:22	Uranium	ND	0.3					

Sample Type **LCS**

Units: pCi/Filter

Sample ID	RunNo: 81642	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
LCS	04/12/12 10:18	Uranium	72.0	0.3	67.7		106	85 - 115	

Sample Type **MS**

Units: pCi/Filter

Sample ID	RunNo: 81642	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
S1204105-001AS	04/12/12 10:42	Uranium	3980	0.3	3720	1.4	107	70 - 130	

Sample ID	RunNo: 81642	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
S1204106-006AS	04/12/12 11:56	Uranium	3800	0.3	3720	2.0	102	70 - 130	

Sample Type **MSD**

Units: pCi/Filter

Sample ID	RunNo: 81642	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
S1204105-001AMSD	04/12/12 10:47	Uranium	3830	0.3	3980	3.66		20	

Sample ID	RunNo: 81642	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
S1204106-006AMSD	04/12/12 12:11	Uranium	4040	0.3	3800	6.28		20	

Sample Type **DUP**

Units: pCi/Filter

Sample ID	RunNo: 81642	Analyte	Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual
S1204105-001AD	04/12/12 10:37	Uranium	1.4	0.3	1.4	6.01		20	

Sample ID	RunNo: 81642	Analyte	Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual
S1204106-006AD	04/12/12 11:51	Uranium	2.0	0.3	2.0	0.269		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



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ANALYTICAL QC SUMMARY REPORT**CLIENT:** Cameco Resources, Crow Butte Operation**Date:** 5/18/2012**Work Order:** S1204105**Report ID:** S1204105001**Project:** Marsland Expansion Area**Lead 210 in Filters**Sample Type **MBLK**

Units: pCi/Filter

Sample ID	RunNo: 82232	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
MB12-108	04/27/12 15:51	Lead 210	ND	2					

Sample Type **LCS**

Units: pCi/Filter

Sample ID	RunNo: 82232	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
LCS12-108	04/26/12 11:54	Lead 210	16	2	12.7		123	70 - 130	

Sample Type **MS**

Units: pCi/Filter

Sample ID	RunNo: 82232	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
TAP WATER MS	04/26/12 11:54	Lead 210	13	2	12.7	ND	93.2	70 - 130	

Sample Type **MSD**

Units: pCi/Filter

Sample ID	RunNo: 82232	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
TAP WATER MSD	04/26/12 11:54	Lead 210	14	2	13	9.74		30	

Radium 226 Air Filter AnalysisSample Type **MBLK**

Units: pCi/Filter

Sample ID	RunNo: 82003	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
MB12-107	04/23/12 12:10	Radium 226	ND	0.3					

Sample Type **LCS**

Units: pCi/Filter

Sample ID	RunNo: 82003	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
LCS12-107	04/23/12 12:10	Radium 226	5.6	0.3	5.06		111	70 - 130	

Sample Type **MS**

Units: pCi/Filter

Sample ID	RunNo: 82003	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
TAP WATER MS	04/23/12 14:14	Radium 226	5.4	0.3	5.06	ND	106	70 - 130	

Sample Type **MSD**

Units: pCi/Filter

Sample ID	RunNo: 82003	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
TAP WATER MSD	04/23/12 14:14	Radium 226	5.5	0.3	5.4	1.94		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



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ANALYTICAL QC SUMMARY REPORT**CLIENT:** Cameco Resources, Crow Butte Operation**Date:** 5/18/2012**Work Order:** S1204105**Report ID:** S1204105001**Project:** Marsland Expansion Area**Thorium Air Filter Analysis**Sample Type **MBLK** Units: pCi/Filter

Sample ID	RunNo: 81978	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
MB12-107	04/19/12 13:35	Thorium-230	ND	0.2					

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

Sample ID	RunNo: 81978	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
LCS12-107	04/19/12 13:35	Thorium-230	11.8	0.2	12.5		94.7	70 - 130	

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

Sample ID	RunNo: 81978	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
LCS12-107 DUP	04/19/12 13:35	Thorium-230	14.2	0.2	11.8	ND	113	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



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Your Environmental Monitoring Partner

Date: 5/1/2015

CLIENT: Cameco Resources, Crow Butte Operation
Project: Marsland Expansion Area
Lab Order: S1201090

CASE NARRATIVE

Report ID: S1201090002
(Replaces S1201090001)

Samples MA-1, MA-2, MA-3, MA-4, and MA-5 were received on January 9, 2012.

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

NRC radiological air particulate filters, animal, vegetation, soil and sediment samples may be composited by date and location per client's monitoring program requirements. Highly carbonaceous samples may require ashing. Samples are subjected to a modified USEPA SW-846 Method 3050B mineral acid digestion as appropriate. Analysis of the resulting solutions and digestates is performed using approved TNI, USEPA, and industry recognized analytical techniques. Where client-provided air volumes corresponding to the air filter composites exist, aqueous digestate results are converted to radiological particulate concentrations in air (e.g. $\mu\text{Ci/mL}$). Quality control parameters acceptance criteria are defined by USEPA programs, and in USNRC Regulatory Guide 4.14 (Radiological Effluent and Environmental Monitoring at Uranium Mills), USNRC Regulatory Guide 4.15 (Quality Assurance for Radiological Monitoring Programs – Effluent Streams and the Environment), the TNI Standard EL-V1-2009, and Inter-Mountain Labs internal quality procedures.

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

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager



Inter-Mountain Labs

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Your Environmental Monitoring Partner

Sample Analysis Report

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

Date Reported: 1/20/2012
Report ID: S1201090001

ProjectName: Marshland Expansion Area
Lab ID: S1201090-001
ClientSample ID: MA-1
COC: WEB

WorkOrder: S1201090
CollectionDate: 1/4/2012
DateReceived: 1/9/2012
FieldSampler: RG
Matrix: Filter

Comments Sampled 10/1/2011 - 1/4/2012 (2011 4th Qtr)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
Field						
Actual Volume	3850477	Liters			Field	1/4/2012
Radionuclides - Filter						
Lead 210	72.2	pCi/Filter		2	OTW01	1/19/2012 12:55:00 PM SH
Lead 210 Precision (±)	6.4	pCi/Filter			OTW01	1/19/2012 12:55:00 PM SH
Lead 210	1.9E-14	µCi/mL		2.0E-15	Calculation	2/7/2012 5:07:39 PM WN
Lead 210 Precision (±)	1.7E-15	µCi/mL			Calculation	2/7/2012 5:07:39 PM WN
Radium 226	ND	pCi/Filter		0.3	SM 7500RAB	1/18/2012 11:20:00 AM SH
Radium 226 Precision (±)	NA	pCi/Filter			SM 7500RAB	1/18/2012 11:20:00 AM SH
Radium 226	ND	µCi/mL		1.0E-16	Calculation	2/7/2012 5:07:39 PM WN
Radium 226 Precision (±)	NA	µCi/mL			Calculation	2/7/2012 5:07:39 PM WN
Thorium 230	ND	pCi/Filter		0.3	ACW10	1/31/2012 1:59:00 PM WL
Thorium 230 Precision (±)	NA	pCi/Filter			ACW10	1/31/2012 1:59:00 PM WL
Thorium 230	ND	µCi/mL		1.0E-16	Calculation	2/7/2012 5:07:39 PM WN
Thorium 230 Precision (±)	NA	µCi/mL			Calculation	2/7/2012 5:07:39 PM WN
Uranium	ND	pCi/Filter		0.3	EPA 200.8	2/6/2012 12:15:01 PM MS
Uranium	ND	µCi/mL		1.0E-16	Calculation	2/7/2012 5:07:39 PM WN

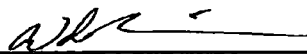
These results apply only to the samples tested.

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, Assistant Laboratory Manager



Sample Analysis Report

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

Date Reported 1/20/2012
Report ID: S1201090001

ProjectName: Marshland Expansion Area
Lab ID: S1201090-002
ClientSample ID: MA-2
COC: WEB

WorkOrder: S1201090
CollectionDate: 1/4/2012
DateReceived: 1/9/2012
FieldSampler: RG
Matrix: Filter

Comments Sampled 10/1/2011 - 1/4/2012 (2011 4th Qtr)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
Field						
Actual Volume	3851229	Liters			Field	1/4/2012
Radionuclides - Filter						
Lead 210	86.9	pCi/Filter		2	OTW01	1/19/2012 12:55:00 PM SH
Lead 210 Precision (±)	6.9	pCi/Filter			OTW01	1/19/2012 12:55:00 PM SH
Lead 210	2.3E-14	µCi/mL		2.0E-15	Calculation	2/7/2012 5:07:39 PM WN
Lead 210 Precision (±)	1.8E-15	µCi/mL			Calculation	2/7/2012 5:07:39 PM WN
Radium 226	ND	pCi/Filter		0.3	SM 7500RAB	1/18/2012 11:20:00 AM SH
Radium 226 Precision (±)	NA	pCi/Filter			SM 7500RAB	1/18/2012 11:20:00 AM SH
Radium 226	ND	µCi/mL		1.0E-16	Calculation	2/7/2012 5:07:39 PM WN
Radium 226 Precision (±)	NA	µCi/mL			Calculation	2/7/2012 5:07:39 PM WN
Thorium 230	ND	pCi/Filter		0.3	ACW10	1/31/2012 1:59:00 PM WL
Thorium 230 Precision (±)	NA	pCi/Filter			ACW10	1/31/2012 1:59:00 PM WL
Thorium 230	ND	µCi/mL		1.0E-16	Calculation	2/7/2012 5:07:39 PM WN
Thorium 230 Precision (±)	NA	µCi/mL			Calculation	2/7/2012 5:07:39 PM WN
Uranium	ND	pCi/Filter		0.3	EPA 200.8	2/6/2012 2:44:12 PM MS
Uranium	ND	µCi/mL		1.0E-16	Calculation	2/7/2012 5:07:39 PM WN

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



Inter-Mountain Labs

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Your Environmental Monitoring Partner

Sample Analysis Report

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

Date Reported 1/20/2012
Report ID: S1201090001

ProjectName: Marshland Expansion Area
Lab ID: S1201090-003
ClientSample ID: MA-3
COC: WEB

WorkOrder: S1201090
CollectionDate: 1/4/2012
DateReceived: 1/9/2012
FieldSampler: RG
Matrix: Filter

Comments Sampled 10/1/2011 - 1/4/2012 (2011 4th Qtr)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
Field						
Actual Volume	3852794	Liters			Field	1/4/2012
Radionuclides - Filter						
Lead 210	83.0	pCi/Filter		2	OTW01	1/19/2012 12:55:00 PM SH
Lead 210 Precision (±)	6.2	pCi/Filter			OTW01	1/19/2012 12:55:00 PM SH
Lead 210	2.2E-14	µCi/mL		2.0E-15	Calculation	2/7/2012 5:07:39 PM WN
Lead 210 Precision (±)	1.6E-15	µCi/mL			Calculation	2/7/2012 5:07:39 PM WN
Radium 226	ND	pCi/Filter		0.3	SM 7500RAB	1/18/2012 11:20:00 AM SH
Radium 226 Precision (±)	NA	pCi/Filter			SM 7500RAB	1/18/2012 11:20:00 AM SH
Radium 226	ND	µCi/mL		1.0E-16	Calculation	2/7/2012 5:07:39 PM WN
Radium 226 Precision (±)	NA	µCi/mL			Calculation	2/7/2012 5:07:39 PM WN
Thorium 230	0.4	pCi/Filter		0.3	ACW10	1/31/2012 1:59:00 PM WL
Thorium 230 Precision (±)	0.4	pCi/Filter			ACW10	1/31/2012 1:59:00 PM WL
Thorium 230	ND	µCi/mL		1.0E-16	Calculation	2/7/2012 5:07:39 PM WN
Thorium 230 Precision (±)	NA	µCi/mL			Calculation	2/7/2012 5:07:39 PM WN
Uranium	0.3	pCi/Filter		0.3	EPA 200.8	2/6/2012 12:28:22 PM MS
Uranium	ND	µCi/mL		1.0E-16	Calculation	2/7/2012 5:07:39 PM WN

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

Page 3 of 5



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Your Environmental Monitoring Partner

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Sample Analysis Report

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

Date Reported 1/20/2012
Report ID: S1201090001

ProjectName: Marshland Expansion Area
Lab ID: S1201090-004
ClientSample ID: MA-4
COC: WEB

WorkOrder: S1201090
CollectionDate: 1/4/2012
DateReceived: 1/9/2012
FieldSampler: RG
Matrix: Filter

Comments Sampled 10/1/2011 - 1/4/2012 (2011 4th Qtr)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
Field						
Actual Volume	3853046	Liters			Field	1/4/2012
Radionuclides - Filter						
Lead 210	91.2	pCi/Filter		2	OTW01	1/19/2012 12:55:00 PM SH
Lead 210 Precision (±)	7.2	pCi/Filter			OTW01	1/19/2012 12:55:00 PM SH
Lead 210	2.4E-14	µCi/mL		2.0E-15	Calculation	2/7/2012 5:07:39 PM WN
Lead 210 Precision (±)	1.9E-15	µCi/mL			Calculation	2/7/2012 5:07:39 PM WN
Radium 226	ND	pCi/Filter		0.3	SM 7500RAB	1/18/2012 11:20:00 AM SH
Radium 226 Precision (±)	NA	pCi/Filter			SM 7500RAB	1/18/2012 11:20:00 AM SH
Radium 226	ND	µCi/mL		1.0E-16	Calculation	2/7/2012 5:07:39 PM WN
Radium 226 Precision (±)	NA	µCi/mL			Calculation	2/7/2012 5:07:39 PM WN
Thorium 230	ND	pCi/Filter		0.3	ACW10	1/31/2012 2:00:00 PM WL
Thorium 230 Precision (±)	NA	pCi/Filter			ACW10	1/31/2012 2:00:00 PM WL
Thorium 230	ND	µCi/mL		1.0E-16	Calculation	2/7/2012 5:07:39 PM WN
Thorium 230 Precision (±)	NA	µCi/mL			Calculation	2/7/2012 5:07:39 PM WN
Uranium	ND	pCi/Filter		0.3	EPA 200.8	1/11/2012 10:31:39 AM MS
Uranium	ND	µCi/mL		1.0E-16	Calculation	2/7/2012 5:07:39 PM WN

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, Assistant Laboratory Manager

Page 4 of 5



Inter-Mountain Labs

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Your Environmental Monitoring Partner

Sample Analysis Report

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

Date Reported: 1/20/2012
Report ID: S1201090001

ProjectName: Marshland Expansion Area
Lab ID: S1201090-005
ClientSample ID: MA-5
COC: WEB

WorkOrder: S1201090
CollectionDate: 1/4/2012
DateReceived: 1/9/2012
FieldSampler: RG
Matrix: Filter

Comments: Sampled 10/1/2011 - 1/4/2012 (2011 4th Qtr)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
Field						
Actual Volume	3856136	Liters			Field	1/4/2012
Radionuclides - Filter						
Lead 210	70.5	pCi/Filter		2	OTW01	1/19/2012 12:55:00 PM SH
Lead 210 Precision (±)	6.0	pCi/Filter			OTW01	1/19/2012 12:55:00 PM SH
Lead 210	1.8E-14	µCi/mL		2.0E-15	Calculation	2/7/2012 5:07:39 PM WN
Lead 210 Precision (±)	1.6E-15	µCi/mL			Calculation	2/7/2012 5:07:39 PM WN
Radium 226	ND	pCi/Filter		0.3	SM 7500RAB	1/18/2012 11:20:00 AM SH
Radium 226 Precision (±)	NA	pCi/Filter			SM 7500RAB	1/18/2012 11:20:00 AM SH
Radium 226	ND	µCi/mL		1.0E-16	Calculation	2/7/2012 5:07:39 PM WN
Radium 226 Precision (±)	NA	µCi/mL			Calculation	2/7/2012 5:07:39 PM WN
Thorium 230	0.4	pCi/Filter		0.3	ACW10	1/31/2012 2:00:00 PM WL
Thorium 230 Precision (±)	0.4	pCi/Filter			ACW10	1/31/2012 2:00:00 PM WL
Thorium 230	1.0E-16	µCi/mL		1.0E-16	Calculation	2/7/2012 5:07:39 PM WN
Thorium 230 Precision (±)	1.0E-16	µCi/mL			Calculation	2/7/2012 5:07:39 PM WN
Uranium	ND	pCi/Filter		0.3	EPA 200.8	1/11/2012 10:39:41 AM MS
Uranium	ND	µCi/mL		1.0E-16	Calculation	2/7/2012 5:07:39 PM WN

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



Inter-Mountain Labs

Your Environmental Monitoring Partner

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

ANALYTICAL QC SUMMARY REPORT

CLIENT: Cameco Resources, Crow Butte Operation
Work Order: S1201090
Project: Marshland Expansion Area

Date: 1/20/2012**Report ID:** S1201090001**Uranium, Air Filter Analysis**Sample Type **MBLK**

Units: pCi/Filter

Sample ID	RunNo: 78768	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
BLK	01/11/12 12:17	Uranium	ND	0.3					

Sample Type **LCS**

Units: pCi/Filter

Sample ID	RunNo: 78768	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
LCS	01/11/12 10:05	Uranium	65.8	0.3	67.7		97.1	85 - 115	

Sample Type **MS**

Units: pCi/Filter

Sample ID	RunNo: 78768	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
S1201090-001AS	01/11/12 10:19	Uranium	726	0.3	745	16.6	95.3	70 - 130	

Sample Type **MSD**

Units: pCi/Filter

Sample ID	RunNo: 78768	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
S1201090-001AMSD	01/11/12 10:21	Uranium	745	0.3	726	2.68		20	

Sample Type **DUP**

Units: pCi/Filter

Sample ID	RunNo: 78768	Analyte	Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual
S1201090-001AD	01/11/12 10:16	Uranium	ND	0.3	16.6			20	

Lead 210 in FiltersSample Type **MBLK**

Units: pCi/Filter

Sample ID	RunNo: 79071	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
AMB12-011	01/19/12 10:44	Lead 210	ND	2					

Sample Type **LCS**

Units: pCi/Filter

Sample ID	RunNo: 79071	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
LCS	01/19/12 0:00	Lead 210	14	2	12.8		112	70 - 130	

Radium 226 Air Filter AnalysisSample Type **MBLK**

Units: pCi/Filter

Sample ID	RunNo: 79035	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
MB12-011	01/18/12 11:20	Radium 226	ND	0.3					

Sample Type **LCS**

Units: pCi/Filter

Sample ID	RunNo: 79035	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
LCS12-011	01/18/12 11:20	Radium 226	5.0	0.3	5.06		99.5	70 - 130	

Sample Type **MS**

Units: pCi/Filter

Sample ID	RunNo: 79035	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
TAP WATER MS	01/18/12 13:44	Radium 226	4.8	0.3	5.06	ND	94.1	70 - 130	

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



Inter-Mountain Labs

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Your Environmental Monitoring Partner

ANALYTICAL QC SUMMARY REPORT**CLIENT:** Cameco Resources, Crow Butte Operation**Date:** 1/20/2012**Work Order:** S1201090**Report ID:** S1201090001**Project:** Marshland Expansion Area**Thorium Air Filter Analysis**Sample Type **MBLK**

Units: pCi/Filter

Sample ID	RunNo: 79103	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
MB12-011	01/18/12 13:43	Thorium-230	ND	0.2					

Sample Type **LCS**

Units: pCi/Filter

Sample ID	RunNo: 79103	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
LCS	01/18/12 0:00	Thorium-230	12.3	0.2	12.5		98.5	70 - 130	

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



Inter-Mountain Labs

Your Environmental Monitoring Partner

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Air Filter Summary Report

Client: Cameco Resources, Crow Butte Operation

Client Sample ID: MA-1

Lab ID: S1201090-001

Sampled 10/1/2011-1/4/2012 (2011 4th Qtr)

Sample Air Volume: 3850477 Liters

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	72.2	6.4	2E-14	2E-15	2E-15	6 E-13	Day	3.33
Radium 226	<0.3		<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.3		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	<0.3		<1E-16		1E-16	9 E-14	Year	0.00

Effluent Limits are from 10 CFR Part 20 Appendix B Table 2

ND - Not Detected at the Reporting Limit

**Air Filter Summary Report****Client: Cameco Resources, Crow Butte Operation****Client Sample ID: MA-2****Lab ID: S1201090-002****Sampled 10/1/2011-1/4/2012 (2011 4th Qtr)****Sample Air Volume: 3851229 Liters**

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	86.9	6.9	2E-14	2E-15	2E-15	6 E-13	Day	3.33
Radium 226	<0.3		<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.3		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	<0.3		<1E-16		1E-16	9 E-14	Year	0.00



Inter-Mountain Labs

Your Environmental Monitoring Partner

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Air Filter Summary Report

Client: Cameco Resources, Crow Butte Operation

Client Sample ID: MA-3

Lab ID: S1201090-003 Sampled 10/1/2011-1/4/2012 (2011 4th Qtr)					Sample Air Volume: 3852794 Liters			
Analyte	Result pCi/filter	Precision ± pCi/filter	Result μCi/ml	Precision ± μCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	83.0	6.2	2E-14	2E-15	2E-15	6 E-13	Day	3.33
Radium 226	<0.3		<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	0.4	0.4	<1E-16		1E-16	3 E-14	Year	0.00
Uranium	0.3		<1E-16		1E-16	9 E-14	Year	0.00

Effluent Limits are from 10 CFR Part 20 Appendix B Table 2

ND - Not Detected at the Reporting Limit



Inter-Mountain Labs

Your Environmental Monitoring Partner

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Air Filter Summary Report

Client: Cameco Resources, Crow Butte Operation

Client Sample ID: MA-4

Lab ID: S1201090-004

Sampled 10/1/2011-1/4/2012 (2011 4th Qtr)

Sample Air Volume: 3853046 Liters

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	91.2	7.2	2E-14	2E-15	2E-15	6 E-13	Day	3.33
Radium 226	<0.3		<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	<0.3		<1E-16		1E-16	3 E-14	Year	0.00
Uranium	<0.3		<1E-16		1E-16	9 E-14	Year	0.00

Effluent Limits are from 10 CFR Part 20 Appendix B Table 2

ND - Not Detected at the Reporting Limit



Inter-Mountain Labs

Your Environmental Monitoring Partner

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Air Filter Summary Report

Client: Cameco Resources, Crow Butte Operation

Client Sample ID: MA-5

Lab ID: S1201090-005

Sampled 10/1/2011-1/4/2012 (2011 4th Qtr)

Sample Air Volume: 3856136 Liters

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	70.5	6.0	2E-14	2E-15	2E-15	6 E-13	Day	3.33
Radium 226	<0.3		<1E-16		1E-16	9 E-13	Week	0.00
Thorium 230	0.4	0.4	1E-16	1E-16	1E-16	3 E-14	Year	0.33
Uranium	<0.3		<1E-16		1E-16	9 E-14	Year	0.00

Effluent Limits are from 10 CFR Part 20 Appendix B Table 2

ND - Not Detected at the Reporting Limit

Appendix V

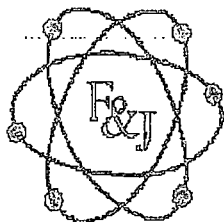
Radiological Records

V-1

Air Sampling Pump Calibration Records

CERTIFICATE OF CALIBRATION

MQ003R01



F&J SPECIALTY PRODUCTS, INC.

PO Box 2888

Ocala, Florida 34478-2888

Tel: (352) 680-1177 • (352) 680-1178

Fax: (352) 680-1454

Email: fandj@fjspecialty.com

Internet: www.fjspecialty.com

The Nucleus of Quality Air Monitoring Programs

MAR-1

CALIBRATED INSTRUMENT:

DIGITAL AIR SAMPLER

P.O. NUMBER: 2379996

MODEL #: DF-75L-BL-AC

SENSOR RANGE: 0.500 to 3.000 SCFM

CUSTOMER: INTER-MOUNTAIN LABS

SERIAL #: 11114

= 14.16 to 84.95 SLPM

REFERENCE SERIAL #: 13277, 0-140 SLPM

LOKAL VERSION: V2.18 (B15144)

CALIBRATION DATE: Mar 09, 2011

RECAL DUE DATE: Mar 09, 2012

BAROMETRIC P: 29.79 InHg = 756.7 mmHg

TEMPERATURE: 72.7 °F = 22.6 °C

CORRECTED TO: 29.92 InHg = 760.0 mmHg

CORRECTED TO: 77.0 °F = 25.0 °C

(X) NEW UNIT

() CALIBRATION AS FOUND

() RE-CALIBRATION REFERENCE

	DIGITAL INSTRUMENT FLOW		REFERENCE INSTRUMENT FLOW		DEVIATION AT READINGS		DEVIATION AT READING	DEVIATION OF FULL SCALE
	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[%]	[%]
1	3.293	93.24	3.302	93.50	-0.009	-0.26	-0.28	-0.31
2	3.088	87.43	3.087	87.40	0.001	0.03	0.04	0.04
3	2.840	80.42	2.829	80.10	0.011	0.32	0.40	0.38
4	2.496	70.67	2.477	70.13	0.019	0.54	0.77	0.63
5	2.157	61.08	2.134	60.43	0.023	0.65	1.07	0.76
6	1.823	51.61	1.810	51.27	0.012	0.35	0.67	0.41
7	1.378	39.02	1.367	38.70	0.011	0.32	0.83	0.38
8	0.994	28.15	0.989	28.00	0.005	0.15	0.53	0.17
9	0.682	19.30	0.671	19.00	0.011	0.30	1.59	0.36
10	0.400	11.33	0.367	10.40	0.033	0.93	8.90	1.09

AVERAGE DEVIATION ACROSS THE RANGE AT READING:

1.51

0.45

INSTRUMENT ACCURACY: 4.0 % of full scale = 0.120 SCFM = 3.40 SLPM

This is to certify that F&J Specialty Products in Ocala, Florida, has on this date certified Digital Instrument model # DF-75L-BL-AC serial # 11114 to be within the instrument accuracy specified above. The Reference Flow Meter Device bears letters of certification traceable to the National Institute of Standards and Technology.

CALIBRATED BY:

QUALITY ASSURANCE:

CALIBRATION
DF-75L-BL-AC

MAR-1

Network: Marland/3 CrowSerial #: 11114Date: 11/10/2011

Notes on instrument as found:

Sampler ID: DF-75L-BL-ACServiced by: R. Grantham

Set Sampler Flow (LPM)	Indicated Flow (LPM)	Actual Flow (LPM)	Deviation (LPM)	Deviation < 3.0 LPM/ (Y/N)
70	68.80	69.30	0.50	YES
60	58.90	58.80	0.10	YES
50	49.20	48.20	1.00	YES
40	39.70	37.70	2.00	YES
30	29.90	28.20	1.70	YES
20	20	20.8	0.80	YES

Digital Flow Meter Low Volume Series Acceptable Deviation = 4% of Full Scale (3.0 LPM)

Notes, comments:

CERTIFICATE OF CALIBRATION

F&J SPECIALTY PRODUCTS, INC.

404 Cypress Road

Ocala, FL 34472

352-680-1177

352-680-1454

MAR-1

CAL057

3

3/15/2011

MODEL #: DF-75L-BL-AC SERIAL #: 1114

REFERENCE INSTRUMENT: CD-8.12V.2-1-0

CALIBRATION DATE: 5/31/2012

REFERENCE SERIAL #: 3551

RECALIBRATION DATE: 05/26/12

REFERENCE CALIBRATED: 05/15/2012

11/30/2012

INSTRUMENT ACCURACY AT FULL SCALE:

+/- 4%

☒ AS RECEIVED

☐ VERIFIED

	DEVICE UNDER TEST		REFERENCE INSTRUMENT		DEVIATION AT		ACCURACY AS % of		PASS/FAIL
	FLOW		FLOW		READING		RDG.	F.S.	
	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[%]	[%]	
1	2.075	58.78	2.071	58.66	0.004	0.12	0.21	0.16	P
2	2.073	58.72	2.069	58.60	0.004	0.12	0.20	0.16	P
3	1.870	52.98	1.883	53.35	-0.013	-0.37	-0.70	-0.50	P
4	1.733	49.08	1.747	49.50	-0.015	-0.41	-0.84	-0.55	P
5	1.529	43.33	1.535	43.49	-0.006	-0.16	-0.38	-0.22	P
6	1.388	39.31	1.381	39.13	0.006	0.18	0.45	0.23	P
7	1.187	33.63	1.156	32.74	0.032	0.89	2.73	1.19	P
8	1.047	29.66	1.002	28.38	0.045	1.28	4.51	1.71	P
9	0.706	20.01	0.676	19.16	0.030	0.85	4.41	1.13	P
10	0.500	14.18	0.526	14.89	-0.025	-0.71	-4.77	-0.95	P

AVERAGE DEVIATION ACROSS THE RANGE AT READING:

0.68

This is to certify that the instrument indicated on this certificate to be within the instrument accuracy specified above. The Reference Device bears letters of certification traceable to the National Institute of Standards and Technology (NIST).

CALIBRATED BY:

INSPECTED BY:

Calibration Software and Equipment provided by F&J SPECIALTY PRODUCTS, INC.

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CAL057

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3/15/2011

MAR-1

MODEL #: DF-75L-BL-AC SERIAL #: 11114

REFERENCE INSTRUMENT: CD-8.12V.2-1-0

CALIBRATION DATE: 8_2_2012

REFERENCE SERIAL #: 3551

RECALIBRATION DATE: ~~03/02/2013~~

REFERENCE CALIBRATED: 05/15/2012

05/02/2013

INSTRUMENT ACCURACY AT FULL SCALE:

+/- 4%

☒ AS RECEIVED

☐ VERIFIED

	DEVICE UNDER TEST FLOW		REFERENCE INSTRUMENT FLOW		DEVIATION AT READING		ACCURACY AS % of		PASS/FAIL
	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[SCFM]	[SLPM]	RDG. [%]	F.S. [%]	
1	2.166	61.37	2.181	61.78	-0.014	-0.41	-0.66	-0.55	P
2	2.043	57.87	2.070	58.64	-0.027	-0.77	-1.31	-1.02	P
3	1.938	54.91	1.966	55.70	-0.028	-0.79	-1.41	-1.05	P
4	1.869	52.96	1.903	53.91	-0.034	-0.96	-1.77	-1.27	P
5	1.801	51.03	1.833	51.93	-0.032	-0.91	-1.75	-1.21	P
6	1.737	49.19	1.777	50.35	-0.041	-1.15	-2.29	-1.54	P
7	1.664	47.14	1.698	48.11	-0.034	-0.97	-2.03	-1.30	P
8	1.397	39.58	1.412	39.99	-0.014	-0.41	-1.02	-0.54	P
9	1.056	29.91	1.033	29.26	0.023	0.65	2.22	0.87	P
10	0.715	20.26	0.708	20.07	0.007	0.20	0.98	0.26	P

AVERAGE DEVIATION ACROSS THE RANGE AT READING:

0.96

This is to certify that the instrument indicated on this certificate to be within the instrument accuracy specified above. The Reference Device bears letters of certification traceable to the National Institute of Standards and Technology (NIST).

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CAL057
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3/15/2011

MAR-1

MODEL #: DF-75L-BL-AC SERIAL #: 1114

REFERENCE INSTRUMENT: CD-8.12V.2-1-0 CALIBRATION DATE: 10_15_2012
REFERENCE SERIAL #: 3551 RECALIBRATION DATE: ~~10/15/2013~~
REFERENCE CALIBRATED: 05/15/2012 4/15/2013

INSTRUMENT ACCURACY AT FULL SCALE: +/- 4%

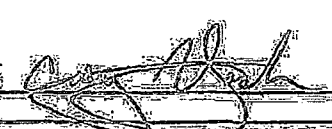
☒ AS RECEIVED

☐ VERIFIED

	DEVICE UNDER TEST FLOW		REFERENCE INSTRUMENT FLOW		DEVIATION AT READING		ACCURACY AS % of		PASS/FAIL
	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[SCFM]	[SLPM]	RDG. [%]	F.S. [%]	
1	2.267	64.22	2.264	64.13	0.003	0.09	0.14	0.12	P
2	2.082	58.98	2.088	59.43	-0.016	-0.46	-0.77	-0.61	P
3	1.936	54.85	1.964	55.64	-0.028	-0.79	-1.41	-1.05	P
4	1.875	53.13	1.904	53.94	-0.029	-0.81	-1.51	-1.09	P
5	1.800	50.99	1.830	51.85	-0.030	-0.86	-1.66	-1.15	P
6	1.734	49.12	1.766	50.04	-0.032	-0.92	-1.83	-1.22	P
7	1.593	45.14	1.622	45.96	-0.029	-0.82	-1.79	-1.10	P
8	1.393	39.46	1.401	39.68	-0.008	-0.22	-0.55	-0.29	P
9	1.047	29.67	1.022	28.95	0.025	0.72	2.47	0.95	P
10	0.704	19.93	0.688	19.50	0.015	0.43	2.22	0.58	P

AVERAGE DEVIATION ACROSS THE RANGE AT READING: 0.82

This is to certify that the instrument indicated on this certificate to be within the instrument accuracy specified above. The Reference Device bears letters of certification traceable to the National Institute of Standards and Technology (NIST).

CALIBRATED BY: 

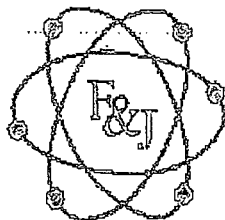
INSPECTED BY: 

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Fax: (352) 680-1454

Email: fandj@fjspecialty.com

Internet: www.fjspecialty.com

The Nucleus of Quality Air Monitoring Programs

MAR-1

CALIBRATED INSTRUMENT: DIGITAL AIR SAMPLER

P.O. NUMBER: 239367

MODEL #: DF-75L-BL-AC

SENSOR RANGE: 0.500 to 3.000 SCFM

CUSTOMER: CROW BUTTE RESOURCES

SERIAL #: 11497

= 14.16 to 84.95 SLPM

REFERENCE SERIAL #: 13277, 0-140 SLPM

LOKAL VERSION: V2.18 (B15144)

CALIBRATION DATE: Mar 14, 2012

RECAL DUE DATE: Mar 14, 2013

BAROMETRIC P: 30.08 InHg = 764.0 mmHg

TEMPERATURE: 70.6 °F = 21.4 °C

CORRECTED TO: 29.92 InHg = 760.0 mmHg

CORRECTED TO: 77.0 °F = 25.0 °C

(X) NEW UNIT

() CALIBRATION AS FOUND

() RE-CALIBRATION REFERENCE

	DIGITAL INSTRUMENT FLOW		REFERENCE INSTRUMENT FLOW		DEVIATION AT READINGS		DEVIATION AT READING	DEVIATION OF FULL SCALE
	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[%]	[%]
1	3.319	93.98	3.300	93.43	0.019	0.55	0.59	0.65
2	3.078	87.17	3.081	87.23	-0.002	-0.07	-0.07	-0.08
3	2.865	81.14	2.841	80.43	0.025	0.70	0.87	0.83
4	2.483	70.32	2.475	70.10	0.008	0.22	0.32	0.26
5	2.164	61.29	2.168	61.40	-0.004	-0.11	-0.18	-0.13
6	1.842	52.17	1.822	51.60	0.020	0.57	1.10	0.67
7	1.421	40.25	1.384	39.20	0.037	1.05	2.67	1.23
8	1.013	28.68	0.998	28.27	0.014	0.41	1.45	0.48
9	0.673	19.07	0.670	18.97	0.004	0.10	0.52	0.12
10	0.450	12.73	0.374	10.60	0.075	2.14	20.14	2.51

AVERAGE DEVIATION ACROSS THE RANGE AT READING:

2.79

0.70

INSTRUMENT ACCURACY: 4.0 % of full scale = 0.120 SCFM = 3.40 SLPM

This is to certify that F&J Specialty Products in Ocala, Florida, has on this date certified Digital Instrument model # DF-75L-BL-AC serial # 11497 to be within the instrument accuracy specified above. The Reference Flow Meter Device bears letters of certification traceable to the National Institute of Standards and Technology.

CALIBRATED BY:

QUALITY ASSURANCE:

CERTIFICATE OF CALIBRATION

F&J SPECIALTY PRODUCTS, INC.

404 Cypress Road

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352-680-1177

352-680-1454

CAL057

3

3/15/2011

MAR-1

MODEL #: DF-75L-BL-AC SERIAL #: 11497

REFERENCE INSTRUMENT: CD-8.12V.2-1-0 CALIBRATION DATE: 8_1_2012
REFERENCE SERIAL #: 3551 RECALIBRATION DATE: ~~08/01/2013~~
REFERENCE CALIBRATED: 05/15/2012 02/01/2013

INSTRUMENT ACCURACY AT FULL SCALE: +/- 4%

☒ AS RECEIVED

☐ VERIFIED

	DEVICE UNDER TEST		REFERENCE INSTRUMENT		DEVIATION AT READING		ACCURACY AS % of		PASS/FAIL
	FLOW		FLOW						
	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[RDG.]	[F.S.]	
							[%]	[%]	
1	2.299	65.12	2.278	64.53	0.021	0.59	0.92	0.79	P
2	2.076	58.82	2.102	59.55	-0.026	-0.73	-1.22	-0.97	P
3	1.939	54.93	1.966	55.70	-0.027	-0.77	-1.38	-1.02	P
4	1.874	53.08	1.902	53.89	-0.028	-0.81	-1.49	-1.07	P
5	1.806	51.15	1.833	51.93	-0.028	-0.78	-1.51	-1.05	P
6	1.735	49.14	1.764	49.98	-0.030	-0.84	-1.68	-1.12	P
7	1.665	47.17	1.675	47.46	-0.010	-0.30	-0.62	-0.39	P
8	1.395	39.52	1.367	38.72	0.028	0.80	2.07	1.07	P
9	1.061	30.06	1.022	28.95	0.039	1.11	3.84	1.48	P
10	0.703	19.90	0.703	19.92	-0.001	-0.02	-0.10	-0.03	P

AVERAGE DEVIATION ACROSS THE RANGE AT READING: 0.90

This is to certify that the instrument indicated on this certificate to be within the instrument accuracy specified above. The Reference Device bears letters of certification traceable to the National Institute of Standards and Technology (NIST).

CALIBRATED BY: 

INSPECTED BY: 

Calibration Software and Equipment provided by F&J SPECIALTY PRODUCTS, INC.

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CERTIFICATE OF CALIBRATION

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MAR-1

CAL057

3

3/15/2011

MODEL #: DF-75L-BL-AC SERIAL #: 11106

REFERENCE INSTRUMENT: CD-8.12V.2-1-0

CALIBRATION DATE: 10/15/2012

REFERENCE SERIAL #: 3551

RECALIBRATION DATE: 10/15/2013

REFERENCE CALIBRATED: 05/15/2012

4/15/2013

INSTRUMENT ACCURACY AT FULL SCALE: +/- 4%

☒ AS RECEIVED

☐ VERIFIED

	DEVICE UNDER TEST		REFERENCE INSTRUMENT		DEVIATION AT		ACCURACY AS % of		PASS/FAIL
	FLOW		FLOW		READING		RDG.	F.S.	
	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[%]	[%]	
1	2.220	62.88	2.232	63.23	-0.012	-0.34	-0.54	-0.46	P
2	2.075	58.78	2.106	59.66	-0.031	-0.88	-1.48	-1.17	P
3	1.940	54.96	1.987	56.29	-0.047	-1.33	-2.37	-1.76	P
4	1.868	52.93	1.914	54.23	-0.046	-1.30	-2.39	-1.73	P
5	1.802	51.04	1.845	52.27	-0.043	-1.23	-2.35	-1.64	P
6	1.731	49.03	1.766	50.04	-0.036	-1.01	-2.02	-1.35	P
7	1.591	45.08	1.606	45.51	-0.015	-0.43	-0.94	-0.57	P
8	1.385	39.24	1.356	38.40	0.030	0.84	2.18	1.12	P
9	1.053	29.83	0.996	28.22	0.057	1.61	5.71	2.15	P
10	0.713	20.21	0.692	19.61	0.021	0.59	3.02	0.79	P

AVERAGE DEVIATION ACROSS THE RANGE AT READING: 1.28

This is to certify that the instrument indicated on this certificate to be within the instrument accuracy specified above. The Reference Device bears letters of certification traceable to the National Institute of Standards and Technology (NIST).

CALIBRATED BY:

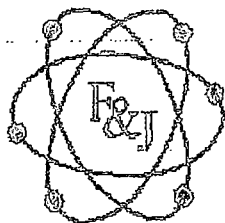
INSPECTED BY:

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CERTIFICATE OF CALIBRATION

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Internet: www.fjspecialty.com

The Nucleus of Quality Air Monitoring Programs

MAR-2

CALIBRATED INSTRUMENT:

DIGITAL AIR SAMPLER

P.O. NUMBER: 2379996

CUSTOMER: INTER-MOUNTAIN LABS

MODEL #: DF-75L-BL-AC

SERIAL #: 11110

SENSOR RANGE: 0.500 to 3.000 SCFM

= 14.16 to 84.95 SLPM

REFERENCE SERIAL #: 13277, 0-140 SLPM

CALIBRATION DATE: Feb 22, 2011

LOKAL VERSION: V2.18 (B15144)

RECAL DUE DATE: Feb 22, 2012

BAROMETRIC P: 29.80 InHg = 756.9 mmHg

CORRECTED TO: 29.92 InHg = 760.0 mmHg

TEMPERATURE: 72.4 °F = 22.4 °C

CORRECTED TO: 77.0 °F = 25.0 °C

(X) NEW UNIT

() CALIBRATION AS FOUND

() RE-CALIBRATION REFERENCE

	DIGITAL INSTRUMENT FLOW		REFERENCE INSTRUMENT FLOW		DEVIATION AT READINGS		DEVIATION AT READING	DEVIATION OF FULL SCALE
	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[%]	[%]
1	3.279	92.86	3.270	92.60	0.009	0.26	0.28	0.31
2	3.064	86.77	3.050	86.37	0.014	0.40	0.47	0.48
3	2.842	80.48	2.825	80.00	0.017	0.48	0.59	0.56
4	2.479	70.19	2.457	69.57	0.022	0.62	0.90	0.73
5	2.167	61.37	2.144	60.70	0.024	0.67	1.11	0.79
6	1.809	51.22	1.794	50.80	0.015	0.42	0.82	0.49
7	1.376	38.96	1.374	38.90	0.002	0.06	0.15	0.07
8	0.994	28.16	0.996	28.20	-0.002	-0.05	-0.16	-0.05
9	0.665	18.84	0.658	18.63	0.007	0.21	1.11	0.24
10	0.397	11.24	0.357	10.10	0.040	1.14	11.30	1.34

AVERAGE DEVIATION ACROSS THE RANGE AT READING:

1.69

0.51

INSTRUMENT ACCURACY: 4.0 % of full scale = 0.120 SCFM = 3.40 SLPM

This is to certify that F&J Specialty Products in Ocala, Florida, has on this date certified Digital Instrument model # DF-75L-BL-AC serial # 11110 to be within the instrument accuracy specified above. The Reference Flow Meter Device bears letters of certification traceable to the National Institute of Standards and Technology.

CALIBRATED BY:

QUALITY ASSURANCE:

CALIBRATION
DF-75L-BL-AC

MAR-2

Network: Marsland/3 Crow
Date: 11/10/2011
Sampler ID: DF-75L-BL-AC
Serviced by: R. Grantham

Serial #: 11110
Notes on instrument as found:

Set Sampler Flow (LPM)	Indicated Flow (LPM)	Actual Flow (LPM)	Deviation (LPM)	Deviation < 3.0 LPM (Y/N)
70	68.80	68.90	0.10	YES
60	59.10	58.90	0.20	YES
50	49.10	48.20	0.90	YES
40	39.50	37.80	1.70	YES
30	30.00	28.40	1.60	YES
20	19.9	21	1.10	YES

Digital Flow Meter Low Volume Series Acceptable Deviation = 4% of Full Scale (3.0 LPM)

Notes, comments:

CERTIFICATE OF CALIBRATION

F&J SPECIALTY PRODUCTS, INC.

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Ocala, FL 34472
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352-680-1454

CAL057
3
3/15/2011

MAR-2

MODEL #: DF-75L-BL-AC SERIAL #: 1110

REFERENCE INSTRUMENT: CD-8.12V.2-1-0 CALIBRATION DATE: 5_31_2012
REFERENCE SERIAL #: 3551 RECALIBRATION DATE: ~~05/31/2012~~
REFERENCE CALIBRATED: 05/15/2012 ~~11/30/2012~~

INSTRUMENT ACCURACY AT FULL SCALE: +/- 4%

☒ AS RECEIVED

☐ VERIFIED

DEVICE UNDER TEST FLOW			REFERENCE INSTRUMENT FLOW		DEVIATION AT READING		ACCURACY AS % of		PASS/FAIL
[SCFM]	[SLPM]		[SCFM]	[SLPM]	[SCFM]	[SLPM]	RDG. [%]	F.S. [%]	
1	2.003	56.73	2.004	56.76	-0.001	-0.03	-0.05	-0.03	P
2	2.000	56.67	1.998	56.59	0.003	0.08	0.13	0.10	P
3	1.871	53.00	1.882	53.32	-0.012	-0.33	-0.61	-0.44	P
4	1.739	49.25	1.749	49.55	-0.011	-0.30	-0.61	-0.40	P
5	1.528	43.28	1.536	43.52	-0.008	-0.24	-0.55	-0.32	P
6	1.387	39.30	1.382	39.16	0.005	0.14	0.35	0.18	P
7	1.184	33.54	1.160	32.85	0.025	0.70	2.12	0.93	P
8	1.040	29.47	0.995	28.18	0.045	1.29	4.56	1.71	P
9	0.698	19.78	0.670	18.99	0.028	0.79	4.15	1.05	P
10	0.501	14.20	0.523	14.80	-0.021	-0.61	-4.10	-0.81	P

AVERAGE DEVIATION ACROSS THE RANGE AT READING: 0.60

This is to certify that the instrument indicated on this certificate to be within the instrument accuracy specified above. The Reference Device bears letters of certification traceable to the National Institute of Standards and Technology (NIST).

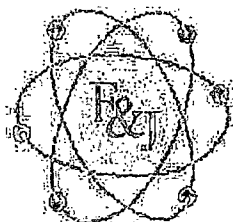
CALIBRATED BY: 

INSPECTED BY: 

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CERTIFICATE OF CALIBRATION

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Internet: www.fjspecialty.com

The Nucleus of Quality Air Monitoring Programs

MAR-2

CALIBRATED INSTRUMENT: DIGITAL AIR SAMPLER

P.O. NUMBER: 239367

CUSTOMER: CROW BUTTE RESOURCES

MODEL #: DF-75L-BL-AC

SERIAL #: 11491

SENSOR RANGE: 0.500 to 3.000 SCFM

= 14.16 to 84.95 SLPM

REFERENCE SERIAL #: 13277, 0-140 SLPM

CALIBRATION DATE: Mar 14, 2012

LOKAL VERSION: V2.18 (B15144)

RECAL DUE DATE: Mar 14, 2013

BAROMETRIC P: 30.17 InHg = 766.3 mmHg

CORRECTED TO: 29.92 InHg = 760.0 mmHg

TEMPERATURE: 71.8 °F = 22.1 °C

CORRECTED TO: 77.0 °F = 25.0 °C

(X) NEW UNIT

() CALIBRATION AS FOUND

() RE-CALIBRATION REFERENCE

	DIGITAL INSTRUMENT FLOW		REFERENCE INSTRUMENT FLOW		DEVIATION AT READINGS		DEVIATION AT READING	DEVIATION AT READING (FULL SCALE)
	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[%]	[%]
1	3.255	92.16	3.245	91.90	0.009	0.26	0.29	0.31
2	3.028	85.74	3.036	85.97	-0.008	-0.23	-0.27	-0.27
3	2.827	80.05	2.805	79.43	0.022	0.62	0.77	0.73
4	2.451	69.40	2.444	69.20	0.007	0.20	0.29	0.24
5	2.129	60.29	2.134	60.43	-0.005	-0.15	-0.24	-0.17
6	1.814	51.38	1.798	50.90	0.017	0.48	0.93	0.56
7	1.402	39.71	1.367	38.70	0.036	1.01	2.54	1.19
8	0.998	28.25	0.990	28.03	0.008	0.22	0.77	0.26
9	0.652	18.47	0.660	18.70	-0.008	-0.23	-1.24	-0.27
10	0.425	12.04	0.360	10.20	0.065	1.84	15.31	2.17

AVERAGE DEVIATION ACROSS THE RANGE AT READING:

2.55

0.62

INSTRUMENT ACCURACY: 4.0 % of full scale = 0.120 SCFM = 3.40 SLPM

This is to certify that F&J Specialty Products in Ocala, Florida, has on this date certified Digital Instrument model # DF-75L-BL-AC serial # 11491 to be within the instrument accuracy specified above. The Reference Flow Meter Device bears letters of certification traceable to the National Institute of Standards and Technology.

CALIBRATED BY:

QUALITY ASSURANCE:

CERTIFICATE OF CALIBRATION

F&J SPECIALTY PRODUCTS, INC.

404 Cypress Road

Ocala, FL 34472

352-680-1177

352-680-1454

CAL057

3

3/15/2011

MAR-2

MODEL #: DF-75L-BL-AC SERIAL #: 11491

REFERENCE INSTRUMENT: CD-8.12V.2-1-0

CALIBRATION DATE: 8_1_2012

REFERENCE SERIAL #: 3551

RECALIBRATION DATE: ~~08/01/2013~~

REFERENCE CALIBRATED: 05/15/2012

~~02/01/2013~~

INSTRUMENT ACCURACY AT FULL SCALE: +/- 4%

☒ AS RECEIVED

☐ VERIFIED

	DEVICE UNDER TEST		REFERENCE INSTRUMENT		DEVIATION AT READING		ACCURACY AS % of		PASS/FAIL
	FLOW		FLOW		READING		RDG.	F.S.	
	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[%]	[%]	
1	2.278	64.53	2.249	63.71	0.029	0.83	1.30	1.10	P
2	2.123	60.14	2.125	60.20	-0.002	-0.06	-0.10	-0.08	P
3	1.940	54.96	1.972	55.87	-0.032	-0.91	-1.63	-1.21	P
4	1.884	53.38	1.917	54.31	-0.033	-0.93	-1.71	-1.24	P
5	1.852	52.46	1.884	53.38	-0.032	-0.92	-1.72	-1.22	P
6	1.732	49.06	1.755	49.73	-0.023	-0.66	-1.33	-0.88	P
7	1.662	47.09	1.681	47.63	-0.019	-0.54	-1.13	-0.72	P
8	1.392	39.43	1.359	38.49	0.033	0.94	2.44	1.25	P
9	1.060	30.03	1.021	28.92	0.039	1.10	3.81	1.47	P
10	0.705	19.96	0.707	20.04	-0.003	-0.08	-0.38	-0.10	P

AVERAGE DEVIATION ACROSS THE RANGE AT READING: 0.93

This is to certify that the instrument indicated on this certificate to be within the instrument accuracy specified above. The Reference Device bears letters of certification traceable to the National Institute of Standards and Technology (NIST).

CALIBRATED BY: 

INSPECTED BY: 

Calibration Software and Equipment provided by F&J SPECIALTY PRODUCTS, INC.

404 Cypress Road, Ocala, FL 34472 - Tel: 352-680-1177 - Fax: 352-680-1454 - WWW: www.fjspecialty.com

CERTIFICATE OF CALIBRATION

F&J SPECIALTY PRODUCTS, INC.

404 Cypress Road

Ocala, FL 34472

352-680-1177

352-680-1454

MAR-2

CAL057

3

3/15/2011

MODEL #: DF-75L-BL-AC SERIAL #: 11114

REFERENCE INSTRUMENT: CD-8.12V.2-1-0

CALIBRATION DATE: 8.2.2012

REFERENCE SERIAL #: 3551

RECALIBRATION DATE: ~~08/02/2013~~

REFERENCE CALIBRATED: 05/15/2012

05/02/2013

INSTRUMENT ACCURACY AT FULL SCALE: +/- 4%

☒ AS RECEIVED

☐ VERIFIED

	DEVICE UNDER TEST		REFERENCE INSTRUMENT		DEVIATION AT READING		ACCURACY AS % of		PASS/FAIL
	FLOW		FLOW				RDG.	F.S.	
	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[%]	[%]	
1	2.166	61.37	2.181	61.78	-0.014	-0.41	-0.66	-0.55	P
2	2.043	57.87	2.070	58.64	-0.027	-0.77	-1.31	-1.02	P
3	1.938	54.91	1.966	55.70	-0.028	-0.79	-1.41	-1.05	P
4	1.869	52.96	1.903	53.91	-0.034	-0.96	-1.77	-1.27	P
5	1.801	51.03	1.833	51.93	-0.032	-0.91	-1.75	-1.21	P
6	1.737	49.19	1.777	50.35	-0.041	-1.15	-2.29	-1.54	P
7	1.664	47.14	1.698	48.11	-0.034	-0.97	-2.03	-1.30	P
8	1.397	39.58	1.412	39.99	-0.014	-0.41	-1.02	-0.54	P
9	1.056	29.91	1.033	29.26	0.023	0.65	2.22	0.87	P
10	0.715	20.26	0.708	20.07	0.007	0.20	0.98	0.26	P

AVERAGE DEVIATION ACROSS THE RANGE AT READING: 0.96

This is to certify that the instrument indicated on this certificate to be within the instrument accuracy specified above. The Reference Device bears letters of certification traceable to the National Institute of Standards and Technology (NIST).

CALIBRATED BY:

INSPECTED BY:

Calibration Software and Equipment provided by F&J SPECIALTY PRODUCTS, INC.

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CERTIFICATE OF CALIBRATION

F&J SPECIALTY PRODUCTS, INC.

404 Cypress Road
Ocala, FL 34472
352-680-1177
352-680-1454

CAL057
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3/15/2011

MAR-2

MODEL #: DF-75L-BL-AC SERIAL #: 11114

REFERENCE INSTRUMENT: CD-8.12V.2-1-0 CALIBRATION DATE: 10_15_2012
REFERENCE SERIAL #: 3551 RECALIBRATION DATE: ~~10/15/2013~~
REFERENCE CALIBRATED: 05/15/2012 4/15/2013

INSTRUMENT ACCURACY AT FULL SCALE: +/- 4%

☒ AS RECEIVED

☐ VERIFIED

	DEVICE UNDER TEST		REFERENCE INSTRUMENT		DEVIATION AT READING		ACCURACY AS % of		PASS/FAIL
	FLOW [SCFM]	[SLPM]	FLOW [SCFM]	[SLPM]	[SCFM]	[SLPM]	RDG. [%]	F.S. [%]	
1	2.267	64.22	2.264	64.13	0.003	0.09	0.14	0.12	P
2	2.082	58.98	2.098	59.43	-0.016	-0.46	-0.77	-0.61	P
3	1.936	54.85	1.964	55.64	-0.028	-0.79	-1.41	-1.05	P
4	1.875	53.13	1.904	53.94	-0.029	-0.81	-1.51	-1.09	P
5	1.800	50.99	1.830	51.85	-0.030	-0.86	-1.66	-1.15	P
6	1.734	49.12	1.766	50.04	-0.032	-0.92	-1.83	-1.22	P
7	1.593	45.14	1.622	45.96	-0.029	-0.82	-1.79	-1.10	P
8	1.393	39.46	1.401	39.68	-0.008	-0.22	-0.55	-0.29	P
9	1.047	29.67	1.022	28.95	0.025	0.72	2.47	0.95	P
10	0.704	19.93	0.688	19.50	0.015	0.43	2.22	0.58	P

AVERAGE DEVIATION ACROSS THE RANGE AT READING: 0.82

This is to certify that the instrument indicated on this certificate to be within the instrument accuracy specified above. The Reference Device bears letters of certification traceable to the National Institute of Standards and Technology (NIST).

CALIBRATED BY: 

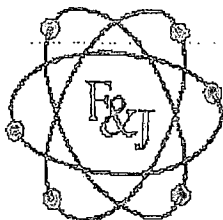
INSPECTED BY: 

Calibration Software and Equipment provided by F&J SPECIALTY PRODUCTS, INC.

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CERTIFICATE OF CALIBRATION

MQ003R01



F&J SPECIALTY PRODUCTS, INC.

PO Box 2888

Ocala, Florida 34478-2888

Tel: (352) 680-1177 • (352) 680-1178

Fax: (352) 680-1454

Email: fandj@fjspecialty.com

Internet: www.fjspecialty.com

The Nucleus of Quality Air Monitoring Programs

MAR-3

CALIBRATED INSTRUMENT:

DIGITAL AIR SAMPLER

P.O. NUMBER: 2379996

CUSTOMER: INTER-MOUNTAIN LABS

MODEL #: DF-75L-BL-AC

SERIAL #: 11111

SENSOR RANGE: 0.500 to 3.000 SCFM

= 14.16 to 84.95 SLPM

REFERENCE SERIAL #: 13277, 0-140 SLPM

CALIBRATION DATE: Mar 09, 2011

LOKAL VERSION: V2.18 (B15144)

RECAL DUE DATE: Mar 09, 2012

BAROMETRIC P: 29.77 InHg = 756.2 mmHg

CORRECTED TO: 29.92 InHg = 760.0 mmHg

TEMPERATURE: 72.9 °F = 22.7 °C

CORRECTED TO: 77.0 °F = 25.0 °C

(X) NEW UNIT

() CALIBRATION AS FOUND

() RE-CALIBRATION REFERENCE

	DIGITAL INSTRUMENT FLOW		REFERENCE INSTRUMENT FLOW		DEVIATION AT READINGS		DEVIATION AT READING	DEVIATION OF FULL SCALE
	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[%]	[%]
1	3.217	91.10	3.257	92.23	-0.040	-1.14	-1.23	-1.34
2	3.019	85.48	3.042	86.13	-0.023	-0.65	-0.76	-0.77
3	2.797	79.20	2.810	79.57	-0.013	-0.37	-0.46	-0.43
4	2.447	69.30	2.443	69.17	0.005	0.13	0.19	0.16
5	2.122	60.10	2.108	59.70	0.014	0.40	0.66	0.47
6	1.805	51.11	1.794	50.80	0.011	0.31	0.61	0.37
7	1.364	38.62	1.356	38.40	0.008	0.22	0.56	0.25
8	0.971	27.50	0.968	27.40	0.004	0.10	0.38	0.12
9	0.653	18.49	0.660	18.70	-0.007	-0.21	-1.12	-0.25
10	0.332	9.41	0.357	10.10	-0.024	-0.69	-6.84	-0.81

AVERAGE DEVIATION ACROSS THE RANGE AT READING:

1.28

0.50

INSTRUMENT ACCURACY: 4.0 % of full scale = 0.120 SCFM = 3.40 SLPM

This is to certify that F&J Specialty Products in Ocala, Florida, has on this date certified Digital Instrument model # DF-75L-BL-AC serial # 11111 to be within the instrument accuracy specified above. The Reference Flow Meter Device bears letters of certification traceable to the National Institute of Standards and Technology.

CALIBRATED BY:

QUALITY ASSURANCE:

CALIBRATION
DF-75L-BL-AC

MAR - 3

Network: Marsland/Crow

Date: 11/10/2011

Sampler ID: DF-75L-BL-AC

Serviced by: R. Grantham

Serial #: 11111

Notes on instrument as found:

Set Sampler Flow (LPM)	Indicated Flow (LPM)	Actual Flow (LPM)	Deviation (LPM)	Deviation < 3.0 LPM (Y/N)
70	69.80	69.50	0.70	YES
60	59.00	59.00	0.00	YES
50	49.40	48.00	1.40	YES
40	39.40	37.00	2.40	YES
30	30.00	28.00	2.00	YES
20	20.1	20.8	0.70	YES

Digital Flow Meter Low Volume Series Acceptable Deviation = 4% of Full Scale (3.0 LPM)

Notes, comments:

Very slow to Reach Set Flow

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F&J SPECIALTY PRODUCTS, INC.

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Ocala, FL 34472

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MAR - 3

CAL057

3

3/15/2011

MODEL #: DF-75L-BL-AC SERIAL #: 1111

REFERENCE INSTRUMENT: CD-8.12V.2-1-0

CALIBRATION DATE: 5-31-2012

REFERENCE SERIAL #: 3551

RECALIBRATION DATE: 05/31/2012

REFERENCE CALIBRATED: 05/15/2012

INSTRUMENT ACCURACY AT FULL SCALE: +/- 4%

☒ AS RECEIVED

☐ VERIFIED

	DEVICE UNDER TEST		REFERENCE INSTRUMENT		DEVIATION AT		ACCURACY AS % of		PASS/FAIL
	FLOW		FLOW		READING		RDG.	F.S.	
	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[%]	[%]	
1	1.997	56.58	2.006	56.81	-0.008	-0.23	-0.41	-0.31	P
2	1.994	56.50	2.000	56.65	-0.005	-0.15	-0.27	-0.20	P
3	1.872	53.04	1.880	53.27	-0.008	-0.22	-0.42	-0.30	P
4	1.733	49.10	1.736	49.19	-0.003	-0.09	-0.18	-0.12	P
5	1.526	43.24	1.523	43.15	0.003	0.09	0.20	0.12	P
6	1.389	39.34	1.365	38.66	0.024	0.68	1.76	0.91	P
7	1.183	33.51	1.127	31.93	0.056	1.58	4.95	2.11	P
8	1.045	29.59	0.975	27.63	0.069	1.97	7.12	2.62	P
9	0.707	20.02	0.653	18.49	0.054	1.53	8.26	2.04	P
10	0.505	14.32	0.522	14.78	-0.016	-0.46	-3.09	-0.61	P

AVERAGE DEVIATION ACROSS THE RANGE AT READING: 0.93

This is to certify that the instrument indicated on this certificate to be within the instrument accuracy specified above. The Reference Device bears letters of certification traceable to the National Institute of Standards and Technology (NIST).

CALIBRATED BY:

INSPECTED BY:

Calibration Software and Equipment provided by F&J SPECIALTY PRODUCTS, INC.

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CERTIFICATE OF CALIBRATION

F&J SPECIALTY PRODUCTS, INC.

404 Cypress Road

Ocala, FL 34472

352-680-1177

352-680-1454

MAR-3

MODEL #: DF-75L-BL-AC SERIAL #: 11111

REFERENCE INSTRUMENT: CD-8.12V.2-1-0 CALIBRATION DATE: 10/17/2012

REFERENCE SERIAL #: 3551 RECALIBRATION DATE: 10/17/2012

REFERENCE CALIBRATED: 05/15/2012

INSTRUMENT ACCURACY AT FULL SCALE: +/- 4%

☒ AS RECEIVED

☐ VERIFIED

	DEVICE UNDER TEST		REFERENCE INSTRUMENT		DEVIATION AT		ACCURACY AS % of		PASS/FAIL
	FLOW		FLOW		READING		RDG.	F.S.	
	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[%]	[%]	
1	2.198	62.27	2.212	62.66	-0.014	-0.39	-0.62	-0.52	P
2	1.943	55.03	1.993	56.46	-0.050	-1.43	-2.53	-1.90	P
3	1.922	54.45	1.976	55.98	-0.054	-1.53	-2.73	-2.04	P
4	1.804	51.09	1.852	52.47	-0.049	-1.38	-2.63	-1.84	P
5	1.735	49.14	1.779	50.40	-0.045	-1.27	-2.51	-1.69	P
6	1.667	47.21	1.697	48.08	-0.031	-0.87	-1.81	-1.16	P
7	1.595	45.19	1.609	45.59	-0.014	-0.41	-0.89	-0.54	P
8	1.386	39.26	1.357	38.43	0.029	0.83	2.16	1.11	P
9	1.041	29.50	0.989	28.02	0.052	1.48	5.28	1.97	P
10	0.709	20.08	0.696	19.73	0.013	0.36	1.81	0.48	P

AVERAGE DEVIATION ACROSS THE RANGE AT READING: 1.33

CALIBRATED BY:

INSPECTED BY:

Calibration Software and Equipment provided by F&J SPECIALTY PRODUCTS, INC.

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CERTIFICATE OF CALIBRATION

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Ocala, FL 34472

352-680-1177

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CAL057

3

3/15/2011

MODEL #: DF-75L-BL-AC SERIAL #: 11110

REFERENCE INSTRUMENT: CD-8.12V.2-1-0 CALIBRATION DATE: 8_31_2012
REFERENCE SERIAL #: 3551 RECALIBRATION DATE: 08/31/2013
REFERENCE CALIBRATED: 05/15/2012

INSTRUMENT ACCURACY AT FULL SCALE: +/- 4%

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☐ VERIFIED

	DEVICE UNDER TEST		REFERENCE INSTRUMENT		DEVIATION AT READING		ACCURACY AS % of		PASS/FAIL
	FLOW		FLOW		READING		RDG.	F.S.	
	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[%]	[%]	
1	2.572	72.86	2.544	72.06	0.028	0.81	1.12	1.08	P
2	2.313	65.51	2.295	65.01	0.018	0.50	0.78	0.67	P
3	2.083	59.01	2.090	59.21	-0.007	-0.19	-0.32	-0.26	P
4	1.884	53.38	1.907	54.03	-0.023	-0.65	-1.19	-0.86	P
5	1.803	51.07	1.828	51.79	-0.025	-0.72	-1.39	-0.96	P
6	1.745	49.43	1.772	50.21	-0.027	-0.78	-1.55	-1.03	P
7	1.665	47.16	1.694	48.00	-0.030	-0.84	-1.75	-1.12	P
8	1.393	39.47	1.402	39.71	-0.008	-0.24	-0.60	-0.32	P
9	1.051	29.76	1.023	28.98	0.028	0.78	2.69	1.04	P
10	0.705	19.96	0.682	19.33	0.022	0.63	3.26	0.84	P

AVERAGE DEVIATION ACROSS THE RANGE AT READING: 0.82

This is to certify that the instrument indicated on this certificate to be within the instrument accuracy specified above. The Reference Device bears letters of certification traceable to the National Institute of Standards and Technology (NIST).

CALIBRATED BY:

INSPECTED BY:

Calibration Software and Equipment provided by F&J SPECIALTY PRODUCTS, INC.

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CERTIFICATE OF CALIBRATION

F&J SPECIALTY PRODUCTS, INC.

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352-680-1454

CAL057
3
3/15/2011

MAR-3

MODEL #: DF-75L-BL-AC SERIAL #: 1110

REFERENCE INSTRUMENT: CD-8.12V.2-1-0 CALIBRATION DATE: 10/16/2012
REFERENCE SERIAL #: 3551 RECALIBRATION DATE: ~~10/16/2013~~
REFERENCE CALIBRATED: 05/15/2012 4/16/2013

INSTRUMENT ACCURACY AT FULL SCALE: +/- 4%

☒ AS RECEIVED

☐ VERIFIED

	DEVICE UNDER TEST		REFERENCE INSTRUMENT		DEVIATION AT		ACCURACY AS % of		PASS/FAIL
	FLOW		FLOW		READING		RDG.	F.S.	
	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[%]	[%]	
1	2.364	66.97	2.350	66.57	0.014	0.40	0.60	0.54	P
2	2.085	59.06	2.097	59.40	-0.012	-0.34	-0.58	-0.46	P
3	1.940	54.95	1.966	55.70	-0.026	-0.75	-1.34	-1.00	P
4	1.869	52.94	1.898	53.77	-0.029	-0.83	-1.55	-1.11	P
5	1.800	50.98	1.834	51.96	-0.035	-0.98	-1.89	-1.31	P
6	1.734	49.12	1.763	49.95	-0.029	-0.83	-1.67	-1.11	P
7	1.594	45.16	1.614	45.74	-0.020	-0.58	-1.26	-0.77	P
8	1.398	39.59	1.403	39.74	-0.005	-0.14	-0.36	-0.19	P
9	1.071	30.33	1.045	29.60	0.026	0.72	2.45	0.97	P
10	0.709	20.09	0.704	19.95	0.005	0.14	0.70	0.19	P

AVERAGE DEVIATION ACROSS THE RANGE AT READING: 0.76

This is to certify that the instrument indicated on this certificate to be within the instrument accuracy specified above. The Reference Device bears letters of certification traceable to the National Institute of Standards and Technology (NIST).

CALIBRATED BY:

INSPECTED BY:

Calibration Software and Equipment provided by F&J SPECIALTY PRODUCTS, INC.

404 Cypress Road, Ocala, FL 34472 - Tel: 352-680-1177 - Fax: 352-680-1454 - WWW: www.fjspecialty.com

CERTIFICATE OF CALIBRATION

F&J SPECIALTY PRODUCTS, INC.

404 Cypress Road

Ocala, FL 34472

352-680-1177

352-680-1454

CAL057

3

3/15/2011

MAR-3

MODEL #: DF-75L-BL-AC SERIAL #: 1112

REFERENCE INSTRUMENT: CD-8.12V.2-1-0 CALIBRATION DATE: 5_31_2012
REFERENCE SERIAL #: 3551 RECALIBRATION DATE: ~~05/31/2012~~
REFERENCE CALIBRATED: 05/15/2012 *11/30/2012*

INSTRUMENT ACCURACY AT FULL SCALE: +/- 4%

☒ AS RECEIVED

☐ VERIFIED

	DEVICE UNDER TEST		REFERENCE INSTRUMENT		DEVIATION AT		ACCURACY AS % of		PASS/FAIL
	FLOW		FLOW		READING		RDG.	F.S.	
	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[%]	[%]	
1	1.909	54.07	1.909	54.08	0.000	-0.01	-0.01	-0.01	P
2	1.905	53.98	1.906	53.99	-0.001	-0.01	-0.03	-0.02	P
3	1.867	52.88	1.869	52.96	-0.003	-0.08	-0.15	-0.10	P
4	1.738	49.22	1.740	49.30	-0.003	-0.08	-0.16	-0.10	P
5	1.527	43.27	1.522	43.13	0.005	0.14	0.33	0.19	P
6	1.386	39.25	1.361	38.55	0.025	0.70	1.83	0.94	P
7	1.183	33.51	1.137	32.21	0.046	1.30	4.04	1.73	P
8	1.046	29.63	0.980	27.76	0.066	1.86	6.72	2.49	P
9	0.710	20.11	0.654	18.52	0.056	1.59	8.60	2.12	P
10	0.502	14.21	0.515	14.58	-0.013	-0.37	-2.56	-0.50	P

AVERAGE DEVIATION ACROSS THE RANGE AT READING: 0.82

This is to certify that the instrument indicated on this certificate to be within the instrument accuracy specified above. The Reference Device bears letters of certification traceable to the National Institute of Standards and Technology (NIST).

CALIBRATED BY: *[Signature]*

INSPECTED BY: *[Signature]*

Calibration Software and Equipment provided by F&J SPECIALTY PRODUCTS, INC.

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CERTIFICATE OF CALIBRATION

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352-680-1177

352-680-1454

MAR - 3

CAL057

3

3/15/2011

MODEL #: DF-75L-BL-AC SERIAL #: 1112

REFERENCE INSTRUMENT: CD-8.12V.2-1-0

CALIBRATION DATE: 8.1.2012

REFERENCE SERIAL #: 3551

RECALIBRATION DATE: 08/04/2013

REFERENCE CALIBRATED: 05/15/2012

02/01/2013

INSTRUMENT ACCURACY AT FULL SCALE: +/- 4%

☒ AS RECEIVED

☐ VERIFIED

	DEVICE UNDER TEST FLOW		REFERENCE INSTRUMENT FLOW		DEVIATION AT READING		ACCURACY AS % of		PASS/FAIL
	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[SCFM]	[SLPM]	RDG. [%]	F.S. [%]	
1	2.317	65.63	2.323	65.80	-0.006	-0.17	-0.26	-0.23	P
2	2.083	59.01	2.092	59.26	-0.009	-0.26	-0.44	-0.34	P
3	1.941	54.98	1.956	55.41	-0.015	-0.44	-0.79	-0.58	P
4	1.874	53.08	1.893	53.63	-0.019	-0.55	-1.03	-0.73	P
5	1.803	51.08	1.821	51.59	-0.018	-0.51	-0.99	-0.68	P
6	1.736	49.19	1.760	49.87	-0.024	-0.68	-1.37	-0.91	P
7	1.661	47.06	1.677	47.52	-0.016	-0.46	-0.96	-0.61	P
8	1.387	39.28	1.367	38.72	0.020	0.56	1.46	0.75	P
9	1.041	29.50	0.989	28.02	0.052	1.48	5.28	1.97	P
10	0.703	19.92	0.656	18.59	0.047	1.33	7.15	1.77	P

AVERAGE DEVIATION ACROSS THE RANGE AT READING: 0.86

This is to certify that the instrument indicated on this certificate to be within the instrument accuracy specified above. The Reference Device bears letters of certification traceable to the National Institute of Standards and Technology (NIST).

CALIBRATED BY: 

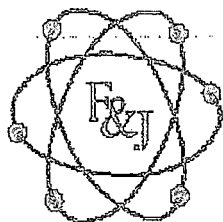
INSPECTED BY: 

Calibration Software and Equipment provided by F&J SPECIALTY PRODUCTS, INC.

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Fax: (352) 680-1454

Email: fandj@fjspecialty.com

Internet: www.fjspecialty.com

The Nucleus of Quality Air Monitoring Programs

MAR-4

CALIBRATED INSTRUMENT:

DIGITAL AIR SAMPLER

P.O. NUMBER: 2379996

CUSTOMER: INTER-MOUNTAIN LABS

MODEL #: DF-75L-BL-AC

SERIAL #: 11115

SENSOR RANGE: 0.500 to 3.000 SCFM

= 14.16 to 84.95 SLPM

REFERENCE SERIAL #: 13277, 0-140 SLPM

CALIBRATION DATE: Mar 09, 2011

LOKAL VERSION: V2.18 (B15144)

RECAL DUE DATE: Mar 09, 2012

BAROMETRIC P: 29.80 InHg = 756.9 mmHg

CORRECTED TO: 29.92 InHg = 760.0 mmHg

TEMPERATURE: 72.2 °F = 22.3 °C

CORRECTED TO: 77.0 °F = 25.0 °C

(X) NEW UNIT

() CALIBRATION AS FOUND

() RE-CALIBRATION REFERENCE

	DIGITAL INSTRUMENT FLOW		REFERENCE INSTRUMENT FLOW		DEVIATION AT READINGS		DEVIATION AT READING	DEVIATION OF FULL SCALE
	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[%]	[%]
1	3.244	91.87	3.280	92.87	-0.035	-1.00	-1.07	-1.17
2	3.037	86.00	3.055	86.50	-0.018	-0.50	-0.58	-0.59
3	2.799	79.27	2.802	79.33	-0.002	-0.07	-0.08	-0.08
4	2.458	69.59	2.447	69.30	0.010	0.29	0.42	0.35
5	2.128	60.27	2.112	59.80	0.016	0.47	0.78	0.55
6	1.818	51.47	1.794	50.80	0.024	0.67	1.32	0.79
7	1.383	39.16	1.367	38.70	0.016	0.46	1.19	0.54
8	0.997	28.23	0.989	28.00	0.008	0.23	0.83	0.27
9	0.668	18.92	0.660	18.70	0.008	0.22	1.20	0.26
10	0.363	10.27	0.360	10.20	0.003	0.07	0.69	0.08

AVERAGE DEVIATION ACROSS THE RANGE AT READING:

0.82

0.47

INSTRUMENT ACCURACY: 4.0 % of full scale = 0.120 SCFM = 3.40 SLPM

This is to certify that F&J Specialty Products in Ocala, Florida, has on this date certified Digital Instrument model # DF-75L-BL-AC serial # 11115 to be within the instrument accuracy specified above. The Reference Flow Meter Device bears letters of certification traceable to the National Institute of Standards and Technology.

CALIBRATED BY:

QUALITY ASSURANCE:

CALIBRATION DF-75L-BL-AC

MAR - 4

Network: Marsland/Crow

Serial #: 11115

Date: 11/10/2011

Notes on instrument as found:

Sampler ID: DF-75L-BL-AC

Serviced by: R. Granham

Set Sampler Flow (LPM)	Indicated Flow (LPM)	Actual Flow (LPM)	Deviation (LPM)	Deviation < 3.0 LPM (Y/N)
70	68.80	69.00	0.20	YES
60	58.90	58.50	0.40	YES
50	49.30	47.50	1.80	YES
40	39.40	36.70	2.70	YES
30	29.60	27.60	2.00	YES
20	19.9	20.4	0.50	YES

Digital Flow Meter Low Volume Series Acceptable Deviation = 4% of Full Scale (3.0 LPM)

Notes, comments:

On/Off Switch Not Working at Beginning

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MAR - 4

CAL057

3

3/15/2011

MODEL #: DF-75L-BL-AC SERIAL #: 1115

REFERENCE INSTRUMENT: CD-8.12V.2-1-0 CALIBRATION DATE: 5.31.2012
REFERENCE SERIAL #: 3551 RECALIBRATION DATE: 05/31/2012
REFERENCE CALIBRATED: 05/15/2012 11/30/2012 ey

INSTRUMENT ACCURACY AT FULL SCALE: +/- 4%

☒ AS RECEIVED

☐ VERIFIED

	DEVICE UNDER TEST		REFERENCE INSTRUMENT		DEVIATION AT		ACCURACY AS % of		PASS/FAIL
	FLOW		FLOW		READING		RDG.	F.S.	
	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[%]	[%]	
1	2.020	57.22	2.016	57.12	0.004	0.10	0.18	0.13	P
2	2.010	56.94	2.007	56.84	0.003	0.10	0.17	0.13	P
3	1.879	53.23	1.879	53.24	0.000	-0.01	-0.01	-0.01	P
4	1.735	49.16	1.736	49.19	-0.001	-0.03	-0.07	-0.04	P
5	1.526	43.23	1.516	42.96	0.010	0.27	0.64	0.36	P
6	1.385	39.23	1.370	38.80	0.015	0.44	1.12	0.58	P
7	1.181	33.47	1.125	31.87	0.056	1.60	5.01	2.13	P
8	1.045	29.60	0.975	27.63	0.070	1.98	7.16	2.64	P
9	0.712	20.16	0.659	18.66	0.053	1.50	8.04	2.00	P
10	0.502	14.22	0.522	14.78	-0.020	-0.56	-3.79	-0.75	P

AVERAGE DEVIATION ACROSS THE RANGE AT READING: 0.88

This is to certify that the instrument indicated on this certificate to be within the instrument accuracy specified above. The Reference Device bears letters of certification traceable to the National Institute of Standards and Technology (NIST).

CALIBRATED BY: 

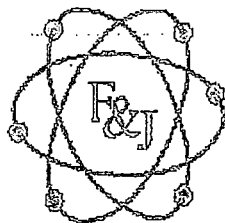
INSPECTED BY: 

Calibration Software and Equipment provided by F&J SPECIALTY PRODUCTS, INC.

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CERTIFICATE OF CALIBRATION

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Tel: (352) 680-1177 • (352) 680-1178

Fax: (352) 680-1454

Email: fandj@fjspecialty.com

Internet: www.fjspecialty.com

The Nucleus of Quality Air Monitoring Programs

MAR-4

CALIBRATED INSTRUMENT: DIGITAL AIR SAMPLER

P.O. NUMBER: 239367

MODEL #: DF-75L-BL-AC

SENSOR RANGE: 0.500 to 3.000 SCFM

CUSTOMER: CROW BUTTE RESOURCES

SERIAL #: 11498

= 14.16 to 84.95 SLPM

REFERENCE SERIAL #: 13277, 0-140 SLPM

LOKAL VERSION: V2.18 (B15144)

CALIBRATION DATE: Mar 14, 2012

RECAL DUE DATE: Mar 14, 2013

BAROMETRIC P: 30.08 InHg = 764.0 mmHg

TEMPERATURE: 70.5 °F = 21.4 °C

CORRECTED TO: 29.92 InHg = 760.0 mmHg

CORRECTED TO: 77.0 °F = 25.0 °C

(X) NEW UNIT

() CALIBRATION AS FOUND

() RE-CALIBRATION REFERENCE

	DIGITAL INSTRUMENT FLOW		REFERENCE INSTRUMENT FLOW		DEVIATION AT READINGS		DEVIATION AT READING	DEVIATION OF FULL SCALE
	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[%]	[%]
1	3.267	92.50	3.271	92.63	-0.005	-0.13	-0.14	-0.15
2	3.048	86.32	3.063	86.73	-0.015	-0.41	-0.48	-0.49
3	2.837	80.34	2.822	79.90	0.015	0.44	0.55	0.51
4	2.445	69.24	2.451	69.40	-0.006	-0.16	-0.22	-0.18
5	2.139	60.56	2.154	61.00	-0.015	-0.44	-0.72	-0.52
6	1.820	51.53	1.815	51.40	0.005	0.13	0.25	0.15
7	1.401	39.66	1.384	39.20	0.016	0.46	1.18	0.55
8	0.983	27.84	1.003	28.40	-0.020	-0.56	-1.95	-0.65
9	0.627	17.76	0.671	19.00	-0.044	-1.24	-6.51	-1.46
10	0.384	10.87	0.364	10.30	0.020	0.57	5.50	0.67

AVERAGE DEVIATION ACROSS THE RANGE AT READING:

1.75

0.53

INSTRUMENT ACCURACY: 4.0 % of full scale = 0.120 SCFM = 3.40 SLPM

This is to certify that F&J Specialty Products in Ocala, Florida, has on this date certified Digital Instrument model # DF-75L-BL-AC serial # 11498 to be within the instrument accuracy specified above. The Reference Flow Meter Device bears letters of certification traceable to the National Institute of Standards and Technology.

CALIBRATED BY:

QUALITY ASSURANCE:

CERTIFICATE OF CALIBRATION

F&J SPECIALTY PRODUCTS, INC.

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352-680-1454

CAL057
3
3/15/2011

MAR-4

MODEL #: DF-75L-BL-AC SERIAL #: 11498

REFERENCE INSTRUMENT: CD-8.12V.2-1-0 CALIBRATION DATE: 8/1/2012
REFERENCE SERIAL #: 3551 RECALIBRATION DATE: ~~6/8/2013~~
REFERENCE CALIBRATED: 05/15/2012 02/01/2013

INSTRUMENT ACCURACY AT FULL SCALE: +/- 4%

☒ AS RECEIVED

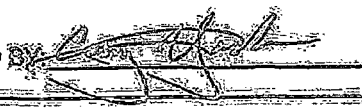
☐ VERIFIED

	DEVICE UNDER TEST		REFERENCE INSTRUMENT		DEVIATION AT READING		ACCURACY AS % of		PASS/FAIL
	FLOW		FLOW		READING		RDG.	F.S.	
	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[%]	[%]	
1	2.378	67.35	2.348	66.51	0.030	0.85	1.27	1.13	P
2	2.075	58.79	2.093	59.29	-0.018	-0.50	-0.85	-0.67	P
3	1.938	54.90	1.969	55.78	-0.031	-0.88	-1.58	-1.17	P
4	1.870	52.99	1.899	53.80	-0.029	-0.81	-1.51	-1.09	P
5	1.800	50.99	1.828	51.79	-0.028	-0.81	-1.55	-1.07	P
6	1.732	49.06	1.751	49.61	-0.019	-0.55	-1.11	-0.73	P
7	1.665	47.18	1.674	47.43	-0.009	-0.26	-0.54	-0.34	P
8	1.392	39.44	1.344	38.07	0.049	1.38	3.61	1.83	P
9	1.052	29.79	0.991	28.08	0.061	1.72	6.11	2.29	P
10	0.707	20.03	0.689	19.53	0.018	0.50	2.56	0.67	P

AVERAGE DEVIATION ACROSS THE RANGE AT READING: 1.10

This is to certify that the instrument indicated on this certificate to be within the instrument accuracy specified above. The Reference Device bears letters of certification traceable to the National Institute of Standards and Technology (NIST).

CALIBRATED BY: 

INSPECTED BY: 

Calibration Software and Equipment provided by F&J SPECIALTY PRODUCTS, INC.

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CAL057

3

3/15/2011

MAR-4

MODEL #: DF-75L-BL-AC SERIAL #: 11492

REFERENCE INSTRUMENT: CD-8.12V.2-1-0

CALIBRATION DATE: 8/2/2012

REFERENCE SERIAL #: 3551

RECALIBRATION DATE: ~~8/2/2013~~

REFERENCE CALIBRATED: 05/15/2012

05/15/2013

INSTRUMENT ACCURACY AT FULL SCALE: +/- 4%

☒ AS RECEIVED

☐ VERIFIED

	DEVICE UNDER TEST FLOW		REFERENCE INSTRUMENT FLOW		DEVIATION AT READING		ACCURACY AS % of		PASS/FAIL
	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[SCFM]	[SLPM]	RDG. [%]	F.S. [%]	
1	2.291	64.90	2.276	64.47	0.015	0.43	0.67	0.57	P
2	2.084	59.02	2.107	59.69	-0.023	-0.66	-1.11	-0.89	P
3	1.941	54.99	1.982	56.15	-0.041	-1.16	-2.07	-1.55	P
4	1.875	53.13	1.913	54.20	-0.038	-1.07	-1.97	-1.42	P
5	1.808	51.20	1.848	52.36	-0.041	-1.15	-2.20	-1.54	P
6	1.733	49.09	1.757	49.78	-0.024	-0.69	-1.39	-0.92	P
7	1.663	47.12	1.679	47.58	-0.016	-0.46	-0.96	-0.61	P
8	1.389	39.35	1.354	38.35	0.035	1.00	2.60	1.33	P
9	1.052	29.79	1.003	28.42	0.049	1.38	4.84	1.83	P
10	0.704	19.94	0.698	19.78	0.006	0.16	0.80	0.21	P

AVERAGE DEVIATION ACROSS THE RANGE AT READING: 1.08

This is to certify that the instrument indicated on this certificate to be within the instrument accuracy specified above. The Reference Device bears letters of certification traceable to the National Institute of Standards and Technology (NIST).

CALIBRATED BY: 

INSPECTED BY: 

Calibration Software and Equipment provided by F&J SPECIALTY PRODUCTS, INC.

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352-680-1454

CAL057
3
3/15/2011

MAR - 4

MODEL #: DF-75L-BL-AC SERIAL #: 1492

REFERENCE INSTRUMENT: CD-8.12V.2-1-0 CALIBRATION DATE: 10_16_2012
REFERENCE SERIAL #: 3551 RECALIBRATION DATE: ~~10/16/2013~~
REFERENCE CALIBRATED: 05/15/2012 4/16/2013

INSTRUMENT ACCURACY AT FULL SCALE: +/- 4%

☒ AS RECEIVED

☐ VERIFIED

	DEVICE UNDER TEST		REFERENCE INSTRUMENT		DEVIATION AT READING		ACCURACY AS % of		PASS/FAIL
	FLOW		FLOW		SCFM	SLPM	RDG.	F.S.	
	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[%]	[%]	
1	2.183	61.83	2.183	61.84	0.000	0.00	-0.01	-0.01	P
2	1.955	55.38	1.987	56.29	-0.032	-0.91	-1.61	-1.21	P
3	1.884	53.36	1.917	54.31	-0.033	-0.95	-1.74	-1.26	P
4	1.803	51.07	1.836	52.02	-0.033	-0.95	-1.82	-1.26	P
5	1.731	49.04	1.760	49.87	-0.029	-0.82	-1.65	-1.10	P
6	1.662	47.07	1.678	47.55	-0.017	-0.47	-1.00	-0.63	P
7	1.597	45.23	1.604	45.45	-0.008	-0.22	-0.48	-0.29	P
8	1.390	39.37	1.363	38.60	0.027	0.76	1.97	1.02	P
9	1.042	29.53	0.987	27.96	0.055	1.56	5.59	2.09	P
10	0.696	19.73	0.682	19.33	0.014	0.40	2.04	0.53	P

AVERAGE DEVIATION ACROSS THE RANGE AT READING: 0.94

This is to certify that the instrument indicated on this certificate to be within the instrument accuracy specified above. The Reference Device bears letters of certification traceable to the National Institute of Standards and Technology (NIST).

CALIBRATED BY:

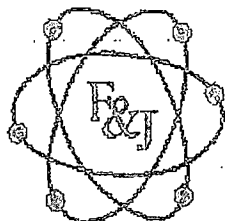
INSPECTED BY:

Calibration Software and Equipment provided by F&J SPECIALTY PRODUCTS, INC.

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CERTIFICATE OF CALIBRATION

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Fax: (352) 680-1454

Email: fandj@fjspecialty.com

Internet: www.fjspecialty.com

The Nucleus of Quality Air Monitoring Programs

MAR-5

CALIBRATED INSTRUMENT: DIGITAL AIR SAMPLER

P.O. NUMBER: 2379996

MODEL #: DF-75L-BL-AC

SENSOR RANGE: 0.500 to 3.000 SCFM

CUSTOMER: INTER-MOUNTAIN LABS

SERIAL #: 11107

= 14.16 to 84.95 SLPM

REFERENCE SERIAL #: 13277, 0-140 SLPM

LOKAL VERSION: V2.18 (B15144)

CALIBRATION DATE: Feb 22, 2011

RECAL DUE DATE: Feb 22, 2012

BAROMETRIC P: 29.85 InHg = 758.2 mmHg

TEMPERATURE: 72.8 °F = 22.7 °C

CORRECTED TO: 29.92 InHg = 760.0 mmHg

CORRECTED TO: 77.0 °F = 25.0 °C

(X) NEW UNIT

() CALIBRATION AS FOUND

() RE-CALIBRATION REFERENCE

	DIGITAL INSTRUMENT FLOW		REFERENCE INSTRUMENT FLOW		DEVIATION AT READINGS		DEVIATION AT READING	DEVIATION OF FULL SCALE
	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[%]	[%]
1	3.344	94.70	3.324	94.13	0.020	0.57	0.60	0.67
2	3.105	87.92	3.107	87.97	-0.002	-0.05	-0.06	-0.06
3	2.867	81.18	2.839	80.40	0.027	0.78	0.97	0.91
4	2.511	71.10	2.499	70.77	0.012	0.34	0.48	0.40
5	2.145	60.73	2.147	60.80	-0.002	-0.07	-0.11	-0.08
6	1.843	52.19	1.823	51.63	0.020	0.56	1.07	0.65
7	1.419	40.17	1.389	39.33	0.030	0.84	2.14	0.99
8	0.996	28.21	1.005	28.47	-0.009	-0.25	-0.90	-0.30
9	0.641	18.15	0.674	19.10	-0.033	-0.95	-4.97	-1.12
10	0.403	11.41	0.374	10.60	0.029	0.81	7.67	0.96

AVERAGE DEVIATION ACROSS THE RANGE AT READING:

1.90

0.61

INSTRUMENT ACCURACY: 4.0 % of full scale = 0.120 SCFM = 3.40 SLPM

This is to certify that F&J Specialty Products in Ocala, Florida, has on this date certified Digital Instrument model # DF-75L-BL-AC serial # 11107 to be within the instrument accuracy specified above. The Reference Flow Meter Device bears letters of certification traceable to the National Institute of Standards and Technology.

CALIBRATED BY:

QUALITY ASSURANCE:

CERTIFICATE OF CALIBRATION

F&J SPECIALTY PRODUCTS, INC.

404 Cypress Road

Ocala, FL 34472

352-680-1177

352-680-1454

MAR-5

CAL057

3

3/15/2011

MODEL #: DF-75L-BL-AC SERIAL #: 11107

REFERENCE INSTRUMENT: CD-812V.2-1-O CALIBRATION DATE: 10/5/2011
REFERENCE SERIAL #: 3506 RECALIBRATION DATE: 10/05/2012
REFERENCE CALIBRATED: 08/02/2011

INSTRUMENT ACCURACY AT FULL SCALE: +/- 4%

☐ AS RECEIVED

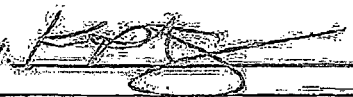
☒ VERIFIED

	DEVICE UNDER TEST		REFERENCE INSTRUMENT		DEVIATION AT READING		ACCURACY AS % of		PASS/FAIL
	FLOW		FLOW		READING		RDG.	F.S.	
	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[%]	[%]	
1	2.634	74.62	2.627	74.41	0.007	0.20	0.28	0.24	P
2	2.153	61.00	2.179	61.74	-0.026	-0.74	-1.20	-0.87	P
3	1.604	45.45	1.556	44.07	0.049	1.38	3.12	1.62	P
4	1.051	29.77	1.043	29.54	0.008	0.24	0.80	0.28	P
5	0.772	21.87	0.829	23.49	-0.057	-1.62	-6.89	-1.90	P

AVERAGE DEVIATION ACROSS THE RANGE AT READING: 0.98

This is to certify that the instrument indicated on this certificate to be within the instrument accuracy specified above. The Reference Device bears letters of certification traceable to the National Institute of Standards and Technology (NIST).

CALIBRATED BY: 

INSPECTED BY: 

Calibration Software and Equipment provided by F&J SPECIALTY PRODUCTS, INC.

404 Cypress Road, Ocala, FL 34472 - Tel: 352-680-1177 - Fax: 352-680-1454 - WWW: www.fjspecialty.com

CALIBRATION
DF-75L-BL-AC

MAR-5

Network: Marsland/3 Crow

Serial #: 11107

Date: 11/10/2011

Notes on instrument as found:

Sampler ID: DF-75L-BL-AC

Serviced by: R. Grantham

Set Sampler Flow (LPM)	Indicated Flow (LPM)	Actual Flow (LPM)	Deviation (LPM)	Deviation < 3.0 LPM (Y/N)
70	68.90	69.80	0.90	YES
60	59.10	59.50	0.40	YES
50	49.20	47.80	1.40	YES
40	39.50	37.40	2.10	YES
30	29.50	28.70	0.80	YES
20	20.1	22	1.90	YES

Digital Flow Meter Low Volume Series Acceptable Deviation = 4% of Full Scale (3.0 LPM)

Notes, comments:

CERTIFICATE OF CALIBRATION

F&J SPECIALTY PRODUCTS, INC.

404 Cypress Road

Ocala, FL 34472

352-680-1177

352-680-1454

MAR - 5

CAL057

3

3/15/2011

MODEL #: DF-75L-BL-AC SERIAL #: 1107

REFERENCE INSTRUMENT: CD-8.12V.2-1-0

CALIBRATION DATE: 5.31.2012

REFERENCE SERIAL #: 3551

RECALIBRATION DATE: ~~05/31/2013~~ 11/30/2012
cy

REFERENCE CALIBRATED: 05/15/2012

INSTRUMENT ACCURACY AT FULL SCALE: +/- 4%

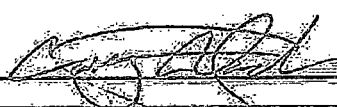
☒ AS RECEIVED

☐ VERIFIED

	DEVICE UNDER TEST		REFERENCE INSTRUMENT		DEVIATION AT		ACCURACY AS % of		PASS/FAIL
	FLOW		FLOW		READING		RDG.	F.S.	
	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[%]	[%]	
1	1.923	54.47	1.952	55.31	-0.030	-0.84	-1.52	-1.12	P
2	1.923	54.49	1.947	55.17	-0.024	-0.68	-1.23	-0.91	P
3	1.872	53.03	1.897	53.74	-0.025	-0.71	-1.32	-0.94	P
4	1.730	49.02	1.747	49.50	-0.017	-0.48	-0.97	-0.64	P
5	1.531	43.37	1.517	42.99	0.013	0.38	0.88	0.50	P
6	1.396	39.55	1.367	38.71	0.030	0.84	2.17	1.12	P
7	1.203	34.07	1.149	32.54	0.054	1.53	4.71	2.04	P
8	1.044	29.56	1.007	28.52	0.037	1.05	3.66	1.39	P
9	0.721	20.41	0.711	20.14	0.010	0.27	1.37	0.37	P
10	0.505	14.32	0.552	15.64	-0.047	-1.32	-8.45	-1.76	P

AVERAGE DEVIATION ACROSS THE RANGE AT READING: 1.08

This is to certify that the instrument indicated on this certificate to be within the instrument accuracy specified above. The Reference Device bears letters of certification traceable to the National Institute of Standards and Technology (NIST).

CALIBRATED BY: 

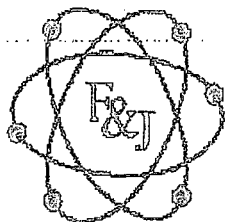
INSPECTED BY: 

Calibration Software and Equipment provided by F&J SPECIALTY PRODUCTS, INC.

404 Cypress Road, Ocala, FL 34472 - Tel: 352-680-1177 - Fax: 352-680-1454 - WWW: www.fjspecialty.com

CERTIFICATE OF CALIBRATION

MQ003R01



F&J SPECIALTY PRODUCTS, INC.

PO Box 2888

Ocala, Florida 34478-2888

Tel: (352) 680-1177 • (352) 680-1178

Fax: (352) 680-1454

Email: fandj@fjspecialty.com

Internet: www.fjspecialty.com

The Nucleus of Quality Air Monitoring Programs

MAR-5

CALIBRATED INSTRUMENT: **DIGITAL AIR SAMPLER**

P.O. NUMBER: 239408

MODEL #: DF-75L-BL-AC

SENSOR RANGE: 0.500 to 3.000 SCFM

CUSTOMER: CROW BUTTE RESOURCES

SERIAL #: 11487

= 14.16 to 84.95 SLPM

REFERENCE SERIAL #: 13277, 0-140 SLPM

LOKAL VERSION: V2.18 (B15144)

CALIBRATION DATE: Mar 14, 2012

RECAL DUE DATE: Mar 14, 2013

BAROMETRIC P: 30.16 InHg = 766.1 mmHg

TEMPERATURE: 71.8 °F = 22.1 °C

CORRECTED TO: 29.92 InHg = 760.0 mmHg

CORRECTED TO: 70.0 °F = 21.1 °C

(X) NEW UNIT

() CALIBRATION AS FOUND

() RE-CALIBRATION REFERENCE

	DIGITAL INSTRUMENT FLOW		REFERENCE INSTRUMENT FLOW		DEVIATION AT READINGS		DEVIATION AT READING	DEVIATION OF FULL SCALE
	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[%]	[%]
1	3.228	91.40	3.216	91.07	0.012	0.33	0.36	0.39
2	2.998	84.89	3.011	85.27	-0.013	-0.38	-0.45	-0.45
3	2.799	79.25	2.785	78.87	0.014	0.39	0.49	0.45
4	2.433	68.90	2.433	68.90	-0.000	-0.01	-0.01	-0.01
5	2.110	59.75	2.128	60.27	-0.018	-0.52	-0.86	-0.61
6	1.791	50.72	1.787	50.60	0.004	0.12	0.25	0.15
7	1.374	38.90	1.353	38.30	0.021	0.60	1.57	0.71
8	0.970	27.47	0.987	27.93	-0.017	-0.47	-1.67	-0.55
9	0.623	17.63	0.660	18.70	-0.038	-1.07	-5.71	-1.26
10	0.362	10.26	0.346	9.80	0.016	0.46	4.68	0.54

AVERAGE DEVIATION ACROSS THE RANGE AT READING:

1.60

0.51

INSTRUMENT ACCURACY: 4.0 % of full scale = 0.120 SCFM = 3.40 SLPM

This is to certify that F&J Specialty Products in Ocala, Florida, has on this date certified Digital Instrument model # DF-75L-BL-AC serial # 11487 to be within the instrument accuracy specified above. The Reference Flow Meter Device bears letters of certification traceable to the National Institute of Standards and Technology.

CALIBRATED BY:

QUALITY ASSURANCE:

CERTIFICATE OF CALIBRATION

F&J SPECIALTY PRODUCTS, INC.

404 Cypress Road

Ocala, FL 34472

352-680-1177

352-680-1454

CAL057

3

3/15/2011

MAR - 5

MODEL #: DF-75L-BL-AC SERIAL #: 11487

REFERENCE INSTRUMENT: CD-8.12V.2-1-0

CALIBRATION DATE: 8_1_2012

REFERENCE SERIAL #: 3551

RECALIBRATION DATE: 08/04/2013

REFERENCE CALIBRATED: 05/15/2012

02/01/2013

INSTRUMENT ACCURACY AT FULL SCALE:

± 4%

☒ AS RECEIVED

☐ VERIFIED

	DEVICE UNDER TEST		REFERENCE INSTRUMENT		DEVIATION AT		ACCURACY AS % of		PASS/FAIL
	FLOW		FLOW		READING		RDG.	F.S.	
	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[%]	[%]	
1	2.290	64.87	2.260	64.02	0.030	0.85	1.33	1.14	P
2	2.080	58.92	2.084	59.05	-0.005	-0.13	-0.22	-0.17	P
3	1.941	54.99	1.988	55.75	-0.027	-0.77	-1.37	-1.02	P
4	1.868	52.93	1.902	53.88	-0.034	-0.95	-1.77	-1.27	P
5	1.811	51.32	1.844	52.23	-0.032	-0.92	-1.75	-1.22	P
6	1.737	49.20	1.764	49.97	-0.027	-0.77	-1.53	-1.02	P
7	1.667	47.22	1.692	47.93	-0.025	-0.71	-1.48	-0.95	P
8	1.391	39.41	1.364	38.63	0.028	0.78	2.02	1.04	P
9	1.050	29.73	0.996	28.21	0.054	1.52	5.39	2.03	P
10	0.695	19.69	0.684	19.39	0.011	0.30	1.56	0.40	P

AVERAGE DEVIATION ACROSS THE RANGE AT READING:

1.03

This is to certify that the instrument indicated on this certificate to be within the instrument accuracy specified above. The Reference Device bears letters of certification traceable to the National Institute of Standards and Technology (NIST).

CALIBRATED BY:

INSPECTED BY:

Calibration Software and Equipment provided by F&J SPECIALTY PRODUCTS, INC.

404 Cypress Road, Ocala, FL 34472 - Tel: 352-680-1177 - Fax: 352-680-1454 - WWW: www.fjspecialty.com

CERTIFICATE OF CALIBRATION

F&J SPECIALTY PRODUCTS, INC.

404 Cypress Road
Ocala, FL 34472
352-680-1177
352-680-1454

CAL057
3
3/15/2011

MAR - 5

MODEL #: DF-75L-BL-AC SERIAL #: 1115

REFERENCE INSTRUMENT: CD-8.12V.2-1-0 CALIBRATION DATE: 10_15_2012
REFERENCE SERIAL #: 3551 RECALIBRATION DATE: ~~10/15/2013~~
REFERENCE CALIBRATED: 05/15/2012 4/15/2013

INSTRUMENT ACCURACY AT FULL SCALE: +/- 4%

☒ AS RECEIVED

☐ VERIFIED

	DEVICE		REFERENCE		DEVIATION		ACCURACY		PASS/FAIL
	UNDER TEST		INSTRUMENT		AT		AS % of		
	FLOW		FLOW		READING		RDG.	F.S.	
	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[SCFM]	[SLPM]	[%]	[%]	
1	2.148	60.85	2.167	61.39	-0.019	-0.54	-0.88	-0.72	P
2	1.940	54.95	1.984	56.21	-0.044	-1.26	-2.24	-1.68	P
3	1.871	53.01	1.918	54.34	-0.047	-1.33	-2.45	-1.78	P
4	1.805	51.14	1.849	52.39	-0.044	-1.25	-2.38	-1.66	P
5	1.735	49.15	1.769	50.12	-0.034	-0.97	-1.94	-1.30	P
6	1.602	45.38	1.614	45.74	-0.012	-0.35	-0.77	-0.47	P
7	1.528	43.30	1.523	43.13	0.006	0.17	0.39	0.22	P
8	1.383	39.18	1.361	38.55	0.022	0.63	1.63	0.84	P
9	1.056	29.91	0.991	28.08	0.065	1.84	6.55	2.45	P
10	0.709	20.08	0.698	19.78	0.011	0.30	1.52	0.40	P

AVERAGE DEVIATION ACROSS THE RANGE AT READING: 1.15

This is to certify that the instrument indicated on this certificate to be within the instrument accuracy specified above. The Reference Device bears letters of certification traceable to the National Institute of Standards and Technology (NIST).

CALIBRATED BY: 

INSPECTED BY: 

Calibration Software and Equipment provided by F&J SPECIALTY PRODUCTS, INC.

404 Cypress Road, Ocala, FL 34472 - Tel: 352-680-1177 - Fax: 352-680-1454 - WWW: www.fjspecialty.com

V-2

Radon (Track Etch Cups) Laboratory Records

Radon Monitoring Report

CROW BUTTE RESOURCES
RHONDA GRANTHAM
PO BOX 169
CRAWFORD, NE 69339

LANDAUER

Landauer, Inc. 2 Science Road Glenwood, Illinois 60425-1586
Telephone: (800) 528-8327 Facsimile: (708) 755-7648

Acct. No. 040074B

PROGRAM NAME: MARSLAND

Detector Number	Detector Type	Starting Date	Ending Date	Field Data / Comments	Exposure pCi/l-days	Avg. Radon Conc. pCi/l	AREA			
							GROSS COUNT	COUNTED (SQ MM)	BACK GRND	LOT NO.
4825223	DRNF	11-NOV-11	04-JAN-12	MA-5 CALIB FACT= 33.8 STD DEV= 7.6 DAYS EXPOSED: 54	35.3 ±2.69	0.7 ±0.05	173	63.8 A	1.66	080908-049
4825224	DRNF	11-NOV-11	04-JAN-12	MA-4 CALIB FACT= 33.8 STD DEV= 7.7 DAYS EXPOSED: 54	32.1 ±2.49	0.6 ±0.05	167	63.8 A	1.66	080908-049
4825225	DRNF	11-NOV-11	04-JAN-12	MA-3 CALIB FACT= 33.7 STD DEV= 8.8 DAYS EXPOSED: 54	12.6 ±1.10	0.2 ±0.02	130	63.8 A	1.66	080908-049
4825226	DRNF	11-NOV-11	04-JAN-12	MA-1 CALIB FACT= 33.7 STD DEV= 8.7 DAYS EXPOSED: 54	13.6 ±1.19	0.3 ±0.02	132	63.8 A	1.66	080908-049
4825227	DRNF	11-NOV-11	04-JAN-12	MA-2 CALIB FACT= 33.7 STD DEV= 8.6 DAYS EXPOSED: 54	15.7 ±1.35	0.3 ±0.03	136	63.8 A	1.66	080908-049

RESULTS RELATED ONLY TO MONITORS
AS RECEIVED BY LANDAUER.

Q.C. Release	Process No.	Report Date	Date Received
LMR	A22367	12-JAN-12	09-JAN-12

PAGE 1 OF 1

Radon Monitoring Report

CROW BUTTE RESOURCES
RHONDA GRANTHAM
PO BOX 169
CRAWFORD, NE 69339

LANDAUER

Landauer, Inc. 2 Science Road Glenwood, Illinois 60425-1580
Telephone: (890) 525-8327 Facsimile: (708) 755-7043

Acct. No. **0400748**

PROGRAM NAME: MARSLAND

Detector Number	Detector Type	Starting Date	Ending Date	Field Data / Comments	Exposure pCi/-days	Avg. Radon Conc. pCi/l	AREA			
							GROSS COUNT	COUNTED (SQ MM)	BACK GRND	LOT NO.
4826590	DRNF	04-JAN-12	02-APR-12	MA-5 CALIB FACT= 33.5 STD DEV= 6.3 DAYS EXPOSED: 89	88.3 ±5.57	1.0 ±0.06	251	63.8 A	1.29	080908-052
4826611	DRNF	04-JAN-12	02-APR-12	MA-1 CALIB FACT= 33.4 STD DEV= 9.1 DAYS EXPOSED: 89	64.5 ±5.89	0.7 ±0.07	120	37.2 A	1.29	080908-052
4846895	DRNF	04-JAN-12	02-APR-12	MA-2 CALIB FACT= 33.6 STD DEV= 10.7 DAYS EXPOSED: 89	23.4 ±2.51	0.3 ±0.03	87	37.2 A	1.64	091201-074
4846896	DRNF	04-JAN-12	02-APR-12	* - LESS THAN INDICATED VALUE MA-4 CALIB FACT= N/A DAYS EXPOSED: 89	* 6.0	* 0.07 ±0.01	43	37.2 A	1.64	091201-074
4846897	DRNF	04-JAN-12	02-APR-12	* - LESS THAN INDICATED VALUE MA-3 CALIB FACT= N/A DAYS EXPOSED: 89	* 6.0	* 0.07 ±0.01	47	37.2 A	1.64	091201-074

RESULTS RELATED ONLY TO MONITORS
AS RECEIVED BY LANDAUER.

Q.C. Release	Process No.	Report Date	Date Received
LMR	A22429	18-APR-12	04-APR-12

PAGE 1 OF 1

Radon Monitoring Report

CROW BUTTE RESOURCES
RHONDA GRANTHAM
PO BOX 169
CRAWFORD, NE 69339

LANDAUER

Landauer, Inc. 2 Science Road Glenwood, Illinois 60424-1580
Telephone: (800) 528-8327 Facsimile: (708) 555-1048

Acct. No.

0400748

PROGRAM NAME: MARSLAND

*** CORRECTED REPORT ***

Detector Number	Detector Type	Starting Date	Ending Date	Field Data / Comments	Exposure pCi/d-days	Avg. Radon Conc. pCi/l	AREA GROSS COUNT (SQ MM)	COUNTED BACK GRND	LOT NO.
4826578	DRNF	02-APR-12	29-JUN-12	MA-1 CALIB FACT= 33.4 STD DEV= 6.4 DAYS EXPOSED: 88	73.6 ±4.74	0.8 ±0.05	241 63.8 A	1.58	080908-052
4826579	DRNF	02-APR-12	29-JUN-12	MA-2 CALIB FACT= 33.5 STD DEV= 5.3 DAYS EXPOSED: 88	137.3 ±7.2	1.6 ±0.08	362 63.8 A	1.58	080908-052
4826580	DRNF	02-APR-12	29-JUN-12	MA-3 CALIB FACT= 33.5 STD DEV= 6.1 DAYS EXPOSED: 88	89.3 ±5.43	1.0 ±0.06	271 63.8 A	1.58	080908-052
4826581	DRNF	02-APR-12	29-JUN-12	MA-4 CALIB FACT= 33.4 STD DEV= 6.4 DAYS EXPOSED: 88	75.1 ±4.81	0.9 ±0.05	244 63.8 A	1.58	080908-052
4826582	DRNF	02-APR-12	29-JUN-12	MA-5 CALIB FACT= 33.4 STD DEV= 6.3 DAYS EXPOSED: 88	80.9 ±5.07	0.9 ±0.06	255 63.8 A	1.58	080908-052

RESULTS RELATED ONLY TO MONITORS
AS RECEIVED BY LANDAUER.

Q.C. Release

LMR

Process No.

A22484

Report Date

25-JUL-12

Date Received

03-JUL-12

PAGE

1 OF

1

Radon Monitoring Report

CROW BUTTE RESOURCES
RHONDA GRANTHAM
PO BOX 169
CRAWFORD, NE 69339

LANDAUER

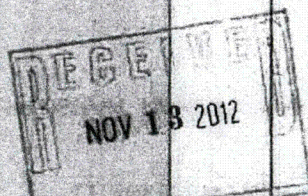
Landauer, Inc. 2 Science Road Glenwood, Illinois 60425-1586
Telephone: (800) 528-8327 Facsimile: (708) 755-7048

Acct. No. 0400748

PROGRAM NAME: MARSLAND

*** CORRECTED REPORT ***

Detector Number	Detector Type	Starting Date	Ending Date	Field Data / Comments	Exposure pCi/l-days	Avg. Radon Conc. pCi/l	AREA GROSS COUNTED BACK LOT COUNT (SQ MM) GRND NO.
4853219	DRNF	29-JUN-12	01-OCT-12	MA5 CALIB FACT= 33.9 STD DEV= 12.0 DAYS EXPOSED: 94	11.0 ±1.32	0.1 ±0.01	70 37.2 A 1.55 101201-003
4853220	DRNF	29-JUN-12	01-OCT-12	MA4 CALIB FACT= 33.9 STD DEV= 11.3 DAYS EXPOSED: 94	19.2 ±2.16	0.2 ±0.02	79 37.2 A 1.55 101201-003
4853361	DRNF	29-JUN-12	01-OCT-12	MA1 CALIB FACT= 33.9 STD DEV= 11.5 DAYS EXPOSED: 94	16.5 ±1.89	0.2 ±0.02	76 37.2 A 1.55 101201-003
4853363	DRNF	29-JUN-12	01-OCT-12	MA2 CALIB FACT= 33.9 STD DEV= 11.1 DAYS EXPOSED: 94	21.0 ±2.34	0.2 ±0.02	81 37.2 A 1.55 101201-003
4853364	DRNF	29-JUN-12	01-OCT-12	MA3 CALIB FACT= 33.9 STD DEV= 11.4 DAYS EXPOSED: 94	17.4 ±1.98	0.2 ±0.02	77 37.2 A 1.55 101201-003



RESULTS RELATED ONLY TO MONITORS
AS RECEIVED BY LANDAUER.

Q.C. Release	Process No.	Report Date	Date Received
LMR	A22539	05-NOV-12	04-OCT-12

PAGE 1 OF 1

Radon Monitoring Report

CROW BUTTE RESOURCES
RHONDA GRANTHAM
PO BOX 169
CRAWFORD, NE 69339

LANDAUER

Landauer, Inc. 2 Science Road Glenwood, Illinois 60425-1586
Telephone: (800) 528-8327 Facsimile: (708) 755-7048

Acct. No. 0400748

PROGRAM NAME: MARSLAND

Detector Number	Detector Type	Starting Date	Ending Date	Field Data / Comments	Exposure pCi/l-days	Avg. Radon Conc. pCi/l	AREA GROSS COUNTED BACK LOT COUNT (SQ MM) GRND NO.
4847341	DRNF	01-OCT-12	02-JAN-13	MA-1 CALIB FACT= 33.3 STD DEV= 5.9 DAYS EXPOSED: 93	75.1 ±4.41	0.8 ±0.05	290 63.8 A 2.29 091201-075
4847342	DRNF	01-OCT-12	02-JAN-13	MA-2 CALIB FACT= 33.3 STD DEV= 6.3 DAYS EXPOSED: 93	57.3 ±3.58	0.6 ±0.04	256 63.8 A 2.29 091201-075
4847343	DRNF	01-OCT-12	02-JAN-13	MA-3 CALIB FACT= 33.2 STD DEV= 6.8 DAYS EXPOSED: 93	36.4 ±2.48	0.4 ±0.03	216 63.8 A 2.29 091201-075
4847373	DRNF	01-OCT-12	02-JAN-13	MA-4 CALIB FACT= 33.2 STD DEV= 7.1 DAYS EXPOSED: 93	26.0 ±1.86	0.3 ±0.02	196 63.8 A 2.29 091201-075
4847374	DRNF	01-OCT-12	02-JAN-13	MA-5 CALIB FACT= 33.2 STD DEV= 7.0 DAYS EXPOSED: 93	31.2 ±2.18	0.3 ±0.02	206 63.8 A 2.29 091201-075

RESULTS RELATED ONLY TO MONITORS
AS RECEIVED BY LANDAUER.

Q.C. Release	Process No.	Report Date	Date Received
LMR	A22582	29-JAN-13	10-JAN-13

PAGE 1 OF 1

V-3

Gamma (OLSS) Laboratory Records

LAN AUER

Landauer, Inc. 2 Science Road Glenwood, Illinois 60425-1586 Telephone: (708) 755-7000 Facsimile: (708) 755-7016

ENVIRONMENTAL / LOW LEVEL DOSIMETRY REPORT

ADDRESS

CROW BUTTE RESOURCES
ATTN: RHONDA GRANTHAM
P O BOX 149
CRAWFORD, NE 69339

ACCOUNT NO.

291820

SERIES CODE

MARSLAND EXPANSION AREA

FOR EXPOSURE PERIOD

10/01/2011

NET CUMULATIVE TOTALS (MILLIREMS)

LOCATION ID NUMBER	IDENTIFIER (CLIENT SUPPLIED)	NOTE CODE	EXPOSURE OF DOSIMETER (MILLIREMS AMBIENT DOSE EQUIVALENT)	CALENDAR QUARTER	YEAR TO DATE	PERMANENT	ADJUST- MENTS	NUMBER OF DOSIMETERS REPORTED	INCEPTION DATE OF PERM. TOTAL
			GROSS						
00000	TRANSIT CONTROL		13.9						
00009	DEPLOY CONTROL		13.0						
00001	MA-1		21.7	6.7	6.7	6.7		1	/ /
00002	MA-2		21.6	6.7	6.7	6.7		1	/ /
00003	MA-3		21.4	6.5	6.5	6.5		1	/ /
00004	MA-4		19.9	5.0	5.0	5.0		1	/ /
00005	MA-5		20.9	5.9	5.9	5.9		1	/ /

G.C. Release	Process No.	Reported Date	Date Processed	Date Received	Minimum Detectable Dose In This Process, Millirems Ambient Dose Equivalent
tm	BD3001	01/17/2012	01/13/2012	01/09/2012	0.10

ONLY PAGE

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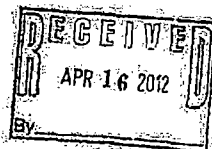
ENVIRONMENTAL / LOW LEVEL DOSIMETRY REPORT

ADDRESS

CROW BUTTE RESOURCES
ATTN: RHONDA GRANTHAM
P O BOX 169
CRAWFORD, NE 69339

ACCOUNT NO: SERIES CODE

291520



FOR EXPOSURE PERIOD

01/01/2012

NET CUMULATIVE TOTALS (MILLIREMS)

LOCATION ID NUMBER	IDENTIFIER (CLIENT SUPPLIED)	NOTE CODE	EXPOSURE OF DOSIMETER (MILLIREMS AMBIENT DOSE EQUIVALENT)	CALENDAR QUARTER	YEAR TO DATE	PERMANENT	ADJUST- MENTS	NUMBER OF DOSIMETERS REPORTED	INCEPTION DATE OF PERM. TOTAL
			GRDSS			NET			
00000	TRANSIT CONTROL		25.7			-0.6			
000X9	DEPLOY CONTROL		26.3			0.0			
00001	MA-1		32.8		6.5	6.5	13.2	2	/ /
00002	MA-2		33.8		7.5	7.5	14.2	2	/ /
00003	MA-3		31.4		5.1	5.1	11.6	2	/ /
00004	MA-4		40.8		14.5	14.5	19.5	2	/ /
00005	MA-5		32.5		6.2	6.2	12.1	2	/ /

G.C. Release	Process No.	Reported Date	Date Processed	Date Received	Minimum Detectable Dose In This Process, Millirems Ambient Dose Equivalent	ONLY PAGE
in	BFH010	04/10/2012	04/05/2012	04/04/2012	0.10	1

CROW BUTTE RESOURCES
RHONDA GRANTHAM
P.O BOX 169
CRAWFORD, NE 69339

Report Date (YYYY-MM-DD)	2012-07-31
Page	1 of 1
Dosimeter Received	2012-07-24
QC Release	sbankhead
Analytical Work Order	1218510376

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Environmental Dosimetry Report

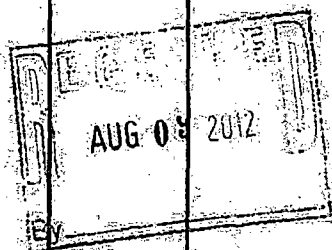
Account: 291520 Subaccount: 1405721 Series: X9

Location ID Number	Dosimeter Type	Identifier (Client Supplied)	Exposure (Ambient Dose mrem)		Net Cumulative Totals (mrem)			Inception Date (YYYY-MM)	Serial Number
			Gross	Net	Quarter to Date	Year to Date	Permanent		
Monitoring Period:			2012-04-01 to	2012-06-30	Q2	2012			
00000	V03NH	Deploy Control	30.4					2011-10	
00001	V03NH	MA-1	40.0	9.6	9.6	16.1	22.8	2011-10	EX000224524
00003	V03NH	MA-3	34.9	4.6	4.6	9.7	16.2	2011-10	EX000138600
00004	V03NH	MA-4	40.9	10.5	10.5	25.0	30.0	2011-10	EX00014881V
00005	V03NH	MA-5	38.1	7.7	7.7	13.9	19.8	2011-10	EX00022973Q

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CROW BUTTE RESOURCES
RHONDA GRANTHAM
P.O. BOX 169
CRAWFORD, NE 69339

Report Date (YYYY-MM-DD)	2012-10-12
Page	1 of 1
Dosimeter Received	2012-10-04
QC Release	SBA
Analytical Work Order	1227810151

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Environmental Dosimetry Report

Account: 291520 Subaccount: 1405721 Series: X9

Dosimeter ID Number	Dosimeter Type	Activity Description	Exposure Period (Start/End)		Exposure Data (mR)			Inspector Date (YYYY-MM-DD)	Serial Number
			Gross	Net	Greater to Date	Partial Date	Per. to Date		
Monitoring Period:			2012-07-01 to	2012-09-30	Q3	2012			
00000	V03NH	Deploy Control						2011-10	EX00019812V
	V03NH	Control Dose Used	28.8						
00001	V03NH	MA-1	38.6	9.9	9.9	26.0	32.7	2011-10	EX00009379N
00002	V03NH	MA-2	39.2	10.4	10.4	17.9	24.6	2011-10	EX00008147Z
00003	V03NH	MA-3	37.5	8.7	8.7	18.3	24.8	2011-10	EX00016372Z
00004	V03NH	MA-4	39.2	10.4	10.4	35.5	40.5	2011-10	EX000248003
00005	V03NH	MA-5	33.3	4.5	4.5	18.4	24.3	2011-10	EX000193208

CROW BUTTE RESOURCES
RHONDA GRANTHAM
P.O. BOX 169
CRAWFORD, NE 69339

Report Date (YYYY-MM-DD)	2013-01-14
Page	1 of 1
Dosimeter Received	2013-01-09
QC Release	LCA
Analytical Work Order	1300910417

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Environmental Dosimetry Report

Account: 291520 Subaccount: 1405721 Series: X9

Location ID Number	Dosimeter Type	Identifier (Client Signage)	Exposure (Ambient Dose in mrem)		Net Cumulative Totals (mrem)			Inception Date (YYYY-MM)	Serial Number
			Gross	Net	Quarter to Date	Year to Date	Permanent		
Monitoring Period:			2012-10-01 to	2012-12-31	Q4	2012			
00000	V03NH	Deploy Control						2011-10	EX000620061
	V03NH	Control Dose Used	27.3						
00001	V03NH	MA-1	39.2	11.9	11.9	37.9	44.6	2011-10	EX000633303
00002	V03NH	MA-2	36.8	9.5	9.5	27.4	34.1	2011-10	EX00063623S
00003	V03NH	MA-3	34.5	7.2	7.2	25.6	32.1	2011-10	EX00063795F
00004	V03NH	MA-4	37.3	10.0	10.0	45.5	50.5	2011-10	EX00063627K
00005	V03NH	MA-5	34.0	6.8	6.8	25.2	31.1	2011-10	EX00063675J

Appendix W

Niobrara River Laboratory Records

W-1

Niobrara River Surface Water Laboratory Records



Inter-Mountain Labs

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Your Environmental Monitoring Partner

Sample Analysis Report

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

Date Reported: 10/30/2013
Report ID: S1309291001

ProjectName: Marsland Stream Samples
Lab ID: S1309291-001
ClientSample ID: N1
COC: Web

WorkOrder: S1309291
CollectionDate: 9/16/2013
DateReceived: 9/18/2013 2:30:00 PM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Metals - Dissolved							
Uranium	0.0051	mg/L		0.0003	EPA 200.8	10/31/2013 015	MS
Uranium Activity	3.5	pCi/L		0.2	Calculation	11/01/2013 1335	LJK
Metals - Suspended							
Uranium	ND	mg/L		0.0003	EPA 200.8	10/01/2013 659	MS
Uranium Activity	ND	pCi/L		0.2	Calculation	11/01/2013 1335	LJK
Radionuclides - Dissolved							
Lead 210	ND	pCi/L		1	OTW01	10/14/2013 1209	SH
Lead 210 (Dissolved) Precision (±)	NA	pCi/L			OTW01	10/14/2013 1209	SH
Polonium 210	ND	pCi/L		1	OTW01	10/04/2013 1043	SH
Polonium 210 (Dissolved) Precision (±)	NA	pCi/L			OTW01	10/04/2013 1043	SH
Radium 226	ND	pCi/L		0.2	SM 7500 Ra-B	10/01/2013 1446	SH
Radium 226 Precision (±)	NA	pCi/L			SM 7500 Ra-B	10/01/2013 1446	SH
Thorium 230	ND	pCi/L		0.2	ACW10	09/30/2013 1205	MB
Thorium 230 Precision (±)	NA	pCi/L			ACW10	09/30/2013 1205	MB
Thorium 229 Tracer (30-120)	74	%			ACW10	09/30/2013 1205	MB
Radionuclides - Suspended							
Lead 210	ND	pCi/L		1	OTW01	10/21/2013 1410	SH
Lead 210 (Suspended) Precision (±)	NA	pCi/L			OTW01	10/21/2013 1410	SH
Polonium 210	ND	pCi/L		1	OTW01	10/15/2013 1452	SH
Polonium 210 (Suspended) Precision (±)	NA	pCi/L			OTW01	10/15/2013 1452	SH
Radium 226	ND	pCi/L		0.2	SM 7500 Ra-B	10/14/2013 1851	SH
Radium 226 (Suspended) Precision (±)	NA	pCi/L			SM 7500 Ra-B	10/14/2013 1851	SH
Thorium 230	ND	pCi/L		0.2	ACW10	10/09/2013 1333	MB
Thorium 230 Precision (±)	NA	pCi/L			ACW10	10/09/2013 1333	MB
Thorium 229 Tracer (30-120)	85	%			ACW10	10/09/2013 1333	MB

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, Assistant Laboratory Manager



Inter-Mountain Labs

Your Environmental Monitoring Partner

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Sample Analysis Report

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

Date Reported 11/20/2013
Report ID: S1310334001

Project Name: Marsland Stream Sampling
Lab ID: S1310334-001
Client Sample ID: N1
COC: WEB

Work Order: S1310334
Collection Date: 10/18/2013
Date Received: 10/22/2013 10:59:00 AM
Field Sampler: WN
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Metals - Dissolved							
Uranium	0.0051	mg/L		0.0003	EPA 200.8	10/22/2013 2026	MS
Uranium Activity	3.5	pCi/L		0.2	Calculation	11/15/2013 1435	WN
Metals - Suspended							
Uranium	ND	mg/L		0.0003	EPA 200.8	10/29/2013 112	MS
Uranium Activity	ND	pCi/L		0.2	Calculation	11/15/2013 1435	WN
Radionuclides - Dissolved							
Lead 210	ND	pCi/L		1	OTW01	11/05/2013 925	SH
Lead 210 (Dissolved) Precision (±)	NA	pCi/L			OTW01	11/05/2013 925	SH
Polonium 210	ND	pCi/L		1	OTW01	10/31/2013 1414	SH
Polonium 210 (Dissolved) Precision (±)	NA	pCi/L			OTW01	10/31/2013 1414	SH
Radium 226	ND	pCi/L		0.2	SM 7500 Ra-B	11/11/2013 1629	SH
Radium 226 Precision (±)	NA	pCi/L			SM 7500 Ra-B	11/11/2013 1629	SH
Thorium 230	ND	pCi/L		0.2	ACW10	11/04/2013 1125	MB
Thorium 230 Precision (±)	NA	pCi/L			ACW10	11/04/2013 1125	MB
Thorium 229 Tracer (30-120)	85	%			ACW10	11/04/2013 1125	MB
Radionuclides - Suspended							
Lead 210	ND	pCi/L		1	OTW01	11/05/2013 1128	SH
Lead 210 (Suspended) Precision (±)	NA	pCi/L			OTW01	11/05/2013 1128	SH
Polonium 210	ND	pCi/L		1	OTW01	10/31/2013 1414	SH
Polonium 210 (Suspended) Precision (±)	NA	pCi/L			OTW01	10/31/2013 1414	SH
Radium 226	ND	pCi/L		0.2	SM 7500 Ra-B	11/11/2013 1629	SH
Radium 226 (Suspended) Precision (±)	NA	pCi/L			SM 7500 Ra-B	11/11/2013 1629	SH
Thorium 230	ND	pCi/L		0.2	ACW10	11/05/2013 800	MB
Thorium 230 Precision (±)	NA	pCi/L			ACW10	11/05/2013 800	MB
Thorium 229 Tracer (30-120)	71	%			ACW10	11/05/2013 800	MB

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, Assistant Laboratory Manager



Inter-Mountain Labs

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Your Environmental Monitoring Partner

Sample Analysis Report

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

Date Reported 1/2/2014
Report ID S1311379001

ProjectName: Marsland Stream Sampling
Lab ID: S1311379-001
ClientSample ID: N1
COC:

WorkOrder: S1311379
CollectionDate: 11/20/2013
DateReceived: 11/22/2013 11:57:00 AM
FieldSampler: WN
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Metals - Dissolved							
Uranium	0.0082	mg/L		0.0003	EPA 200.8	11/22/2013 1947	MS
Uranium Activity	5.6	pCi/L		0.2	Calculation	12/30/2013 1224	WN
Metals - Suspended							
Uranium	ND	mg/L		0.0003	EPA 200.8	12/02/2013 1631	MS
Uranium Activity	ND	pCi/L		0.2	Calculation	12/30/2013 1224	WN
Radionuclides - Dissolved							
Lead 210	ND	pCi/L		1	OTW01	12/13/2013 851	SH
Lead 210 (Dissolved) Precision (±)	NA	pCi/L			OTW01	12/13/2013 851	SH
Polonium 210	ND	pCi/L		1	OTW01	12/13/2013 1436	SH
Polonium 210 (Dissolved) Precision (±)	NA	pCi/L			OTW01	12/13/2013 1436	SH
Radium 226	ND	pCi/L		0.2	SM 7500 Ra-B	12/13/2013 1111	SH
Radium 226 Precision (±)	NA	pCi/L			SM 7500 Ra-B	12/13/2013 1111	SH
Thorium 230	ND	pCi/L		0.2	ACW10	12/11/2013 1047	MB
Thorium 230 Precision (±)	NA	pCi/L			ACW10	12/11/2013 1047	MB
Thorium 229 Tracer (30-120)	56	%			ACW10	12/11/2013 1047	MB
Radionuclides - Suspended							
Lead 210	ND	pCi/L		1	OTW01	12/26/2013 1304	SH
Lead 210 (Suspended) Precision (±)	NA	pCi/L			OTW01	12/26/2013 1304	SH
Polonium 210	ND	pCi/L		1	OTW01	12/26/2013 1304	SH
Polonium 210 (Suspended) Precision (±)	NA	pCi/L			OTW01	12/26/2013 1304	SH
Radium 226	ND	pCi/L		0.2	SM 7500 Ra-B	12/18/2013 1018	SH
Radium 226 (Suspended) Precision (±)	NA	pCi/L			SM 7500 Ra-B	12/18/2013 1018	SH
Thorium 230	ND	pCi/L		0.2	ACW10	12/17/2013 1013	MB
Thorium 230 Precision (±)	NA	pCi/L			ACW10	12/17/2013 1013	MB
Thorium 229 Tracer (30-120)	84	%			ACW10	12/17/2013 1013	MB

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, Assistant Laboratory Manager



Inter-Mountain Labs

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Your Environmental Monitoring Partner

Sample Analysis Report

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

Date Reported 1/20/2014
Report ID S1312366001

ProjectName: Marsland Stream Sampling
Lab ID: S1312366-001
ClientSample ID: N1
COC: WEB

WorkOrder: S1312366
CollectionDate: 12/27/2013
DateReceived: 12/31/2013 11:28:00 AM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Metals - Dissolved							
Uranium	0.0061	mg/L		0.0003	EPA 200.8	01/03/2014 1510	MS
Uranium Activity	4.1	pCi/L		0.2	Calculation	01/20/2014 1413	WN
Metals - Suspended							
Uranium	<0.0003	mg/L		0.0003	EPA 200.8	01/03/2014 1927	MS
Uranium Activity	<0.2	pCi/L		0.2	Calculation	01/20/2014 1413	WN
Radionuclides - Dissolved							
Lead 210	<1	pCi/L		1	OTW01	01/14/2014 1153	SH
Lead 210 (Dissolved) Precision (±)	NA	pCi/L			OTW01	01/14/2014 1153	SH
Polonium 210	<1	pCi/L		1	OTW01	01/15/2014 1338	SH
Polonium 210 (Dissolved) Precision (±)	NA	pCi/L			OTW01	01/15/2014 1338	SH
Radium 226	<0.2	pCi/L		0.2	SM 7500 Ra-B	01/14/2014 1156	SH
Radium 226 Precision (±)	NA	pCi/L			SM 7500 Ra-B	01/14/2014 1156	SH
Thorium 230	<0.2	pCi/L		0.2	ACW10	01/10/2014 1130	MB
Thorium 230 Precision (±)	NA	pCi/L			ACW10	01/10/2014 1130	MB
Thorium 229 Tracer (30-120)	90	%			ACW10	01/10/2014 1130	MB
Radionuclides - Suspended							
Lead 210	<1	pCi/L		1	OTW01	01/14/2014 1406	SH
Lead 210 (Suspended) Precision (±)	NA	pCi/L			OTW01	01/14/2014 1406	SH
Polonium 210	<1	pCi/L		1	OTW01	01/15/2014 1338	SH
Polonium 210 (Suspended) Precision (±)	NA	pCi/L			OTW01	01/15/2014 1338	SH
Radium 226	<0.2	pCi/L		0.2	SM 7500 Ra-B	01/14/2014 950	SH
Radium 226 (Suspended) Precision (±)	NA	pCi/L			SM 7500 Ra-B	01/14/2014 950	SH
Thorium 230	<0.2	pCi/L		0.2	ACW10	01/10/2014 1130	MB
Thorium 230 Precision (±)	NA	pCi/L			ACW10	01/10/2014 1130	MB
Thorium 229 Tracer (30-120)	88	%			ACW10	01/10/2014 1130	MB

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

- A 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, Assistant Laboratory Manager



Inter-Mountain Labs

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Your Environmental Monitoring Partner

Sample Analysis Report

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

ProjectName: Marsland Stream Sampling
Lab ID: S1401235-001
ClientSample ID: N1
COC:

Date Reported 2/25/2014
Report ID S1401235001

WorkOrder: S1401235
CollectionDate: 1/17/2014
DateReceived: 1/22/2014 11:43:00 AM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Metals - Dissolved							
Uranium	0.0067	mg/L		0.0003	EPA 200.8	01/23/2014 1908	MS
Uranium Activity	4.5	pCi/L		0.2	Calculation	02/25/2014 1558	WN
Metals - Suspended							
Uranium	<0.0003	mg/L		0.0003	EPA 200.8	01/30/2014 2023	MS
Uranium Activity	<0.2	pCi/L		0.2	Calculation	02/25/2014 1558	WN
Radionuclides - Dissolved							
Lead 210	<1	pCi/L		1	OTW01	02/18/2014 1549	SH
Lead 210 (Dissolved) Precision (±)	0.4	pCi/L			OTW01	02/18/2014 1549	SH
Polonium 210	<1	pCi/L		1	OTW01	02/20/2014 1057	SH
Polonium 210 (Dissolved) Precision (±)	0.2	pCi/L			OTW01	02/20/2014 1057	SH
Radium 226	<0.2	pCi/L		0.2	SM 7500 Ra-B	02/06/2014 1134	SH
Radium 226 Precision (±)	0.04	pCi/L			SM 7500 Ra-B	02/06/2014 1134	SH
Thorium 230	<0.2	pCi/L		0.2	ACW10	02/16/2014 1049	MB
Thorium 230 Precision (±)	<	pCi/L			ACW10	02/16/2014 1049	MB
Thorium 229 Tracer (30-120)	95	%			ACW10	02/16/2014 1049	MB
Radionuclides - Suspended							
Lead 210	<1	pCi/L		1	OTW01	02/18/2014 1549	SH
Lead 210 (Suspended) Precision (±)	0.5	pCi/L			OTW01	02/18/2014 1549	SH
Polonium 210	<1	pCi/L		1	OTW01	02/20/2014 1057	SH
Polonium 210 (Suspended) Precision (±)	0.4	pCi/L			OTW01	02/20/2014 1057	SH
Radium 226	1.9	pCi/L		0.2	SM 7500 Ra-B	02/06/2014 1134	SH
Radium 226 (Suspended) Precision (±)	0.2	pCi/L			SM 7500 Ra-B	02/06/2014 1134	SH
Thorium 230	<0.2	pCi/L		0.2	ACW10	02/16/2014 1542	MB
Thorium 230 Precision (±)	0.2	pCi/L			ACW10	02/16/2014 1542	MB
Thorium 229 Tracer (30-120)	85	%			ACW10	02/16/2014 1542	MB

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, Assistant Laboratory Manager



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Sample Analysis Report

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

Date Reported 3/14/2014
Report ID S1402203001

ProjectName: Marsland Stream Sampling
Lab ID: S1402203-001
ClientSample ID: N1
COC: WEB

WorkOrder: S1402203
CollectionDate: 2/14/2014
DateReceived: 2/19/2014 10:00:00 AM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Metals - Dissolved							
Uranium	0.0112	mg/L		0.0003	EPA 200.8	02/20/2014 1942	MS
Uranium Activity	7.6	pCi/L		0.2	Calculation	03/14/2014 1155	WN
Metals - Suspended							
Uranium	<0.0003	mg/L		0.0003	EPA 200.8	02/20/2014 2117	MS
Uranium Activity	<0.2	pCi/L		0.2	Calculation	03/14/2014 1155	WN
Radionuclides - Dissolved							
Lead 210	<1	pCi/L		1	OTW01	03/04/2014 1259	SH
Lead 210 (Dissolved) Precision (±)	0.5	pCi/L			OTW01	03/04/2014 1259	SH
Polonium 210	<1	pCi/L		1	OTW01	03/05/2014 000	SH
Polonium 210 (Dissolved) Precision (±)	0.1	pCi/L			OTW01	03/05/2014 000	SH
Radium 226	<0.2	pCi/L		0.2	SM 7500 Ra-B	03/04/2014 1021	SH
Radium 226 Precision (±)	0.05	pCi/L			SM 7500 Ra-B	03/04/2014 1021	SH
Thorium 230	<0.2	pCi/L		0.2	ACW10	03/06/2014 1124	KK
Thorium 230 Precision (±)	<	pCi/L			ACW10	03/06/2014 1124	KK
Thorium 229 Tracer (30-120)	90	%			ACW10	03/06/2014 1124	KK
Radionuclides - Suspended							
Lead 210	<1	pCi/L		1	OTW01	03/04/2014 1540	SH
Lead 210 (Suspended) Precision (±)	0.5	pCi/L			OTW01	03/04/2014 1540	SH
Polonium 210	<1	pCi/L		1	OTW01	03/05/2014 000	SH
Polonium 210 (Suspended) Precision (±)	0.2	pCi/L			OTW01	03/05/2014 000	SH
Radium 226	<0.2	pCi/L		0.2	SM 7500 Ra-B	03/04/2014 1021	SH
Radium 226 (Suspended) Precision (±)	0.03	pCi/L			SM 7500 Ra-B	03/04/2014 1021	SH
Thorium 230	<0.2	pCi/L		0.2	ACW10	03/06/2014 1124	KK
Thorium 230 Precision (±)	0.2	pCi/L			ACW10	03/06/2014 1124	KK
Thorium 229 Tracer (30-120)	87	%			ACW10	03/06/2014 1124	KK

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



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Sample Analysis Report

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

Date Reported 3/31/2014
Report ID S1403095001

ProjectName: Marsland Stream Sampling
Lab ID: S1403095-001
ClientSample ID: N1
COC: WEB

WorkOrder: S1403095
CollectionDate: 3/5/2014
DateReceived: 3/7/2014 12:03:00 PM
FieldSampler: WN
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Metals - Dissolved							
Uranium	0.0056	mg/L		0.0003	EPA 200.8	03/07/2014 1912	MS
Uranium Activity	3.8	pCi/L		0.2	Calculation	03/31/2014 1347	WN
Metals - Suspended							
Uranium	<0.0003	mg/L		0.0003	EPA 200.8	03/14/2014 115	MS
Uranium Activity	<0.2	pCi/L		0.2	Calculation	03/31/2014 1347	WN
Radionuclides - Dissolved							
Lead 210	1.2	pCi/L		1	OTW01	03/21/2014 911	SH
Lead 210 (Dissolved) Precision (±)	0.5	pCi/L			OTW01	03/21/2014 911	SH
Polonium 210	<1	pCi/L		1	OTW01	03/19/2014 1309	SH
Polonium 210 (Dissolved) Precision (±)	0.2	pCi/L			OTW01	03/19/2014 1309	SH
Radium 226	<0.2	pCi/L		0.2	SM 7500 Ra-B	03/20/2014 1443	SH
Radium 226 Precision (±)	0.04	pCi/L			SM 7500 Ra-B	03/20/2014 1443	SH
Thorium 230	<0.2	pCi/L		0.2	ACW10	03/24/2014 1555	MB
Thorium 230 Precision (±)	0.04	pCi/L			ACW10	03/24/2014 1555	MB
Thorium 229 Tracer (30-120)	.91	%			ACW10	03/24/2014 1555	MB
Radionuclides - Suspended							
Lead 210	1.1	pCi/L		1	OTW01	03/24/2014 1511	MB
Lead 210 (Suspended) Precision (±)	0.4	pCi/L			OTW01	03/24/2014 1511	MB
Polonium 210	<1	pCi/L		1	OTW01	03/24/2014 1301	MB
Polonium 210 (Suspended) Precision (±)	0.4	pCi/L			OTW01	03/24/2014 1301	MB
Radium 226	<0.2	pCi/L		0.2	SM 7500 Ra-B	03/25/2014 1014	MB
Radium 226 (Suspended) Precision (±)	0.04	pCi/L			SM 7500 Ra-B	03/25/2014 1014	MB
Thorium 230	<0.2	pCi/L		0.2	ACW10	03/25/2014 1659	MB
Thorium 230 Precision (±)	0.1	pCi/L			ACW10	03/25/2014 1659	MB
Thorium 229 Tracer (30-120)	110	%			ACW10	03/25/2014 1659	MB

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers: 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 or is less than LCL
O Outside the Range of Dilutions
X Matrix Effect

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

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager



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Sample Analysis Report

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

Date Reported 5/28/2014
Report ID S1404283001

ProjectName: Marsland Stream Sampling
Lab ID: S1404283-001
ClientSample ID: N1
COC: WEB

WorkOrder: S1404283
CollectionDate: 4/15/2014
DateReceived: 4/17/2014 10:45:00 AM
FieldSampler: WN
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Metals - Dissolved							
Uranium	0.0081	mg/L		0.0003	EPA 200.8	04/18/2014 225	MS
Uranium Activity	5.5	pCi/L		0.2	Calculation	05/27/2014 1302	WN
Metals - Suspended							
Uranium	ND	mg/L		0.0003	EPA 200.8	04/22/2014 1918	MS
Uranium Activity	ND	pCi/L		0.2	Calculation	05/27/2014 1302	WN
Radionuclides - Dissolved							
Lead 210	1.1	pCi/L		1	OTW01	04/28/2014 914	MB
Lead 210 (Dissolved) Precision (±)	0.6	pCi/L			OTW01	04/28/2014 914	MB
Polonium 210	ND	pCi/L		1	OTW01	04/28/2014 1331	MB
Polonium 210 (Dissolved) Precision (±)	NA	pCi/L			OTW01	04/28/2014 1331	MB
Radium 226	ND	pCi/L		0.2	SM 7500 Ra-B	04/28/2014 1319	MB
Radium 226 Precision (±)	NA	pCi/L			SM 7500 Ra-B	04/28/2014 1319	MB
Thorium 230	ND	pCi/L		0.2	ACW10	05/05/2014 934	KK
Thorium 230 Precision (±)	NA	pCi/L			ACW10	05/05/2014 934	KK
Thorium 229 Tracer (30-120)	94	%			ACW10	05/05/2014 934	KK
Radionuclides - Suspended							
Lead 210	ND	pCi/L		1	OTW01	04/28/2014 914	MB
Lead 210 (Suspended) Precision (±)	NA	pCi/L			OTW01	04/28/2014 914	MB
Polonium 210	ND	pCi/L		1	OTW01	04/28/2014 1331	MB
Polonium 210 (Suspended) Precision (±)	NA	pCi/L			OTW01	04/28/2014 1331	MB
Radium 226	ND	pCi/L		0.2	SM 7500 Ra-B	04/29/2014 1040	MB
Radium 226 (Suspended) Precision (±)	NA	pCi/L			SM 7500 Ra-B	04/29/2014 1040	MB
Thorium 230	ND	pCi/L		0.2	ACW10	05/05/2014 934	KK
Thorium 230 Precision (±)	NA	pCi/L			ACW10	05/05/2014 934	KK
Thorium 229 Tracer (30-120)	89	%			ACW10	05/05/2014 934	KK

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B	Analyte detected in the associated Method Blank	C	Calculated Value
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
	M	Value exceeds Monthly Ave or MCL or is less than LCL	ND	Not Detected at the Reporting Limit
	O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	X	Matrix Effect		

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



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Sample Analysis Report

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

Date Reported 6/5/2014
Report ID S1405088001

ProjectName: Marsland Stream Sampling
Lab ID: S1405088-001
ClientSample ID: N1
COC: WEB

WorkOrder: S1405088
CollectionDate: 5/2/2014
DateReceived: 5/6/2014 11:57:00 AM
FieldSampler: WN
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Metals - Dissolved							
Uranium	0.0053	mg/L		0.0003	EPA 200.8	05/07/2014 125	MS
Uranium Activity	3.6	pCi/L		0.2	Calculation	06/05/2014 1158	WN
Metals - Suspended							
Uranium	ND	mg/L		0.0003	EPA 200.8	05/09/2014 1524	MS
Uranium Activity	ND	pCi/L		0.2	Calculation	06/05/2014 1158	WN
Radionuclides - Dissolved							
Lead 210	2.0	pCi/L		1	OTW01	05/15/2014 1046	MB
Lead 210 (Dissolved) Precision (±)	0.6	pCi/L			OTW01	05/15/2014 1046	MB
Polonium 210	ND	pCi/L		1	OTW01	05/13/2014 1409	MB
Polonium 210 (Dissolved) Precision (±)	NA	pCi/L			OTW01	05/13/2014 1409	MB
Radium 226	ND	pCi/L		0.2	SM 7500 Ra-B	05/12/2014 1347	MB
Radium 226 Precision (±)	NA	pCi/L			SM 7500 Ra-B	05/12/2014 1347	MB
Thorium 230	ND	pCi/L		0.2	ACW10	05/16/2014 1024	KK
Thorium 230 Precision (±)	NA	pCi/L			ACW10	05/16/2014 1024	KK
Thorium 229 Tracer (30-120)	92	%			ACW10	05/16/2014 1024	KK
Radionuclides - Suspended							
Lead 210	ND	pCi/L		1	OTW01	05/19/2014 1101	MB
Lead 210 (Suspended) Precision (±)	NA	pCi/L			OTW01	05/19/2014 1101	MB
Polonium 210	ND	pCi/L		1	OTW01	05/16/2014 1352	MB
Polonium 210 (Suspended) Precision (±)	NA	pCi/L			OTW01	05/16/2014 1352	MB
Radium 226	ND	pCi/L		0.2	SM 7500 Ra-B	05/19/2014 1229	MB
Radium 226 (Suspended) Precision (±)	NA	pCi/L			SM 7500 Ra-B	05/19/2014 1229	MB
Thorium 230	ND	pCi/L		0.2	ACW10	05/21/2014 1236	MB
Thorium 230 Precision (±)	NA	pCi/L			ACW10	05/21/2014 1236	MB
Thorium 229 Tracer (30-120)	93	%			ACW10	05/21/2014 1236	MB

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers: 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 or is less than LCL
O Outside the Range of Dilutions
X Matrix Effect

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

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager



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Sample Analysis Report

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

Date Reported 7/16/2014
Report ID S1406214001

ProjectName: Marsland Stream Samples
Lab ID: S1406214-001
ClientSample ID: N1
COC: WEB

WorkOrder: S1406214
CollectionDate: 6/6/2014
DateReceived: 6/11/2014 10:52:00 AM
FieldSampler: WN
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Metals - Dissolved							
Uranium	0.0035	mg/L		0.0003	EPA 200.8	06/11/2014 1921	MS
Uranium Activity	2.4	pCi/L		0.2	Calculation	07/15/2014 1255	WN
Metals - Suspended							
Uranium	ND	mg/L		0.0003	EPA 200.8	06/13/2014 1528	MS
Uranium Activity	ND	pCi/L		0.2	Calculation	07/15/2014 1255	WN
Radionuclides - Dissolved							
Lead 210	1.0	pCi/L		1	OTW01	06/25/2014 1254	MB
Lead 210 (Dissolved) Precision (±)	0.6	pCi/L			OTW01	06/25/2014 1254	MB
Polonium 210	ND	pCi/L		1	OTW01	06/25/2014 1702	MB
Polonium 210 (Dissolved) Precision (±)	NA	pCi/L			OTW01	06/25/2014 1702	MB
Radium 226	0.5	pCi/L		0.2	SM 7500 Ra-B	07/02/2014 926	MB
Radium 226 Precision (±)	0.1	pCi/L			SM 7500 Ra-B	07/02/2014 926	MB
Thorium 230	ND	pCi/L		0.2	ACW10	06/27/2014 1623	MB
Thorium 230 Precision (±)	NA	pCi/L			ACW10	06/27/2014 1623	MB
Thorium 229 Tracer (30-120)	76	%			ACW10	06/27/2014 1623	MB
Radionuclides - Suspended							
Lead 210	ND	pCi/L		1	OTW01	07/01/2014 1021	MB
Lead 210 (Suspended) Precision (±)	NA	pCi/L			OTW01	07/01/2014 1021	MB
Polonium 210	ND	pCi/L		1	OTW01	06/27/2014 1331	MB
Polonium 210 (Suspended) Precision (±)	NA	pCi/L			OTW01	06/27/2014 1331	MB
Radium 226	ND	pCi/L		0.2	SM 7500 Ra-B	07/09/2014 1405	MB
Radium 226 (Suspended) Precision (±)	NA	pCi/L			SM 7500 Ra-B	07/09/2014 1405	MB
Thorium 230	ND	pCi/L		0.2	ACW10	07/01/2014 1657	MB
Thorium 230 Precision (±)	NA	pCi/L			ACW10	07/01/2014 1657	MB
Thorium 229 Tracer (30-120)	86	%			ACW10	07/01/2014 1657	MB

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B Analyte detected in the associated Method Blank	C Calculated Value
	E Value above quantitation range	H Holding times for preparation or analysis exceeded
	J Analyte detected below quantitation limits	L Analyzed by a contract laboratory
	M Value exceeds Monthly Ave or MCL or is less than LCL	ND Not Detected at the Reporting Limit
	O Outside the Range of Dilutions	S Spike Recovery outside accepted recovery limits
	X Matrix Effect	

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager



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Sample Analysis Report

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

Date Reported 8/19/2014
Report ID S1407208001

ProjectName: Marsland Chadron Well Sampling
Lab ID: S1407208-001
ClientSample ID: N1
COC: WEB

WorkOrder: S1407208
CollectionDate: 7/8/2014
DateReceived: 7/10/2014 11:05:00 AM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Metals - Dissolved							
Uranium	0.0130	mg/L		0.0003	EPA 200.8	07/10/2014 2057	MS
Uranium Activity	8.8	pCi/L		0.2	Calculation	08/19/2014 1029	WN
Metals - Suspended							
Uranium	<0.0003	mg/L		0.0003	EPA 200.8	07/15/2014 1804	MS
Uranium Activity	<0.2	pCi/L		0.2	Calculation	08/19/2014 1029	WN
Radionuclides - Dissolved							
Lead 210	<1	pCi/L		1	OTW01	08/06/2014 1514	MB
Lead 210 (Dissolved) Precision (±)	0.3	pCi/L			OTW01	08/06/2014 1514	MB
Polonium 210	<1	pCi/L		1	OTW01	08/07/2014 1057	MB
Polonium 210 (Dissolved) Precision (±)	0.2	pCi/L			OTW01	08/07/2014 1057	MB
Radium 226	<0.2	pCi/L		0.2	SM 7500 Ra-B	08/27/2014 1338	MB
Radium 226 Precision (±)	0.1	pCi/L			SM 7500 Ra-B	08/27/2014 1338	MB
Thorium 230	<0.2	pCi/L		0.2	ACW10	07/28/2014 1225	MB
Thorium 230 Precision (±)	0.0	pCi/L			ACW10	07/28/2014 1225	MB
Thorium 229 Tracer (30-120)	63	%			ACW10	07/28/2014 1225	MB
Radionuclides - Suspended							
Lead 210	<1	pCi/L		1	OTW01	08/07/2014 839	MB
Lead 210 (Suspended) Precision (±)	0.3	pCi/L			OTW01	08/07/2014 839	MB
Polonium 210	<1	pCi/L		1	OTW01	08/07/2014 1233	MB
Polonium 210 (Suspended) Precision (±)	0.4	pCi/L			OTW01	08/07/2014 1233	MB
Radium 226	<0.2	pCi/L		0.2	SM 7500 Ra-B	07/28/2014 1140	MB
Radium 226 (Suspended) Precision (±)	0.03	pCi/L			SM 7500 Ra-B	07/28/2014 1140	MB
Thorium 230	<0.2	pCi/L		0.2	ACW10	08/01/2014 836	MB
Thorium 230 Precision (±)	0.04	pCi/L			ACW10	08/01/2014 836	MB
Thorium 229 Tracer (30-120)	77	%			ACW10	08/01/2014 836	MB

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B	Analyte detected in the associated Method Blank	C	Calculated Value
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
	M	Value exceeds Monthly Ave or MCL or is less than LCL	ND	Not Detected at the Reporting Limit
	O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	X	Matrix Effect		

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager



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Sample Analysis Report

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

Date Reported 9/23/2014
Report ID S1408200001

ProjectName: Marsland Stream Samples
Lab ID: S1408200-001
ClientSample ID: N1
COC: WEB

WorkOrder: S1408200
CollectionDate: 8/8/2014
DateReceived: 8/12/2014 11:12:00 AM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Metals - Dissolved							
Uranium	0.0050	mg/L		0.0003	EPA 200.8	08/12/2014 1931	MS
Uranium Activity	3.4	pCi/L		0.2	Calculation	09/23/2014 1111	WN
Metals - Suspended							
Uranium	<0.0003	mg/L		0.0003	EPA 200.8	08/14/2014 1502	MS
Uranium Activity	<0.2	pCi/L		0.2	Calculation	09/23/2014 1111	WN
Radionuclides - Dissolved							
Lead 210	1.1	pCi/L		1	OTW01	08/23/2014 1512	MB
Lead 210 (Dissolved) Precision (±)	0.4	pCi/L			OTW01	08/23/2014 1512	MB
Polonium 210	<1	pCi/L		1	OTW01	08/23/2014 1205	MB
Polonium 210 (Dissolved) Precision (±)	0.4	pCi/L			OTW01	08/23/2014 1205	MB
Radium 226	<0.2	pCi/L		0.2	SM 7500 Ra-B	09/03/2014 1153	MB
Radium 226 Precision (±)	0.04	pCi/L			SM 7500 Ra-B	09/03/2014 1153	MB
Thorium 230	<0.2	pCi/L		0.2	ACW10	08/27/2014 1712	MB
Thorium 230 Precision (±)	0.0	pCi/L			ACW10	08/27/2014 1712	MB
Thorium 229 Tracer (30-120)	62	%			ACW10	08/27/2014 1712	MB
Radionuclides - Suspended							
Lead 210	<1	pCi/L		1	OTW01	08/23/2014 1046	MB
Lead 210 (Suspended) Precision (±)	0.5	pCi/L			OTW01	08/23/2014 1046	MB
Polonium 210	<1	pCi/L		1	OTW01	08/25/2014 000	MB
Polonium 210 (Suspended) Precision (±)	0.2	pCi/L			OTW01	08/25/2014 000	MB
Radium 226	0.3	pCi/L		0.2	SM 7500 Ra-B	08/22/2014 1721	MB
Radium 226 (Suspended) Precision (±)	0.1	pCi/L			SM 7500 Ra-B	08/22/2014 1721	MB
Thorium 230	<0.2	pCi/L		0.2	ACW10	09/17/2014 1015	MB
Thorium 230 Precision (±)	0.04	pCi/L			ACW10	09/17/2014 1015	MB
Thorium 229 Tracer (30-120)	77	%			ACW10	09/17/2014 1015	MB

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B Analyte detected in the associated Method Blank	C Calculated Value
	E Value above quantitation range	H Holding times for preparation or analysis exceeded
	J Analyte detected below quantitation limits	L Analyzed by a contract laboratory
	M Value exceeds Monthly Ave or MCL or is less than LCL	ND Not Detected at the Reporting Limit
	O Outside the Range of Dilutions	S Spike Recovery outside accepted recovery limits
	X Matrix Effect	

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager



Inter-Mountain Labs

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Your Environmental Monitoring Partner

Sample Analysis Report

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

ProjectName: Marsland Stream Samples
Lab ID: S1409204-001
ClientSample ID: N1
COC: WEB

Date Reported: 10/20/2014
Report ID: S1409204001

WorkOrder: S1409204
CollectionDate: 9/8/2014
DateReceived: 9/10/2014 2:53:00 PM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Metals - Dissolved							
Uranium	0.0086	mg/L		0.0003	EPA 200.8	09/11/2014 1448	MS
Uranium Activity	5.8	pCi/L		0.2	Calculation	10/16/2014 902	WN
Metals - Suspended							
Uranium	ND	mg/L		0.0003	EPA 200.8	09/13/2014 1017	MS
Uranium Activity	ND	pCi/L		0.2	Calculation	10/16/2014 902	WN
Radionuclides - Dissolved							
Lead 210	ND	pCi/L		1	OTW01	09/29/2014 1111	MB
Lead 210 (Dissolved) Precision (±)	NA	pCi/L			OTW01	09/29/2014 1111	MB
Polonium 210	ND	pCi/L		1	OTW01	09/30/2014 1314	MB
Polonium 210 (Dissolved) Precision (±)	NA	pCi/L			OTW01	09/30/2014 1314	MB
Radium 226	ND	pCi/L		0.2	SM 7500 Ra-B	09/22/2014 1343	MB
Radium 226 Precision (±)	NA	pCi/L			SM 7500 Ra-B	09/22/2014 1343	MB
Thorium 230	ND	pCi/L		0.2	ACW10	10/31/2014 837	MB
Thorium 230 Precision (±)	NA	pCi/L			ACW10	10/31/2014 837	MB
Thorium 229 Tracer (30-120)	75	%			ACW10	10/31/2014 837	MB
Radionuclides - Suspended							
Lead 210	ND	pCi/L		1	OTW01	09/29/2014 1314	MB
Lead 210 (Suspended) Precision (±)	NA	pCi/L			OTW01	09/29/2014 1314	MB
Polonium 210	ND	pCi/L		1	OTW01	09/30/2014 1421	MB
Polonium 210 (Suspended) Precision (±)	NA	pCi/L			OTW01	09/30/2014 1421	MB
Radium 226	ND	pCi/L		0.2	SM 7500 Ra-B	10/15/2014 1302	MB
Radium 226 (Suspended) Precision (±)	NA	pCi/L			SM 7500 Ra-B	10/15/2014 1302	MB
Thorium 230	ND	pCi/L		0.2	ACW10	09/19/2014 1722	MB
Thorium 230 Precision (±)	NA	pCi/L			ACW10	09/19/2014 1722	MB
Thorium 229 Tracer (30-120)	82	%			ACW10	09/19/2014 1722	MB

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B	Analyte detected in the associated Method Blank	C	Calculated Value
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
	M	Value exceeds Monthly Ave or MCL or is less than LCL	ND	Not Detected at the Reporting Limit
	O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	X	Matrix Effect		

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



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Your Environmental Monitoring Partner

Sample Analysis Report

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

Date Reported 10/30/2013
Report ID: S1309291001

ProjectName: Marsland Stream Samples
Lab ID: S1309291-002
ClientSample ID: N2
COC: Web

WorkOrder: S1309291
CollectionDate: 9/16/2013
DateReceived: 9/18/2013 2:30:00 PM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Metals - Dissolved							
Uranium	0.0051	mg/L		0.0003	EPA 200.8	10/31/2013 037	MS
Uranium Activity	3.5	pCi/L		0.2	Calculation	11/01/2013 1335	LJK
Metals - Suspended							
Uranium	ND	mg/L		0.0003	EPA 200.8	10/01/2013 716	MS
Uranium Activity	ND	pCi/L		0.2	Calculation	11/01/2013 1335	LJK
Radionuclides - Dissolved							
Lead 210	ND	pCi/L		1	OTW01	10/14/2013 1413	SH
Lead 210 (Dissolved) Precision (±)	NA	pCi/L			OTW01	10/14/2013 1413	SH
Polonium 210	ND	pCi/L		1	OTW01	10/04/2013 1043	SH
Polonium 210 (Dissolved) Precision (±)	NA	pCi/L			OTW01	10/04/2013 1043	SH
Radium 226	ND	pCi/L		0.2	SM 7500 Ra-B	10/01/2013 1446	SH
Radium 226 Precision (±)	NA	pCi/L			SM 7500 Ra-B	10/01/2013 1446	SH
Thorium 230	ND	pCi/L		0.2	ACW10	09/30/2013 1205	MB
Thorium 230 Precision (±)	NA	pCi/L			ACW10	09/30/2013 1205	MB
Thorium 229 Tracer (30-120)	88	%			ACW10	09/30/2013 1205	MB
Radionuclides - Suspended							
Lead 210	ND	pCi/L		1	OTW01	10/21/2013 1410	SH
Lead 210 (Suspended) Precision (±)	NA	pCi/L			OTW01	10/21/2013 1410	SH
Polonium 210	ND	pCi/L		1	OTW01	10/15/2013 1452	SH
Polonium 210 (Suspended) Precision (±)	NA	pCi/L			OTW01	10/15/2013 1452	SH
Radium 226	ND	pCi/L		0.2	SM 7500 Ra-B	10/14/2013 1851	SH
Radium 226 (Suspended) Precision (±)	NA	pCi/L			SM 7500 Ra-B	10/14/2013 1851	SH
Thorium 230	ND	pCi/L		0.2	ACW10	10/09/2013 1333	MB
Thorium 230 Precision (±)	NA	pCi/L			ACW10	10/09/2013 1333	MB
Thorium 229 Tracer (30-120)	85	%			ACW10	10/09/2013 1333	MB

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, Assistant Laboratory Manager



Inter-Mountain Labs

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Your Environmental Monitoring Partner

Sample Analysis Report

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

Date Reported: 11/20/2013
Report ID: S1310334001

ProjectName: Marsland Stream Sampling
Lab ID: S1310334-002
ClientSample ID: N2
COC: WEB

WorkOrder: S1310334
CollectionDate: 10/18/2013
DateReceived: 10/22/2013 10:59:00 AM
FieldSampler: WN
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Metals - Dissolved							
Uranium	0.0059	mg/L		0.0003	EPA 200.8	10/22/2013 2032	MS
Uranium Activity	4.0	pCi/L		0.2	Calculation	11/15/2013 1435	WN
Metals - Suspended							
Uranium	ND	mg/L		0.0003	EPA 200.8	10/29/2013 145	MS
Uranium Activity	ND	pCi/L		0.2	Calculation	11/15/2013 1435	WN
Radionuclides - Dissolved							
Lead 210	ND	pCi/L		1	OTW01	11/05/2013 1128	SH
Lead 210 (Dissolved) Precision (±)	NA	pCi/L			OTW01	11/05/2013 1128	SH
Polonium 210	ND	pCi/L		1	OTW01	10/31/2013 1414	SH
Polonium 210 (Dissolved) Precision (±)	NA	pCi/L			OTW01	10/31/2013 1414	SH
Radium 226	ND	pCi/L		0.2	SM 7500 Ra-B	11/11/2013 1629	SH
Radium 226 Precision (±)	NA	pCi/L			SM 7500 Ra-B	11/11/2013 1629	SH
Thorium 230	ND	pCi/L		0.2	ACW10	11/04/2013 1125	M
Thorium 230 Precision (±)	NA	pCi/L			ACW10	11/04/2013 1125	M
Thorium 229 Tracer (30-120)	77	%			ACW10	11/04/2013 1125	MB
Radionuclides - Suspended							
Lead 210	ND	pCi/L		1	OTW01	11/05/2013 1334	SH
Lead 210 (Suspended) Precision (±)	NA	pCi/L			OTW01	11/05/2013 1334	SH
Polonium 210	ND	pCi/L		1	OTW01	10/31/2013 1414	SH
Polonium 210 (Suspended) Precision (±)	NA	pCi/L			OTW01	10/31/2013 1414	SH
Radium 226	ND	pCi/L		0.2	SM 7500 Ra-B	11/11/2013 1629	SH
Radium 226 (Suspended) Precision (±)	NA	pCi/L			SM 7500 Ra-B	11/11/2013 1629	SH
Thorium 230	ND	pCi/L		0.2	ACW10	11/05/2013 800	MB
Thorium 230 Precision (±)	NA	pCi/L			ACW10	11/05/2013 800	MB
Thorium 229 Tracer (30-120)	68	%			ACW10	11/05/2013 800	MB

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, Assistant Laboratory Manager



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Sample Analysis Report

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

Date Reported 1/2/2014
Report ID S1311379001

ProjectName: Marsland Stream Sampling
Lab ID: S1311379-002
ClientSample ID: N2
COC:

WorkOrder: S1311379
CollectionDate: 11/20/2013
DateReceived: 11/22/2013 11:57:00 AM
FieldSampler: WN
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Metals - Dissolved							
Uranium	0.0062	mg/L		0.0003	EPA 200.8	11/22/2013 1953	MS
Uranium Activity	4.2	pCi/L		0.2	Calculation	12/30/2013 1224	WN
Metals - Suspended							
Uranium	ND	mg/L		0.0003	EPA 200.8	12/02/2013 1703	MS
Uranium Activity	ND	pCi/L		0.2	Calculation	12/30/2013 1224	WN
Radionuclides - Dissolved							
Lead 210	ND	pCi/L		1	OTW01	12/19/2013 1436	SH
Lead 210 (Dissolved) Precision (±)	NA	pCi/L			OTW01	12/19/2013 1436	SH
Polonium 210	ND	pCi/L		1	OTW01	12/24/2013 1128	SH
Polonium 210 (Dissolved) Precision (±)	NA	pCi/L			OTW01	12/24/2013 1128	SH
Radium 226	ND	pCi/L		0.2	SM 7500 Ra-B	12/13/2013 1111	SH
Radium 226 Precision (±)	NA	pCi/L			SM 7500 Ra-B	12/13/2013 1111	SH
Thorium 230	ND	pCi/L		0.2	ACW10	12/11/2013 1047	MB
Thorium 230 Precision (±)	NA	pCi/L			ACW10	12/11/2013 1047	MB
Thorium 229 Tracer (30-120)	89	%			ACW10	12/11/2013 1047	MB
Radionuclides - Suspended							
Lead 210	ND	pCi/L		1	OTW01	12/26/2013 1304	SH
Lead 210 (Suspended) Precision (±)	NA	pCi/L			OTW01	12/26/2013 1304	SH
Polonium 210	ND	pCi/L		1	OTW01	12/26/2013 1304	SH
Polonium 210 (Suspended) Precision (±)	NA	pCi/L			OTW01	12/26/2013 1304	SH
Radium 226	ND	pCi/L		0.2	SM 7500 Ra-B	12/18/2013 1228	SH
Radium 226 (Suspended) Precision (±)	NA	pCi/L			SM 7500 Ra-B	12/18/2013 1228	SH
Thorium 230	ND	pCi/L		0.2	ACW10	12/17/2013 1013	MB
Thorium 230 Precision (±)	NA	pCi/L			ACW10	12/17/2013 1013	MB
Thorium 229 Tracer (30-120)	110	%			ACW10	12/17/2013 1013	MB

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, Assistant Laboratory Manager



Inter-Mountain Labs

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Your Environmental Monitoring Partner

Sample Analysis Report

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

Date Reported 1/20/2014
Report ID S1312366001

ProjectName: Marsland Stream Sampling
Lab ID: S1312366-002
ClientSample ID: N2
COC: WEB

WorkOrder: S1312366
CollectionDate: 12/27/2013
DateReceived: 12/31/2013 11:28:00 AM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Metals - Dissolved							
Uranium	0.0060	mg/L		0.0003	EPA 200.8	01/03/2014 1526	MS
Uranium Activity	4.1	pCi/L		0.2	Calculation	01/20/2014 1413	WN
Metals - Suspended							
Uranium	<0.0003	mg/L		0.0003	EPA 200.8	01/03/2014 1959	MS
Uranium Activity	<0.2	pCi/L		0.2	Calculation	01/20/2014 1413	WN
Radionuclides - Dissolved							
Lead 210	<1	pCi/L		1	OTW01	01/14/2014 1406	SH
Lead 210 (Dissolved) Precision (±)	NA	pCi/L			OTW01	01/14/2014 1406	SH
Polonium 210	<1	pCi/L		1	OTW01	01/15/2014 1338	SH
Polonium 210 (Dissolved) Precision (±)	NA	pCi/L			OTW01	01/15/2014 1338	SH
Radium 226	<0.2	pCi/L		0.2	SM 7500 Ra-B	01/14/2014 1156	SH
Radium 226 Precision (±)	NA	pCi/L			SM 7500 Ra-B	01/14/2014 1156	SH
Thorium 230	<0.2	pCi/L		0.2	ACW10	01/10/2014 1130	MB
Thorium 230 Precision (±)	NA	pCi/L			ACW10	01/10/2014 1130	MB
Thorium 229 Tracer (30-120)	92	%			ACW10	01/10/2014 1130	MB
Radionuclides - Suspended							
Lead 210	<1	pCi/L		1	OTW01	01/14/2014 1406	SH
Lead 210 (Suspended) Precision (±)	NA	pCi/L			OTW01	01/14/2014 1406	SH
Polonium 210	<1	pCi/L		1	OTW01	01/15/2014 1338	SH
Polonium 210 (Suspended) Precision (±)	NA	pCi/L			OTW01	01/15/2014 1338	SH
Radium 226	<0.2	pCi/L		0.2	SM 7500 Ra-B	01/14/2014 950	SH
Radium 226 (Suspended) Precision (±)	NA	pCi/L			SM 7500 Ra-B	01/14/2014 950	SH
Thorium 230	<0.2	pCi/L		0.2	ACW10	01/10/2014 1130	MB
Thorium 230 Precision (±)	NA	pCi/L			ACW10	01/10/2014 1130	MB
Thorium 229 Tracer (30-120)	82	%			ACW10	01/10/2014 1130	MB

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



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Sample Analysis Report

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

Date Reported 2/25/2014
Report ID S1401235001

ProjectName: Marsland Stream Sampling
Lab ID: S1401235-002
ClientSample ID: N2
COC:

WorkOrder: S1401235
CollectionDate: 1/17/2014
DateReceived: 1/22/2014 11:43:00 AM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Metals - Dissolved							
Uranium	0.0062	mg/L		0.0003	EPA 200.8	01/23/2014 1913	MS
Uranium Activity	4.2	pCi/L		0.2	Calculation	02/25/2014 1558	WN
Metals - Suspended							
Uranium	<0.0003	mg/L		0.0003	EPA 200.8	01/30/2014 2055	MS
Uranium Activity	<0.2	pCi/L		0.2	Calculation	02/25/2014 1558	WN
Radionuclides - Dissolved							
Lead 210	<1	pCi/L		1	OTW01	02/18/2014 1549	SH
Lead 210 (Dissolved) Precision (±)	0.5	pCi/L			OTW01	02/18/2014 1549	SH
Polonium 210	<1	pCi/L		1	OTW01	02/20/2014 1057	SH
Polonium 210 (Dissolved) Precision (±)	0.2	pCi/L			OTW01	02/20/2014 1057	SH
Radium 226	0.4	pCi/L		0.2	SM 7500 Ra-B	02/06/2014 1134	SH
Radium 226 Precision (±)	0.1	pCi/L			SM 7500 Ra-B	02/06/2014 1134	SH
Thorium 230	<0.2	pCi/L		0.2	ACW10	02/16/2014 1542	MB
Thorium 230 Precision (±)	<	pCi/L			ACW10	02/16/2014 1542	MB
Thorium 229 Tracer (30-120)	70	%			ACW10	02/16/2014 1542	MB
Radionuclides - Suspended							
Lead 210	<1	pCi/L		1	OTW01	02/18/2014 1549	SH
Lead 210 (Suspended) Precision (±)	0.4	pCi/L			OTW01	02/18/2014 1549	SH
Polonium 210	<1	pCi/L		1	OTW01	02/20/2014 1057	SH
Polonium 210 (Suspended) Precision (±)	0.3	pCi/L			OTW01	02/20/2014 1057	SH
Radium 226	<0.2	pCi/L		0.2	SM 7500 Ra-B	02/06/2014 1402	SH
Radium 226 (Suspended) Precision (±)	0.03	pCi/L			SM 7500 Ra-B	02/06/2014 1402	SH
Thorium 230	<0.2	pCi/L		0.2	ACW10	02/16/2014 1542	MB
Thorium 230 Precision (±)	0.2	pCi/L			ACW10	02/16/2014 1542	MB
Thorium 229 Tracer (30-120)	91	%			ACW10	02/16/2014 1542	MB

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, Assistant Laboratory Manager



Inter-Mountain Labs

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Sample Analysis Report

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

Date Reported 3/14/2014
Report ID S1402203001

ProjectName: Marsland Stream Sampling
Lab ID: S1402203-002
ClientSample ID: N2
COC: WEB

WorkOrder: S1402203
CollectionDate: 2/14/2014
DateReceived: 2/19/2014 10:00:00 AM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Metals - Dissolved							
Uranium	0.0100	mg/L		0.0003	EPA 200.8	02/20/2014 1947	MS
Uranium Activity	6.8	pCi/L		0.2	Calculation	03/14/2014 1155	WN
Metals - Suspended							
Uranium	<0.0003	mg/L		0.0003	EPA 200.8	02/20/2014 2149	MS
Uranium Activity	<0.2	pCi/L		0.2	Calculation	03/14/2014 1155	WN
Radionuclides - Dissolved							
Lead 210	<1	pCi/L		1	OTW01	03/04/2014 1540	SH
Lead 210 (Dissolved) Precision (±)	0.5	pCi/L			OTW01	03/04/2014 1540	SH
Polonium 210	<1	pCi/L		1	OTW01	03/05/2014 000	SH
Polonium 210 (Dissolved) Precision (±)	0.2	pCi/L			OTW01	03/05/2014 000	SH
Radium 226	<0.2	pCi/L		0.2	SM 7500 Ra-B	03/04/2014 1021	SH
Radium 226 Precision (±)	0.1	pCi/L			SM 7500 Ra-B	03/04/2014 1021	SH
Thorium 230	<0.2	pCi/L		0.2	ACW10	03/06/2014 1124	KK
Thorium 230 Precision (±)	<	pCi/L			ACW10	03/06/2014 1124	KK
Thorium 229 Tracer (30-120)	100	%			ACW10	03/06/2014 1124	KK
Radionuclides - Suspended							
Lead 210	<1	pCi/L		1	OTW01	03/04/2014 1540	SH
Lead 210 (Suspended) Precision (±)	0.6	pCi/L			OTW01	03/04/2014 1540	SH
Polonium 210	<1	pCi/L		1	OTW01	03/05/2014 000	SH
Polonium 210 (Suspended) Precision (±)	0.2	pCi/L			OTW01	03/05/2014 000	SH
Radium 226	<0.2	pCi/L		0.2	SM 7500 Ra-B	03/04/2014 1021	SH
Radium 226 (Suspended) Precision (±)	0.03	pCi/L			SM 7500 Ra-B	03/04/2014 1021	SH
Thorium 230	<0.2	pCi/L		0.2	ACW10	03/06/2014 1125	KK
Thorium 230 Precision (±)	0.1	pCi/L			ACW10	03/06/2014 1125	KK
Thorium 229 Tracer (30-120)	90	%			ACW10	03/06/2014 1125	KK

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, Assistant Laboratory Manager



Inter-Mountain Labs

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Your Environmental Monitoring Partner

Sample Analysis Report

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

Date Reported 3/31/2014
Report ID S1403095001

ProjectName: Marsland Stream Sampling
Lab ID: S1403095-002
ClientSample ID: N2
COC: WEB

WorkOrder: S1403095
CollectionDate: 3/5/2014
DateReceived: 3/7/2014 12:03:00 PM
FieldSampler: WN
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Metals - Dissolved							
Uranium	0.0018	mg/L		0.0003	EPA 200.8	03/07/2014 1918	MS
Uranium Activity	1.2	pCi/L		0.2	Calculation	03/31/2014 1347	WN
Metals - Suspended							
Uranium	0.0012	mg/L		0.0003	EPA 200.8	03/14/2014 136	MS
Uranium Activity	0.8	pCi/L		0.2	Calculation	03/31/2014 1347	WN
Radionuclides - Dissolved							
Lead 210	<1	pCi/L		1	OTW01	03/21/2014 911	SH
Lead 210 (Dissolved) Precision (±)	0.5	pCi/L			OTW01	03/21/2014 911	SH
Polonium 210	<1	pCi/L		1	OTW01	03/19/2014 1309	SH
Polonium 210 (Dissolved) Precision (±)	0.2	pCi/L			OTW01	03/19/2014 1309	SH
Radium 226	<0.2	pCi/L		0.2	SM 7500 Ra-B	03/20/2014 1443	SH
Radium 226 Precision (±)	0.02	pCi/L			SM 7500 Ra-B	03/20/2014 1443	SH
Thorium 230	<0.2	pCi/L		0.2	ACW10	03/24/2014 1555	MB
Thorium 230 Precision (±)	0.04	pCi/L			ACW10	03/24/2014 1555	MB
Thorium 229 Tracer (30-120)	76	%			ACW10	03/24/2014 1555	MB
Radionuclides - Suspended							
Lead 210	<1	pCi/L		1	OTW01	03/24/2014 1511	MB
Lead 210 (Suspended) Precision (±)	0.4	pCi/L			OTW01	03/24/2014 1511	MB
Polonium 210	<1	pCi/L		1	OTW01	03/24/2014 1301	MB
Polonium 210 (Suspended) Precision (±)	0.3	pCi/L			OTW01	03/24/2014 1301	MB
Radium 226	<0.2	pCi/L		0.2	SM 7500 Ra-B	03/25/2014 1014	MB
Radium 226 (Suspended) Precision (±)	0.05	pCi/L			SM 7500 Ra-B	03/25/2014 1014	MB
Thorium 230	<0.2	pCi/L		0.2	ACW10	03/25/2014 1659	MB
Thorium 230 Precision (±)	0.1	pCi/L			ACW10	03/25/2014 1659	MB
Thorium 229 Tracer (30-120)	110	%			ACW10	03/25/2014 1659	MB

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers: 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 or is less than LCL
O Outside the Range of Dilutions
X Matrix Effect

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

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager



Inter-Mountain Labs

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Your Environmental Monitoring Partner

Sample Analysis Report

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

Date Reported 5/28/2014
Report ID S1404283001

ProjectName: Marsland Stream Sampling
Lab ID: S1404283-002
ClientSample ID: N2
COC: WEB

WorkOrder: S1404283
CollectionDate: 4/15/2014
DateReceived: 4/17/2014 10:45:00 AM
FieldSampler: WN
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Metals - Dissolved							
Uranium	0.0068	mg/L		0.0003	EPA 200.8	04/18/2014 231	MS
Uranium Activity	4.6	pCi/L		0.2	Calculation	05/27/2014 1302	WN
Metals - Suspended							
Uranium	ND	mg/L		0.0003	EPA 200.8	04/22/2014 1940	MS
Uranium Activity	ND	pCi/L		0.2	Calculation	05/27/2014 1302	WN
Radionuclides - Dissolved							
Lead 210	1.1	pCi/L		1	OTW01	04/28/2014 914	MB
Lead 210 (Dissolved) Precision (±)	0.6	pCi/L			OTW01	04/28/2014 914	MB
Polonium 210	ND	pCi/L		1	OTW01	04/28/2014 1331	MB
Polonium 210 (Dissolved) Precision (±)	NA	pCi/L			OTW01	04/28/2014 1331	MB
Radium 226	ND	pCi/L		0.2	SM 7500 Ra-B	04/28/2014 1319	MB
Radium 226 Precision (±)	NA	pCi/L			SM 7500 Ra-B	04/28/2014 1319	MB
Thorium 230	ND	pCi/L		0.2	ACW10	05/05/2014 934	KK
Thorium 230 Precision (±)	NA	pCi/L			ACW10	05/05/2014 934	KK
Thorium 229 Tracer (30-120)	85	%			ACW10	05/05/2014 934	KK
Radionuclides - Suspended							
Lead 210	ND	pCi/L		1	OTW01	04/28/2014 914	MB
Lead 210 (Suspended) Precision (±)	NA	pCi/L			OTW01	04/28/2014 914	MB
Polonium 210	ND	pCi/L		1	OTW01	04/28/2014 1331	MB
Polonium 210 (Suspended) Precision (±)	NA	pCi/L			OTW01	04/28/2014 1331	MB
Radium 226	ND	pCi/L		0.2	SM 7500 Ra-B	04/29/2014 1040	MB
Radium 226 (Suspended) Precision (±)	NA	pCi/L			SM 7500 Ra-B	04/29/2014 1040	MB
Thorium 230	ND	pCi/L		0.2	ACW10	05/05/2014 934	KK
Thorium 230 Precision (±)	NA	pCi/L			ACW10	05/05/2014 934	KK
Thorium 229 Tracer (30-120)	89	%			ACW10	05/05/2014 934	KK

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B	Analyte detected in the associated Method Blank	C	Calculated Value
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
	M	Value exceeds Monthly Ave or MCL or is less than LCL	ND	Not Detected at the Reporting Limit
	O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	X	Matrix Effect		

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



Inter-Mountain Labs

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1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Sample Analysis Report

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

Date Reported 6/5/2014
Report ID S1405088001

ProjectName: Marsland Stream Sampling
Lab ID: S1405088-002
ClientSample ID: N2
COC: WEB

WorkOrder: S1405088
CollectionDate: 5/2/2014
DateReceived: 5/6/2014 11:57:00 AM
FieldSampler: WN
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Metals - Dissolved							
Uranium	0.0055	mg/L		0.0003	EPA 200.8	05/07/2014 130	MS
Uranium Activity	3.7	pCi/L		0.2	Calculation	06/05/2014 1158	WN
Metals - Suspended							
Uranium	ND	mg/L		0.0003	EPA 200.8	05/09/2014 1530	MS
Uranium Activity	ND	pCi/L		0.2	Calculation	06/05/2014 1158	WN
Radionuclides - Dissolved							
Lead 210	1.1	pCi/L		1	OTW01	05/15/2014 1046	MB
Lead 210 (Dissolved) Precision (±)	0.5	pCi/L			OTW01	05/15/2014 1046	MB
Polonium 210	ND	pCi/L		1	OTW01	05/13/2014 1409	MB
Polonium 210 (Dissolved) Precision (±)	NA	pCi/L			OTW01	05/13/2014 1409	MB
Radium 226	0.5	pCi/L		0.2	SM 7500 Ra-B	05/12/2014 1347	MB
Radium 226 Precision (±)	0.2	pCi/L			SM 7500 Ra-B	05/12/2014 1347	MB
Thorium 230	ND	pCi/L		0.2	ACW10	05/19/2014 909	KK
Thorium 230 Precision (±)	NA	pCi/L			ACW10	05/19/2014 909	KK
Thorium 229 Tracer (30-120)	87	%			ACW10	05/19/2014 909	KK
Radionuclides - Suspended							
Lead 210	ND	pCi/L		1	OTW01	05/19/2014 1101	MB
Lead 210 (Suspended) Precision (±)	NA	pCi/L			OTW01	05/19/2014 1101	MB
Polonium 210	ND	pCi/L		1	OTW01	05/16/2014 1352	MB
Polonium 210 (Suspended) Precision (±)	NA	pCi/L			OTW01	05/16/2014 1352	MB
Radium 226	ND	pCi/L		0.2	SM 7500 Ra-B	05/19/2014 1229	MB
Radium 226 (Suspended) Precision (±)	NA	pCi/L			SM 7500 Ra-B	05/19/2014 1229	MB
Thorium 230	ND	pCi/L		0.2	ACW10	05/30/2014 1320	MB
Thorium 230 Precision (±)	NA	pCi/L			ACW10	05/30/2014 1320	MB
Thorium 229 Tracer (30-120)	80	pCi/L			ACW10	05/30/2014 1320	MB

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B Analyte detected in the associated Method Blank	C Calculated Value
	E Value above quantitation range	H Holding times for preparation or analysis exceeded
	J Analyte detected below quantitation limits	L Analyzed by a contract laboratory
	M Value exceeds Monthly Ave or MCL or is less than LCL	ND Not Detected at the Reporting Limit
	O Outside the Range of Dilutions	S Spike Recovery outside accepted recovery limits
	X Matrix Effect	

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager



Inter-Mountain Labs

Your Environmental Monitoring Partner

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Sample Analysis Report

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

Date Reported 7/16/2014
Report ID S1406214001

ProjectName: Marsland Stream Samples
Lab ID: S1406214-002
ClientSample ID: N2
COC: WEB

WorkOrder: S1406214
CollectionDate: 6/6/2014
DateReceived: 6/11/2014 10:52:00 AM
FieldSampler: WN
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Metals - Dissolved							
Uranium	0.0037	mg/L		0.0003	EPA 200.8	06/11/2014 1926	MS
Uranium Activity	2.5	pCi/L		0.2	Calculation	07/15/2014 1255	WN
Metals - Suspended							
Uranium	0.0003	mg/L		0.0003	EPA 200.8	06/13/2014 1600	MS
Uranium Activity	0.2	pCi/L		0.2	Calculation	07/15/2014 1255	WN
Radionuclides - Dissolved							
Lead 210	ND	pCi/L		1	OTW01	06/25/2014 1254	MB
Lead 210 (Dissolved) Precision (±)	NA	pCi/L			OTW01	06/25/2014 1254	MB
Polonium 210	3.0	pCi/L		1	OTW01	06/25/2014 1702	MB
Polonium 210 (Dissolved) Precision (±)	0.7	pCi/L			OTW01	06/25/2014 1702	MB
Radium 226	0.2	pCi/L		0.2	SM 7500 Ra-B	07/02/2014 926	MB
Radium 226 Precision (±)	0.1	pCi/L			SM 7500 Ra-B	07/02/2014 926	MB
Thorium 230	ND	pCi/L		0.2	ACW10	06/27/2014 1623	MB
Thorium 230 Precision (±)	NA	pCi/L			ACW10	06/27/2014 1623	MB
Thorium 229 Tracer (30-120)	84	%			ACW10	06/27/2014 1623	MB
Radionuclides - Suspended							
Lead 210	ND	pCi/L		1	OTW01	07/01/2014 1021	MB
Lead 210 (Suspended) Precision (±)	NA	pCi/L			OTW01	07/01/2014 1021	MB
Polonium 210	ND	pCi/L		1	OTW01	06/27/2014 1331	MB
Polonium 210 (Suspended) Precision (±)	NA	pCi/L			OTW01	06/27/2014 1331	MB
Radium 226	ND	pCi/L		0.2	SM 7500 Ra-B	07/09/2014 1405	MB
Radium 226 (Suspended) Precision (±)	NA	pCi/L			SM 7500 Ra-B	07/09/2014 1405	MB
Thorium 230	ND	pCi/L		0.2	ACW10	07/01/2014 1657	MB
Thorium 230 Precision (±)	NA	pCi/L			ACW10	07/01/2014 1657	MB
Thorium 229 Tracer (30-120)	87	%			ACW10	07/01/2014 1657	MB

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B Analyte detected in the associated Method Blank	C Calculated Value
	E Value above quantitation range	H Holding times for preparation or analysis exceeded
	J Analyte detected below quantitation limits	L Analyzed by a contract laboratory
	M Value exceeds Monthly Ave or MCL or is less than LCL	ND Not Detected at the Reporting Limit
	O Outside the Range of Dilutions	S Spike Recovery outside accepted recovery limits
	X Matrix Effect	

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager



Inter-Mountain Labs

Your Environmental Monitoring Partner

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Sample Analysis Report

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

Date Reported 8/19/2014
Report ID S1407208001

ProjectName: Marsland Chadron Well Sampling
Lab ID: S1407208-002
ClientSample ID: N2
COC: WEB

WorkOrder: S1407208
CollectionDate: 7/8/2014
DateReceived: 7/10/2014 11:05:00 AM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Metals - Dissolved							
Uranium	0.0072	mg/L		0.0003	EPA 200.8	07/10/2014 2101	MS
Uranium Activity	4.9	pCi/L		0.2	Calculation	08/19/2014 1029	WN
Metals - Suspended							
Uranium	<0.0003	mg/L		0.0003	EPA 200.8	07/15/2014 1810	MS
Uranium Activity	<0.2	pCi/L		0.2	Calculation	08/19/2014 1029	WN
Radionuclides - Dissolved							
Lead 210	<1	pCi/L		1	OTW01	08/06/2014 1514	MB
Lead 210 (Dissolved) Precision (±)	0.3	pCi/L			OTW01	08/06/2014 1514	MB
Polonium 210	<1	pCi/L		1	OTW01	08/07/2014 1057	MB
Polonium 210 (Dissolved) Precision (±)	0.2	pCi/L			OTW01	08/07/2014 1057	MB
Radium 226	0.2	pCi/L		0.2	SM 7500 Ra-B	07/21/2014 1422	MB
Radium 226 Precision (±)	0.1	pCi/L			SM 7500 Ra-B	07/21/2014 1422	MB
Thorium 230	<0.2	pCi/L		0.2	ACW10	07/28/2014 1225	MB
Thorium 230 Precision (±)	0.1	pCi/L			ACW10	07/28/2014 1225	MB
Thorium 229 Tracer (30-120)	80	%			ACW10	07/28/2014 1225	MB
Radionuclides - Suspended							
Lead 210	1.6	pCi/L		1	OTW01	08/07/2014 839	MB
Lead 210 (Suspended) Precision (±)	0.4	pCi/L			OTW01	08/07/2014 839	MB
Polonium 210	<1	pCi/L		1	OTW01	08/07/2014 1233	MB
Polonium 210 (Suspended) Precision (±)	0.4	pCi/L			OTW01	08/07/2014 1233	MB
Radium 226	<0.2	pCi/L		0.2	SM 7500 Ra-B	07/29/2014 839	MB
Radium 226 (Suspended) Precision (±)	0.03	pCi/L			SM 7500 Ra-B	07/29/2014 839	MB
Thorium 230	<0.2	pCi/L		0.2	ACW10	08/01/2014 836	MB
Thorium 230 Precision (±)	0.03	pCi/L			ACW10	08/01/2014 836	MB
Thorium 229 Tracer (30-120)	77	%			ACW10	08/01/2014 836	MB

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B Analyte detected in the associated Method Blank	C Calculated Value
	E Value above quantitation range	H Holding times for preparation or analysis exceeded
	J Analyte detected below quantitation limits	L Analyzed by a contract laboratory
	M Value exceeds Monthly Ave or MCL or is less than LCL	ND Not Detected at the Reporting Limit
	O Outside the Range of Dilutions	S Spike Recovery outside accepted recovery limits
	X Matrix Effect	

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager



Inter-Mountain Labs

Your Environmental Monitoring Partner

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Sample Analysis Report

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

Date Reported 9/23/2014
Report ID S1408200001

ProjectName: Marsland Stream Samples
Lab ID: S1408200-002
ClientSample ID: N2
COC: WEB

WorkOrder: S1408200
CollectionDate: 8/8/2014
DateReceived: 8/12/2014 11:12:00 AM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Metals - Dissolved							
Uranium	0.0052	mg/L		0.0003	EPA 200.8	08/12/2014 1936	MS
Uranium Activity	3.5	pCi/L		0.2	Calculation	09/23/2014 1111	WN
Metals - Suspended							
Uranium	<0.0003	mg/L		0.0003	EPA 200.8	08/14/2014 1507	MS
Uranium Activity	<0.2	pCi/L		0.2	Calculation	09/23/2014 1111	WN
Radionuclides - Dissolved							
Lead 210	2.1	pCi/L		1	OTW01	08/23/2014 1512	MB
Lead 210 (Dissolved) Precision (±)	0.4	pCi/L			OTW01	08/23/2014 1512	MB
Polonium 210	<1	pCi/L		1	OTW01	08/23/2014 1205	MB
Polonium 210 (Dissolved) Precision (±)	0.5	pCi/L			OTW01	08/23/2014 1205	MB
Radium 226	<0.2	pCi/L		0.2	SM 7500 Ra-B	09/03/2014 1153	MB
Radium 226 Precision (±)	0.04	pCi/L			SM 7500 Ra-B	09/03/2014 1153	MB
Thorium 230	<0.2	pCi/L		0.2	ACW10	08/27/2014 1712	MB
Thorium 230 Precision (±)	0.03	pCi/L			ACW10	08/27/2014 1712	MB
Thorium 229 Tracer (30-120)	60	%			ACW10	08/27/2014 1712	MB
Radionuclides - Suspended							
Lead 210	<1	pCi/L		1	OTW01	08/23/2014 1046	MB
Lead 210 (Suspended) Precision (±)	0.5	pCi/L			OTW01	08/23/2014 1046	MB
Polonium 210	<1	pCi/L		1	OTW01	08/25/2014 000	MB
Polonium 210 (Suspended) Precision (±)	0.2	pCi/L			OTW01	08/25/2014 000	MB
Radium 226	0.4	pCi/L		0.2	SM 7500 Ra-B	08/22/2014 1721	MB
Radium 226 (Suspended) Precision (±)	0.1	pCi/L			SM 7500 Ra-B	08/22/2014 1721	MB
Thorium 230	<0.2	pCi/L		0.2	ACW10	08/28/2014 939	MB
Thorium 230 Precision (±)	0.1	pCi/L			ACW10	08/28/2014 939	MB
Thorium 229 Tracer (30-120)	46	%			ACW10	08/28/2014 939	MB

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B	Analyte detected in the associated Method Blank	C	Calculated Value
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
	M	Value exceeds Monthly Ave or MCL or is less than LCL	ND	Not Detected at the Reporting Limit
	O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	X	Matrix Effect		

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



Inter-Mountain Labs

Your Environmental Monitoring Partner

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Sample Analysis Report

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

Date Reported 10/20/2014
Report ID S1409204001

ProjectName: Marsland Stream Samples
Lab ID: S1409204-002
ClientSample ID: N2
COC: WEB

WorkOrder: S1409204
CollectionDate: 9/8/2014
DateReceived: 9/10/2014 2:53:00 PM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Metals - Dissolved							
Uranium	0.0062	mg/L		0.0003	EPA 200.8	09/11/2014 1509	MS
Uranium Activity	4.2	pCi/L		0.2	Calculation	10/16/2014 902	WN
Metals - Suspended							
Uranium	ND	mg/L		0.0003	EPA 200.8	09/13/2014 1037	MS
Uranium Activity	ND	pCi/L		0.2	Calculation	10/16/2014 902	WN
Radionuclides - Dissolved							
Lead 210	1.0	pCi/L		1	OTW01	09/29/2014 1111	MB
Lead 210 (Dissolved) Precision (±)	0.4	pCi/L			OTW01	09/29/2014 1111	MB
Polonium 210	ND	pCi/L		1	OTW01	09/30/2014 1314	MB
Polonium 210 (Dissolved) Precision (±)	NA	pCi/L			OTW01	09/30/2014 1314	MB
Radium 226	ND	pCi/L		0.2	SM 7500 Ra-B	09/22/2014 1343	MB
Radium 226 Precision (±)	NA	pCi/L			SM 7500 Ra-B	09/22/2014 1343	MB
Thorium 230	ND	pCi/L		0.2	ACW10	10/31/2014 837	MB
Thorium 230 Precision (±)	NA	pCi/L			ACW10	10/31/2014 837	MB
Thorium 229 Tracer (30-120)	72	%			ACW10	10/31/2014 837	MB
Radionuclides - Suspended							
Lead 210	ND	pCi/L		1	OTW01	09/29/2014 1314	MB
Lead 210 (Suspended) Precision (±)	NA	pCi/L			OTW01	09/29/2014 1314	MB
Polonium 210	ND	pCi/L		1	OTW01	09/30/2014 1421	MB
Polonium 210 (Suspended) Precision (±)	NA	pCi/L			OTW01	09/30/2014 1421	MB
Radium 226	ND	pCi/L		0.2	SM 7500 Ra-B	10/15/2014 1302	MB
Radium 226 (Suspended) Precision (±)	NA	pCi/L			SM 7500 Ra-B	10/15/2014 1302	MB
Thorium 230	ND	pCi/L		0.2	ACW10	09/19/2014 1722	MB
Thorium 230 Precision (±)	NA	pCi/L			ACW10	09/19/2014 1722	MB
Thorium 229 Tracer (30-120)	75	%			ACW10	09/19/2014 1722	MB

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B	Analyte detected in the associated Method Blank	C	Calculated Value
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
	M	Value exceeds Monthly Ave or MCL or is less than LCL	ND	Not Detected at the Reporting Limit
	O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	X	Matrix Effect		

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager

W-2

Niobrara River and Ephemeral Drainages Sediment Laboratory Records



Inter-Mountain Labs

Sheridan, WY and Gillette, WY

- CHAIN OF CUSTODY RECORD -

Page 1 of 1

All shaded fields must be completed.

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#WEB

Client Name Cameco Resources, Crow Butte		Project Identification Marsland Sediment Samples		Sampler (Signature/Attestation of Authenticity)		Telephone # 308-665-2215x117													
Report Address PO Box 169 Crawford, Ne 69339		Contact Name Walt Nelson		ANALYSES / PARAMETERS															
Invoice Address		Email Walter_Nelson@cameco.com																	
Same		Phone 308-665-2215x117																	
		Purchase Order #		Quote #															
						REMARKS													
ITEM	LAB ID (Lab Use Only)	DATE SAMPLED	TIME	SAMPLE IDENTIFICATION	Matrix	# of Containers	U, Ra226, Pb210	Th230											
1	51311292-001	10/25/13		MED-1	SL	1	x	x											Detection limits per Reg.
2	-002	10/25/13		MED-2	SL	1	x	x											Guide 4.14 standards for
3	-003	10/25/13		MED-3	SL	1	x	x											preoperational sediment
4	-004	10/25/13		MED-4	SL	1	x	x											sampling.
5	-005	10/25/13		MED-5	SL	1	x	x											
6	-006	10/25/13		MED-6	SL	1	x	x											
7	-007	10/25/13		N1	SL	1	x	x											
8	-008	10/25/13		N2	SL	1	x	x											
9																			
10																			
11																			
12																			
13																			
14																			
LAB COMMENTS		Relinquished By (Signature/Printed)				DATE		TIME		Received By (Signature/Printed)				DATE		TIME			
172°C		Walter D. Nelson				11/14/13		11:00		UPS				11-19-13		13:34			
SHIPPING INFO		MATRIX CODES		TURN AROUND TIMES		COMPLIANCE INFORMATION				ADDITIONAL REMARKS									
☐ UPS		Water	WT	Check desired service		Compliance Monitoring ?				Y / N									
☐ FedEx		Soil	SL	☒ Standard turnaround		Program (SDWA, NPDES,...)													
☐ USPS		Solid	SD	☐ RUSH - 5 Working Days		PWSID / Permit #													
☐ Hand Carried		Filter	FT	☐ URGENT - < 2 Working Days		Chlorinated?				Y / N									
☐ Other		Other	OT	Rush & Urgent Surcharges will be applied		Sample Disposal: Lab x Client													



Date: 1/9/2014

CLIENT: Cameco Resources, Crow Butte Operation
Project: Marsland Sediment Samples
Lab Order: S1311292

CASE NARRATIVE
Report ID: S1311292001

Samples MED-1, MED-2, MED-3, MED-4, MED-5, MED-6, N1, and N2 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 1/9/2014
Report ID S1311292001

ProjectName: Marsland Sediment Samples
Lab ID: S1311292-001
ClientSample ID: MED-1
COC: WEB

WorkOrder: S1311292
CollectionDate: 10/25/2013
DateReceived: 11/19/2013 1:34:00 PM
FieldSampler: WN
Matrix: Sediment

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Lead 210	2.1	pCi/g		1	OTW01	12/18/2013 955	SH
Lead 210 Precision (±)	0.4	pCi/g			OTW01	12/18/2013 955	SH
Radium 226	0.3	pCi/g		0.2	E901.1 Mod.	12/19/2013 1640	SH
Radium 226 Precision (±)	0.3	pCi/g			E901.1 Mod.	12/19/2013 1640	SH
Thorium 230	0.2	pCi/g		0.2	ACW10	12/16/2013 1048	MB
Thorium230 Precision (±)	0.1	pCi/g			ACW10	12/16/2013 1048	MB
Thorium229 Tracer (30-120)	92.8	%			ACW10	12/16/2013 1048	MB
Metals - Total							
Uranium	0.4	pCi/g		0.2	EPA 200.8	12/02/2013 1718	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 1/9/2014
Report ID S1311292001

ProjectName: Marsland Sediment Samples
Lab ID: S1311292-002
ClientSample ID: MED-2
COC: WEB

WorkOrder: S1311292
CollectionDate: 10/25/2013
DateReceived: 11/19/2013 1:34:00 PM
FieldSampler: WN
Matrix: Sediment

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Lead 210	<1	pCi/g		1	OTW01	12/18/2013 955	SH
Lead 210 Precision (±)	NA	pCi/g			OTW01	12/18/2013 955	SH
Radium 226	0.4	pCi/g		0.2	E901.1 Mod.	12/19/2013 1700	SH
Radium 226 Precision (±)	0.3	pCi/g			E901.1 Mod.	12/19/2013 1700	SH
Thorium 230	<0.2	pCi/g		0.2	ACW10	12/16/2013 1048	MB
Thorium230 Precision (±)	NA	pCi/g			ACW10	12/16/2013 1048	MB
Thorium229 Tracer (30-120)	96.6	%			ACW10	12/16/2013 1048	MB
Metals - Total							
Uranium	0.2	pCi/g		0.2	EPA 200.8	12/02/2013 1741	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 1/9/2014
Report ID S1311292001

ProjectName: Marsland Sediment Samples
Lab ID: S1311292-003
ClientSample ID: MED-3
COC: WEB

WorkOrder: S1311292
CollectionDate: 10/25/2013
DateReceived: 11/19/2013 1:34:00 PM
FieldSampler: WN
Matrix: Sediment

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Lead 210	<1	pCi/g		1	OTW01	12/18/2013 1215	SH
Lead 210 Precision (±)	NA	pCi/g			OTW01	12/18/2013 1215	SH
Radium 226	0.2	pCi/g		0.2	E901.1 Mod.	12/19/2013 1721	SH
Radium 226 Precision (±)	0.3	pCi/g			E901.1 Mod.	12/19/2013 1721	SH
Thorium 230	<0.2	pCi/g		0.2	ACW10	12/16/2013 1048	MB
Thorium230 Precision (±)	NA	pCi/g			ACW10	12/16/2013 1048	MB
Thorium229 Tracer (30-120)	95.6	%			ACW10	12/16/2013 1048	MB
Metals - Total							
Uranium	0.2	pCi/g		0.2	EPA 200.8	12/02/2013 1757	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, Assistant Laboratory Manager



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Sample Analysis Report

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

Date Reported: 1/9/2014
Report ID: S1311292001

ProjectName: Marsland Sediment Samples
Lab ID: S1311292-004
ClientSample ID: MED-4
COC: WEB

WorkOrder: S1311292
CollectionDate: 10/25/2013
DateReceived: 11/19/2013 1:34:00 PM
FieldSampler: WN
Matrix: Sediment

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Lead 210	1.7	pCi/g		1	OTW01	12/18/2013 1215	SH
Lead 210 Precision (±)	0.4	pCi/g			OTW01	12/18/2013 1215	SH
Radium 226	0.7	pCi/g		0.2	E901.1 Mod.	12/19/2013 1742	SH
Radium 226 Precision (±)	0.4	pCi/g			E901.1 Mod.	12/19/2013 1742	SH
Thorium 230	0.5	pCi/g		0.2	ACW10	12/16/2013 1048	MB
Thorium230 Precision (±)	0.1	pCi/g			ACW10	12/16/2013 1048	MB
Thorium229 Tracer (30-120)	87.2	%			ACW10	12/16/2013 1048	MB
Metals - Total							
Uranium	0.5	pCi/g		0.2	EPA 200.8	12/02/2013 1802	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

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Sample Analysis Report

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

Date Reported 1/9/2014
Report ID S1311292001

ProjectName: Marsland Sediment Samples
Lab ID: S1311292-005
ClientSample ID: MED-5
COC: WEB

WorkOrder: S1311292
CollectionDate: 10/25/2013
DateReceived: 11/19/2013 1:34:00 PM
FieldSampler: WN
Matrix: Sediment

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Lead 210	1.2	pCi/g		1	OTW01	12/18/2013 1215	SH
Lead 210 Precision (±)	0.3	pCi/g			OTW01	12/18/2013 1215	SH
Radium 226	0.6	pCi/g		0.2	E901.1 Mod.	12/19/2013 1803	SH
Radium 226 Precision (±)	0.4	pCi/g			E901.1 Mod.	12/19/2013 1803	SH
Thorium 230	<0.2	pCi/g		0.2	ACW10	12/16/2013 1048	MB
Thorium230 Precision (±)	NA	pCi/g			ACW10	12/16/2013 1048	MB
Thorium229 Tracer (30-120)	54.0	%			ACW10	12/16/2013 1048	MB
Metals - Total							
Uranium	0.4	pCi/g		0.2	EPA 200.8	12/02/2013 1808	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, Assistant Laboratory Manager

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**Sample Analysis Report**

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

Date Reported 1/9/2014
Report ID S1311292001

ProjectName: Marsland Sediment Samples
Lab ID: S1311292-006
ClientSample ID: MED-6
COC: WEB

WorkOrder: S1311292
CollectionDate: 10/25/2013
DateReceived: 11/19/2013 1:34:00 PM
FieldSampler: WN
Matrix: Sediment

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Lead 210	<1	pCi/g		1	OTW01	12/18/2013 1215	SH
Lead 210 Precision (±)	NA	pCi/g			OTW01	12/18/2013 1215	SH
Radium 226	0.7	pCi/g		0.2	E901.1 Mod.	12/19/2013 1823	SH
Radium 226 Precision (±)	0.3	pCi/g			E901.1 Mod.	12/19/2013 1823	SH
Thorium 230	0.4	pCi/g		0.2	ACW10	01/07/2014 1223	MB
Thorium230 Precision (±)	0.1	pCi/g			ACW10	01/07/2014 1223	MB
Thorium229 Tracer (30-120)	93.5	pCi/g			ACW10	01/07/2014 1223	MB
Metals - Total							
Uranium	0.4	pCi/g		0.2	EPA 200.8	12/02/2013 1813	MS

These results apply only to the samples tested.

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

RL - Reporting Limit

- 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



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Sample Analysis Report

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

Date Reported 1/9/2014
Report ID S1311292001

ProjectName: Marsland Sediment Samples
Lab ID: S1311292-007
ClientSample ID: N1
COC: WEB

WorkOrder: S1311292
CollectionDate: 10/25/2013
DateReceived: 11/19/2013 1:34:00 PM
FieldSampler: WN
Matrix: Sediment

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Lead 210	<1	pCi/g		1	OTW01	12/18/2013 1215	SH
Lead 210 Precision (±)	NA	pCi/g			OTW01	12/18/2013 1215	SH
Radium 226	0.6	pCi/g		0.2	E901.1 Mod.	12/19/2013 1844	SH
Radium 226 Precision (±)	0.3	pCi/g			E901.1 Mod.	12/19/2013 1844	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)	51.2	%			ACW10	12/17/2013 1013	MB
Metals - Total							
Uranium	0.3	pCi/g		0.2	EPA 200.8	12/02/2013 1819	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



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Sample Analysis Report

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

Date Reported 1/9/2014
Report ID S1311292001

ProjectName: Marsland Sediment Samples
Lab ID: S1311292-008
ClientSample ID: N2
COC: WEB

WorkOrder: S1311292
CollectionDate: 10/25/2013
DateReceived: 11/19/2013 1:34:00 PM
FieldSampler: WN
Matrix: Sediment

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Lead 210	<1	pCi/g		1	OTW01	12/18/2013 1215	SH
Lead 210 Precision (±)	NA	pCi/g			OTW01	12/18/2013 1215	SH
Radium 226	0.4	pCi/g		0.2	E901.1 Mod.	12/19/2013 1905	SH
Radium 226 Precision (±)	0.3	pCi/g			E901.1 Mod.	12/19/2013 1905	SH
Thorium 230	<0.2	pCi/g		0.2	ACW10	12/17/2013 1013	MB
Thorium230 Precision (±)	NA	pCi/g			ACW10	12/17/2013 1013	MB
Thorium229 Tracer (30-120)	70.7	%			ACW10	12/17/2013 1013	MB
Metals - Total							
Uranium	0.2	pCi/g		0.2	EPA 200.8	12/02/2013 1824	MS

These results apply only to the samples tested.

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

RL - Reporting Limit

- 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, Assistant Laboratory Manager



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ANALYTICAL QC SUMMARY REPORT**CLIENT:** Cameco Resources, Crow Butte Operation**Date:** 1/9/2014**Work Order:** S1311292**Report ID:** S1311292001**Project:** Marsland Sediment Samples**Lead 210 in Soil**Sample Type **MBLK** Units: pCi/g

Sample ID	RunNo: 103174	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
MB13-337	12/18/13 9:55	Lead 210	ND	1					

Sample ID	RunNo: 103174	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
MB13-337	12/19/13 12:26	Lead 210	ND	1					

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

Sample ID	RunNo: 103174	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
LCS13-337	12/18/13 9:55	Lead 210	13	1	12.1		107	50 - 150	

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

Sample ID	RunNo: 103174	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
TAP WATER MS	12/18/13 9:55	Lead 210	12	1	12.4	ND	97.0	50 - 150	

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

Sample ID	RunNo: 103174	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
TAP WATER MSD	12/18/13 9:55	Lead 210	15	1	12	20.9	117	30	

Radium By Gamma Spectroscopy in SoilSample 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
S1311251-001ADUP	12/19/13 21:51	Radium 226	ND	1	ND			30	

Sample ID	RunNo: 103246	Analyte	Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual
S1311292-008BDUP	12/19/13 22:12	Radium 226	ND	0.2	0.4			30	

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



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ANALYTICAL QC SUMMARY REPORT**CLIENT:** Cameco Resources, Crow Butte Operation**Date:** 1/9/2014**Work Order:** S1311292**Report ID:** S1311292001**Project:** Marsland Sediment Samples**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 ID	RunNo: 103560	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
MB13-357	01/07/14 8:03	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 ID	RunNo: 103560	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
LCS13-357	01/07/14 8:03	Thorium230	14.5	0.2	12.5		116	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	

Sample ID	RunNo: 103560	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
LCS13-357 DUP	01/07/14 8:03	Thorium230	12.6	0.2	14.5	13.4	101	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



Inter-Mountain Labs

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1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

ANALYTICAL QC SUMMARY REPORT**CLIENT:** Cameco Resources, Crow Butte Operation**Date:** 1/9/2014**Work Order:** S1311292**Report ID:** S1311292001**Project:** Marsland Sediment Samples**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
S1311292-001BS	12/02/13 17:29	Uranium	735	0.2	745	0.4	98.7	70 - 130	

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

Sample ID	RunNo: 102549	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
S1311292-001BMSD	12/02/13 17:36	Uranium	716	0.2	735	2.61	96.1	20	

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

Sample ID	RunNo: 102549	Analyte	Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual
S1311292-001BD	12/02/13 17:24	Uranium	0.4	0.2	0.4	2.56		20	

Sample ID	RunNo: 102549	Analyte	Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual
S1311293-003BD	12/02/13 18:45	Uranium	0.5	0.2	0.5	2.60		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



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Sheridan, WY and Gillette, WY

- CHAIN OF CUSTODY RECORD -

Page 1 of 1

All shaded fields must be completed.

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#WEB

Client Name Cameco Resources, Crow Butte		Project Identification Marsland Sediment Samples		Sampler (Signature/Attestation of Authenticity)		Telephone # 308-665-2215x117										
Report Address PO Box 169 Crawford, Ne 69339		Contact Name Walt Nelson		ANALYSES / PARAMETERS												
Invoice Address Same		Email Walter_Nelson@cameco.com														
		Phone 308-665-2215x117														
		Purchase Order #		Quote #												
						REMARKS										
ITEM	LAB ID (Lab Use Only)	DATE SAMPLED	TIME	SAMPLE IDENTIFICATION	Matrix	# of Containers	U, Ra226, Pb210	Th230								
1	1405089-001	05/02/14		MED-1	SL	1	x	x								Detection limits per Reg.
2	002	05/02/14		MED-2	SL	1	x	x								Guide 4.14 standards for
3	003	05/02/14		MED-3	SL	1	x	x								preoperational sediment
4	004	05/02/14		MED-4	SL	1	x	x								sampling.
5	005	05/02/14		MED-5	SL	1	x	x								
6	006	05/02/14		MED-6	SL	1	x	x								
7	007	05/02/14		N1	SL	1	x	x								
8	008	05/02/14		N2	SL	1	x	x								
9																
10																
11																
12																
13																
14																
LAB COMMENTS		Relinquished By (Signature/Printed)			DATE	TIME	Received By (Signature/Printed)			DATE	TIME					
13.3		<i>Walter Nelson</i>			5/6/14	11:00	<i>Action Carap</i>			5/6/14	11:00					
							<i>Kathy Boyd</i>			5.6.14	11:57					
SHIPPING INFO		MATRIX CODES		TURN AROUND TIMES		COMPLIANCE INFORMATION		ADDITIONAL REMARKS								
☐ UPS		Water	WT	Check desired service		Compliance Monitoring ?		Y / N								
☐ FedEx		Soil	SL	☒ Standard turnaround		Program (SDWA, NPDES,...)										
☐ USPS		Solid	SD	☐ RUSH - 5 Working Days		PWSID / Permit #										
☐ Hand Carried		Filter	FT	☐ URGENT - < 2 Working Days		Chlorinated?		Y / N								
☐ Other		Other	OT	Rush & Urgent Surcharges will be applied		Sample Disposal: Lab		x	Client							



Inter-Mountain Labs

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Your Environmental Monitoring Partner

Date: 6/19/2014

CLIENT: Cameco Resources, Crow Butte Operation
Project: Marshland Sediment Samples
Lab Order: S1405089

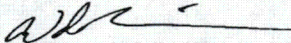
CASE NARRATIVE
Report ID: S1405089001

Samples MED-1, MED-2, MED-3, MED-4, MED-5, MED-6, N1, and N2 were received on May 6, 2014.

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 6/19/2014
Report ID S1405089001

ProjectName: Marshland Sediment Samples
Lab ID: S1405089-001
ClientSample ID: MED-1
COC: WEB

WorkOrder: S1405089
CollectionDate: 5/2/2014
DateReceived: 5/6/2014 11:57:00 AM
FieldSampler:
Matrix: Sediment

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Lead 210	0.3	pCi/g		0.2	OTW01	05/20/2014 1134	MB
Lead 210 Precision (±)	0.1	pCi/g			OTW01	05/20/2014 1134	MB
Radium 226	0.3	pCi/g		0.2	E901.1 Mod.	06/14/2014 1120	MB
Radium 226 Precision (±)	0.2	pCi/g			E901.1 Mod.	06/14/2014 1120	MB
Thorium 230	ND	pCi/g		0.2	ACW10	05/23/2014 920	MB
Thorium230 Precision (±)	NA	pCi/g			ACW10	05/23/2014 920	MB
Thorium229 Tracer (30-120)	95.2	%			ACW10	05/23/2014 920	MB
Metals - Total							
Uranium	0.3	pCi/g		0.2	EPA 200.8	05/14/2014 1204	MS

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B	Analyte detected in the associated Method Blank	C	Calculated Value
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
	M	Value exceeds Monthly Ave or MCL or is less than LCL	ND	Not Detected at the Reporting Limit
	O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	X	Matrix Effect		

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

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

Date Reported 6/19/2014
Report ID S1405089001

ProjectName: Marshland Sediment Samples
Lab ID: S1405089-002
ClientSample ID: MED-2
COC: WEB

WorkOrder: S1405089
CollectionDate: 5/2/2014
DateReceived: 5/6/2014 11:57:00 AM
FieldSampler:
Matrix: Sediment

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Lead 210	1.3	pCi/g		0.2	OTW01	05/20/2014 1134	MB
Lead 210 Precision (±)	0.2	pCi/g			OTW01	05/20/2014 1134	MB
Radium 226	0.5	pCi/g		0.2	E901.1 Mod.	06/14/2014 1120	MB
Radium 226 Precision (±)	0.4	pCi/g			E901.1 Mod.	06/14/2014 1120	MB
Thorium 230	0.4	pCi/g		0.2	ACW10	05/23/2014 920	MB
Thorium230 Precision (±)	0.1	pCi/g			ACW10	05/23/2014 920	MB
Thorium229 Tracer (30-120)	98.9	%			ACW10	05/23/2014 920	MB
Metals - Total							
Uranium	0.6	pCi/g		0.2	EPA 200.8	05/14/2014 1224	MS

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B	Analyte detected in the associated Method Blank	C	Calculated Value
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
	M	Value exceeds Monthly Ave or MCL or is less than LCL	ND	Not Detected at the Reporting Limit
	O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	X	Matrix Effect		

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

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

Date Reported 6/19/2014
Report ID S1405089001

ProjectName: Marshland Sediment Samples
Lab ID: S1405089-003
ClientSample ID: MED-3
COC: WEB

WorkOrder: S1405089
CollectionDate: 5/2/2014
DateReceived: 5/6/2014 11:57:00 AM
FieldSampler:
Matrix: Sediment

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Lead 210	1.4	pCi/g		0.2	OTW01	05/20/2014 1134	MB
Lead 210 Precision (±)	0.2	pCi/g			OTW01	05/20/2014 1134	MB
Radium 226	0.8	pCi/g		0.2	E901.1 Mod.	06/14/2014 1120	MB
Radium 226 Precision (±)	0.3	pCi/g			E901.1 Mod.	06/14/2014 1120	MB
Thorium 230	0.3	pCi/g		0.2	ACW10	05/23/2014 920	MB
Thorium230 Precision (±)	0.1	pCi/g			ACW10	05/23/2014 920	MB
Thorium229 Tracer (30-120)	94.1	%			ACW10	05/23/2014 920	MB
Metals - Total							
Uranium	0.5	pCi/g		0.2	EPA 200.8	05/14/2014 1241	MS

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers: 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 or is less than LCL
O Outside the Range of Dilutions
X Matrix Effect

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

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 6/19/2014
Report ID S1405089001

ProjectName: Marshland Sediment Samples
Lab ID: S1405089-004
ClientSample ID: MED-4
COC: WEB

WorkOrder: S1405089
CollectionDate: 5/2/2014
DateReceived: 5/6/2014 11:57:00 AM
FieldSampler:
Matrix: Sediment

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Lead 210	2.1	pCi/g		0.2	OTW01	05/20/2014 1134	MB
Lead 210 Precision (±)	0.3	pCi/g			OTW01	05/20/2014 1134	MB
Radium 226	0.8	pCi/g		0.2	E901.1 Mod.	06/14/2014 1120	MB
Radium 226 Precision (±)	0.4	pCi/g			E901.1 Mod.	06/14/2014 1120	MB
Thorium 230	0.5	pCi/g		0.2	ACW10	05/23/2014 920	MB
Thorium230 Precision (±)	0.1	pCi/g			ACW10	05/23/2014 920	MB
Thorium229 Tracer (30-120)	90.3	%			ACW10	05/23/2014 920	MB
Metals - Total							
Uranium	0.5	pCi/g		0.2	EPA 200.8	05/14/2014 1246	MS

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B	Analyte detected in the associated Method Blank	C	Calculated Value
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
	M	Value exceeds Monthly Ave or MCL or is less than LCL	ND	Not Detected at the Reporting Limit
	O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	X	Matrix Effect		

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

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

Date Reported 6/19/2014
Report ID S1405089001

ProjectName: Marshland Sediment Samples
Lab ID: S1405089-005
ClientSample ID: MED-5
COC: WEB

WorkOrder: S1405089
CollectionDate: 5/2/2014
DateReceived: 5/6/2014 11:57:00 AM
FieldSampler:
Matrix: Sediment

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Lead 210	2.0	pCi/g		0.2	OTW01	05/20/2014 1134	MB
Lead 210 Precision (±)	0.2	pCi/g			OTW01	05/20/2014 1134	MB
Radium 226	1.2	pCi/g		0.2	E901.1 Mod.	06/14/2014 1120	MB
Radium 226 Precision (±)	0.5	pCi/g			E901.1 Mod.	06/14/2014 1120	MB
Thorium 230	0.5	pCi/g		0.2	ACW10	05/23/2014 920	MB
Thorium230 Precision (±)	0.2	pCi/g			ACW10	05/23/2014 920	MB
Thorium229 Tracer (30-120)	85.4	%			ACW10	05/23/2014 920	MB
Metals - Total							
Uranium	0.6	pCi/g		0.2	EPA 200.8	05/14/2014 1252	MS

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers: 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 or is less than LCL
O Outside the Range of Dilutions
X Matrix Effect

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

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



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Sample Analysis Report

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

Date Reported 6/19/2014
Report ID S1405089001

ProjectName: Marshland Sediment Samples
Lab ID: S1405089-006
ClientSample ID: MED-6
COC: WEB

WorkOrder: S1405089
CollectionDate: 5/2/2014
DateReceived: 5/6/2014 11:57:00 AM
FieldSampler:
Matrix: Sediment

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Lead 210	1.0	pCi/g		0.2	OTW01	05/20/2014 1134	MB
Lead 210 Precision (±)	0.2	pCi/g			OTW01	05/20/2014 1134	MB
Radium 226	0.7	pCi/g		0.2	E901.1 Mod.	06/14/2014 1120	MB
Radium 226 Precision (±)	0.3	pCi/g			E901.1 Mod.	06/14/2014 1120	MB
Thorium 230	0.2	pCi/g		0.2	ACW10	05/23/2014 1328	MB
Thorium230 Precision (±)	0.1	pCi/g			ACW10	05/23/2014 1328	MB
Thorium229 Tracer (30-120)	88.3	%			ACW10	05/23/2014 1328	MB
Metals - Total							
Uranium	0.4	pCi/g		0.2	EPA 200.8	05/14/2014 1257	MS

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B	Analyte detected in the associated Method Blank	C	Calculated Value
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
	M	Value exceeds Monthly Ave or MCL or is less than LCL	ND	Not Detected at the Reporting Limit
	O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	X	Matrix Effect		

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 6/19/2014
Report ID S1405089001

ProjectName: Marshland Sediment Samples
Lab ID: S1405089-007
ClientSample ID: N1
COC: WEB

WorkOrder: S1405089
CollectionDate: 5/2/2014
DateReceived: 5/6/2014 11:57:00 AM
FieldSampler:
Matrix: Sediment

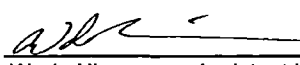
Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Lead 210	1.3	pCi/g		0.2	OTW01	05/20/2014 1134	MB
Lead 210 Precision (±)	0.2	pCi/g			OTW01	05/20/2014 1134	MB
Radium 226	0.7	pCi/g		0.2	E901.1 Mod.	06/14/2014 1120	MB
Radium 226 Precision (±)	0.3	pCi/g			E901.1 Mod.	06/14/2014 1120	MB
Thorium 230	0.2	pCi/g		0.2	ACW10	05/23/2014 1328	MB
Thorium230 Precision (±)	0.1	pCi/g			ACW10	05/23/2014 1328	MB
Thorium229 Tracer (30-120)	107	%			ACW10	05/23/2014 1328	MB
Metals - Total							
Uranium	0.6	pCi/g		0.2	EPA 200.8	05/14/2014 1302	MS

These results apply only to the samples tested.**RL - Reporting Limit**

Qualifiers: 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 or is less than LCL
O Outside the Range of Dilutions
X Matrix Effect

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

Reviewed by: 

Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

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

Date Reported 6/19/2014
Report ID S1405089001

ProjectName: Marshland Sediment Samples
Lab ID: S1405089-008
ClientSample ID: N2
COC: WEB

WorkOrder: S1405089
CollectionDate: 5/2/2014
DateReceived: 5/6/2014 11:57:00 AM
FieldSampler:
Matrix: Sediment

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Lead 210	0.5	pCi/g		0.2	OTW01	05/20/2014 1345	MB
Lead 210 Precision (±)	0.1	pCi/g			OTW01	05/20/2014 1345	MB
Radium 226	0.5	pCi/g		0.2	E901.1 Mod.	06/14/2014 1120	MB
Radium 226 Precision (±)	0.2	pCi/g			E901.1 Mod.	06/14/2014 1120	MB
Thorium 230	ND	pCi/g		0.2	ACW10	05/23/2014 1328	MB
Thorium230 Precision (±)	NA	pCi/g			ACW10	05/23/2014 1328	MB
Thorium229 Tracer (30-120)	93.0	%			ACW10	05/23/2014 1328	MB
Metals - Total							
Uranium	0.3	pCi/g		0.2	EPA 200.8	05/14/2014 1308	MS

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B	Analyte detected in the associated Method Blank	C	Calculated Value
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
	M	Value exceeds Monthly Ave or MCL or is less than LCL	ND	Not Detected at the Reporting Limit
	O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	X	Matrix Effect		

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



Inter-Mountain Labs

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1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

ANALYTICAL QC SUMMARY REPORT**CLIENT:** Cameco Resources, Crow Butte Operation**Date:** 6/19/2014**Work Order:** S1405089**Report ID:** S1405089001**Project:** Marshland Sediment Samples**Lead 210 in Soil**Sample Type **MBLK**

Units: pCi/g

MB14-133 (05/20/14 11:34)	RunNo: 107987	PrepDate: 05/15/14 0:00	BatchID R107987					
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Lead 210	ND	1						

Lead 210 in SoilSample Type **LCS**

Units: pCi/g

LCS14-133 (05/20/14 11:34)	RunNo: 107987	PrepDate: 05/15/14 0:00	BatchID R107987					
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Lead 210	15	1	11.9		123	50 - 150		

Lead 210 in SoilSample Type **MS**

Units: pCi/g

TAPMS (05/20/14 11:34)	RunNo: 107987	PrepDate: 05/15/14 0:00	BatchID R107987					
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Lead 210	14	1	12.4	1	106	50 - 150		

Lead 210 in SoilSample Type **MSD**

Units: pCi/g

TAPMSD (05/20/14 11:34)	RunNo: 107987	PrepDate: 05/15/14 0:00	BatchID R107987					
Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual	
Lead 210	15	1	14	4.16	110	30		

Radium By Gamma Spectroscopy in SoilSample Type **MBLK**

Units: pCi/g

MB (06/14/14 11:20)	RunNo: 109199							
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Radium 226	ND	0.2						

Radium By Gamma Spectroscopy in SoilSample Type **LCS**

Units: pCi/g

LCS (06/14/14 11:20)	RunNo: 109199							
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Radium 226	527	0.2	534		98.8	70 - 130		

Radium By Gamma Spectroscopy in SoilSample Type **DUP**

Units: pCi/g

S1405089-001AD (06/14/14 11:20)	RunNo: 109199							
Analyte	Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual	
Radium 226	0.3	0.2	ND			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
X Matrix Effect



Inter-Mountain Labs

Your Environmental Monitoring Partner

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

ANALYTICAL QC SUMMARY REPORT**CLIENT:** Cameco Resources, Crow Butte Operation**Date:** 6/19/2014**Work Order:** S1405089**Report ID:** S1405089001**Project:** Marshland Sediment Samples

Thorium 230 in Soil		Sample Type MBLK		Units: pCi/g				
MB14-134 (05/23/14 09:20)		RunNo: 108084		PrepDate: 05/13/14 0:00		BatchID R108084		
Analyte		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Thorium230		ND	0.2					
Thorium 230 in Soil		Sample Type LCS		Units: pCi/g				
LCS14-134 (05/23/14 09:20)		RunNo: 108084		PrepDate: 05/13/14 0:00		BatchID R108084		
Analyte		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Thorium230		12.4	0.2	12.5		98.9	50 - 150	
Thorium 230 in Soil		Sample Type LCSD		Units: pCi/g				
LCS14-134 DUP (05/23/14 09:20)		RunNo: 108084		PrepDate: 05/13/14 0:00		BatchID R108084		
Analyte		Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
Thorium230		13.8	0.2	12.4	11.4	110	30	
Total (3050) Metals by EPA 200.8 - Soil		Sample Type MBLK		Units: pCi/g				
MBLK (05/14/14 11:42)		RunNo: 107639						
Analyte		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Uranium		ND	0.2					
Total (3050) Metals by EPA 200.8 - Soil		Sample Type LCS		Units: pCi/g				
LCS (05/14/14 11:37)		RunNo: 107639						
Analyte		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Uranium		69.8	0.2	67.7		103	85 - 115	
Total (3050) Metals by EPA 200.8 - Soil		Sample Type MS		Units: pCi/g				
S1405089-001AS (05/14/14 12:15)		RunNo: 107639						
Analyte		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Uranium		745	0.2	745	0.3	100	70 - 130	
Total (3050) Metals by EPA 200.8 - Soil		Sample Type MSD		Units: pCi/g				
S1405089-001AMSD (05/14/14 12:19)		RunNo: 107639						
Analyte		Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
Uranium		746	0.2	745	0.209	100	20	
Total (3050) Metals by EPA 200.8 - Soil		Sample Type DUP		Units: pCi/g				
S1405089-001AD (05/14/14 12:09)		RunNo: 107639						
Analyte		Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual
Uranium		0.3	0.2	0.3	0.893		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
- X Matrix Effect

Appendix X

Niobrara River Fish Tissue Laboratory Records



Sample Analysis Report

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

ProjectName: Spring Box Butte Sample
Lab ID: S1408283-001
ClientSample ID: Spring Box Butte Fish Tissue
COC: WEB

Date Reported 1/27/2015
Report ID S1408283004
(Replaces S1408283003)
WorkOrder: S1408283
CollectionDate: 5/25/2014
DateReceived: 8/15/2014 11:31:00 AM
FieldSampler:
Matrix: Fish Tissue

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Lead 210	2.8E-5	µCi/kg		1.0E-6	OTW01	09/13/2014 1255	MB
Lead 210 Precision (±)	1.5E-5	µCi/kg			OTW01	09/13/2014 1255	MB
Polonium 210	8.1E-6	µCi/kg		1.0E-6	OTW01	09/22/2014 1709	MB
Polonium 210 Precision (±)	7.0E-6	µCi/kg			OTW01	09/22/2014 1709	MB
Radium 226	4.1E-6	µCi/kg		5.0E-8	SM 7500 Ra-B	09/22/2014 1343	MB
Radium 226 Precision (±)	2.2E-6	µCi/kg			SM 7500 Ra-B	09/22/2014 1343	MB
Thorium 230	8.0E-7	µCi/kg		2.0E-7	ACW10	09/19/2014 1311	MB
Thorium 230 Precision (±)	1.6E-6	µCi/kg			ACW10	09/19/2014 1311	MB
Thorium 229 Tracer (30-120)	56.5	%			ACW10	09/19/2014 1311	MB
Uranium	2.1E-6	µCi/kg		2.0E-7	EPA 200.8	09/25/2014 1313	MS
Metals - Total							
Uranium	0.0031	mg/Kg		0.0003	EPA 200.8	09/25/2014 000	MS

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B Analyte detected in the associated Method Blank	C Calculated Value
	E Value above quantitation range	H Holding times for preparation or analysis exceeded
	J Analyte detected below quantitation limits	L Analyzed by a contract laboratory
	M Value exceeds Monthly Ave or MCL or is less than LCL	ND Not Detected at the Reporting Limit
	O Outside the Range of Dilutions	S Spike Recovery outside accepted recovery limits
	X Matrix Effect	

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



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ANALYTICAL QC SUMMARY REPORT**CLIENT:** Cameco Resources, Crow Butte Operation**Date:** 9/30/2014**Work Order:** S1408283**Report ID:** S1408283001**Project:** Spring Box Butte Sample**Pb210 in Animals**Sample Type **MBLK**

Units: pCi/Kg

MB-408 (09/13/14 12:55)	RunNo: 113035	PrepDate: 09/12/14 0:00	BatchID: R113035					
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Lead 210	ND	1						

Pb210 in AnimalsSample Type **LCS**

Units: pCi/Kg

LCS-408 (09/23/14 09:41)	RunNo: 113035	PrepDate: 09/12/14 0:00	BatchID: R113035					
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Lead 210	14	1	11.8		117	50 - 150		

Pb210 in AnimalsSample Type **MS**

Units: pCi/Kg

TAPMS-408 (09/23/14 09:41)	RunNo: 113035	PrepDate: 09/12/14 0:00	BatchID: R113035					
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Lead 210	14	1	12.3	ND	105	50 - 150		

Pb210 in AnimalsSample Type **MSD**

Units: pCi/Kg

TAPMSD-408 (09/23/14 09:41)	RunNo: 113035	PrepDate: 09/12/14 0:00	BatchID: R113035					
Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual	
Lead 210	13	1	14	3.69	93.8	20		

Po210 in AnimalSample Type **MBLK**

Units: pCi/Kg

MB-408 (09/22/14 17:09)	RunNo: 113043	PrepDate: 09/12/14 0:00	BatchID: R113043					
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Polonium 210	ND	1						

Po210 in AnimalSample Type **LCS**

Units: pCi/Kg

LCS-408 (09/22/14 16:07)	RunNo: 113043	PrepDate: 09/12/14 0:00	BatchID: R113043					
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Polonium 210	14	1	12.9		105	59.4 - 129		

Po210 in AnimalSample Type **MS**

Units: pCi/Kg

TAPMS-408 (09/22/14 16:07)	RunNo: 113043	PrepDate: 09/12/14 0:00	BatchID: R113043					
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Polonium 210	12	1	12.3	ND	101	58.7 - 143		

Po210 in AnimalSample Type **MSD**

Units: pCi/Kg

TAPMSD-408 (09/22/14 16:07)	RunNo: 113043	PrepDate: 09/12/14 0:00	BatchID: R113043					
Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual	
Polonium 210	12	1	12	1.89	99.0	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
X Matrix Effect



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ANALYTICAL QC SUMMARY REPORT

CLIENT: Cameco Resources, Crow Butte Operation
Work Order: S1408283
Project: Spring Box Butte Sample

Date: 9/30/2014
Report ID: S1408283001

Radium 226 In Animal		Sample Type	MBLK		Units: pCi/Kg				
MB2-1341 (09/22/14 13:43)		RunNo:	112982	PrepDate:	09/17/14 0:00	BatchID: R112982			
Analyte		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Radium 226		ND	0.2						
Radium 226 In Animal		Sample Type	LCS		Units: pCi/Kg				
LCS-1341 (09/22/14 10:24)		RunNo:	112982	PrepDate:	09/17/14 0:00	BatchID: R112982			
Analyte		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Radium 226		4.6	0.2	5		92.7	80 - 120		
Radium 226 In Animal		Sample Type	MS		Units: pCi/Kg				
TAPMS-1341 (09/22/14 10:24)		RunNo:	112982	PrepDate:	09/17/14 0:00	BatchID: R112982			
Analyte		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Radium 226		4.6	0.2	5	0.2	87.7	73.8 - 120		
Radium 226 In Animal		Sample Type	MSD		Units: pCi/Kg				
TAPMSD-1341 (09/22/14 10:24)		RunNo:	112982	PrepDate:	09/17/14 0:00	BatchID: R112982			
Analyte		Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual	
Radium 226		4.9	0.2	4.6	6.36	93.6	0		
Thorium 230 In Animal		Sample Type	MBLK		Units: pCi/Kg				
MB-374 (09/19/14 13:11)		RunNo:	112897	PrepDate:	09/16/14 0:00	BatchID: R112897			
Analyte		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Thorium230		ND	0.2						
Thorium 230 In Animal		Sample Type	LCS		Units: pCi/Kg				
LCS-374 (09/19/14 13:11)		RunNo:	112897	PrepDate:	09/16/14 0:00	BatchID: R112897			
Analyte		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Thorium230		13.4	0.2	12.5		107	66.4 - 143		
Thorium 230 In Animal		Sample Type	DUP		Units: pCi/Kg				
LCSD-374 (09/19/14 13:11)		RunNo:	112897	PrepDate:	09/16/14 0:00	BatchID: R112897			
Analyte		Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual	
Thorium230		12.2	0.2	13.4	9.06		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
X Matrix Effect



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ANALYTICAL QC SUMMARY REPORT

CLIENT: Cameco Resources, Crow Butte Operation
Work Order: S1408283
Project: Spring Box Butte Sample

Date: 9/30/2014
Report ID: S1408283001

Total (3050) Metals by EPA 200.8Sample Type **MBLK**

Units: pCi/Kg

MBLK (09/25/14 12:46)		RunNo: 113135						
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	

Uranium

ND

0.2

Total (3050) Metals by EPA 200.8Sample Type **LCS**

Units: pCi/Kg

LCS (09/25/14 12:41)		RunNo: 113135						
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	

Uranium

70.4

0.2

67.7

104

85 - 115

Total (3050) Metals by EPA 200.8Sample Type **MS**

Units: pCi/Kg

S1408283-001AS (09/25/14 13:24)		RunNo: 113135						
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	

Uranium

3750

0.2

3720

2.1

101

70 - 130

Total (3050) Metals by EPA 200.8Sample Type **MSD**

Units: pCi/Kg

S1408283-001AMSD (09/25/14 13:29)		RunNo: 113135						
Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual	

Uranium

3780

0.2

3750

0.755

102

20

Total (3050) Metals by EPA 200.8Sample Type **DUP**

Units: pCi/Kg

S1408283-001AD (09/25/14 13:18)		RunNo: 113135						
Analyte	Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual	

Uranium

2.1

0.2

2.1

0.829

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
X Matrix Effect



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Sample Analysis Report

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

Date Reported: 1/27/2015
Report ID: S1410151003
(Replaces S1410151002)

ProjectName: Fall Box Butte Fish Sample
Lab ID: S1410151-001
ClientSample ID: Fall Box Butte Fish Tissue
COC: WEB

WorkOrder: S1410151
CollectionDate: 9/26/2014
DateReceived: 10/8/2014
FieldSampler:
Matrix: Fish Tissue

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Lead 210	<1.0E-6	µCi/kg		1.0E-6	OTW01	11/04/2014 842	MB
Lead 210 Precision (±)	2.9E-6	µCi/kg			OTW01	11/04/2014 842	MB
Polonium 210	<1.0E-6	µCi/kg		1.0E-6	OTW01	10/31/2014 1639	MB
Polonium 210 Precision (±)	8.0E-7	µCi/kg			OTW01	10/31/2014 1639	MB
Radium 226	8.0E-7	µCi/kg		5.0E-8	SM 7500 Ra-B	11/05/2014 1249	MB
Radium 226 Precision (±)	3.0E-7	µCi/kg			SM 7500 Ra-B	11/05/2014 1249	MB
Thorium 230	4.0E-7	µCi/kg		2.0E-7	ACW10	11/03/2014 1010	MB
Thorium 230 Precision (±)	3.0E-7	µCi/kg			ACW10	11/03/2014 1010	MB
Thorium 229 Tracer (30-120)	85.7	%			ACW10	11/03/2014 1010	MB
Uranium	1.5E-6	µCi/kg		2.0E-7	EPA 200.8	10/27/2014 2003	MS
Metals - Total							
Uranium	0.0023	mg/Kg		0.0003	EPA 200.8	10/27/2014 000	MS

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B	Analyte detected in the associated Method Blank	C	Calculated Value
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
	M	Value exceeds Monthly Ave or MCL or is less than LCL	ND	Not Detected at the Reporting Limit
	O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	X	Matrix Effect		

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager

Page 1 of 1



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ANALYTICAL QC SUMMARY REPORT**CLIENT:** Cameco Resources, Crow Butte Operation**Date:** 11/12/2014**Work Order:** S1410151**Report ID:** S1410151001**Project:** Fall Box Butte Fish Sample

Pb210 in Animals		Sample Type MBLK		Units: pCi/Kg				
MB-419 (11/04/14 08:42)		RunNo: 114590		PrepDate: 10/28/14 0:00		BatchID: R114590		
Analyte		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Lead 210		ND	1					
Pb210 in Animals		Sample Type LCS		Units: pCi/Kg				
LCS-419 (11/04/14 08:42)		RunNo: 114590		PrepDate: 10/28/14 0:00		BatchID: R114590		
Analyte		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Lead 210		13	1	11.8		110	79.4 - 145	
Pb210 in Animals		Sample Type MS		Units: pCi/Kg				
TAPMS-419 (11/04/14 08:42)		RunNo: 114590		PrepDate: 10/28/14 0:00		BatchID: R114590		
Analyte		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Lead 210		14	1	12.5	ND	110	80 - 129	
Pb210 in Animals		Sample Type MSD		Units: pCi/Kg				
TAPMSD-419 (11/04/14 08:42)		RunNo: 114590		PrepDate: 10/28/14 0:00		BatchID: R114590		
Analyte		Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
Lead 210		13	1	14	6.11	104	20	
Po210 in Animal		Sample Type MBLK		Units: pCi/Kg				
MB-419 (10/31/14 16:39)		RunNo: 114597		PrepDate: 10/30/14 0:00		BatchID: R114597		
Analyte		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Polonium 210		ND	1					
Po210 in Animal		Sample Type LCS		Units: pCi/Kg				
LCS-419 (10/31/14 16:39)		RunNo: 114597		PrepDate: 10/30/14 0:00		BatchID: R114597		
Analyte		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Polonium 210		8	1	10.1		79.4	50 - 150	
Po210 in Animal		Sample Type MS		Units: pCi/Kg				
TAPMS-419 (10/31/14 16:39)		RunNo: 114597		PrepDate: 10/30/14 0:00		BatchID: R114597		
Analyte		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Polonium 210		14	1	12.5	ND	111	60.9 - 134	
Po210 in Animal		Sample Type MSD		Units: pCi/Kg				
TAPMSD-419 (10/31/14 16:39)		RunNo: 114597		PrepDate: 10/30/14 0:00		BatchID: R114597		
Analyte		Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
Polonium 210		11	1	14	22.9	88.6	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
X	Matrix Effect



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ANALYTICAL QC SUMMARY REPORT**CLIENT:** Cameco Resources, Crow Butte Operation**Date:** 11/12/2014**Work Order:** S1410151**Report ID:** S1410151001**Project:** Fall Box Butte Fish Sample**Radium 226 in Animal**Sample Type **MBLK**

Units: pCi/L

MB-1359 (11/05/14 12:49)	RunNo: 114701	PrepDate: 10/29/14 0:00	BatchID: 9162				
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Radium 226	ND	0.05					

Radium 226 in AnimalSample Type **LCS**

Units: pCi/L

LCS-1359 (11/05/14 10:39)	RunNo: 114701	PrepDate: 10/29/14 0:00	BatchID: 9162				
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Radium 226	5.1	0.05	5		102	56.9 - 139	

Radium 226 in AnimalSample Type **MS**

Units: pCi/L

TAPMS-1359 (11/05/14 10:39)	RunNo: 114701	PrepDate: 10/29/14 0:00	BatchID: 9162				
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Radium 226	4.6	0.05	5	0.07	91.1	79.6 - 122	

Radium 226 in AnimalSample Type **MSD**

Units: pCi/L

TAPMSD-1359 (11/05/14 10:39)	RunNo: 114701	PrepDate: 10/29/14 0:00	BatchID: 9162				
Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
Radium 226	4.5	0.05	4.6	2.12	89.2	0	

Thorium 230 in AnimalSample Type **MBLK**

Units: pCi/Kg

MB-385 (11/03/14 10:10)	RunNo: 114525	PrepDate: 10/28/14 0:00	BatchID: R114525				
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Thorium230	ND	0.2					

Thorium 230 in AnimalSample Type **LCS**

Units: pCi/Kg

LCS-385 (11/03/14 10:10)	RunNo: 114525	PrepDate: 10/28/14 0:00	BatchID: R114525				
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Thorium230	13.4	0.2	12.5		108	50 - 143	

Thorium 230 in AnimalSample Type **DUP**

Units: pCi/Kg

LCSD-385 (11/03/14 10:10)	RunNo: 114525	PrepDate: 10/28/14 0:00	BatchID: R114525				
Analyte	Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual
Thorium230	12.9	0.2	13.4	4.45		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
X Matrix Effect



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ANALYTICAL QC SUMMARY REPORT**CLIENT:** Cameco Resources, Crow Butte Operation**Date:** 11/12/2014**Work Order:** S1410151**Report ID:** S1410151001**Project:** Fall Box Butte Fish Sample**Total (3050) Metals by EPA 200.8**

Sample Type MBLK

Units: pCi/Kg

MBLK (10/27/14 12:53)	RunNo: 114262							
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Uranium	ND	0.2						

Total (3050) Metals by EPA 200.8

Sample Type LCS

Units: pCi/Kg

LCS (10/27/14 12:48)	RunNo: 114262							
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Uranium	68.9	0.2	67.7		102	85 - 115		

Total (3050) Metals by EPA 200.8

Sample Type MS

Units: pCi/Kg

S1410151-001AS (10/27/14 20:24)	RunNo: 114262	PrepDate: 10/14/14 14:13	BatchID: 9036					
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Uranium	2490	0.2	2480	1.5	101	70 - 130		

Total (3050) Metals by EPA 200.8

Sample Type MSD

Units: pCi/Kg

S1410151-001AMSD (10/27/14 20:29)	RunNo: 114262	PrepDate: 10/14/14 14:13	BatchID: 9036					
Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual	
Uranium	2480	0.2	2490	0.454	100	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
X Matrix Effect

Appendix Y

Cameco Evaluation of Site Ventilation Systems

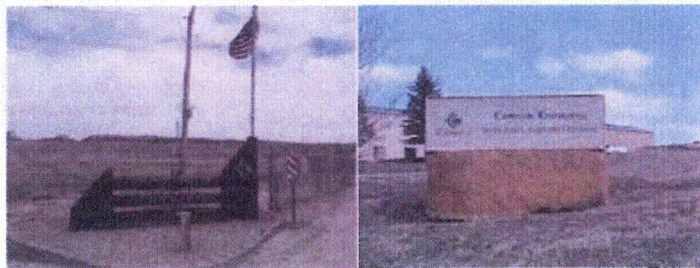
Appendix Y

Air Ventilation, Air Surveys and Air Exchange Measurements for Plant Facilities at Crow Butte, NE and Smith Ranch, WY

Prepared for:

Power Resources, Inc.

August 14, 2013



By:

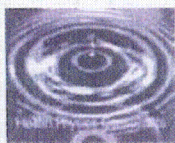
Charles "Chuck" McLendon, Senior IH, CIH, RSO, PE

Charles R. Flynn, Senior Health Physicist

HEALTH PHYSICS CONSULTANTS

1161 Lost Creek Blvd.

Austin, Texas 78746



EXECUTIVE SUMMARY

Airflow measurements were made at Cameco's Crow Butte, NE and the Smith Ranch, WY in-situ leach uranium processing facilities to determine the airflow rate and the air exchange rate for these facilities. Prior to data collection, the facility layouts and configurations were analyzed and a plan was made for conducting physical air measurements and gathering base data to estimate flow rates and air exchange rates for these facilities. These measurements were made at selected points across the openings of the facilities using highly accurate hand-held anemometers, pitot tubes and velometers. Additional flow-rate measurements were calculated using air monitoring instruments and ventilation equipment manufacturer's information. Measurements were based on physical measurements in exhaust vents and stacks. This field data was then reduced and analyzed.

The resulting flow rates for discharges to unrestricted areas and the calculated facility air exchange rates are presented below.

Facility	Flow Rates for Discharges to Unrestricted Areas	Facility Air Exchanges/Hour
Smith Ranch, WY	56,927 cubic feet per minute	5.4
Crow Butte, NE	77,433 cubic feet per minute	4.6

The accuracy of the ventilation numbers reported is estimated at plus-or-minus 15% accuracy. Numerous inputs were considered in this statement of accuracy, such as accuracy of the instruments, accessories and various measuring devices. The range of positioning the garage-style air inlet doors (i.e., were doors open, closed or partially closed) and the resulting effect on air flow was also taken into account.

The multiple exhaust fans at both facilities results in a negative pressure inside each of the facility buildings at Smith Ranch, WY and Crow Butte, NE. In the yellow cake production process, it was noted that areas for potential radon release were enclosed with exhausting ventilation ducting, sheet metal or other material. These enclosures and the negative pressure

from the ventilation system design control and mitigate the concentration of radon emissions within each of these facilities.

Airflow, through any openings in vessels or process equipment, is from the process areas into the ventilation systems which maintain the negative pressure, thereby directing any releases from within these facilities to the ventilation exhaust ducting. Any radon emissions within these processes are thereby directed to the ventilation system ducting or fans, which further reduces the radon concentration by the addition of air induced into the ventilation exhaust fans or blowers prior to venting to the atmosphere.

This ventilation design is effective in preventing or mitigating radon releases to the workers and the public.

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APPENDICES

A. Smith Ranch, WY Facility Photographs	Presented in separate document
B. Crow Butte, NE Facility Photographs	Presented in separate document

1.0 INTRODUCTION

The Nuclear Regulatory Commission (NRC) reviewed the gaseous and airborne particulate effluent control systems at the Crow Butte, NE and Smith Ranch, WY facilities. For air particulates related to the vacuum drying of uranium yellow cake, they concluded that Cameco meets all applicable regulatory criteria stated in 10 CFR Parts 20 and 40. With respect to radon, the NRC notes that most of the radon is vented from the process stream via exhaust ventilation that directs the radon to discharge stacks located away from building ventilation intakes. The ventilation system is designed to control worker exposure and to prevent or mitigate releases to the public to prevent or limit radiation exposure. Additional radon releases occurring during operations are infrequent. Thus, the NRC has concluded that Cameco's radon controls are adequate.

Notwithstanding these findings, in the resulting Safety Evaluation Report, the NRC found that Cameco 1) must address the discharge flow rate to the environment and 2) provide information regarding the air flow rate for the redundant exhaust fans and the air exchange rate for each facility. The NRC further noted that 3) Cameco should discuss methods for controlling radon releases. This report details the effort of gathering the requisite data and information to address items 1 through 3 described above.

This report includes measurements of flow rates for discharges to unrestricted areas and the air exchange rate for the facilities, and further describes the method(s) used to control releases to unrestricted areas.

2.0 WORK SCOPE

A portion of this effort included visiting both the Crow Butte and Smith Ranch operations. Additional information was gathered regarding the number of doors and openings to the facilities, the number and configuration of intake and exhaust ducts, the proper placement of air and flow rate measuring instruments in the exhaust stacks and ventilation ducts. Prior to data collection, contacts were made with appropriate Smith Ranch and Crow Butte personnel to more fully define the layout and configuration of these facilities.

A plan was then made for conducting physical air measurements and gathering base data to estimate a range of flow rates and air exchange rates for each of the facilities. These measurements were made at selected points across the openings of the facilities using highly-accurate hand-held anemometers, pitot tubes and velometers.

Cameco noted that during facility operations, the roll-up doors of the facility may be open or closed, depending on a number of factors. Because the exhaust from the facilities is through vents using air-induced blowers and fans, the facilities each have a negative pressure with respect to the outside atmosphere. As a result, radon is vented from process equipment in these facilities and is routed through the ventilation system for emission to the atmosphere at the exhaust stacks. Accordingly, additional air flow measurements were made in exhaust vents and stacks using air instruments, as appropriate. This field data was then reduced and analyzed.

Based on these measurements, Cameco will be able to provide flow rates for discharges to unrestricted areas and air exchange rates for the facilities. This data coupled with the existing and proposed measurements of emission concentrations will provide a technical basis to determine the radiation dose resulting from releases to unrestricted areas.

3.0 FIELD WORK EXECUTION

The following are highlights of the performed work.

3.1 FIELD INSTRUMENTS UTILIZED

A TSE (Alnor) model 9555-P wind vane anemometer and a model 964 Thermal Anemometer (TA) probe were used to make field air flow measurements. Specifications for each instrument are given below:

Table 1 – Instrument Specifications

Instrument	Range/Resolution	Accuracy	Calibration Date	Notes
TSI (Alnor) model 9555-P wind vane anemometer	50 to 6,000 feet per minute/ -1 feet per minute 0.1 degree Fahrenheit	+/- 1% of reading +/- 4 feet per minute (+/- 0.02 meters per minute)	Aug 2012	Next calibration due Aug 2013
Thermal Anemometer probe model number 964	0 to 9,999 feet per minute	+/- 3% of reading	Aug 2012	Next calibration due Aug 2013

Air measurement instruments were field calibrated for barometric pressure and humidity at the respective facilities, using the facilities' nearest weather station, while cross-referencing with the nearest Accuweather® station. The TSI (Alnor) 9555P, with the wind vane anemometer, was the base instrument used as much as practicable, due to its extraordinary accuracy (+/- 1% of readings).

3.2 FIELD WORK – SMITH RANCH, WY

April 25 -26, 2013:

Arlene Faunce, RSO; Beverly Johnson, Sr. HP tech and Plant Superintendent Erik Heide were extremely helpful in facilitating the process of taking air readings at the facility and also conveying information about the facility ventilation, which was critical in completing this field

work. Velocity readings and ancillary measurements were taken at the facility.

All velocity readings were taken with the highly accurate Anemometer, except the truck sump fan inlet, where air readings were taken with the Thermal Anemometer (TA) probe due to physical constraints (see Tables 2 and 3 below). Data was gathered for equipment at inaccessible areas from manufacturer name plate data and plant records, which were plentiful at this facility. Air surveys of the plant wall-installed fan inlets were conducted on all lower wall fans. Area determinations were based on measurements taken with a standard Stanley® metal tape measure. Digital photographs were taken at major sampling locations. These photos are located in Appendix A.

The field readings are summarized in Tables 2 and 3. Total flow rate for discharges to unrestricted areas is 56,927 cubic feet per minute (CFM), which is the sum total of the quantities provided in Tables 2 and 3.

Table 2 - Ventilation & Air Readings - Smith Ranch, WY - 4/26/13

Note: Reference Appendix A for photographs of the items listed below				
Location	Vane (V) or Thermo Anemometer (TA) Readings (fpm)	Area (sq ft)	Quantity (cfm)	Temperature °F
#1 Lower Fan	V - 1323, 1313, 1377, 1333 $\bar{V} = 1337$	5.07	6776	71.0
#2 Upper Fan	Down for Maintenance			
#3 Lower Cooler Fan	V - 508, 482, 490, 577, 445, 439, 548, 486, 548, 522, 490, 513, 359, 432, 501, 573, 570, 573 $\bar{V} = 503$	32.5" x 53" => 12.0 sq ft	6040	71.0
#4 Upper Fan	Down for Maintenance			
#5 Upper Fan	Down for Maintenance			
#6 Lower Fan	V - 1276, 1292, 1307, 1392 $\bar{V} = 1317$	5.07	6676	71.4
#7 Lower Fan	V - 1026, 1016, 1099, 992, 865, 964, 934, 1019, 1164 $\bar{V} = 1009$	44.5" x 44.75" => 13.8 sq ft	13900	71.6
Note: #'s 2, 4 & 5 upper vent fans were down for maintenance.				
Sum of Quantities: 33,392 (cfm)				

**Table 3 - Ventilation & Air Readings
Information from Manufacturer's Data & Fan Curves
Smith Ranch, WY - 4/26/13**

Note: Reference Appendix A for photographs of the items listed below		
Location	Quantity (cfm)	Temperature °F
#8 Upper Fan	3610	68.5
#9 Upper Fan	3610	67.0
A. T106A Fan (HF)	263	71.5
B. T100 Fan (HF)	263	71.0
C. Truck Sump Fan	5000	71.0
D. NE Shaker Fan	5000	72.3
E. SE Shaker Fan	5000	74.3
F. T20 Radon Exhaust Fan	263	71.6
G. T40 Radon Exhaust Fan	263	71.9
H. T21 Radon Exhaust Fan	263	75.3
Sum of Quantities: 23,535 (cfm)		

3.3 FIELD WORK – CROW BUTTE, NE

April 28 -29, 2013:

Meetings were held with Plant Superintendent Bruce Lemmon to facilitate data collection. This ensured the plant was covered adequately. Rhonda Grantham, RSO; Casey Yada, Sr. HP tech, and Plant Superintendent Bruce Lemmon were extremely helpful in facilitating the process of taking air readings at the facility and also conveying information about the facility ventilation, which was critical in completing this field work.

Velocity readings and ancillary physical measurements were taken inside and out of the processing plant at accessible exhaust fans and stacks. Data was gathered at inaccessible areas from manufacturer name plate data and plant records, which were plentiful at this facility.

The TSI (Alnor) 9555P was the base instrument used in these field air measurements with all velocity readings taken with the Vane Anemometer attachment (accuracy +/- 1% of readings). In this plant, there were dozens of manometers (U-tubes) in the vent lines, which were also located and read.

Digital photographs were taken at major sampling locations. These photos are located in Appendix B. The field readings are summarized in Tables 4 and 5 on the following pages. Total flow rate for discharges to unrestricted areas is 77,433 cubic feet per minute (CFM), which is the sum total of the quantities provided in Tables 4 and 5.

Table 4 - Ventilation & Air Readings - Crow Butte, NE - 4/29/13

Note: Reference Appendix B for photographs of the items listed below					
Location	Vane (V) or Thermo Anemometer (TA) Readings (fpm)	Dimensions (inches)	Area (sq ft)	Quantity (cfm)	Temperature °F
#1 Pipe	V - 2952 (centerline) 3200, 2872, 2876, 3029 $\bar{V} = 2994$	23.75" diam	3.076	9209	63.2
#2 Pipe	V - 3389 (centerline) 3200, 3595, 3740, 3046 $\bar{V} = 3395$	22.75" diam	2.83	9610	62.4
#3 Boxed Fan	V - 574, 689, 818, 756, 930, 730, 427, 578, 818, 619, 818, 803, 656, 837, 678, 1027, 788, 780 $\bar{V} = 740$	36.5" by 36.5" by 11" box	9.25	6845	63.0
#4 Boxed Fan	V - 634, 864, 652, 666, 709, 754, 786, 506, 490, 665, 903, 566, 710, 671, 776, 521, 487, 490 $\bar{V} = 658$	36.5" by 36.5" by 11" box	9.25	6090	63.0
#5 Duct	V - 3369 (centerline) 3572, 2579, 2830, 3214 $\bar{V} = 3049$	24.5" diam	3.22	9820	66.5
#9 Box Fan	V - 670, 636, 433, 602, 780, 654, 592, 672, 672, 785, 579, 691, 485, 666, 670, 212, 616, 378, 669, 482 $\bar{V} = 597$	36.5" by 36.5" by 14" box	9.25	5523	63.9
#12 Shaker Room Blower/Exhaust	V - 3111 (centerline)	12.5" diam 0.85	0.85	2651	49.0
Sum of Quantities: 49,748 (cfm)					

**Table 5 - Ventilation & Air Information from Manufacturer's Data
Crow Butte, NE - 4/29/13**

Note: Reference Appendix B for photographs of the items listed below		
Location	Quantity (cfm)	Temperature °F
#6 Centifugal Pond Water Treatment Fan	4700	67.0
#7 Chem Mix Demister Fan	4700	66.1
#8 Waste Tank Blower	1500	66.1
#10 Precip Demister Fan (same unit as #8 above)	1500	62.0
#11 Shaker Deck (west)	800	63.9
#13 Eluent Tank Blower	1500	67.8
#14 Precip A Blower	185	67.8
#15 East Train Blower	6000	71.3
#16 West Tank Blower	6000	72.0
#17 Backwash Tank Demister Blower	800	70.5
Sum of Quantities: 27,685 (cfm)		

4.0 DISCUSSION AND ANALYSIS OF FIELD DATA

There are large roll-up, garage style doors at both the Smith Ranch, WY and Crow Butte, NE plant facilities. Typically, these doors have openings measuring 12' wide by 16' high. During operations at the facilities these roll-up doors may be positioned fully opened, partially opened and sometimes fully closed. On a particular day, this positioning of the doors may change for a number of reasons, like opening/closing doors for retrieval of resin, deliveries, facility temperature control and general personnel/equipment access.

Field air velocity measurements were taken at both plant facilities to determine the effect of air flow with the opening and closing of the garage style roll-up doors. As the doors were moved to various positions, it was noted that air velocity (and also air flow) measurements did not vary more than approximately 10%, which is comparable to typical variations in air flow operation over the course of time. This field data shows that when the roll-up doors were closed there were alternate and adequately-sized openings for air flow to continue. These openings include louvers, vents, doors and other openings that allowed air flow.

Field air measurements confirmed that the facilities have an effective ventilation design and control system consisting of parallel installations of multiple blowers and fans that exhaust air from the facilities. The configuration of intake and exhaust ducts is adequate with respect to their opening size and location. The air intakes of the facilities are located such that the intake ducts intake fresh air, well away from the plant air exhausts, so air recirculation was not an issue.

The multiple exhaust fans at both facilities results in a negative pressure inside each of the facility buildings at Smith Ranch, WY and Crow Butte, NE. Airflow, through any openings in vessels or process equipment, is from the process areas into the ventilation systems, which maintains negative pressure, positive flow and control of releases. Negative pressure vacuum dryers are used to contain and control radon emissions, which are then reduced in concentration by the induced air flow within the ventilation exhaust system and vented to the atmosphere. These vacuum dryers are much more effective in radon control compared with

the former hearth style of dryer design. At each of these two facility buildings, there were 17 blowers or exhaust fans which exhaust air from facility process areas. The ventilation systems at both of these facilities exhaust to outside the facility buildings and draw in fresh air from a location at a sufficient distance from the exhaust locations. This design minimizes recirculation of the fresh air ventilation system and help control potential releases. The field data and measurements of these 34 blowers or exhaust fans are shown in Section 3.0 of this report.

This negative pressure present in the facilities is a control feature for radon emissions. In the yellow cake production process, it was noted that points for potential radon release were enclosed with exhaust ventilation ducting, sheet metal or other items to contain and direct radon emissions to the exhaust ventilation system where possible. Accordingly, radon emissions are controlled where possible within these facilities and their concentrations are reduced by the induced air flow from the ventilation exhaust fans or blowers, and vented to the atmosphere.

Based on the physical measurements taken in the field, the air exchange rates for the two facilities are presented in the following table:

Table 6 – Facility Air Exchanges

Facility	Air Exchanges / Day	Air Exchanges / Hour
Smith Ranch, WY	129	5.4
Crow Butte, NE	111	4.6

An additional objective of the field work was to provide flow rates for discharges to unrestricted areas. These flow rates, for the Smith Ranch, WY and Crow Butte, NE plant facilities are presented in the following table:

Table 7 - Flow Rates for Discharges to Unrestricted Areas

Facility	Flow Rates for Discharges to Unrestricted Areas	Facility Volume
Smith Ranch, WY	56,927 cubic feet per minute	632,050 cubic feet
Crow Butte, NE	77,433 cubic feet per minute	1,000,565 cubic feet

5.0 CONCLUSIONS

Field air measurements and data were taken and air volumes calculated for the Smith Ranch, WY and Crow Butte, NE plant facilities. The discharge flow rate to the environment at the two Cameco facilities was calculated utilizing direct field measurements and data taken at the facility.

Facility	Flow Rates for Discharges to Unrestricted Areas	Facility Volume
Smith Ranch, WY	56,927 cubic feet per minute	632,050 cubic feet
Crow Butte, NE	77,433 cubic feet per minute	1,000,565 cubic feet

The air exchange rate for the facility was calculated utilizing field data review and analysis.

Facility	Air Exchanges / Day	Air Exchanges / Hour
Smith Ranch, WY	129	5.4
Crow Butte, NE	111	4.6

The accuracy of the ventilation numbers reported is estimated plus-or-minus 15% accuracy. Numerous inputs were considered in this estimated range, such as accuracy of the instruments, accessories and various measuring devices. Also the range of positioning of the garage-style air inlet doors (i.e., if the doors were open, closed or partially closed) and its effect on air flow was also taken into account to estimate the accuracy of the presented ventilation numbers.

The multiple exhaust fans at both facilities results in a negative pressure inside each of the facility buildings at Smith Ranch, WY and Crow Butte, NE. In the yellow cake production process, it was noted that points for potential radon release were enclosed with exhausting ventilation ducting, sheet metal or other material. Radon emissions were contained and their concentrations were reduced. Airflow, through any openings in vessels or process equipment, is from the process areas into the ventilation systems thus maintaining negative pressure and positive flow inside the ventilation system and controlling releases. Radon emissions are typically controlled and their concentrations are reduced by the induced air flow from ventilation exhaust fans or blowers, and vented to the atmosphere. This general design was found to be effective in preventing or mitigating radon releases to the public.

APPENDIX B
CROW BUTTE, NE FACILITY PHOTOGRAPHS

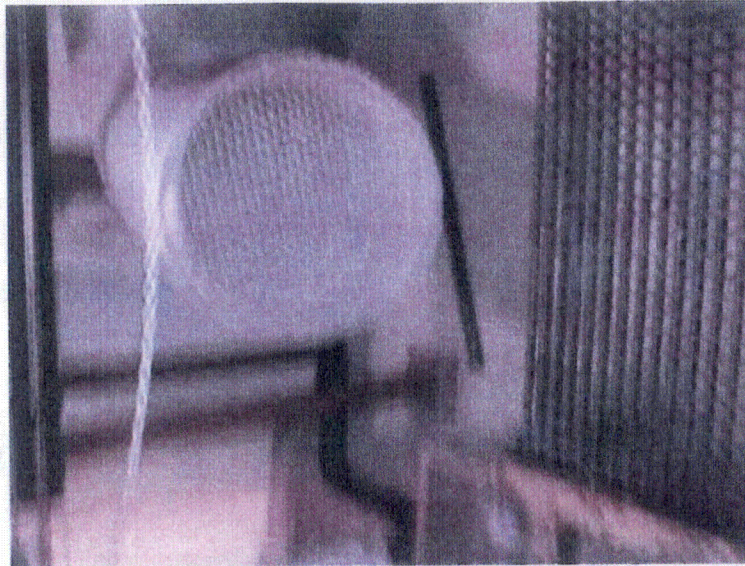


Cameco Crow Butte (CB)



CB Facility View from Front Entrance

APPENDIX B
CROW BUTTE, NE FACILITY PHOTOGRAPHS



#1 High Gamma Field Exhaust Pipe



#3 Box Fan

APPENDIX B
CROW BUTTE, NE FACILITY PHOTOGRAPHS

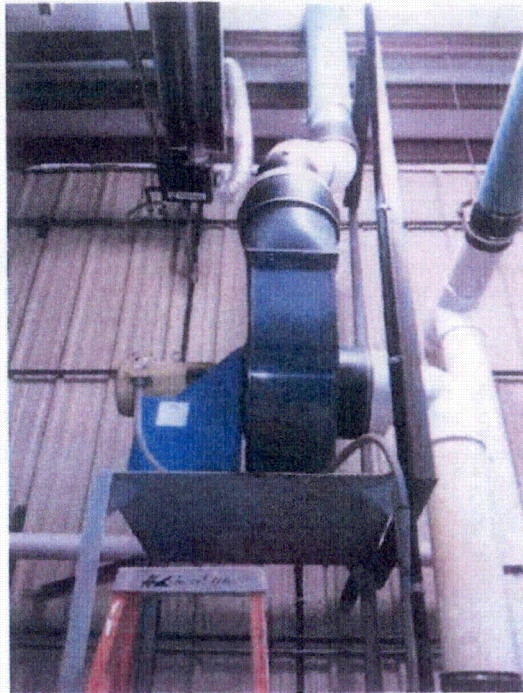


#4 Box Fan



#5 Duct

APPENDIX B
CROW BUTTE, NE FACILITY PHOTOGRAPHS



#6 Pond Water Treatment Demister Fan



#7 Chemical Mix Tank Demister

APPENDIX B
CROW BUTTE, NE FACILITY PHOTOGRAPHS



#9 Box Fan

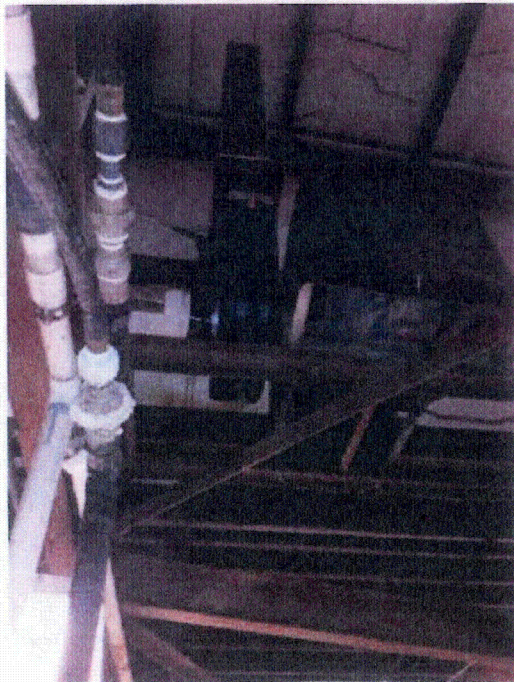


#10 Demister Fan

APPENDIX B
CROW BUTTE, NE FACILITY PHOTOGRAPHS

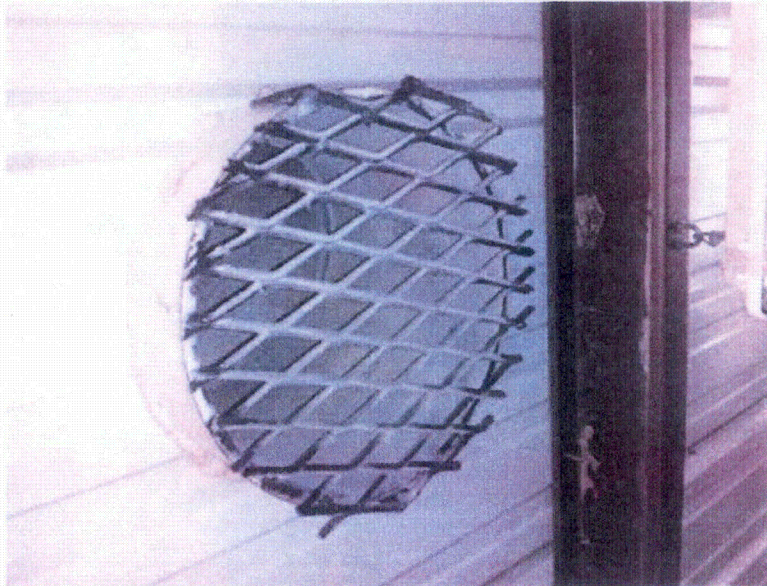


#10 Precip Demister Fan



#11 Shaker Deck Exhaust Blower

APPENDIX B
CROW BUTTE, NE FACILITY PHOTOGRAPHS

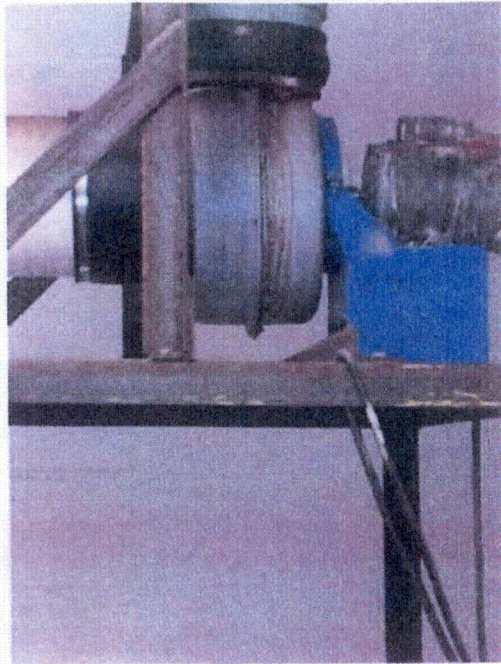


#12 Shaker Room Exhaust Pipe



#13 Effluent Blower

APPENDIX B
CROW BUTTE, NE FACILITY PHOTOGRAPHS

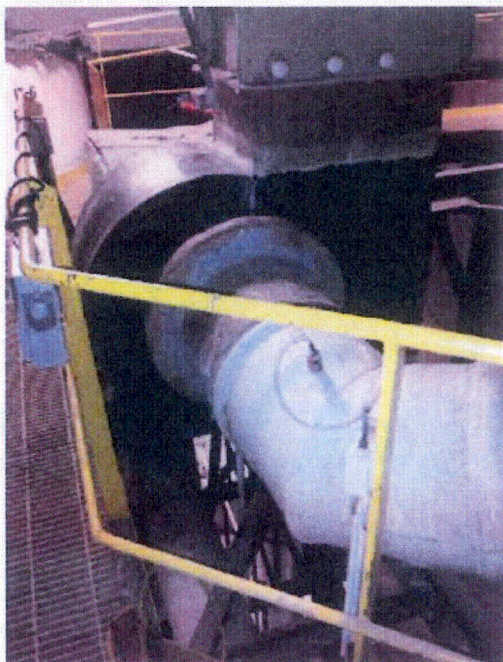


#14 Precip Blower

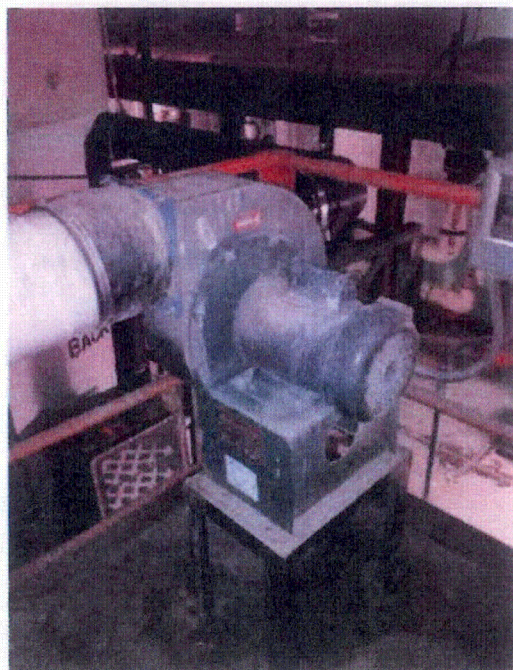


#15 East Train Blower

APPENDIX B
CROW BUTTE, NE FACILITY PHOTOGRAPHS



#16 West Train Blower

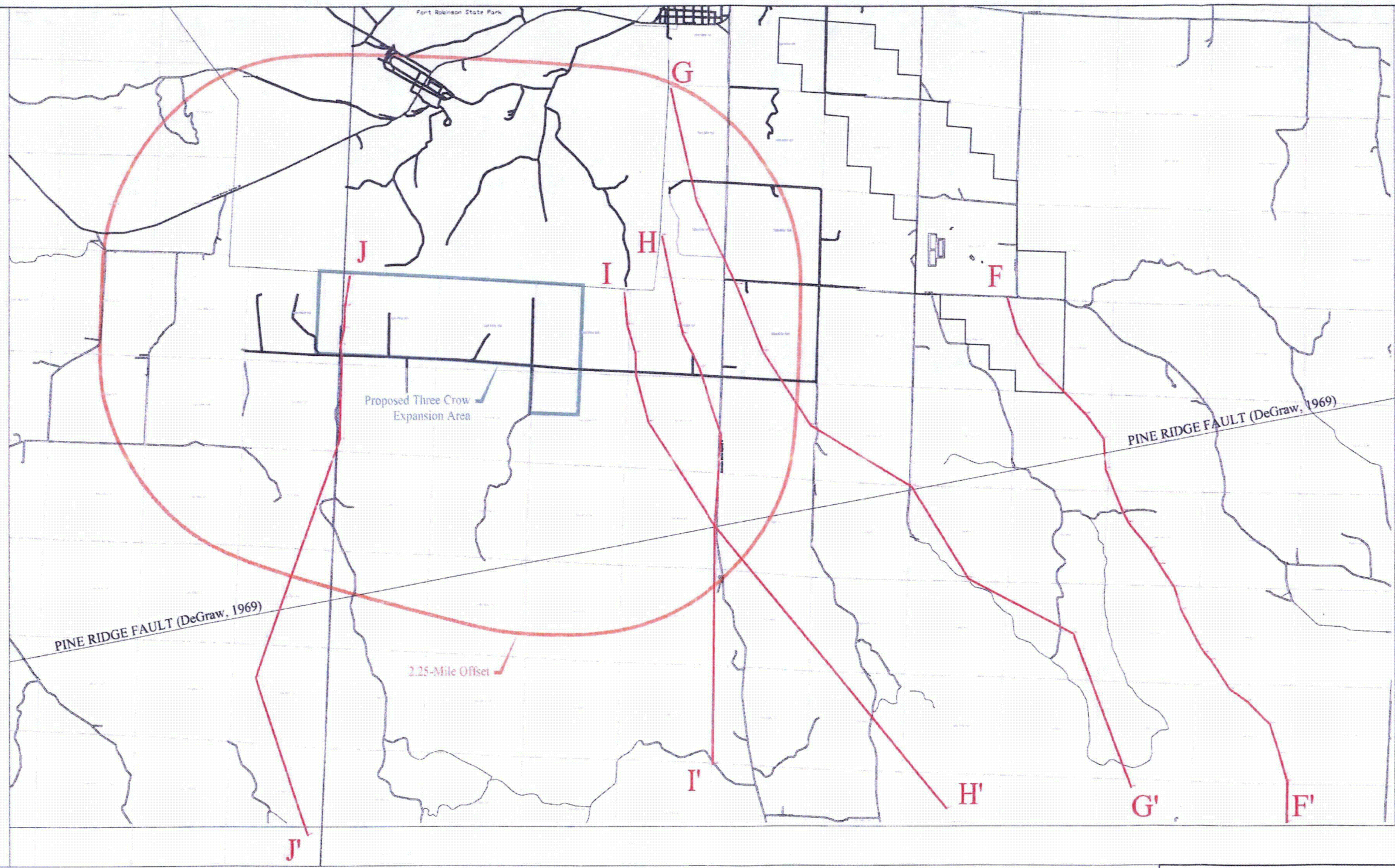


#17 Backwash Tank Demister Blower

Appendix Z

Three Crow Expansion Area Cross Sections

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PROJECTION:
NAD 1927, STATE PLANE
NEBRASKA NORTH FIPS 2601

2000 0 2000 4000 6000 8000 Feet



CROW BUTTE
RESOURCES, INC.

FIGURE 1
REGIONAL CROSS-SECTION
LOCATION MAP

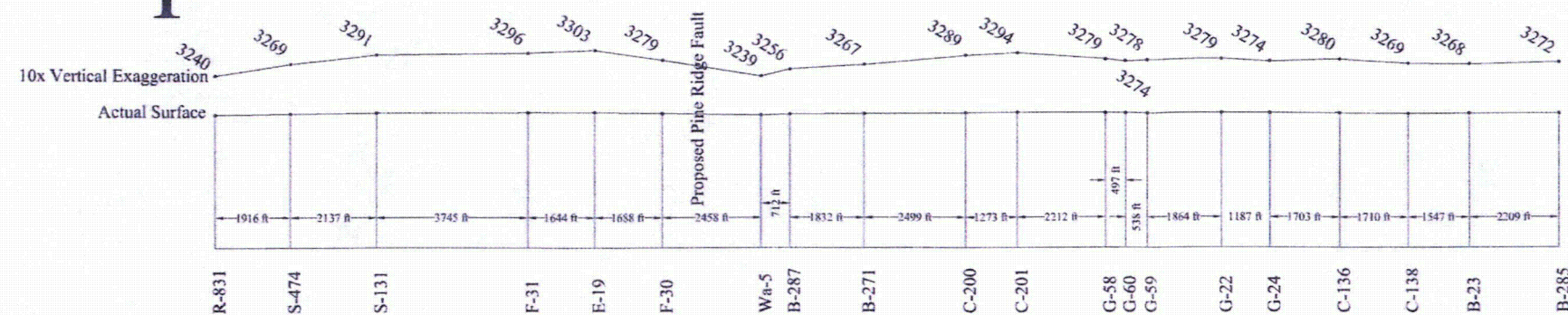
PROJECT: CO001396 MAPPED BY: JC CHECKED BY: MS



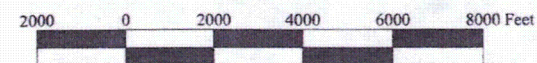
630 Plaza Drive, Ste. 100
Highlands Ranch, CO 80129
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www.arcadis-us.com

PATH: K:\CIBR_Projects\CO001396_ThreeCrows\ACAD\transmission\Hydro-XS.dwg LAYOUT: UIC-1 SAVED DATE/TIME: 5/5/2010 2:01 PM

North **F** **F'** South



North **G** **G'** South



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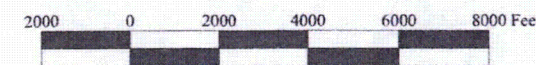
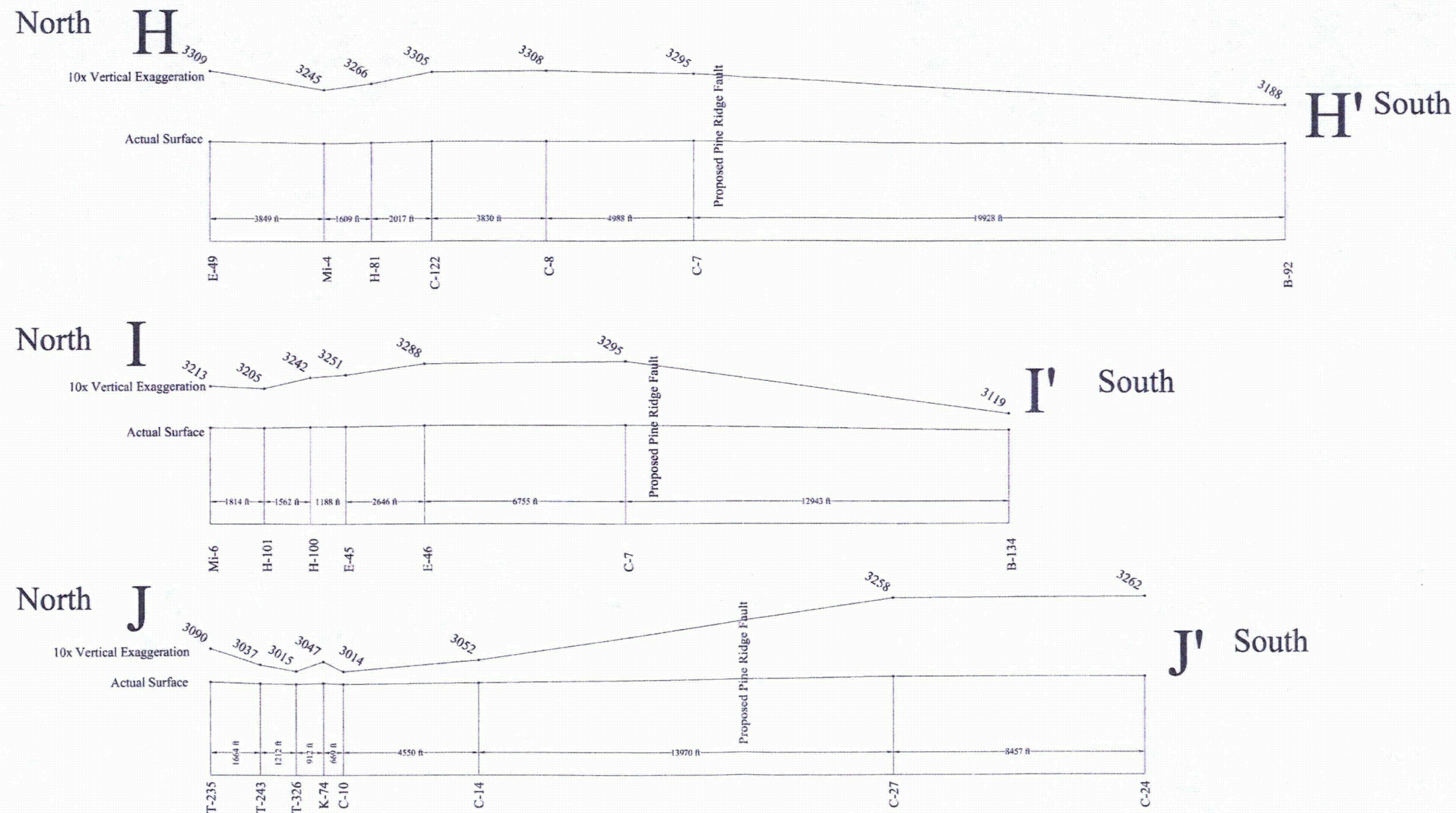
FIGURE 2
THREE CROW STRUCTURAL
CROSS-SECTIONS F-F' AND G-G'
(TOP OF PIERRE SHALE)

PROJECT: CO001396 MAPPED BY: JC CHECKED BY: MS



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CROW BUTTE
RESOURCES, INC.

FIGURE 3
THREE CROW STRUCTURAL
CROSS-SECTIONS H-H', I-I', AND J-J'
(TOP OF PIERRE SHALE)

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Appendix AA

Agricultural Well Impact Analysis

AA-1

MEA Agricultural Well Impact Analysis - Aqui-Ver Report (December 2013)

AQUI-VER, INC

Hydrogeology, Water Resources & Data Services

Mr. Doug Pavlick
Cameco Resources
Crow Butte Facility
P.O. Box 169
Crawford, NE 69339

December 10, 2013

Re: Marsland Expansion Area (MEA) Agricultural Well Impact Analysis

As requested, we have completed an analysis of the potential hydrologic impacts to local irrigation wells resulting from a hypothetical shallow casing leak in the overlying aquifer at the MEA In-Situ Recovery (ISR) wellfields. Our analysis is in response to U.S. Nuclear Regulatory Commission (NRC) Technical Report RAI 15(a), which requested "an analysis of the hydraulic effects that nearby agricultural wells may have on the migration potential of MEA regulated material releases in the overlying groundwater zone toward these wells".

INTRODUCTION AND SCOPE

Cameco has conducted a local well inventory which identified local agricultural, domestic, and stock watering wells in and near the MEA (Figure 1, Appendix A, Technical Report). Of particular significance to this assessment is well 732, which is a high capacity irrigation well located in the shallow Arikaree/Brule aquifer approximately 2500 feet east of the nearest MEA ISR wellfield pattern area. This assessment focuses on the hydrologic influence of well 732 on a hypothetical material release (e.g. shallow casing leak) at the MEA ISR wellfields. In order to accomplish this task, the following basic analyses were performed:

- Hydrological and geological data for the shallow Arikaree/Brule aquifer were compiled and summarized as the basis for an analytical groundwater flow model of the shallow aquifer at the MEA and vicinity.
- The maximum average pumping rate for irrigation well 732 was computed from an annual permitted water use of 14 inches per acre (215 acres of irrigated land) and a typical 5-month irrigation season (mid-April to mid-September).
- The drawdown and capture zone of irrigation well 732 was simulated using the groundwater flow model and particle tracking techniques to assess whether a hypothetical shallow casing leak from the MEA wellfields could potentially impact the irrigation well.
- the adequacy of the current shallow groundwater monitoring well network was assessed and recommendations made to insure adequate protection of irrigation and domestic wells from a shallow release of regulated material at MEA wellfields.

AQUI-VER, INC

Hydrogeology, Water Resources & Data Services

IRRIGATION WELL CONSTRUCTION AND OPERATION

Well 732 supplies water to two center pivots totaling 215 acres of irrigated land. Permit documents for well 732 indicate an original pumping rate of 1300 gallons per minute (gpm). However, recent discussions with Upper Niobrara White Natural Resource District (UNWNRD) personnel indicate the actual operating pumping rate is approximately 800 gpm. The well is cased to a depth of 140 feet, with an open screened interval extending from 140 to 280 feet below grade (well bottom).

Given a permitted annual water application rate of 14 inches per acre and 215 acres of irrigated land, the maximum permitted water use for well 732 is 251 acre-ft/year. Assuming a 5-month irrigation season extending from mid-April to mid-September, this equates to a maximum continuous pumping rate of 373 gpm during the growing season. Because the actual operating pumping rate of well 732 is approximately 800 gpm, we can infer well 732 pumps at a rate of 800 gpm for a maximum of 11 hours each day during the 5-month growing season.

HYDROGEOLOGY AND GROUNDWATER MODEL PARAMETER ESTIMATES

Irrigation and domestic wells in the vicinity of the MEA are completed primarily within the shallow Arikaree/Brule aquifer, which is part of the High Plains Aquifer System of northwestern Nebraska¹. The Arikaree/Brule aquifer at the MEA is hydraulically separated from the underlying Basal Chadron production aquifer by more than 400 feet of claystone and siltstone of the middle Chadron and upper Chadron Formations.

Water level elevation data compiled from shallow Arikaree formation monitoring wells and shallow Brule formation monitoring wells at the MEA indicate water levels and hydraulic gradients in the Arikaree and Brule are very similar, indicating a high degree of hydraulic communication and water-table (unconfined) conditions (Attachment A). Thus, the Arikaree and Brule Formations comprise a single, hydraulically-connected shallow aquifer at the MEA.

Depending on well construction and the depth of wells installed in the Arikaree/Brule aquifer, local groundwater conditions can vary from unconfined to semi-confined conditions (consistent with the observation of first water encountered at static water level depth and a hydraulically-connected shallow aquifer system). In areas with relatively deep irrigation wells that could be described as semi-confined under non-pumping conditions, groundwater becomes fully unconfined shortly after significant pumping begins (e.g. semi-confined to unconfined conversion) due to lowering of the local water table as pumping progresses. For these reasons, groundwater within the Arikaree/Brule aquifer at the MEA was simulated as an unconfined aquifer.

¹ Geohydrology of the High Plains Aquifer in Parts of Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming, U.S. Geological Survey Professional Paper 1400-B, High Plains RASA project, 1984, 63p.

AQUI-VER, INC

Hydrogeology, Water Resources & Data Services

Aquifer properties of the Arikaree/Brule aquifer for this analysis were estimated from 1) grain-size distribution data collected from Cameco shallow Arikaree/Brule monitoring wells within the MEA, 2) specific capacity estimates from irrigation well 732, and 3) published regional hydrogeologic studies of the Arikaree/Brule aquifer. The following is a summary of hydrologic properties of the Arikaree/Brule aquifer at and near the MEA:

- the hydraulic conductivity of the Arikaree/Brule aquifer calculated from grain-size distribution analysis of sandy samples (> 45% sand by weight) obtained from shallow MEA monitoring wells varies from an average of 1.6 ft/day to a maximum of 8.2 ft/day (Attachment B).
- the hydraulic conductivity of the Arikaree/Brule aquifer was calculated from specific capacity estimates² for irrigation well 732, as given by:

$$T = 1500 * Q/s, \text{ and} \quad (1)$$

$$K = T/b \quad (2)$$

where T is the aquifer transmissivity (gpd/ft), K is the hydraulic conductivity, b is the aquifer thickness (200 feet at well 732), Q is the pumping rate (800 gpm), and s is the maximum available drawdown limited by well/pump depth, (assumed to be approximately 160 feet at irrigation well 732). Given these assumptions, the hydraulic conductivity of the Arikaree/Brule aquifer is approximately 5.0 ft/day.

- regional studies^{1,3} of the Arikaree/Brule aquifer indicate hydraulic conductivities near the MEA are less than 25 ft/day, consistent with grain-size and specific capacity estimates. These studies also indicate a specific yield of 0.15 to 0.20 is appropriate for the Arikaree/Brule aquifer at the MEA.
- The hydraulic gradient in the shallow Arikaree/Brule aquifer in the vicinity of well 732 is approximately 0.004 (calculated from water level maps presented in Attachment C).

IRRIGATION WELL IMPACT ANALYSIS

For purposes of this analysis, we have assumed a conservative (worse-case) scenario in which irrigation well 732 pumps the maximum allowable amount of groundwater (251 acre-ft/year) and a hypothetical shallow casing leak occurs at some time along the downgradient portion of the adjacent ISR wellfields at the MEA.

² Driscoll (1986), Groundwater and Wells, second edition, equation 16.15 modified for unconfined conditions.

³ Reed, E.C., and Pitkin, R. (unpublished). Table of hydraulic conductivity values for the High Plains Aquifer by grain-size classification, northwest Nebraska, Conservation and Survey Division, University of Nebraska.

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To accomplish this task, an analytical groundwater flow model was used to simulate groundwater flow in the shallow Arikaree/Brule aquifer at the MEA. Particle-tracking techniques were used to illustrate the 30-year capture zone of irrigation well 732 to assess whether a hypothetical shallow casing leak from the MEA wellfields could potentially impact the irrigation well.

Two scenarios were simulated to ensure the range of possible hydrologic conditions at the site were adequately addressed. A high transmissivity (high K) scenario was simulated in order to produce a capture zone having the highest groundwater velocity (maximum chemical travel time). The low transmissivity (low K) scenario was simulated to produce a capture zone having the greatest width to ensure the area of potential impact was adequately addressed. Input parameters for the groundwater flow model were conservatively assigned as follows:

Hydraulic Conductivity (K) – 8.2 ft/day (high transmissivity scenario), 1.6 ft/day (low transmissivity scenario)

Aquifer Thickness - 202 feet

Regional Hydraulic Gradient (I) – 0.004 to the southeast

Specific Yield – 0.15

Aquifer Porosity – 0.15

Pumping Rate – 373 gpm for 5 months continuously, off for 7 months, each year.

RESULTS AND CONCLUSIONS

The water level drawdown in well 732 after 5 months of continuous pumping for high and low transmissivity scenarios are provided in Figures 2 and 3, respectively. Assuming maximum water use, approximately 0.1 to 0.7 feet of drawdown is predicted to occur at the end of each irrigation season in the nearest shallow monitor wells (AOW-9/BOW-9) due to operation of well 732.

The 30-year capture zone of well 732 was computed using reverse particle-tracking techniques. Figures 4 and 5 illustrate the capture zone of well 732 after 30 years for high and low transmissivity scenarios, respectively. Based on the results of this analysis, MEA wellfields are not located within the capture zone of irrigation well 732. A shallow casing leak within the MEA wellfields will not impact irrigation well 732 at any time in the future given similar operating conditions.

Given the location of other irrigation and domestic wells in the area (Figure 1, Appendix A Technical Report) and configuration of the worse-case capture zone (well 732), it is reasonable to conclude there are no other wells outside the MEA boundary that will be impacted by a potential release of MEA regulated material to the shallow aquifer. Therefore, the current MEA

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shallow groundwater monitoring network is adequate to ensure the protection of human health and environment.

RECOMMENDATIONS

This study relies on limited information currently available concerning the hydrology of the shallow Arikaree/Brule aquifer and local irrigation well operations. Cameco currently plans to conduct continuous monitoring of groundwater elevations in shallow Arikaree/Brule monitoring wells in an effort to better characterize the shallow aquifer and quantify the hydrologic influence (e.g. drawdown) of local agricultural well pumping in the MEA during the 2014 irrigation season. At the end of the 2014 irrigation season, Cameco will use this information to calibrate and verify the groundwater model and confirm the conclusions of this study remain valid.

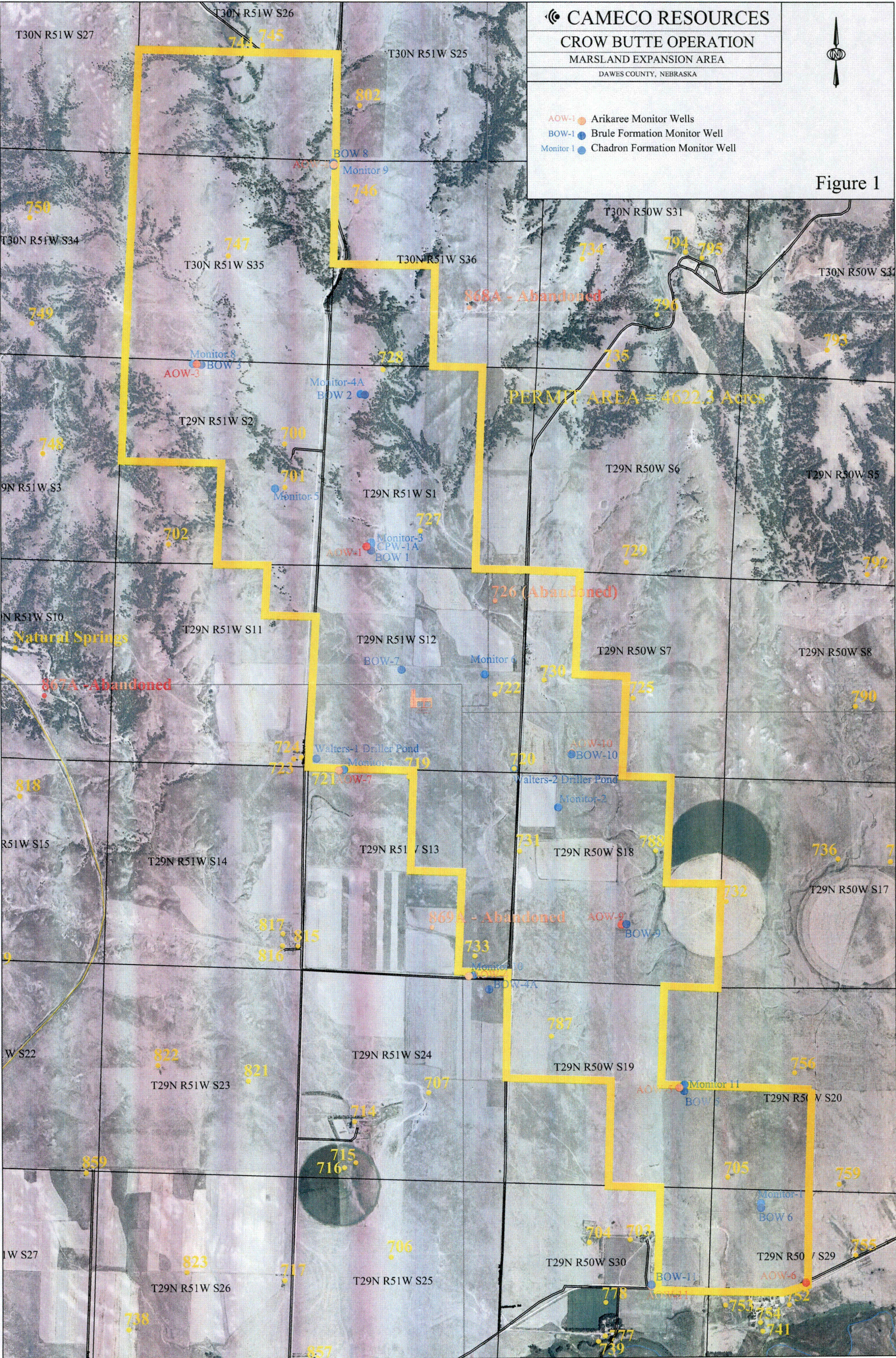
Please contact me directly if you have questions or comments concerning this report at 720-242-9510 Ext. 1#.

Sincerely,

AQUI-VER, INC



Robert L. Lewis, P.G.
Principal Hydrogeologist



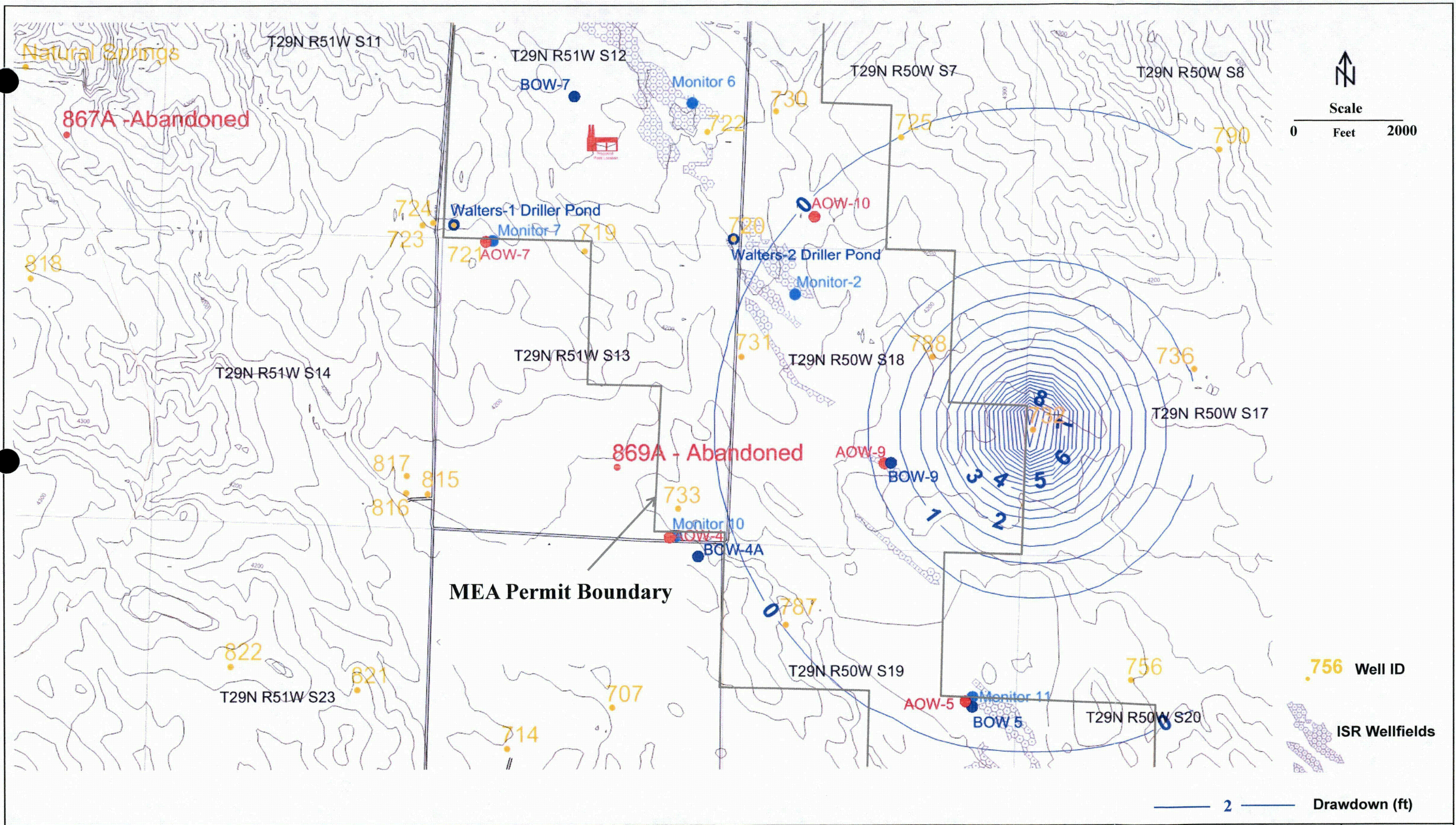
CAMECO RESOURCES
CROW BUTTE OPERATION
MARSLAND EXPANSION AREA
DAWES COUNTY, NEBRASKA



- AOW-1 ● Arikaree Monitor Wells
- BOW-1 ● Brule Formation Monitor Well
- Monitor 1 ● Chadron Formation Monitor Well

Figure 1

PERMIT AREA = 4622.3 Acres



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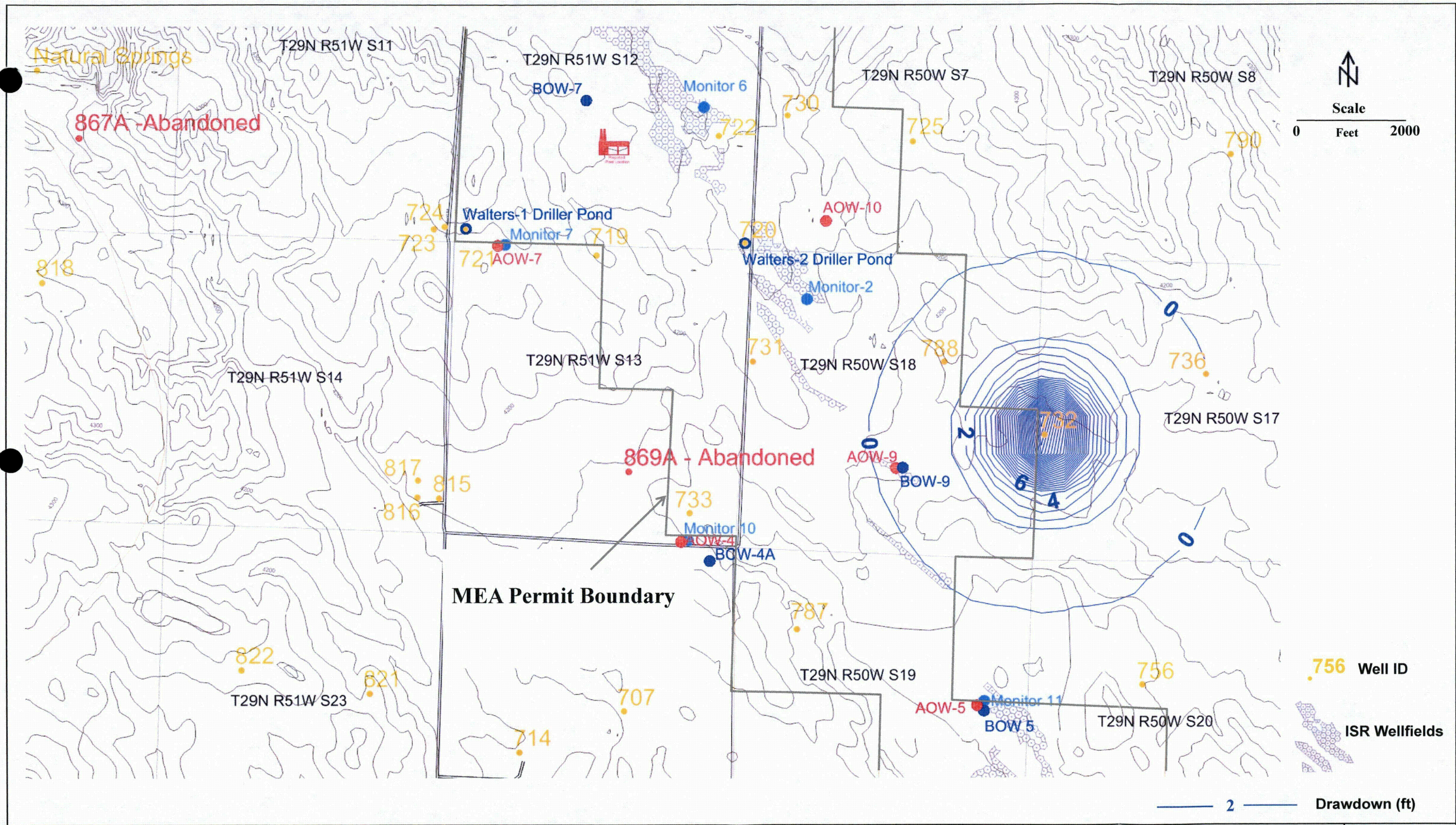
**Projected Drawdown in Arikaree/Brule Aquifer
End of 5-month Irrigation Season
High Transmissivity Scenario**

Crow Butte Project, Marsland Expansion Area,
Dawes County, NE



FIGURE:

2



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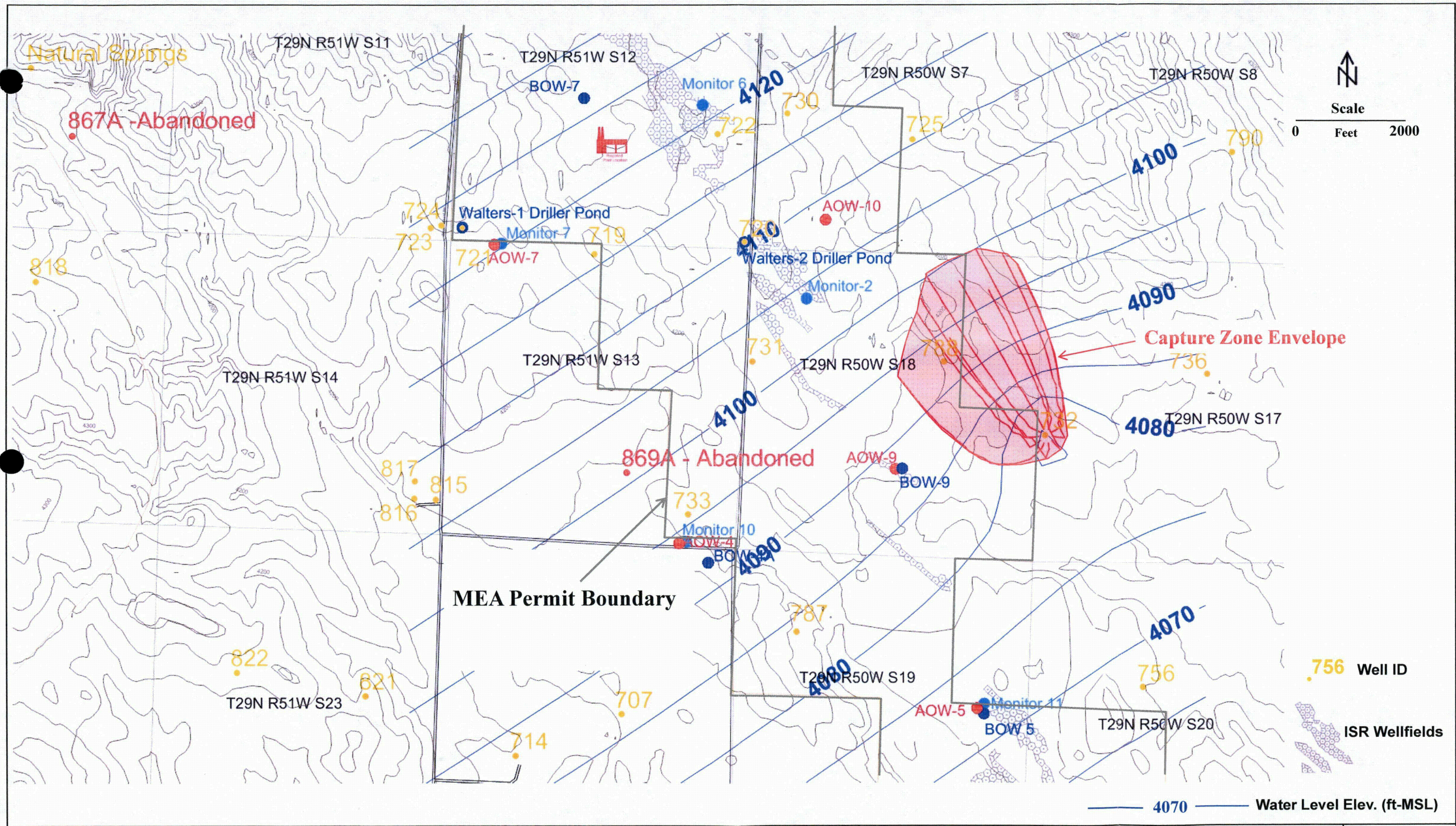
**Projected Drawdown in Arikaree/Brule Aquifer
End of 5-month Irrigation Season
Low Transmissivity Scenario**

Crow Butte Project, Marsland Expansion Area,
Dawes County, NE



FIGURE:

3



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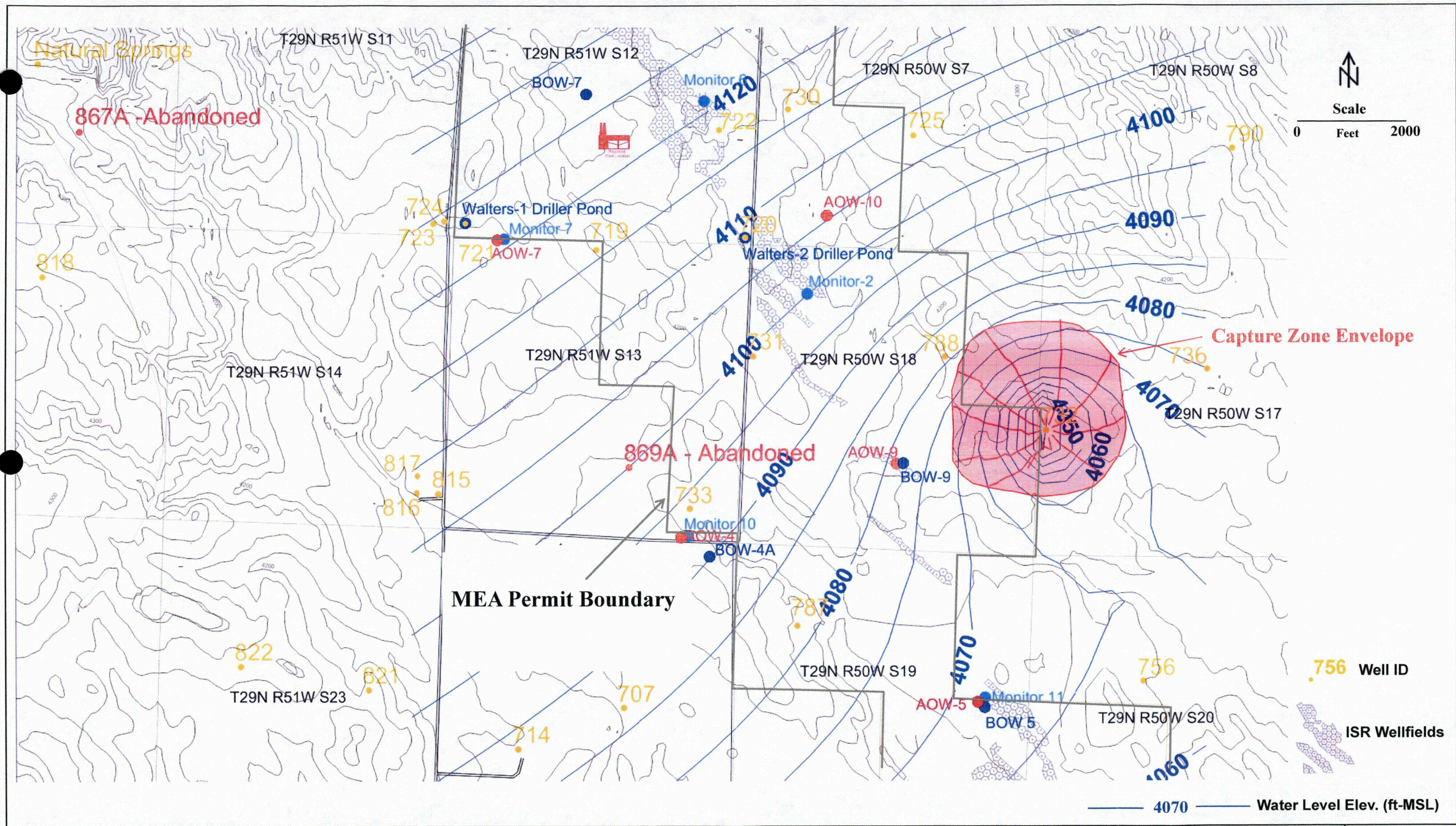
**30-Year Capture Zone of Irrigation Well 732
High Transmissivity Scenario**

Crow Butte Project, Marsland Expansion Area,
Dawes County, NE



FIGURE:

4



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Hydrogeology, Water Resources & Data Services

ATTACHMENT A
WATER LEVEL MONITORING DATA

Water Levels - Arikaree Group, Brule Formation and Basal Sandstone of Chadron Formation

Well	TOC Elevation (ft amsl)	2/22/11 Water Level (ft TOC)	2/22/11 Groundwater Elevation (ft amsl)	10/17/13 Water Level (ft TOC)	10/17/13 Groundwater Elevation (ft amsl)
ARIKAREE GROUP					
AOW-1	4261.64	--	--	126.4	4135.24
AOW-3	4351.97	--	--	142.2	4209.77
AOW-4	4161.91	--	--	87.3	4074.61
AOW-5	4125.42	--	--	72.0	4053.42
AOW-6	4068.60	--	--	20.0	4048.60
AOW-7	4243.94	--	--	DRY	4093.94
AOW-8	4365.02	--	--	71.7	4293.32
AOW-9	4146.41	--	--	74.9	4071.51
AOW-10	4198.60	--	--	113.3	4085.30
AOW-11	4091.02	--	--	35.4	4055.62
BRULE FORMATION					
BOW 2010-1	4260.10	125.74	4134.36	124.9	4135.20
BOW 2010-2	4324.96	150.03	4174.93	151.4	4173.56
BOW 2010-3	4352.80	137.20	4215.60	139.6	4213.20
BOW-2010-4	4163.13	86.65	4076.48	--	--
BOW 2010-4A	--	--	--	93.7	4069.43
BOW 2010-5	4127.88	71.19	4056.69	74.0	4053.88
BOW 2010-6	4100.43	49.30	4051.13	50.3	4050.13
BOW-2010-7	4248.37	--	--	155.6	4092.77
BOW-2010-8	4369.29	--	--	74.0	4295.29
BOW-2013-9	4145.90	--	--	74.6	4071.30
BOW-2013-10	4197.84	--	--	113.8	4084.04
BOW-2013-11	4091.87	--	--	37.4	4054.47
BASAL SANDSTONE OF CHADRON FORMATION					
CPW-2010-1	4261.35	551.63	3709.72	565.3	3696.05
CPW-2010-1A	4263.28	--	--	567.0	3696.28
Monitor 1	4103.28	387.65	3715.63	399.4	3703.88
Monitor 2	4199.50	484.99	3714.51	500.3	3699.20
Monitor 3	4261.40	550.90	3710.50	565.5	3695.90
Monitor 4A	4329.72	618.09	3711.64	634.3	3695.42
Monitor 5	4340.80	628.87	3711.93	645.4	3695.40
Monitor 6	4216.40	502.80	3713.60	518.2	3698.20
Monitor 7	4246.28	531.20	3715.08	548.0	3698.28
Monitor 8	4355.90	644.97	3710.93	660.5	3695.40
Monitor 9	4367.02	656.54	3710.48	669.7	3697.32
Monitor 10	4163.99	449.01	3714.98	465.0	3698.99
Monitor 11	4128.07	412.74	3715.33	427.9	3700.17

NOTES:

Groundwater elevations for the Brule Formation and Basal Chadron Sandstone are based on depth to water measurements.

TOC = top of casing

ft TOC = feet below top of casing

ft amsl = feet above mean sea level

DRY = measurable water not present in well at time of sampling

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Hydrogeology, Water Resources & Data Services

ATTACHMENT B

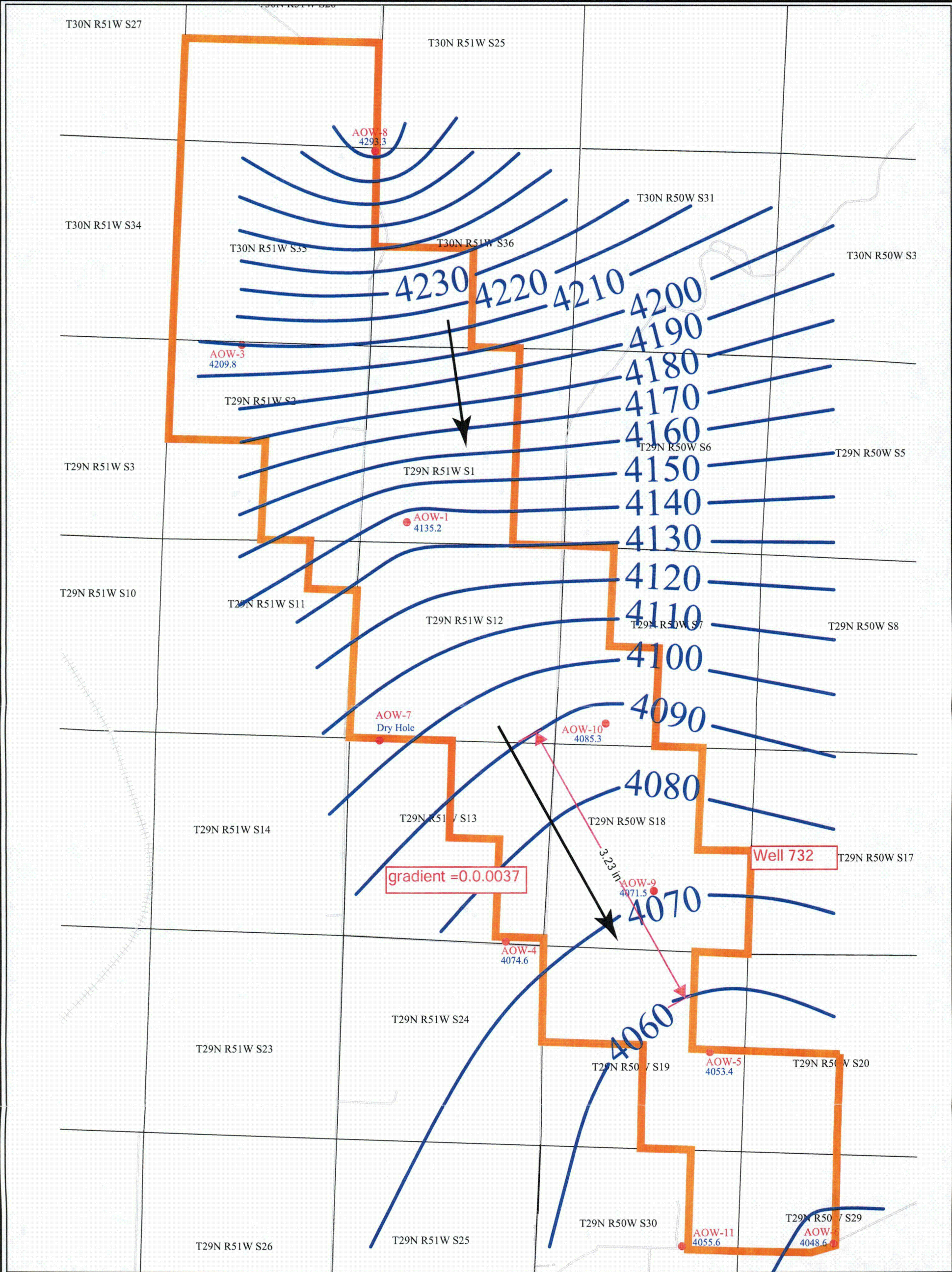
HYDRAULIC CONDUCTIVITY OF THE ARIKAREE/BRULE AQUIFER
CALCULATED FROM GRAIN-SIZE ANALYSES

Hydraulic Conductivity of Arikaree and Brule Formation Samples from Grain-Size Analyses

	Geomean of K (cm/sec)	Geomean of K (ft/day)	STD	Max K (cm/sec)	Max K (ft/day)	Min K (cm/sec)	Min K (ft/day)	# of Samples
Arikaree (all samples)	1.4E-04	0.4	9.3E-04	2.9E-03	8.2	2.3E-05	0.1	10
Arikaree (sand >45% by weight)	6.9E-04	1.9	1.2E-03	2.9E-03	8.2	1.0E-04	0.3	4
Brule (all samples)	8.9E-05	0.3	6.1E-05	2.3E-04	0.7	2.6E-05	0.1	13
Brule (sand >45% by weight)	2.3E-04	0.7	--	--	--	--	--	1
Combined Arikaree and Brule (sand >45% by weight)	5.5E-04	1.6	1.1E-03	2.9E-03	8.2	1.0E-04	0.3	5

AQUI-VER, INC
Hydrogeology, Water Resources & Data Services

ATTACHMENT C
WATER LEVEL CONTOUR MAPS AND HYDRAULIC GRADIENT CALCULATIONS



LEGEND

- Proposed Marsland Expansion Area
- Arikaree Group Well and Well ID
- Water Level (FT-AMSL)
- Groundwater Elevation Contour (FT-AMSL)
- Groundwater Flow Direction
- Road
- Railroad
- FT-AMSL = Feet Above Mean Sea Level

0 1 in 1,250 2,500
Feet

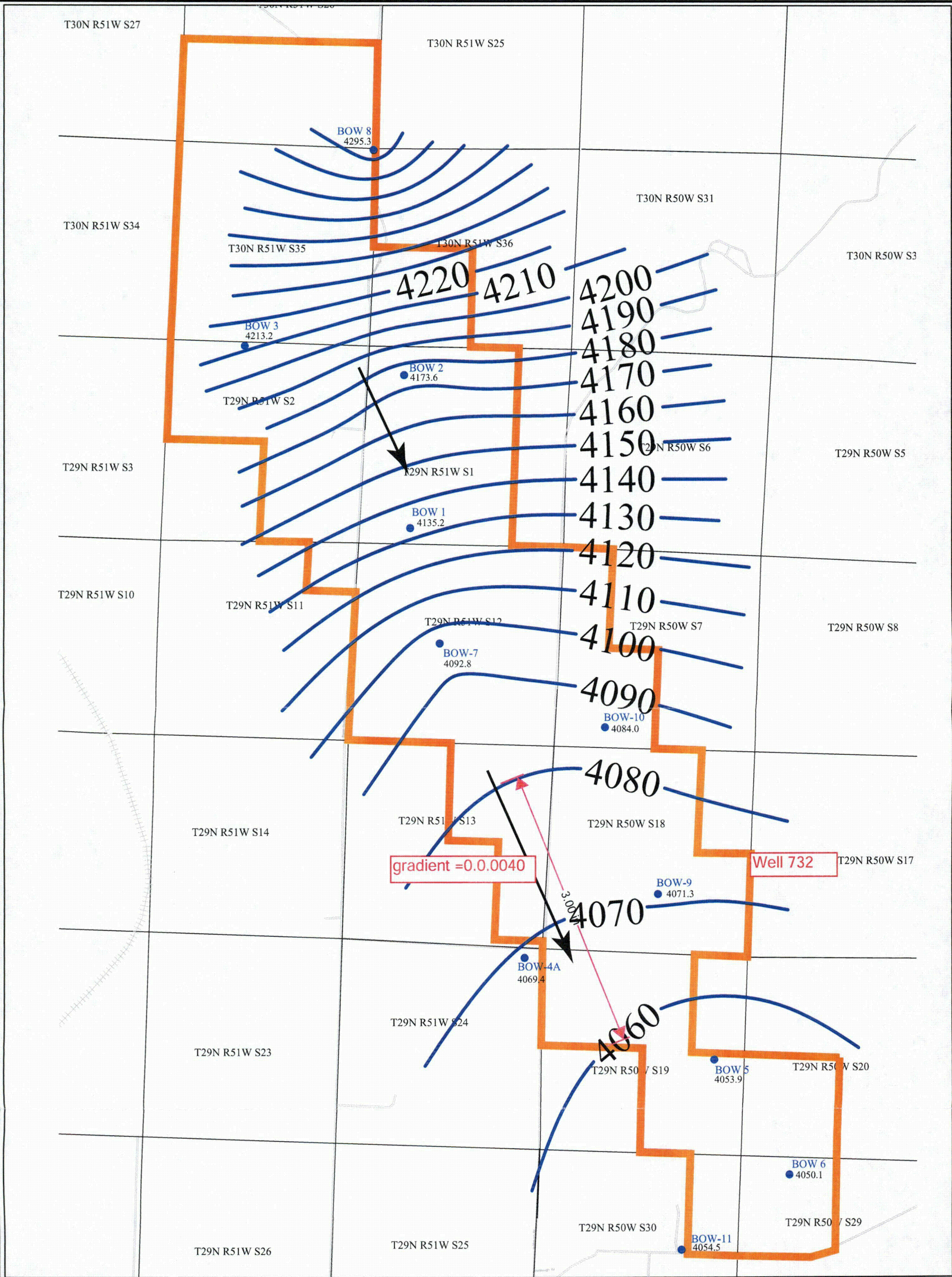
PROJECTION: NAD 1927, STATE PLANE
NEBRASKA NORTH, FIPS 2601

CROW BUTTE RESOURCES, INC.

**FIGURE C-1
POTENTIOMETRIC SURFACE
ARIKAREE GROUP (10/17/13)**

PROJECT: CO001636 FORMATTED BY: JC CHECKED BY: JA

ARCADIS 630 Plaza Drive, Ste. 100
Highlands Ranch, CO 80129
P: 720-344-3500 F: 720-344-3535
www.arcadis-us.com



LEGEND

- Proposed Marsland Expansion Area
- Brule Formation Well and Well ID
- 4053.9 Water Level (FT-AMSL)
- Groundwater Elevation Contour (FT-AMSL)
- Groundwater Flow Direction
- Road
- Railroad

FT-AMSL = Feet Above Mean Sea Level

PROJECTION: NAD 1927, STATE PLANE
NEBRASKA NORTH, FIPS 2601

CROW BUTTE
RESOURCES, INC.

FIGURE C-2
POTENTIOMETRIC SURFACE
BRULE FORMATION (10/17/13)

PROJECT: CO001636 FORMATTED BY: JC CHECKED BY: JA

ARCADIS

630 Plaza Drive, Ste. 100
Highlands Ranch, CO 80129
P: 720-344-3500 F: 720-344-3535
www.arcadis-us.com

AA-2

AquiferTek Report (November 2014)



AquiferTek

Mr. Doug Pavlick
Larry Teahon
Cameco Resources
Crow Butte Facility
P.O. Box 169
Crawford, NE 69339

November 7, 2014

Re: Validation of Marsland Expansion Area (MEA) Agricultural Well Impact Analysis

As requested, we have completed an update and validation of the Marsland Expansion Area (MEA) Agricultural Well Impact Analysis (dated December 10, 2013) based on results of recent water level monitoring at the MEA. Our analysis included the calibration of the groundwater flow model using water level data collected during the 2014 irrigation season, and calculation of the calibrated 30-year capture zone of irrigation well 732.

WATER LEVEL MONITORING

Water level elevation data was collected from eight shallow monitoring wells (AOW-4, AOW-5, AOW-9, AOW-10, BOW-4A, BOW-5, BOW-9, and BOW-10) at the MEA from 12/11/2013 to 10/9/2014. Water level data were collected using downhole in-situ Troll® dataloggers equipped with pressure transducers. Water levels were collected once per day from each monitoring well over the monitoring period, and are plotted in **Attachment A**.

Results of water level monitoring indicate the operation of irrigation well 732 caused a maximum of 2.2 feet of drawdown in the nearest monitoring well cluster (AOW-9/BOW-9) over a 100-day (3.3 month) irrigation well pumping period. Drawdown in other shallow monitoring wells was not significant and less than 0.5 feet. Drawdown measured in AOW-9 and BOW-9 was very similar, indicating the shallow Arikaree and Brule aquifers are in hydraulic communication as previously noted in the December 2013 summary report.

IRRIGATION WELL 732 OPERATING CONDITIONS

Pump operating and monitoring data collected during the 2014 irrigation season indicates irrigation well 732 pumped 57,742,980 gallons of groundwater over an approximate 100-day (3.3 month) period from late April to early August 2014. This equates to an average continuous pumping rate of 401 gpm over the 3.3 month operating period. Because the actual operating pumping rate of well 732 is approximately 800 gpm, we can infer well 732 pumped at a rate of

800 gpm for 12 hours each day during operating period. The observed 2014 irrigation operating conditions differed somewhat from the estimated operating conditions used in our December 2013 impact analysis (well 732 operating 11 hours per day for 5-months, or an average continuous pumping rate of 373 gpm).

GROUNDWATER FLOW MODEL CALIBRATION

The groundwater flow model used in the original December 2013 impact analysis was calibrated by simulating observed changes in water level elevation (drawdown) in shallow monitoring wells AOW-9/BOW-9 during the 2014 irrigation season using the updated irrigation well 732 operating conditions.

Aquifer parameters used in the "high transmissivity scenario" of the December 2013 irrigation well impact analysis were used as initial conditions for the model calibration. In order to calibrate the flow model and achieve a reasonable match between observed and simulated drawdown, the specific yield of the shallow Arikaree/Brule aquifer was lowered slightly from 0.1 to 0.048. A summary of calibrated flow model parameters and irrigation well operating conditions is summarized below:

Hydraulic conductivity - 8.2 ft/day.

Transmissivity - 1656 ft²/day (aquifer thickness 202 feet).

The hydraulic gradient – 0.004.

Porosity – 0.15

Specific Yield – 0.048 (adjusted downward from 0.1 to calibrate the model)

Pumping rate – 401 gpm for 3.3 months (100 days).

Results of the flow model calibration are shown in Figures 1 and 2. Observed and simulated drawdowns in wells AOW-9/BOW-9 are very similar, and simulated drawdown in other shallow monitoring wells is less than 0.5 feet as observed. Given these results, the model has been adequately calibrated and can be used to make predictions with a reasonable degree of accuracy.

REVISED IRRIGATION WELL IMPACT ANALYSIS

The calibrated groundwater flow model was used to calculate the 30-year capture zone of irrigation well 732. Particle-tracking techniques were used to illustrate the 30-year capture zone

of irrigation well 732 to assess whether a hypothetical shallow casing leak from the MEA wellfields could potentially impact the irrigation well.

For purposes of this analysis, we have assumed a conservative (worse-case) scenario in which irrigation well 732 pumps the maximum allowable amount of groundwater (251 acre-ft/year, 373 gpm for 5-months) and a hypothetical shallow casing leak occurs at some time along the downgradient portion of the adjacent ISR wellfields at the MEA. These are the same operating conditions assumed in the original December 2013 impact analysis, which are considered to be more conservative than conditions observed during the 2014 growing season (e.g. 3.3 month operating period, 70% of permitted water right).

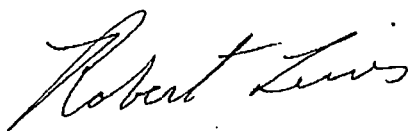
RESULTS AND CONCLUSIONS

The revised 30-year capture zone of irrigation well 732 is illustrated in Figure 3. Based on the results of this analysis, MEA wellfields are not located within the capture zone of irrigation well 732. A shallow casing leak within the MEA wellfields will not impact irrigation well 732 at any time in the future given similar operating conditions. This conclusion is identical to the original December 2013 impact analysis.

Given the location of other irrigation and domestic wells in the area (Figure 1, Appendix A Technical Report) and configuration of the worse-case capture zone, it is reasonable to conclude there are no other wells outside the MEA boundary that will be impacted by a potential release of MEA regulated material to the shallow aquifer. Therefore, the current MEA shallow groundwater monitoring network is adequate to ensure the protection of human health and environment.

If you have any questions or comments concerning this report, please contact me directly at 303-522-1118.

Sincerely,
AquiferTek



Robert L. Lewis, P.G.
Principal Hydrogeologist

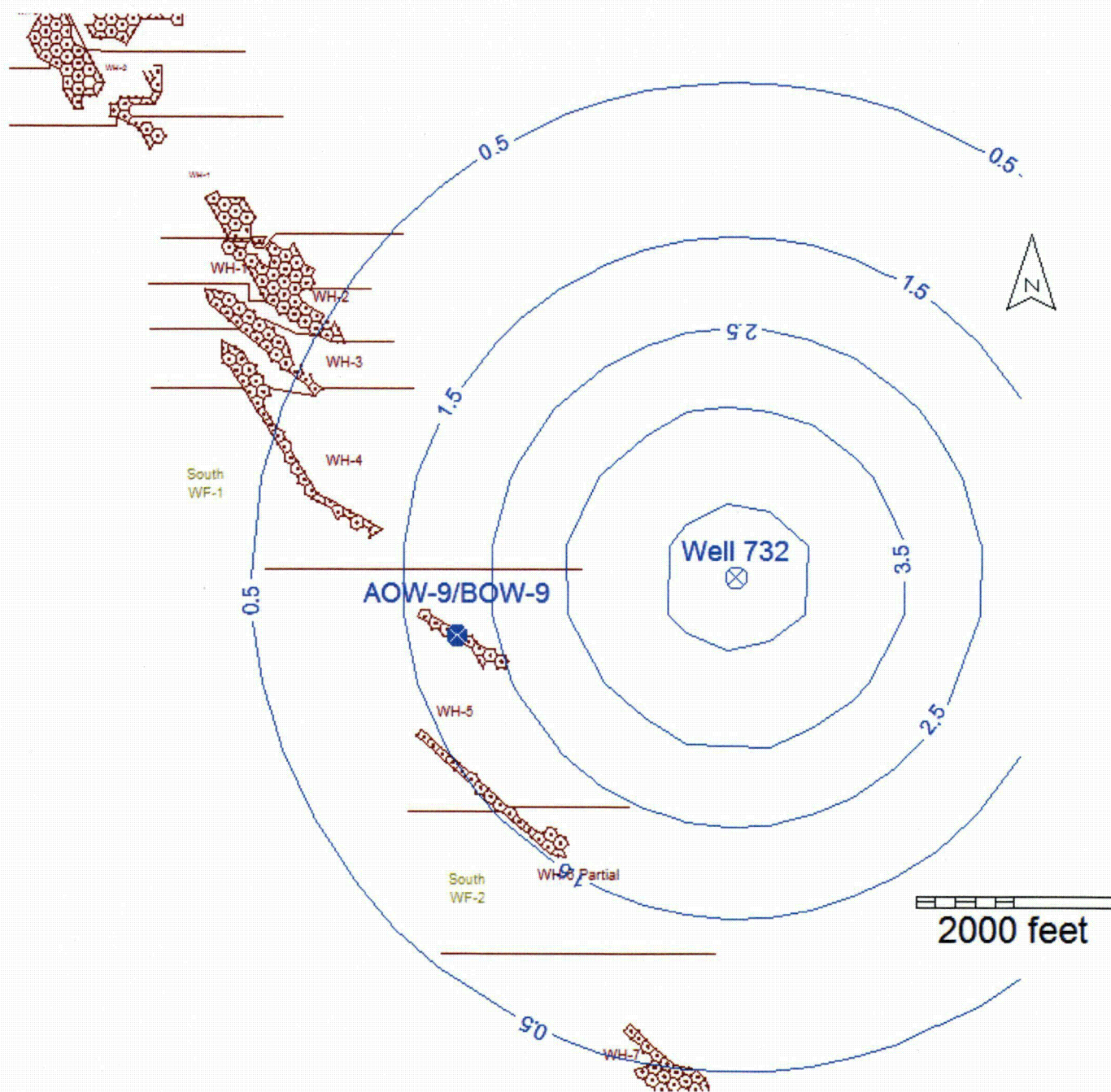


Figure 1. Calibrated maximum drawdown contour map, 2014 Irrigation Season.

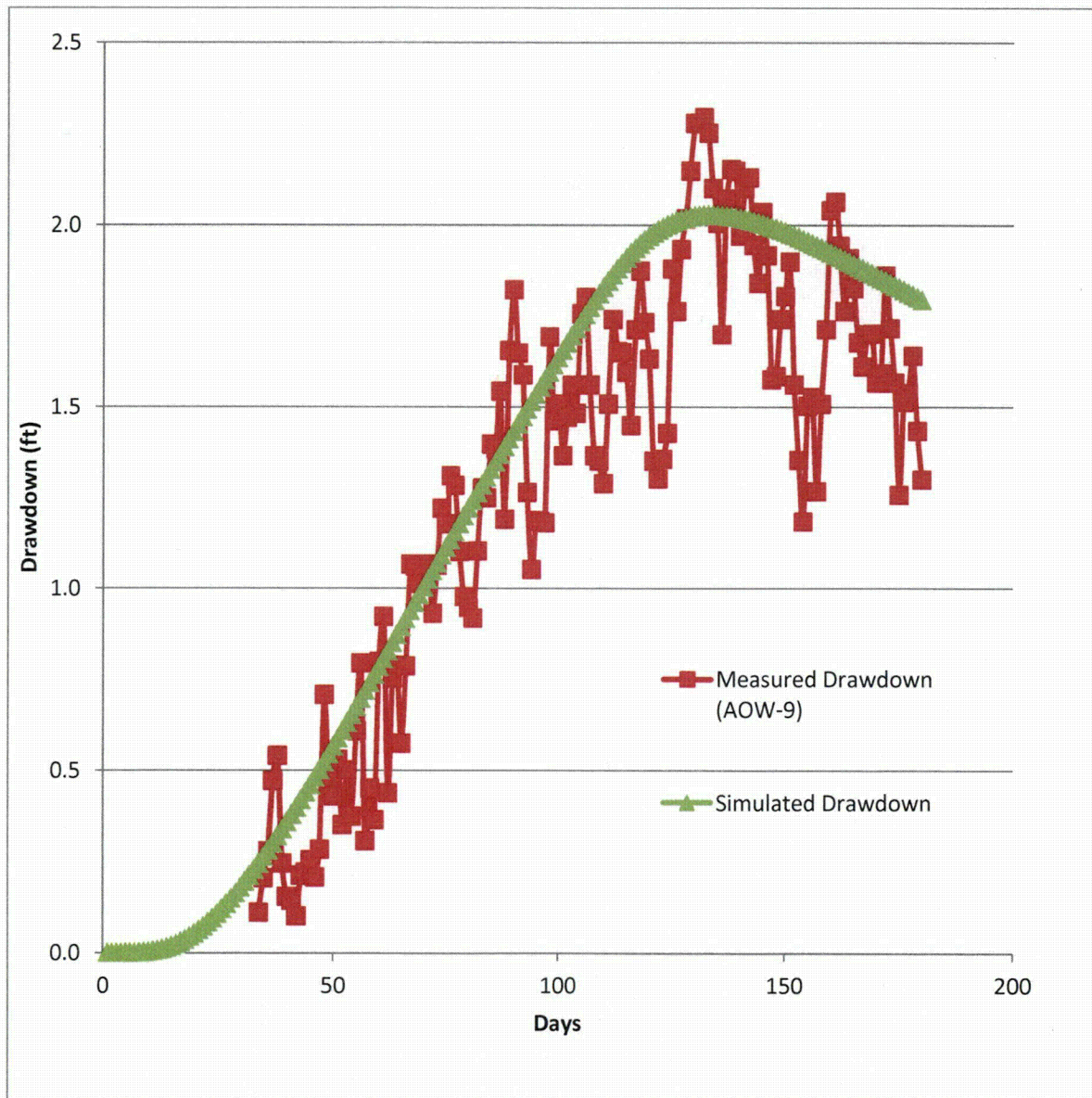


Figure 2. Simulated vs. Observed Drawdown in shallow monitoring well AOW-09, Irrigation Well 732 calibration .

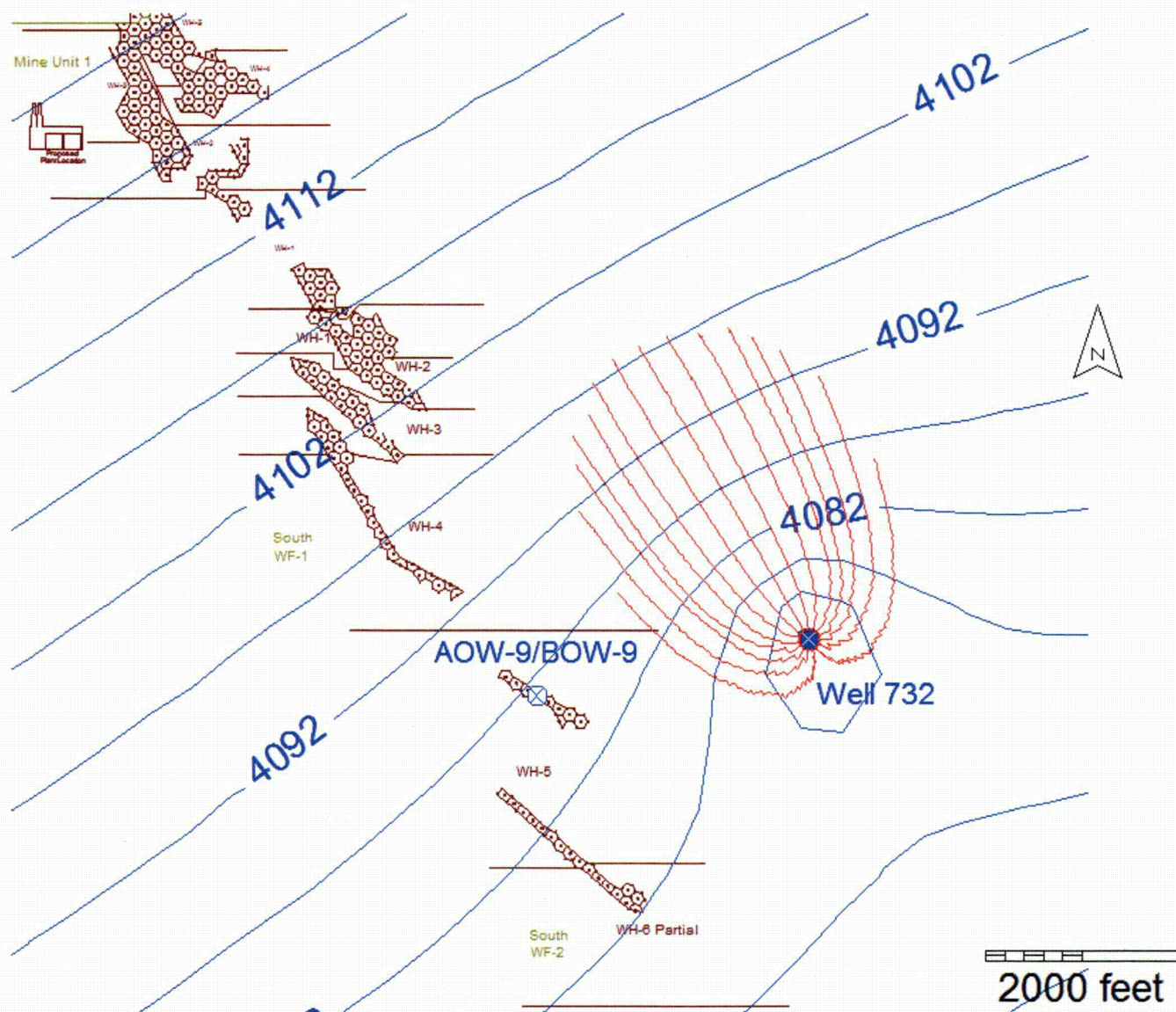
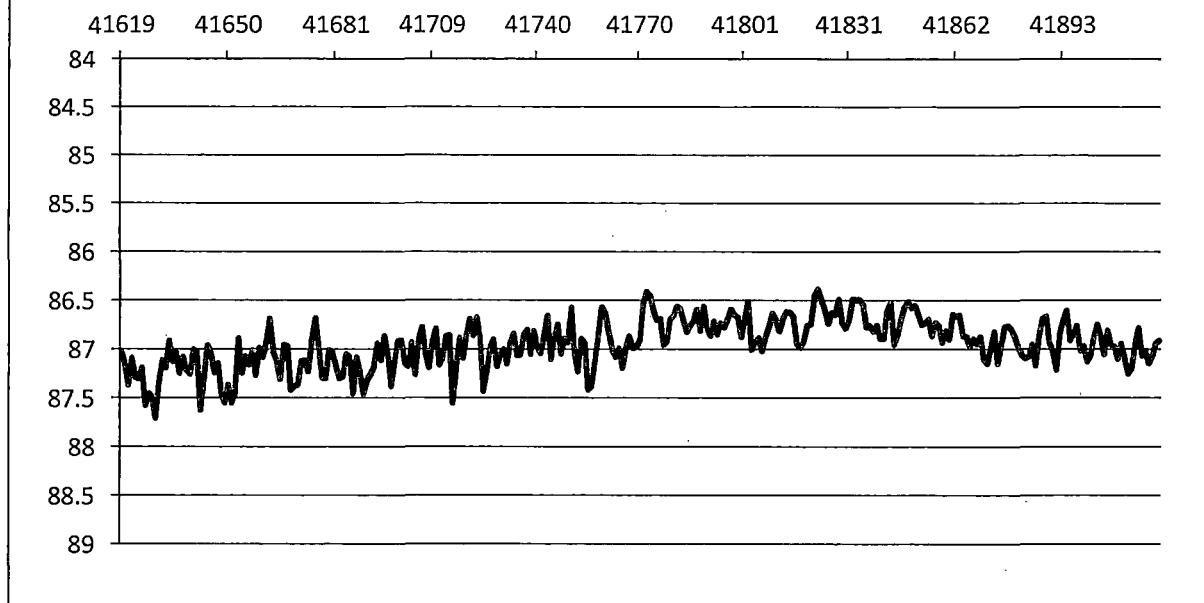


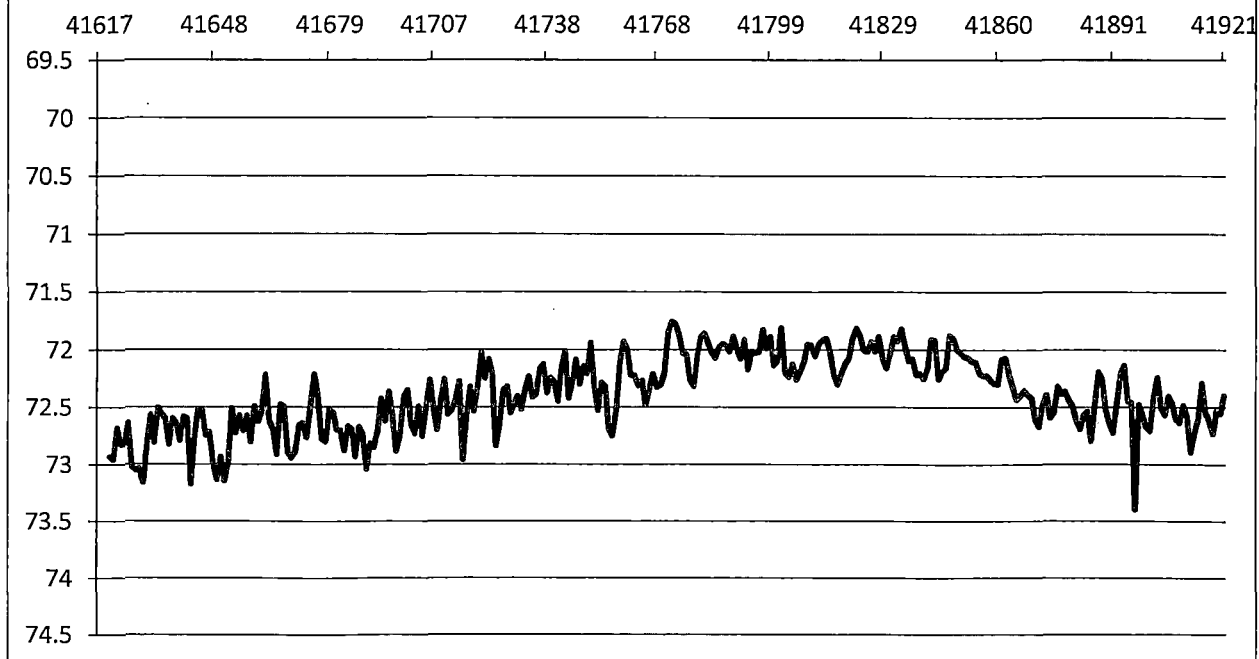
Figure 3. 30-year capture zone of Irrigation Well 732.

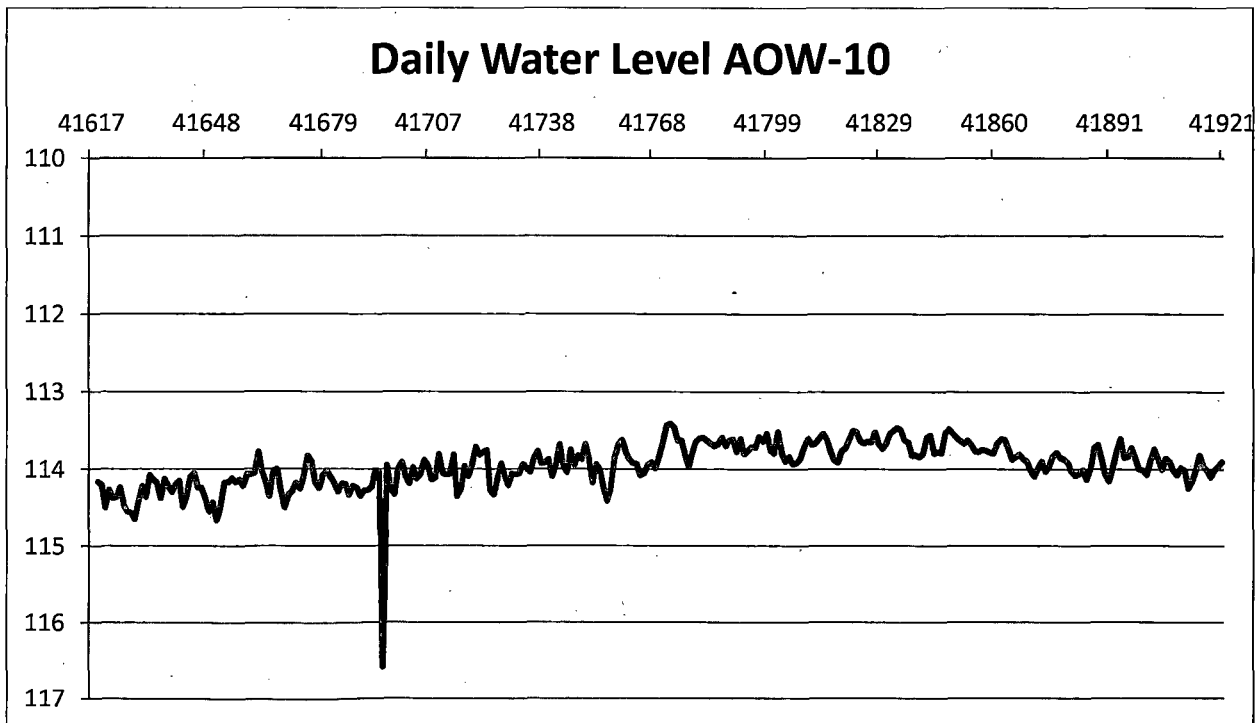
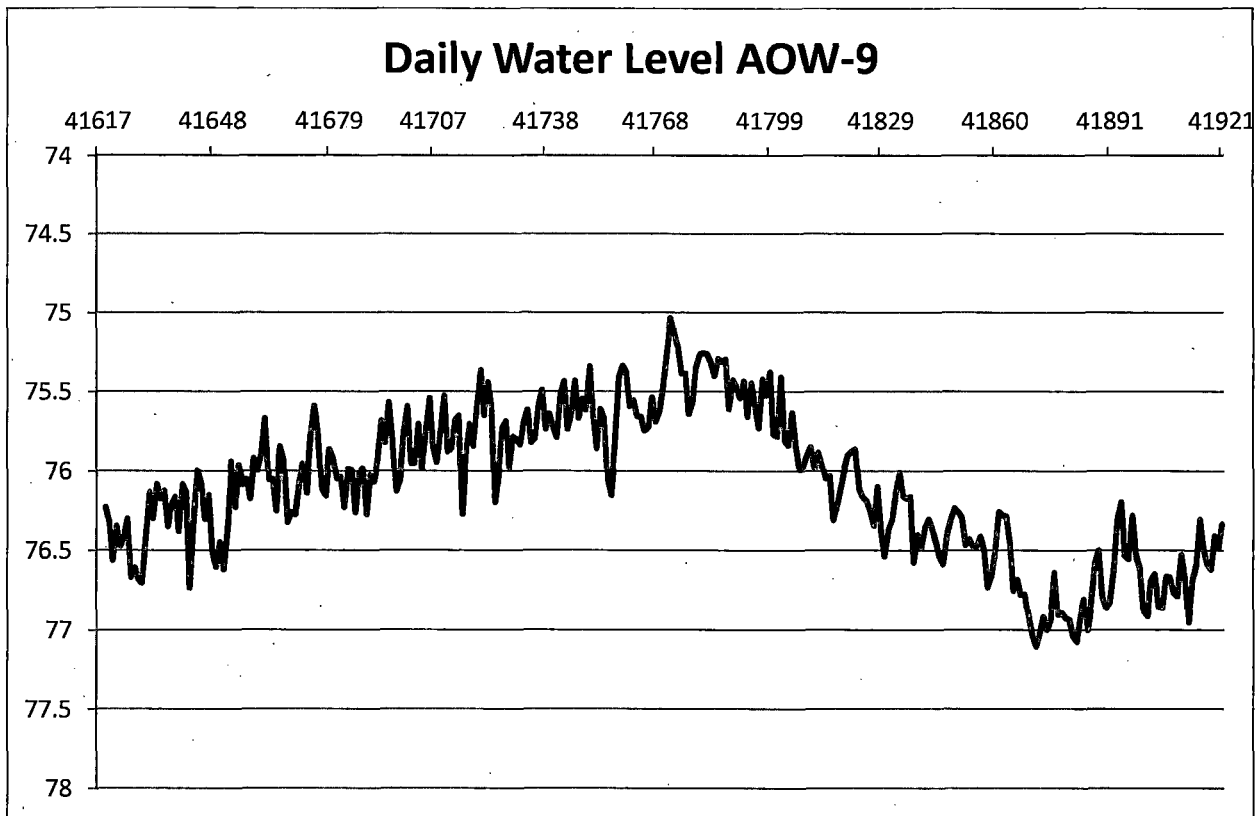
ATTACHMENT A
WATER LEVEL MONITORING DATA

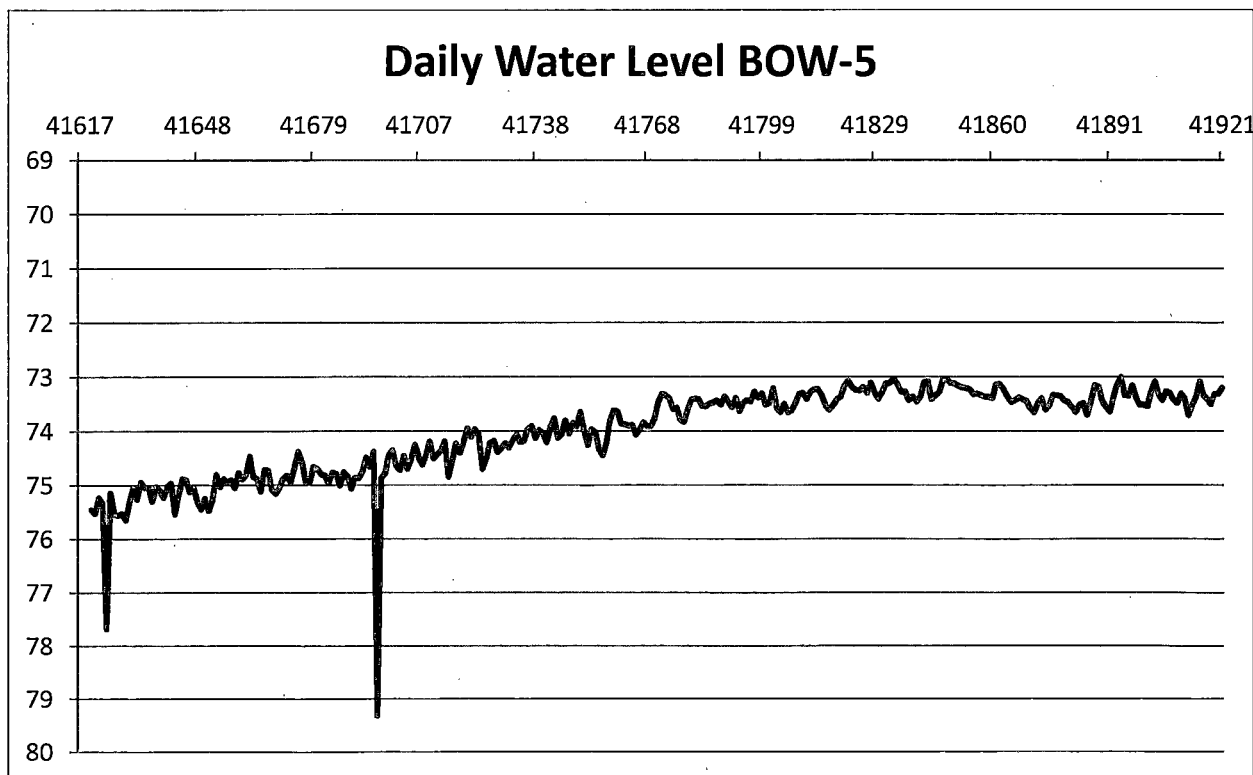
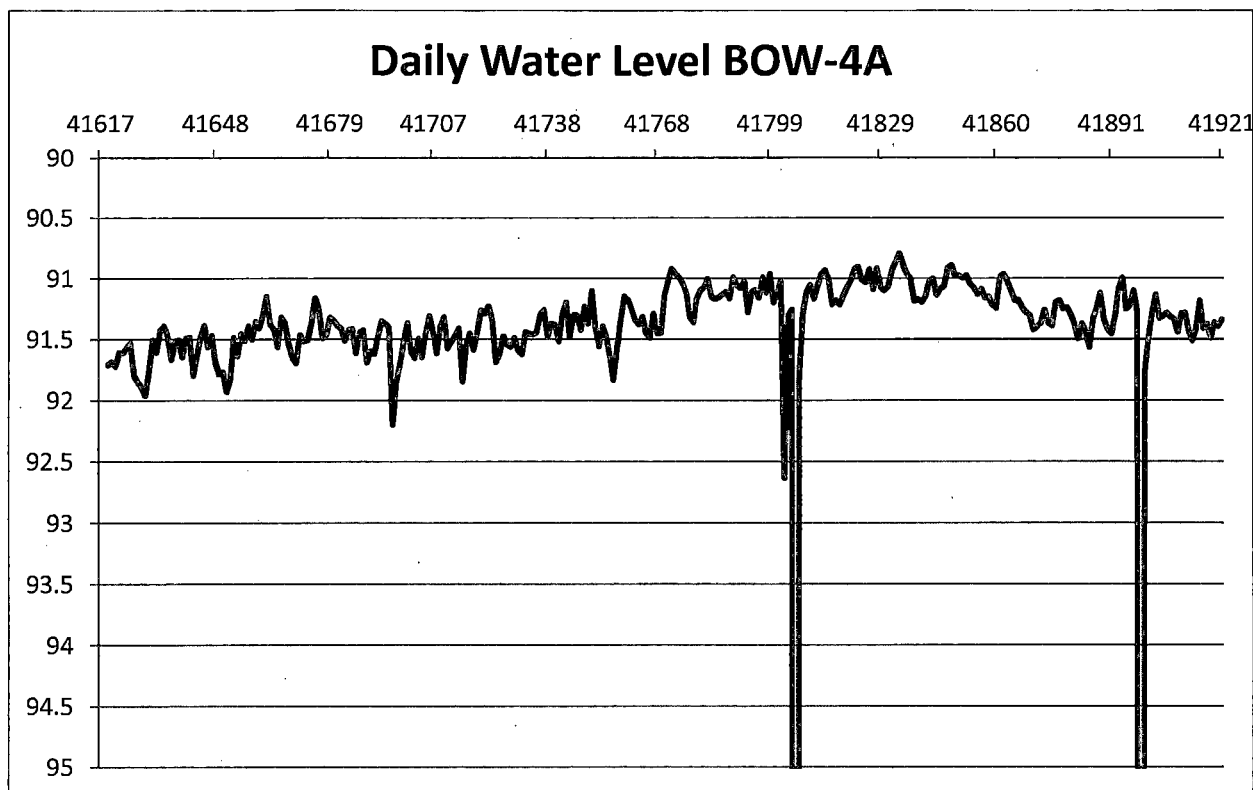
Daily Water Level AOW-4



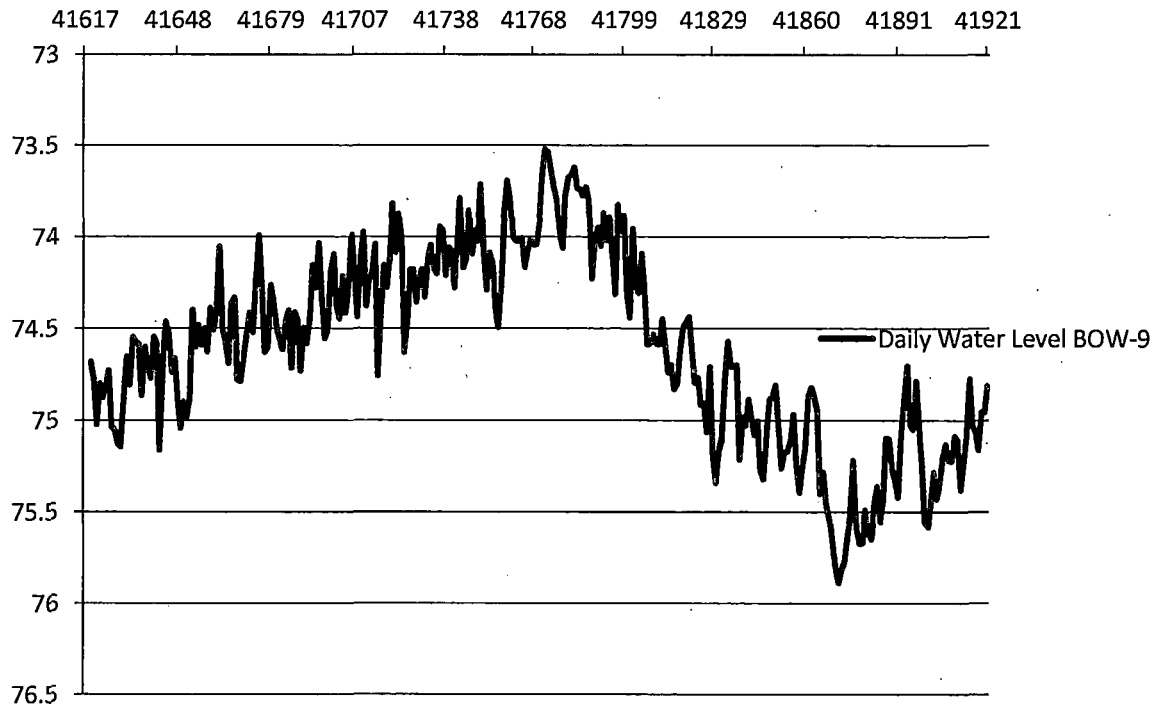
Daily Water Level AOW-5



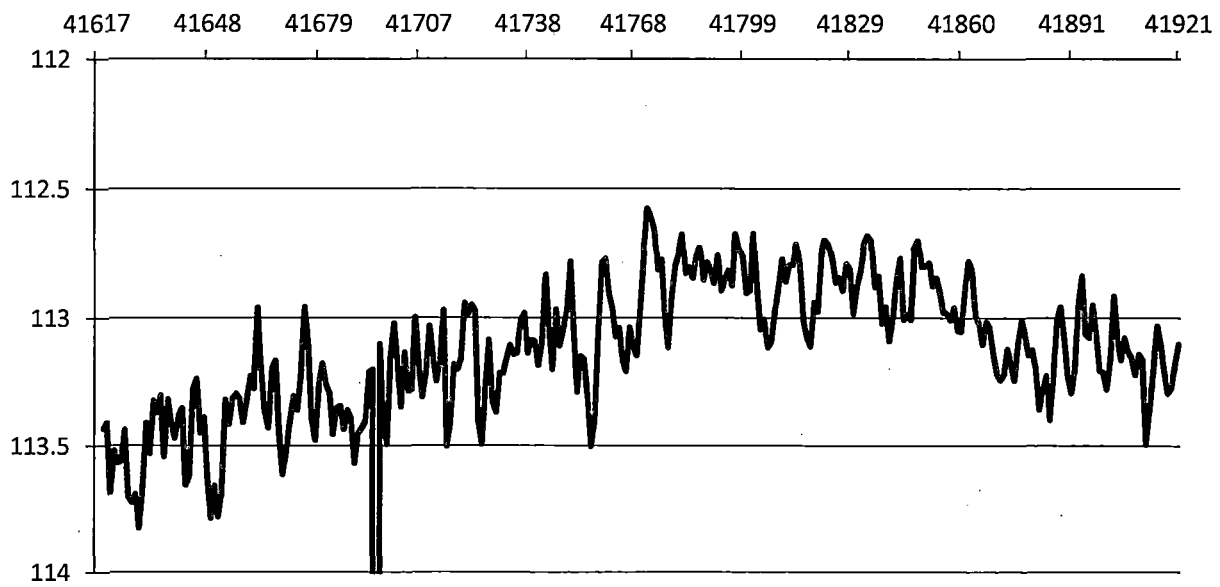




Daily Water Level BOW-9



Daily Water Level BOW-10



AA-3

AquiferTek Hydraulic Containment (October 2015)



AquiferTek

Mr. Doug Pavlick
Mr. Larry Teahon
Cameco Resources
Crow Butte Facility
P.O. Box 169
Crawford, NE 69339

October 8, 2015

Re: Response to ASLB Contention #2, Hydraulic Containment of Mining Solutions at the Marsland Expansion Area (MEA)

Gentlemen,

I've reviewed the discussion related to hydraulic containment of mining solutions at the Marsland Expansion Area (MEA) as expressed in Contention #2 by the MEA Atomic Safety Licensing Board (ASLB). The following is a summary of my evaluation.

CONTAINMENT OF MINING SOLUTIONS

Existing hydrogeologic and operations data support the conclusion that mining solutions will be fully contained both laterally and vertically at the MEA.

1) The steeply downward hydraulic gradient at the MEA prevents upward migration of mining solutions.

Mining solutions at the MEA are contained vertically given the steeply downward hydraulic gradient observed between the shallow Arikaree/Brule aquifer and the Basal Chadron production aquifer. Baseline water level data collected at the MEA to date indicate water level elevations in the shallow Arikaree/Brule aquifer are 350 to more than 500 feet higher than water levels in the production aquifer. Given an observed thickness of the Upper/Middle Chadron confining unit of 360 to 450 feet at the MEA, the observed downward hydraulic gradient at the site is approximately 0.8 to 1.4. Wellfield operations at the MEA will only act to increase the observed downward hydraulic gradient given the net drawdown produced by the wellfield bleed. Under no circumstances can the observed difference in water levels be overcome during wellfield operations. Given these facts, there is no hydrologic mechanism by which mining solutions could migrate upward from the production aquifer toward the shallow Arikaree/Brule aquifer. Therefore, vertical containment of mining solutions at the MEA can be assured.

regardless of the physical characteristics of the shallow aquifer, confining unit, or production aquifer.

2) Geological and hydrologic data collected at the MEA indicates the Basal Chadron production aquifer is confined and hydraulically isolated from the shallow Arikaree/Brule aquifer.

Baseline water level data collected at the MEA indicate water level elevations in the Basal Chadron aquifer are more than 400 feet above the top of the Basal Chadron sandstone, indicating confined aquifer conditions exist. This is to be expected given the 360 to 450 feet of low permeability claystone and siltstone of the Upper/Middle Chadron confining unit that separate the shallow aquifer from the Basal Chadron production aquifer. Further, water level drawdown and recovery data collected during the regional aquifer test at the MEA are indicative of confined aquifer conditions. Further, water level data collected from shallow aquifer monitoring wells during the aquifer test did not show any evidence of drawdown during the test, indicating the production aquifer was isolated from the shallow aquifer. The Basal Chadron storage coefficient (2.6×10^{-4}) calculated from aquifer test data is also indicative of confined conditions. There is no evidence of leaky (e.g. semi-confined) aquifer conditions observed at the site from geologic data including borehole logs, core data, or geophysical well logs. Furthermore, as discussed previously, the strongly downward hydraulic gradient observed between the shallow aquifer and the Basal Chadron production aquifer prevents vertical migration of mining solutions upward from the production aquifer, regardless of the physical characteristics of the aquifers or confining units.

3) The Upper/Middle Chadron confining unit is sufficiently impermeable to hydraulically isolate the production aquifer from the shallow aquifer.

A review of geologic and geophysical logs from boreholes at the MEA indicates the Upper/Middle Chadron confining unit consists of more than 90 percent claystone and less than 10 percent coarser material (e.g. siltstone and sandstone). The average vertical hydraulic conductivity of Upper/Middle Chadron Formation claystone, as measured in a core sample in the laboratory using a falling head permeameter, is 1.32×10^{-7} cm/sec (**Attachment A**). Therefore, the Upper/Middle Chadron claystones can be classified as low permeability (e.g., Norris and others, 2012). The representative vertical hydraulic conductivity of the lesser coarser-grained materials (e.g. siltstone and fine sandstone) in the Upper/Middle Chadron Formation, as calculated from grain-size analysis (Kozeny-Carmen analysis) of five core samples, is 3.7×10^{-5} cm/sec (**Attachment A**).

The representative hydraulic conductivity of a stratified sequence of sediments undergoing vertical flow is characterized as the harmonic mean of the hydraulic conductivities of the individual strata (e.g. Norris and others, 2012). Given a conservative composition of the

Upper/Middle Chadron confining unit of 90 percent claystone and 10 percent coarser material, the representative vertical hydraulic conductivity of the Upper/Middle Chadron confining unit is 1.5×10^{-7} cm/sec. As a point of reference, one to two feet of clay having a vertical hydraulic conductivity of 1×10^{-7} cm/sec is considered sufficiently impermeable to be used as a liner in landfills and waste repositories to isolate waste from groundwater (e.g., Norris and others, 2012). For purposes of comparison, the Upper/Middle Chadron confining unit consists of more than 320 feet of claystone of this character.

4) The rate of vertical groundwater movement is insignificant and further demonstrates vertical containment of mining solutions.

The rate of vertical movement between the shallow aquifer and the production aquifer can be calculated using Darcy's Law and available hydrogeologic data including vertical hydraulic conductivity and effective porosity of the Upper/Middle Chadron confining unit, and the hydraulic gradient between the shallow aquifer the production aquifer.

Given a maximum hydraulic gradient of 1.4, an effective porosity of the confining unit of 0.1, and a representative vertical hydraulic conductivity of 1.5×10^{-7} cm/sec from 3) above, the downward movement of groundwater from the shallow aquifer is about 2.1 ft/year. At this rate of movement, and assuming a minimum thickness of 360 feet for the Upper/Middle Chadron confining unit, it would take more than 170 years for groundwater to move downward from the shallow Arikaree/Brule aquifer to the Basal Chadron production aquifer.

5) Other chemical transport processes including hydrodynamic dispersion and chemical diffusion are insignificant.

Chemical transport processes including hydrodynamic dispersion and diffusion are insignificant relative to the velocity or advective movement of groundwater. Furthermore, movement of chemicals due to hydrodynamic dispersion only occurs in the direction of groundwater flow, which in the case of vertical movement at the MEA is downward. Vertical dispersion is typically only 0.01 to 0.1 percent of the total advective flow distance depending on scale (e.g. Gelhar, 1993). In the case of the MEA, we would expect no more than 0.002 ft/year of downward chemical movement due to hydrodynamic dispersion based on calculations of vertical groundwater velocity previously provided in 4) above. Vertical diffusion of dissolved chemical constituents in low permeability sediments is less than either the advective or dispersive flow component, and can be ignored over practical time scales.

6) Water quality data indicates the shallow Arikaree/Brule aquifer and the Basal Chadron production aquifer are chemically and hydraulically distinct. Water quality data collected at

the MEA indicates the shallow Arikaree/Brule aquifer and the Basal Chadron production aquifer are chemically distinct. Significant differences in major ion chemistry observed between the shallow Arikaree/Brule aquifer and the Basal Chadron aquifer are indicative of relative hydraulic separation of the aquifers. Baseline TDS and major ion concentrations in the Basal Chadron production aquifer are typically two to five times greater than the shallow Arikaree/Brule aquifer, indicating groundwater in the production aquifer is more evolved (older) than the shallow aquifer. Water quality of the shallow aquifer and production aquifer would be expected to be very similar in the event there was significant hydraulic communication between the aquifers.

6) Lateral containment of mining solutions at the MEA has been demonstrated.

Lateral (horizontal) containment of mining solutions within the Basal Chadron production aquifer has been demonstrated through aquifer testing, groundwater modeling, and by analogy to observed containment at the existing Crow Butte ISR facility (CBR operates within the same aquifer system and under similar operating conditions as planned for the MEA). Regional aquifer testing at the MEA indicates excellent hydraulic communication between the pumped well and Basal Chadron monitor wells with a radius of influence of greater than 8,800 feet, indicating hydraulic containment of mining solutions (and excursion recovery) can be accomplished without difficulty. Further, groundwater modeling has been conducted at the MEA that demonstrates mining solutions will be contained under worse-case conditions (e.g. loss of power for extended period of time, etc.). In addition, operating experience at the existing Crow Butte ISR facility, which also produces from the Basal Chadron aquifer, indicates hydraulic containment can be achieved at the MEA given similar operating conditions (e.g. bleed rate, well spacing). Lateral containment of mining solutions is also verified by the installation and frequent sampling of mine unit monitor ring wells.

As further evidence to support the lateral containment of mining solutions at the MEA, a groundwater modeling simulation was performed to demonstrate hydraulic containment of mining solutions under typical operating conditions. The operation of Mine Unit 1 at the MEA was simulated for this purpose, given a total flow rate of 1600 gpm and bleed (net production rate) of 1.2 percent per MEA water balance. Details and results of the simulation are provided in **Attachment B**. Results of the simulation demonstrate hydraulic containment of mining solutions can be fully maintained given proposed operating parameters.

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If you have any questions or comments concerning this report, please contact me directly at 303-522-1118.

Sincerely,
AquiferTek

A handwritten signature in black ink, reading "Robert L. Lewis". The signature is written in a cursive style with a large, stylized "R" and "L".

Robert L. Lewis, P.G.
Principal Hydrogeologist