



4601 DTC Boulevard, Suite 130, Denver, CO 80237
T. (303) 862-3928

April 9, 2018

Mr. Michael Cunningham
Division of Reclamation, Mining, and Safety
Department of Natural Resources
1313 Sherman Street, Room 215
Denver, CO 80203

Regarding: Schwartzwalder Mine, Permit No. M-1977-300, Water Quality Data and Mine Pool Level Measurements for February 2018

Dear Mr. Cunningham:

Enclosed please find monthly water quality monitoring results and daily mine water level measurements for the month of February 2018. This submittal represents the continuation of routine monthly reporting of water quality monitoring results and daily mine pool elevations. A review of the February 2018 data indicates that uranium concentrations at SW-BPL were all below 30 µg/L. Furthermore, arsenic was not detected at SW-BPL. Due to the size of the data files, an email transmission is not possible. Therefore, the files may be downloaded from the following web link:

<https://cotterusa.box.com/s/zo6rmht0qf4hbgnp35cdty4bl39no7ir>

If you have any questions regarding this deliverable, please do not hesitate to contact me.

Sincerely,

Jim Harrington, Managing Director
COLORADO LEGACY LAND
jim@Legacy.Land

Enclosures: 1. Surface Water Data
 2. Groundwater Data
 3. Mine Pool Elevations

cc: Dan Arnold (Denver Water), Daniel.Arnold@DenverWater.org
 Eric Mink (WQCD) Eric.Mink@state.co.us
 JoAnne Ary (Alexco Water and Environment, Inc.) jary@alexcoresource.com
 Elizabeth Busby (Alexco Water and Environment, Inc.) ebusby@alexcoresource.com
 Stephen Cohen (Alexco Water and Environment, Inc.) scohen@alexcoresource.com
 Billy Ray (Alexco Water and Environment, Inc.) bray@alexcoresource.com



February 2018 Schwartzwalder Groundwater Report

Contents:

- Mine Refill, table4, Sampled on: 06FEB2018
 - ELI: C18020275-004
 - SCG: 418099.A
- Mine Refill, table4, Sampled on: 14FEB2018
 - ELI: C18020442-007
 - SCG: 418131.A
- Sump 8, table2, Sampled on: 22FEB2018
 - ELI: C18030035-004
 - SCG: 418167.A
- Sump 9, table2, Sampled on: 22FEB2018
 - ELI: C18030035-006
 - SCG: 418169.A
- Sump 10, table2, Sampled on: 22FEB2018
 - ELI: C18030035-005
 - SCG: 418168.A
- Sump 1, table2, Sampled on: 23FEB2018
 - ELI: C18030035-007
 - SCG: 418171.A
- Sump 4, table2, Sampled on: 23FEB2018
 - ELI: C18030035-008
 - SCG: 418172.A
- MW9, table2, Sampled on: 26FEB2018
 - ELI: C18030035-009
 - SCG: 418174.A



Trust our People. Trust our Data.
www.energylab.com

Billings, MT 800.735.4489 • Casper, WY 888.235.0515
Gillette, WY 866.686.7175 • Helena, MT 877.472.0711

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Cotter Corporation
Project: Schwartzwalder Mine
Lab ID: C18020275-004
Client Sample ID: Mine Refill

Report Date: 03/08/18
Collection Date: 02/06/18 11:20
Date Received: 02/12/18
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
NON-METALS							
Organic Carbon, Total (TOC)	4.1	mg/L		0.5		A5310 C	02/13/18 18:30 / dmb
METALS, DISSOLVED							
Arsenic	0.008	mg/L		0.001		E200.8	02/15/18 15:33 / eli-b
Barium	0.10	mg/L		0.05		E200.8	02/15/18 15:33 / eli-b
Iron	5.14	mg/L		0.02		E200.8	02/15/18 15:33 / eli-b
Manganese	0.744	mg/L	D	0.005		E200.7	02/21/18 10:58 / eli-b
Molybdenum	0.167	mg/L		0.001		E200.8	02/15/18 15:33 / eli-b
Uranium	8.01	mg/L		0.0003		E200.8	02/15/18 15:33 / eli-b
METALS, TOTAL							
Arsenic	0.010	mg/L		0.001		E200.8	02/15/18 17:18 / eli-b
Barium	0.66	mg/L		0.05		E200.8	02/15/18 17:18 / eli-b
Iron	5.35	mg/L	D	0.04		E200.7	02/21/18 11:10 / eli-b
Manganese	0.784	mg/L	D	0.008		E200.7	02/21/18 11:10 / eli-b
Molybdenum	0.218	mg/L		0.001		E200.8	02/15/18 17:18 / eli-b
Uranium	8.12	mg/L		0.0003		E200.8	02/15/18 17:18 / eli-b
RADIONUCLIDES, TOTAL							
Radium 226	15.5	pCi/L				E903.0	03/05/18 12:23 / arh
Radium 226 precision (±)	3.0	pCi/L				E903.0	03/05/18 12:23 / arh
Radium 226 MDC	0.1	pCi/L				E903.0	03/05/18 12:23 / arh
Radium 228	0.5	pCi/L	U			RA-05	02/28/18 09:58 / plj
Radium 228 precision (±)	1.0	pCi/L				RA-05	02/28/18 09:58 / plj
Radium 228 MDC	1.7	pCi/L				RA-05	02/28/18 09:58 / plj
Radium 226 + Radium 228	16.0	pCi/L				A7500-RA	03/06/18 10:49 / dmf
Radium 226 + Radium 228 precision (±)	3.2	pCi/L				A7500-RA	03/06/18 10:49 / dmf
Radium 226 + Radium 228 MDC	1.7	pCi/L				A7500-RA	03/06/18 10:49 / dmf
CLIENT PROVIDED FIELD PARAMETERS							
Field Conductivity	3085	umhos/cm				FIELD	02/06/18 11:20 / ***
Field pH	7.07	s.u.				FIELD	02/06/18 11:20 / ***
Field Temperature, C	11.5	°C				FIELD	02/06/18 11:20 / ***
Oxidation-Reduction Potential (ORP)	168.4	mV				FIELD	02/06/18 11:20 / ***

*** Field data provided by client

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
U - Not detected at minimum detectable concentration

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
D - RL increased due to sample matrix.



Analytical Report

3

Client: Cotter Corp
Location ID: Mine Refill
Analyte: Chloride

Prep Date: 02/14/2018
Analysis Date: 02/14/2018
Approved Method Source: 40 CFR 136.3
Prep ID: SM 4500-Cl--1997
Analytical Method ID: SM 4500-Cl--1997
Instrument: Titrimetric

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 100 mL
Analyst: SE

<u>Location ID</u>	<u>SmpDate</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
Mine Refill	02/06/18	418099.A	37		2	mg/L

Client: Cotter Corp
Location ID: Mine Refill
Analyte: Sulfate, SO_4^{2-}

Prep Date: 02/14/2018
Analysis Date: 02/14/2018
Approved Method Source: 40 CFR 136.3
Prep ID: ASTM D516-07
Analytical Method ID: ASTM D516-07
Instrument: Evo 160, UV/VIS

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 100 mL Dilution Factor: 100
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
Mine Refill	02/06/18	418099.A	1,132		12.0	59	mg/L

Qualifiers:

E - Extrapolated value. Value exceeds calibration range
H - Analysis exceeded holding time
J - Estimated value detected below the RL/MRL
S - Spike recovery outside acceptance limits
U - Analyte not detected
X - See case narrative

Confidential and Privileged

19-Feb-18

Client: Cotter Corp
Location ID: Mine Refill
Analyte: Residue – filterable (TDS)

Prep Date: 02/12/2018
Analysis Date: 02/13/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 2540 C
Analytical Method ID: Std. Methods 2540 C
Instrument: AE-240 Dual Range Analytical Balance

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 100 mL
Analyst: ND

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
Mine Refill	02/06/18	418099.A	2,523		10	mg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative



Trust our People. Trust our Data.
www.energylab.com

Billings, MT 800.735.4489 • Casper, WY 888.235.0515
Gillette, WY 866.686.7175 • Helena, MT 877.472.0711

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Cotter Corporation
Project: Schwartzwalder Mine
Lab ID: C18020442-007
Client Sample ID: Mine Refill

Report Date: 03/26/18
Collection Date: 02/14/18 11:46
Date Received: 02/16/18
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
NON-METALS							
Organic Carbon, Total (TOC)	16.7	mg/L		0.5		A5310 C	02/22/18 17:21 / ljl
METALS, DISSOLVED							
Arsenic	0.015	mg/L		0.001		E200.8	02/22/18 21:40 / eli-b
Barium	0.16	mg/L		0.05		E200.8	02/22/18 21:40 / eli-b
Iron	1.52	mg/L		0.02		E200.8	02/22/18 21:40 / eli-b
Manganese	1.65	mg/L		0.001		E200.8	02/22/18 21:40 / eli-b
Molybdenum	0.161	mg/L		0.001		E200.8	02/23/18 19:42 / eli-b
Uranium	16.3	mg/L		0.0003		E200.8	02/23/18 19:42 / eli-b
METALS, TOTAL							
Arsenic	0.020	mg/L		0.001		E200.8	02/23/18 06:24 / eli-b
Barium	0.15	mg/L		0.05		E200.8	02/23/18 06:24 / eli-b
Iron	7.06	mg/L		0.03		E200.7	02/23/18 02:08 / eli-b
Manganese	1.65	mg/L		0.001		E200.8	02/23/18 06:24 / eli-b
Molybdenum	0.302	mg/L		0.001		E200.8	02/27/18 15:49 / eli-b
Uranium	20.0	mg/L		0.0003		E200.8	02/23/18 06:24 / eli-b
RADIONUCLIDES, TOTAL							
Radium 226	0.5	pCi/L				E903.0	03/19/18 10:09 / arh
Radium 226 precision (±)	0.2	pCi/L				E903.0	03/19/18 10:09 / arh
Radium 226 MDC	0.1	pCi/L				E903.0	03/19/18 10:09 / arh
Radium 228	2.5	pCi/L				RA-05	03/13/18 09:44 / plj
Radium 228 precision (±)	1.0	pCi/L				RA-05	03/13/18 09:44 / plj
Radium 228 MDC	1.5	pCi/L				RA-05	03/13/18 09:44 / plj
Radium 226 + Radium 228	2.9	pCi/L				A7500-RA	03/21/18 19:03 / sec
Radium 226 + Radium 228 precision (±)	1.0	pCi/L				A7500-RA	03/21/18 19:03 / sec
Radium 226 + Radium 228 MDC	1.5	pCi/L				A7500-RA	03/21/18 19:03 / sec
CLIENT PROVIDED FIELD PARAMETERS							
Field Conductivity	6879	umhos/cm				FIELD	02/14/18 11:46 / ***
Field pH	7.28	s.u.				FIELD	02/14/18 11:46 / ***
Field Temperature, C	15.3	°C				FIELD	02/14/18 11:46 / ***
Oxidation-Reduction Potential (ORP)	84.8	mV				FIELD	02/14/18 11:46 / ***

*** Field data provided by client

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

Client: Cotter Corp
Location ID: Mine Refill
Analyte: Chloride

Prep Date: 02/16/2018
 Analysis Date: 02/16/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: SM 4500-Cl--1997
 Analytical Method ID: SM 4500-Cl--1997
 Instrument: Titrimetric

Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 100 mL
 Analyst: SE

<u>Location ID</u>	<u>SmpDate</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
Mine Refill	02/14/18	418131.A	56		2	mg/L

Client: Cotter Corp
Location ID: Mine Refill
Analyte: Sulfate, SO₄²⁻

Prep Date: 02/20/2018
 Analysis Date: 02/20/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: ASTM D516-07
 Analytical Method ID: ASTM D516-07
 Instrument: Evo 160, UV/VIS

Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 100 mL Dilution Factor: 100
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
Mine Refill	02/14/18	418131.A	2,754		12.0	59	mg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
 H – Analysis exceeded holding time
 J – Estimated value detected below the RL/MRL
 S – Spike recovery outside acceptance limits
 U – Analyte not detected
 X – See case narrative

Client: Cotter Corp
Location ID: Mine Refill
Analyte: Residue – filterable (TDS)

Prep Date: 02/19/2018
Analysis Date: 02/20/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 2540 C
Analytical Method ID: Std. Methods 2540 C
Instrument: AE-240 Dual Range Analytical Balance

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 100 mL
Analyst: ND

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
Mine Refill	02/14/18	418131.A	5,998		10	mg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative



Trust our People. Trust our Data.
www.energylab.com

Billings, MT 800.735.4489 • Casper, WY 888.235.0515
Gillette, WY 866.686.7175 • Helena, MT 877.472.0711

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Cotter Corporation
Project: Schwartzwalder Mine
Lab ID: C18030035-004
Client Sample ID: Sump 8

Report Date: 03/26/18
Collection Date: 02/22/18 13:13
Date Received: 03/01/18
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.60	mg/L		0.01		E353.2	03/05/18 10:07 / dmb
Phosphorus, Total as P	ND	mg/L		0.005		E365.1	03/02/18 16:11 / dmb
METALS, DISSOLVED							
Aluminum	ND	mg/L		0.2		E200.8	03/05/18 16:02 / eli-b
Antimony	ND	mg/L		0.001		E200.8	03/05/18 16:02 / eli-b
Molybdenum	0.028	mg/L		0.005		E200.8	03/05/18 16:02 / eli-b
Thallium	ND	mg/L		0.0002		E200.8	03/05/18 16:02 / eli-b
Uranium	1.28	mg/L		0.0002		E200.8	03/05/18 16:02 / eli-b
METALS, TOTAL							
Aluminum	ND	mg/L		0.2		E200.8	03/07/18 15:54 / eli-b
Antimony	ND	mg/L		0.001		E200.8	03/07/18 15:54 / eli-b
Arsenic	ND	mg/L		0.001		E200.8	03/07/18 15:54 / eli-b
Mercury	ND	mg/L		0.0001		E245.1	03/06/18 12:21 / eli-b
Thallium	ND	mg/L		0.0002		E200.8	03/07/18 18:48 / eli-b
RADIONUCLIDES, DISSOLVED							
Radium 226	0.9	pCi/L				E903.0	03/13/18 07:15 / arh
Radium 226 precision (±)	0.3	pCi/L				E903.0	03/13/18 07:15 / arh
Radium 226 MDC	0.3	pCi/L				E903.0	03/13/18 07:15 / arh
RADIONUCLIDES, TOTAL							
Gross Alpha	867	pCi/L				E900.0	03/15/18 14:46 / trs
Gross Alpha precision (±)	169	pCi/L				E900.0	03/15/18 14:46 / trs
Gross Alpha MDC	3.2	pCi/L				E900.0	03/15/18 14:46 / trs
Gross Beta	176	pCi/L				E900.0	03/15/18 14:46 / trs
Gross Beta precision (±)	18.1	pCi/L				E900.0	03/15/18 14:46 / trs
Gross Beta MDC	3.5	pCi/L				E900.0	03/15/18 14:46 / trs
CLIENT PROVIDED FIELD PARAMETERS							
Field Conductivity	810	umhos/cm				FIELD	02/22/18 13:13 / ***
Field pH	7.28	s.u.				FIELD	02/22/18 13:13 / ***
Field Temperature, C	7.2	°C				FIELD	02/22/18 13:13 / ***
Oxidation-Reduction Potential (ORP)	394.3	mV				FIELD	02/22/18 13:13 / ***
*** Field data provided by client							

Report RL - Analyte reporting limit.
Definitions: QCL - Quality control limit.
MDC - Minimum detectable concentration

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

Client: Cotter Corp
 Analyte: Bicarbonate (As HCO₃)

Prep Date: 03/06/2018
 Analysis Date: 03/06/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 2320 B.
 Analytical Method ID: Std. Methods 2320 B.
 Instrument: Titrimetric
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 100 mL
 Analyst: SE

<u>Location ID</u>	<u>SmpDate</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
SUMP #8	02/22/18	418167.A	285		10	mg/L

Client: Cotter Corp
 Analyte: Alkalinity (total as CaCO₃)

Prep Date: 03/06/2018
 Analysis Date: 03/06/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 2320 B.
 Analytical Method ID: Std. Methods 2320 B.
 Instrument: Titrimetric
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 100 mL
 Analyst: SE

<u>Location ID</u>	<u>SmpDate</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
SUMP #8	02/22/18	418167.A	285		10	mg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
 H – Analysis exceeded holding time
 J – Estimated value detected below the RL/MRL
 S – Spike recovery outside acceptance limits
 U – Analyte not detected
 X – See case narrative



Analytical Report

4

Client: Cotter Corp
Analyte: Chloride

Prep Date: 03/06/2018
Analysis Date: 03/06/2018
Approved Method Source: 40 CFR 136.3
Prep ID: SM 4500-Cl--1997
Analytical Method ID: SM 4500-Cl--1997
Instrument: Titrimetric

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 100 mL
Analyst: SE

<u>Location ID</u>	<u>SmpDate</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
SUMP #8	02/22/18	418167.A	7		2	mg/L

Client: Cotter Corp
Analyte: Sulfate, SO₄²⁻

Prep Date: 03/06/2018
Analysis Date: 03/06/2018
Approved Method Source: 40 CFR 136.3
Prep ID: ASTM D516-07
Analytical Method ID: ASTM D516-07
Instrument: Evo 160, UV/VIS

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 100 mL Dilution Factor: 10
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #8	02/22/18	418167.A	192		1.2	5.9	mg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Confidential and Privileged

16-Mar-18



Analytical Report

5

Client: Cotter Corp
Analyte: Calcium, Ca – Dis

Prep Date: 02/28/2018
Analysis Date: 03/05/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 100
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #8	02/22/18	418167.A	94,607		1,000	5,000	µg/L

Client: Cotter Corp
Analyte: Magnesium, Mg – Dis

Prep Date: 02/28/2018
Analysis Date: 03/05/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 100
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #8	02/22/18	418167.A	35,136		60	310	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Confidential and Privileged

21-Mar-18



Analytical Report

6

Client: Cotter Corp
Analyte: Potassium, K – Dis

Prep Date: 02/28/2018
Analysis Date: 03/05/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 10
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #8	02/22/18	418167.A	2,908		100	600	µg/L

Client: Cotter Corp
Analyte: Sodium, Na – Dis

Prep Date: 02/28/2018
Analysis Date: 03/05/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 100
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #8	02/22/18	418167.A	32,505		250	1,250	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Confidential and Privileged

16-Mar-18



Analytical Report

7

Client: Cotter Corp
Analyte: Copper, Cu - Dis

Prep Date: 02/28/2018
Analysis Date: 03/03/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: USEPA 200.9
Instrument: iCE 3500, STPGFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #8	02/22/18	418167.A	4.18		0.21	1.07	µg/L

Client: Cotter Corp
Analyte: Copper, Cu - T

Prep Date: 02/28/2018
Analysis Date: 03/03/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: USEPA 200.9
Instrument: iCE 3500, STPGFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #8	02/22/18	418167.A	4.29		0.21	1.07	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Confidential and Privileged

16-Mar-18



Analytical Report

8

Client: Cotter Corp
Analyte: Silver, Ag - T

Prep Date: 02/28/2018
Analysis Date: 03/02/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: USEPA 200.9
Instrument: iCE 3500, STPGFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #8	02/22/18	418167.A	U		0.036	0.18	µg/L

Client: Cotter Corp
Analyte: Lead, Pb - T

Prep Date: 02/28/2018
Analysis Date: 03/07/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: USEPA 200.9
Instrument: iCE 3500, STPGFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #8	02/22/18	418167.A	0.379		0.04	0.18	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Confidential and Privileged

16-Mar-18

Client: Cotter Corp
 Analyte: Manganese, Mn - Dis

Prep Date: 02/28/2018
 Analysis Date: 03/07/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3074 E.
 Analytical Method ID: Std. Methods 200.9
 Instrument: iCE 3500, GFAA
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 10
 Analyst: SE

Location ID	Smp Date	SCG #	Results	Flags	MDL	RL	Units
SUMP #8	02/22/18	418167.A	18.1		0.7	3.3	µg/L

Client: Cotter Corp
 Analyte: Manganese, Mn - T

Prep Date: 02/28/2018
 Analysis Date: 03/07/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3074 E.
 Analytical Method ID: Std. Methods 200.9
 Instrument: iCE 3500, GFAA
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 10
 Analyst: SE

Location ID	Smp Date	SCG #	Results	Flags	MDL	RL	Units
SUMP #8	02/22/18	418167.A	116.1		0.7	3.3	µg/L

Qualifiers:
 E – Extrapolated value. Value exceeds calibration range
 H – Analysis exceeded holding time
 J – Estimated value detected below the RL/MRL
 S – Spike recovery outside acceptance limits
 U – Analyte not detected
 X – See case narrative

Confidential and Privileged

16-Mar-18

Client: Cotter Corp
Analyte: Zinc, Zn - Dis

Prep Date: 02/28/2018
 Analysis Date: 03/01/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3074 E.
 Analytical Method ID: Std. Methods 3111 B.
 Instrument: iCE 3500, FLAA
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 1
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #8	02/22/18	418167.A	U		1.6	8.08	µg/L

Client: Cotter Corp
Analyte: Zinc, Zn - T

Prep Date: 02/28/2018
 Analysis Date: 03/01/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3074 E.
 Analytical Method ID: Std. Methods 3111 B.
 Instrument: iCE 3500, FLAA
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 1
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #8	02/22/18	418167.A	U		1.6	8.08	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
 H – Analysis exceeded holding time
 J – Estimated value detected below the RL/MRL
 S – Spike recovery outside acceptance limits
 U – Analyte not detected
 X – See case narrative

Client: Cotter Corp
Analyte: Iron, Fe - Dis

Prep Date: 02/28/2018
Analysis Date: 03/01/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

Location ID	Smp Date	SCG #	Results	Flags	MDL	RL	Units
SUMP #8	02/22/18	418167.A	U		4.0	10.0	µg/L

Client: Cotter Corp
Analyte: Iron, Fe - Total

Prep Date: 02/28/2018
Analysis Date: 03/01/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

Location ID	Smp Date	SCG #	Results	Flags	MDL	RL	Units
SUMP #8	02/22/18	418167.A	U		4.0	10.0	µg/L

Qualifiers

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Client: Cotter Corp
Analyte: Residue – filterable (TDS)

Prep Date: 02/28/2018
Analysis Date: 02/29/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 2540 C
Analytical Method ID: Std. Methods 2540 C
Instrument: AE-240 Dual Range Analytical Balance

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 100 mL
Analyst: ND

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
SUMP #8	02/22/18	418167.A	484		10	mg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative



Trust our People. Trust our Data.
www.energylab.com

Billings, MT 800.735.4489 • Casper, WY 888.235.0515
Gillette, WY 866.686.7175 • Helena, MT 877.472.0711

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Cotter Corporation
Project: Schwartzwalder Mine
Lab ID: C18030035-006
Client Sample ID: Sump 9

Report Date: 03/26/18
Collection Date: 02/22/18 14:41
Date Received: 03/01/18
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	1.17	mg/L		0.01		E353.2	03/05/18 10:10 / dmb
Phosphorus, Total as P	0.068	mg/L		0.005		E365.1	03/02/18 16:13 / dmb
METALS, DISSOLVED							
Aluminum	ND	mg/L		0.2		E200.8	03/05/18 16:07 / eli-b
Antimony	ND	mg/L		0.001		E200.8	03/05/18 16:07 / eli-b
Molybdenum	0.030	mg/L		0.005		E200.8	03/05/18 16:07 / eli-b
Thallium	ND	mg/L		0.0002		E200.8	03/05/18 16:07 / eli-b
Uranium	1.53	mg/L		0.0002		E200.8	03/05/18 16:07 / eli-b
METALS, TOTAL							
Aluminum	ND	mg/L		0.2		E200.8	03/07/18 16:01 / eli-b
Antimony	ND	mg/L		0.001		E200.8	03/07/18 16:01 / eli-b
Arsenic	ND	mg/L		0.001		E200.8	03/07/18 16:01 / eli-b
Mercury	ND	mg/L		0.0001		E245.1	03/06/18 12:25 / eli-b
Thallium	ND	mg/L		0.0002		E200.8	03/07/18 18:54 / eli-b
RADIONUCLIDES, DISSOLVED							
Radium 226	0.4	pCi/L				E903.0	03/13/18 07:15 / arh
Radium 226 precision (±)	0.2	pCi/L				E903.0	03/13/18 07:15 / arh
Radium 226 MDC	0.3	pCi/L				E903.0	03/13/18 07:15 / arh
RADIONUCLIDES, TOTAL							
Gross Alpha	1240	pCi/L				E900.0	03/15/18 14:46 / trs
Gross Alpha precision (±)	240	pCi/L				E900.0	03/15/18 14:46 / trs
Gross Alpha MDC	3.3	pCi/L				E900.0	03/15/18 14:46 / trs
Gross Beta	239	pCi/L				E900.0	03/15/18 14:46 / trs
Gross Beta precision (±)	24.5	pCi/L				E900.0	03/15/18 14:46 / trs
Gross Beta MDC	4.0	pCi/L				E900.0	03/15/18 14:46 / trs
CLIENT PROVIDED FIELD PARAMETERS							
Field Conductivity	863	umhos/cm				FIELD	02/22/18 14:41 / ***
Field pH	7.19	s.u.				FIELD	02/22/18 14:41 / ***
Field Temperature, C	11.1	°C				FIELD	02/22/18 14:41 / ***
Oxidation-Reduction Potential (ORP)	364.5	mV				FIELD	02/22/18 14:41 / ***
*** Field data provided by client							

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

Client: Cotter Corp
 Analyte: Bicarbonate (As HCO₃)

Prep Date: 03/06/2018
 Analysis Date: 03/06/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 2320 B.
 Analytical Method ID: Std. Methods 2320 B.
 Instrument: Titrimetric
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 100 mL
 Analyst: SE

<u>Location ID</u>	<u>SmpDate</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
SUMP #9	02/22/18	418169.A	236		10	mg/L

Client: Cotter Corp
 Analyte: Alkalinity (total as CaCO₃)

Prep Date: 03/06/2018
 Analysis Date: 03/06/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 2320 B.
 Analytical Method ID: Std. Methods 2320 B.
 Instrument: Titrimetric
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 100 mL
 Analyst: SE

<u>Location ID</u>	<u>SmpDate</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
SUMP #9	02/22/18	418169.A	236		10	mg/L

Qualifiers:
 E – Extrapolated value. Value exceeds calibration range
 H – Analysis exceeded holding time
 J – Estimated value detected below the RL/MRL
 S – Spike recovery outside acceptance limits
 U – Analyte not detected
 X – See case narrative

Confidential and Privileged

16-Mar-18



Analytical Report

24

Client: Cotter Corp
Analyte: Chloride

Prep Date: 03/06/2018
Analysis Date: 03/06/2018
Approved Method Source: 40 CFR 136.3
Prep ID: SM 4500-Cl--1997
Analytical Method ID: SM 4500-Cl--1997
Instrument: Titrimetric

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 100 mL
Analyst: SE

<u>Location ID</u>	<u>SmpDate</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
SUMP #9	02/22/18	418169.A	8		2	mg/L

Client: Cotter Corp
Analyte: Sulfate, SO₄²⁻

Prep Date: 03/06/2018
Analysis Date: 03/06/2018
Approved Method Source: 40 CFR 136.3
Prep ID: ASTM D516-07
Analytical Method ID: ASTM D516-07
Instrument: Evo 160, UV/VIS

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 100 mL Dilution Factor: 10
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #9	02/22/18	418169.A	229		1.2	5.9	mg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Confidential and Privileged

16-Mar-18

Client: Cotter Corp
Analyte: Calcium, Ca – Dis

Prep Date: 02/28/2018
Analysis Date: 03/05/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 100
Analyst: SE

Location ID	Smp Date	SCG #	Results	Flags	MDL	RL	Units
SUMP #9	02/22/18	418169.A	94,080		1,000	5,000	µg/L

Client: Cotter Corp
Analyte: Magnesium, Mg – Dis

Prep Date: 02/28/2018
Analysis Date: 03/05/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 100
Analyst: SE

Location ID	Smp Date	SCG #	Results	Flags	MDL	RL	Units
SUMP #9	02/22/18	418169.A	43,297		60	310	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Client: Cotter Corp
Analyte: Potassium, K – Dis

Prep Date: 02/28/2018
Analysis Date: 03/05/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 10
Analyst: SE

Location ID	Smp Date	SCG #	Results	Flags	MDL	RL	Units
SUMP #9	02/22/18	418169.A	2,834		100	600	µg/L

Client: Cotter Corp
Analyte: Sodium, Na – Dis

Prep Date: 02/28/2018
Analysis Date: 03/05/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 100
Analyst: SE

Location ID	Smp Date	SCG #	Results	Flags	MDL	RL	Units
SUMP #9	02/22/18	418169.A	33,277		250	1,250	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative



Analytical Report

27

Client: Cotter Corp
Analyte: Copper, Cu - Dis

Prep Date: 02/28/2018
Analysis Date: 03/03/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: USEPA 200.9
Instrument: iCE 3500, STPGFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #9	02/22/18	418169.A	3.62		0.21	1.07	µg/L

Client: Cotter Corp
Analyte: Copper, Cu - T

Prep Date: 02/28/2018
Analysis Date: 03/03/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: USEPA 200.9
Instrument: iCE 3500, STPGFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #9	02/22/18	418169.A	4.03		0.21	1.07	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Confidential and Privileged

16-Mar-18



Analytical Report

28

Client: Cotter Corp
Analyte: Silver, Ag - T

Prep Date: 02/28/2018
Analysis Date: 03/02/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: USEPA 200.9
Instrument: iCE 3500, STPGFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #9	02/22/18	418169.A	U		0.036	0.18	µg/L

Client: Cotter Corp
Analyte: Lead, Pb - T

Prep Date: 02/28/2018
Analysis Date: 03/07/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: USEPA 200.9
Instrument: iCE 3500, STPGFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #9	02/22/18	418169.A	0.193		0.04	0.18	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Confidential and Privileged

16-Mar-18

Client: Cotter Corp
Analyte: Manganese, Mn - Dis

Prep Date: 02/28/2018
Analysis Date: 03/07/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: Std. Methods 200.9
Instrument: iCE 3500, GFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 10
Analyst: SE

Location ID	Smp Date	SCG #	Results	Flags	MDL	RL	Units
SUMP #9	02/22/18	418169.A	4.83		0.7	3.3	µg/L

Client: Cotter Corp
Analyte: Manganese, Mn - T

Prep Date: 02/28/2018
Analysis Date: 03/07/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: Std. Methods 200.9
Instrument: iCE 3500, GFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 10
Analyst: SE

Location ID	Smp Date	SCG #	Results	Flags	MDL	RL	Units
SUMP #9	02/22/18	418169.A	49.3		0.7	3.3	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Client: Cotter Corp
Analyte: Zinc, Zn - Dis

Prep Date: 02/28/2018
 Analysis Date: 03/01/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3030 E.
 Analytical Method ID: Std. Methods 3111 B.
 Instrument: iCE 3500, FLAA
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 1
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #9	02/22/18	418169.A	U		1.6	8.08	µg/L

Client: Cotter Corp
Analyte: Zinc, Zn - T

Prep Date: 02/28/2018
 Analysis Date: 03/01/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3030 E.
 Analytical Method ID: Std. Methods 3111 B.
 Instrument: iCE 3500, FLAA
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 1
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #9	02/22/18	418169.A	U		1.6	8.08	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
 H – Analysis exceeded holding time
 J – Estimated value detected below the RL/MRL
 S – Spike recovery outside acceptance limits
 U – Analyte not detected
 X – See case narrative

Client: Cotter Corp
Analyte: Iron, Fe - Dis

Prep Date: 02/28/2018
Analysis Date: 03/01/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

Location ID	Smp Date	SCG #	Results	Flags	MDL	RL	Units
SUMP #9	02/22/18	418169.A	U		4.0	10.0	µg/L

Client: Cotter Corp
Analyte: Iron, Fe - Total

Prep Date: 02/28/2018
Analysis Date: 03/01/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

Location ID	Smp Date	SCG #	Results	Flags	MDL	RL	Units
SUMP #9	02/22/18	418169.A	U		4.0	10.0	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Client: Cotter Corp
Analyte: Residue – filterable (TDS)

 Prep Date: 02/28/2018
 Analysis Date: 02/29/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 2540 C
 Analytical Method ID: Std. Methods 2540 C
 Instrument: AE-240 Dual Range Analytical Balance

 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 100 mL
 Analyst: ND

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
SUMP #9	02/22/18	418169.A	550		10	mg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
 H – Analysis exceeded holding time
 J – Estimated value detected below the RL/MRL
 S – Spike recovery outside acceptance limits
 U – Analyte not detected
 X – See case narrative



Trust our People. Trust our Data.
www.energylab.com

Billings, MT 800.735.4489 • Casper, WY 888.235.0515
Gillette, WY 866.686.7175 • Helena, MT 877.472.0711

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Cotter Corporation
Project: Schwartzwalder Mine
Lab ID: C18030035-005
Client Sample ID: Sump 10

Report Date: 03/26/18
Collection Date: 02/22/18 14:04
Date Received: 03/01/18
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	1.39	mg/L		0.01		E353.2	03/05/18 10:08 / dmb
Phosphorus, Total as P	ND	mg/L		0.005		E365.1	03/02/18 16:12 / dmb
METALS, DISSOLVED							
Aluminum	ND	mg/L		0.2		E200.8	03/05/18 16:04 / eli-b
Antimony	ND	mg/L		0.001		E200.8	03/05/18 16:04 / eli-b
Molybdenum	0.036	mg/L		0.005		E200.8	03/05/18 16:04 / eli-b
Thallium	ND	mg/L		0.0002		E200.8	03/05/18 16:04 / eli-b
Uranium	1.34	mg/L		0.0002		E200.8	03/05/18 16:04 / eli-b
METALS, TOTAL							
Aluminum	ND	mg/L		0.2		E200.8	03/07/18 15:57 / eli-b
Antimony	ND	mg/L		0.001		E200.8	03/07/18 15:57 / eli-b
Arsenic	ND	mg/L		0.001		E200.8	03/07/18 15:57 / eli-b
Mercury	ND	mg/L		0.0001		E245.1	03/06/18 12:23 / eli-b
Thallium	ND	mg/L		0.0002		E200.8	03/07/18 18:51 / eli-b
RADIONUCLIDES, DISSOLVED							
Radium 226	0.4	pCi/L				E903.0	03/13/18 07:15 / arh
Radium 226 precision (±)	0.2	pCi/L				E903.0	03/13/18 07:15 / arh
Radium 226 MDC	0.2	pCi/L				E903.0	03/13/18 07:15 / arh
RADIONUCLIDES, TOTAL							
Gross Alpha	609	pCi/L				E900.0	03/15/18 14:46 / trs
Gross Alpha precision (±)	119	pCi/L				E900.0	03/15/18 14:46 / trs
Gross Alpha MDC	3.1	pCi/L				E900.0	03/15/18 14:46 / trs
Gross Beta	173	pCi/L				E900.0	03/15/18 14:46 / trs
Gross Beta precision (±)	17.9	pCi/L				E900.0	03/15/18 14:46 / trs
Gross Beta MDC	3.9	pCi/L				E900.0	03/15/18 14:46 / trs
CLIENT PROVIDED FIELD PARAMETERS							
Field Conductivity	844	umhos/cm				FIELD	02/22/18 14:04 / ***
Field pH	7.36	s.u.				FIELD	02/22/18 14:04 / ***
Field Temperature, C	7.3	°C				FIELD	02/22/18 14:04 / ***
Oxidation-Reduction Potential (ORP)	385.2	mV				FIELD	02/22/18 14:04 / ***
*** Field data provided by client							

Report Definitions: RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



Analytical Report

13

Client: Cotter Corp
Analyte: Bicarbonate (As HCO_3)

Prep Date: 03/06/2018
Analysis Date: 03/06/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 2320 B.
Analytical Method ID: Std. Methods 2320 B.
Instrument: Titrimetric

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 100 mL
Analyst: SE

<u>Location ID</u>	<u>SmpDate</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
SUMP #10	02/22/18	418168.A	240		10	mg/L

Client: Cotter Corp
Analyte: Alkalinity (total as CaCO_3)

Prep Date: 03/06/2018
Analysis Date: 03/06/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 2320 B.
Analytical Method ID: Std. Methods 2320 B.
Instrument: Titrimetric

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 100 mL
Analyst: SE

<u>Location ID</u>	<u>SmpDate</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
SUMP #10	02/22/18	418168.A	240		10	mg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Confidential and Privileged

16-Mar-18

Client: Cotter Corp
Analyte: Chloride

Prep Date: 03/06/2018
Analysis Date: 03/06/2018
Approved Method Source: 40 CFR 136.3
Prep ID: SM 4500-Cl--1997
Analytical Method ID: SM 4500-Cl--1997
Instrument: Titrimetric

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 100 mL
Analyst: SE

<u>Location ID</u>	<u>SmpDate</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
SUMP #10	02/22/18	418168.A	11		2	mg/L

Client: Cotter Corp
Analyte: Sulfate, SO₄²⁻

Prep Date: 03/06/2018
Analysis Date: 03/06/2018
Approved Method Source: 40 CFR 136.3
Prep ID: ASTM D516-07
Analytical Method ID: ASTM D516-07
Instrument: Evo 160, UV/VIS

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 100 mL Dilution Factor: 10
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #10	02/22/18	418168.A	235		1.2	5.9	mg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Client: Cotter Corp
Analyte: Calcium, Ca – Dis

Prep Date: 02/28/2018
 Analysis Date: 03/05/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3074 E.
 Analytical Method ID: Std. Methods 3111 B.
 Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 100
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #10	02/22/18	418168.A	101,730		1,000	5,000	µg/L

Client: Cotter Corp
Analyte: Magnesium, Mg – Dis

Prep Date: 02/28/2018
 Analysis Date: 03/05/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3074 E.
 Analytical Method ID: Std. Methods 3111 B.
 Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 100
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #10	02/22/18	418168.A	42,179		60	310	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
 H – Analysis exceeded holding time
 J – Estimated value detected below the RL/MRL
 S – Spike recovery outside acceptance limits
 U – Analyte not detected
 X – See case narrative



Analytical Report

16

Client: Cotter Corp
Analyte: Potassium, K – Dis

Prep Date: 02/28/2018
Analysis Date: 03/05/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 10
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #10	02/22/18	418168.A	4,238		100	600	µg/L

Client: Cotter Corp
Analyte: Sodium, Na – Dis

Prep Date: 02/28/2018
Analysis Date: 03/05/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 100
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #10	02/22/18	418168.A	24,382		250	1,250	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Confidential and Privileged

16-Mar-18

Client: Cotter Corp
Analyte: Copper, Cu - Dis

Prep Date: 02/28/2018
Analysis Date: 03/03/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: USEPA 200.9
Instrument: iCE 3500, STPGFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #10	02/22/18	418168.A	1.19		0.21	1.07	µg/L

Client: Cotter Corp
Analyte: Copper, Cu - T

Prep Date: 02/28/2018
Analysis Date: 03/03/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: USEPA 200.9
Instrument: iCE 3500, STPGFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #10	02/22/18	418168.A	2.05		0.21	1.07	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative



Analytical Report

18

Client: Cotter Corp
Analyte: Silver, Ag - T

Prep Date: 02/28/2018
Analysis Date: 03/02/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: USEPA 200.9
Instrument: iCE 3500, STPGFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #10	02/22/18	418168.A	U		0.036	0.18	µg/L

Client: Cotter Corp
Analyte: Lead, Pb - T

Prep Date: 02/28/2018
Analysis Date: 03/07/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: USEPA 200.9
Instrument: iCE 3500, STPGFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #10	02/22/18	418168.A	0.206		0.04	0.18	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Confidential and Privileged

16-Mar-18

Client: Cotter Corp
Analyte: Manganese, Mn - Dis

Prep Date: 02/28/2018
Analysis Date: 03/07/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: Std. Methods 200.9
Instrument: iCE 3500, GFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 10
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #10	02/22/18	418168.A	8.12		0.7	3.3	µg/L

Client: Cotter Corp
Analyte: Manganese, Mn - T

Prep Date: 02/28/2018
Analysis Date: 03/07/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: Std. Methods 200.9
Instrument: iCE 3500, GFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 10
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #10	02/22/18	418168.A	31.3		0.7	3.3	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Client: Cotter Corp
Analyte: Zinc, Zn - Dis

Prep Date: 02/28/2018
Analysis Date: 03/01/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

Location ID	Smp Date	SCG #	Results	Flags	MDL	RL	Units
SUMP #10	02/22/18	418168.A	U		1.6	8.08	µg/L

Client: Cotter Corp
Analyte: Zinc, Zn - T

Prep Date: 02/28/2018
Analysis Date: 03/01/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

Location ID	Smp Date	SCG #	Results	Flags	MDL	RL	Units
SUMP #10	02/22/18	418168.A	U		1.6	8.08	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Client: Cotter Corp
Analyte: Iron, Fe - Dis

Prep Date: 02/28/2018
Analysis Date: 03/01/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

Location ID	Smp Date	SCG #	Results	Flags	MDL	RL	Units
SUMP #10	02/22/18	418168.A	U		4.0	10.0	µg/L

Client: Cotter Corp
Analyte: Iron, Fe - Total

Prep Date: 02/28/2018
Analysis Date: 03/01/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

Location ID	Smp Date	SCG #	Results	Flags	MDL	RL	Units
SUMP #10	02/22/18	418168.A	U		4.0	10.0	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Client: Cotter Corp
Analyte: Residue – filterable (TDS)

Prep Date: 02/28/2018
Analysis Date: 02/29/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 2540 C
Analytical Method ID: Std. Methods 2540 C
Instrument: AE-240 Dual Range Analytical Balance

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 100 mL
Analyst: ND

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
SUMP #10	02/22/18	418168.A	575		10	mg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative



Trust our People. Trust our Data.
www.energylab.com

Billings, MT 800.735.4489 • Casper, WY 888.235.0515
Gillette, WY 866.686.7175 • Helena, MT 877.472.0711

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Cotter Corporation
Project: Schwartzwalder Mine
Lab ID: C18030035-007
Client Sample ID: Sump 1

Report Date: 03/26/18
Collection Date: 02/23/18 11:14
Date Received: 03/01/18
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.23	mg/L		0.01		E353.2	03/05/18 10:11 / dmb
Phosphorus, Total as P	ND	mg/L		0.005		E365.1	03/02/18 16:18 / dmb
METALS, DISSOLVED							
Aluminum	ND	mg/L		0.2		E200.8	03/05/18 16:10 / eli-b
Antimony	ND	mg/L		0.001		E200.8	03/05/18 16:10 / eli-b
Molybdenum	0.032	mg/L		0.005		E200.8	03/05/18 16:10 / eli-b
Thallium	ND	mg/L		0.0002		E200.8	03/05/18 16:10 / eli-b
Uranium	1.55	mg/L		0.0002		E200.8	03/05/18 16:10 / eli-b
METALS, TOTAL							
Aluminum	ND	mg/L		0.2		E200.8	03/07/18 16:04 / eli-b
Antimony	ND	mg/L		0.001		E200.8	03/07/18 16:04 / eli-b
Arsenic	ND	mg/L		0.001		E200.8	03/07/18 16:04 / eli-b
Mercury	ND	mg/L		0.0001		E245.1	03/06/18 12:30 / eli-b
Thallium	ND	mg/L		0.0002		E200.8	03/07/18 18:58 / eli-b
RADIONUCLIDES, DISSOLVED							
Radium 226	1.7	pCi/L				E903.0	03/13/18 07:15 / arh
Radium 226 precision (±)	0.4	pCi/L				E903.0	03/13/18 07:15 / arh
Radium 226 MDC	0.2	pCi/L				E903.0	03/13/18 07:15 / arh
RADIONUCLIDES, TOTAL							
Gross Alpha	1570	pCi/L				E900.0	03/15/18 14:46 / trs
Gross Alpha precision (±)	304	pCi/L				E900.0	03/15/18 14:46 / trs
Gross Alpha MDC	4.4	pCi/L				E900.0	03/15/18 14:46 / trs
Gross Beta	286	pCi/L				E900.0	03/15/18 14:46 / trs
Gross Beta precision (±)	29.4	pCi/L				E900.0	03/15/18 14:46 / trs
Gross Beta MDC	4.5	pCi/L				E900.0	03/15/18 14:46 / trs
CLIENT PROVIDED FIELD PARAMETERS							
Field Conductivity	795	umhos/cm				FIELD	02/23/18 11:14 / ***
Field pH	7.13	s.u.				FIELD	02/23/18 11:14 / ***
Field Temperature, C	11.4	°C				FIELD	02/23/18 11:14 / ***
Oxidation-Reduction Potential (ORP)	361.2	mV				FIELD	02/23/18 11:14 / ***
*** Field data provided by client							

Report RL - Analyte reporting limit.
Definitions: QCL - Quality control limit.
MDC - Minimum detectable concentration

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

Client: Cotter Corp
Analyte: Bicarbonate (As HCO₃)

Prep Date: 03/06/2018
Analysis Date: 03/06/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 2320 B.
Analytical Method ID: Std. Methods 2320 B.
Instrument: Titrimetric

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 100 mL
Analyst: SE

<u>Location ID</u>	<u>SmpDate</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
SUMP #1	02/23/18	418171.A	238		10	mg/L

Client: Cotter Corp
Analyte: Alkalinity (total as CaCO₃)

Prep Date: 03/06/2018
Analysis Date: 03/06/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 2320 B.
Analytical Method ID: Std. Methods 2320 B.
Instrument: Titrimetric

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 100 mL
Analyst: SE

<u>Location ID</u>	<u>SmpDate</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
SUMP #1	02/23/18	418171.A	238		10	mg/L

Qualifiers:
E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Confidential and Privileged

16-Mar-18

Client: Cotter Corp
Analyte: Chloride

Prep Date: 03/06/2018
Analysis Date: 03/06/2018
Approved Method Source: 40 CFR 136.3
Prep ID: SM 4500-Cl--1997
Analytical Method ID: SM 4500-Cl--1997
Instrument: Titrimetric

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 100 mL
Analyst: SE

<u>Location ID</u>	<u>SmpDate</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
SUMP #1	02/23/18	418171.A	7		2	mg/L

Client: Cotter Corp
Analyte: Sulfate, SO₄²⁻

Prep Date: 03/06/2018
Analysis Date: 03/06/2018
Approved Method Source: 40 CFR 136.3
Prep ID: ASTM D516-07
Analytical Method ID: ASTM D516-07
Instrument: Evo 160, UV/VIS

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 100 mL Dilution Factor: 10
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #1	02/23/18	418171.A	201		1.2	5.9	mg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Client: Cotter Corp
Analyte: Calcium, Ca – Dis

Prep Date: 02/28/2018
 Analysis Date: 03/05/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3074 E.
 Analytical Method ID: Std. Methods 3111 B.
 Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 100
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #1	02/23/18	418171.A	97,572		1,000	5,000	µg/L

Client: Cotter Corp
Analyte: Magnesium, Mg – Dis

Prep Date: 02/28/2018
 Analysis Date: 03/05/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3074 E.
 Analytical Method ID: Std. Methods 3111 B.
 Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 100
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #1	02/23/18	418171.A	37,248		60	310	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
 H – Analysis exceeded holding time
 J – Estimated value detected below the RL/MRL
 S – Spike recovery outside acceptance limits
 U – Analyte not detected
 X – See case narrative

Client: Cotter Corp
Analyte: Potassium, K – Dis

Prep Date: 02/28/2018
 Analysis Date: 03/05/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3074 E.
 Analytical Method ID: Std. Methods 3111 B.
 Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 10
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #1	02/23/18	418171.A	4,268		100	600	µg/L

Client: Cotter Corp
Analyte: Sodium, Na – Dis

Prep Date: 02/28/2018
 Analysis Date: 03/05/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3074 E.
 Analytical Method ID: Std. Methods 3111 B.
 Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 100
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #1	02/23/18	418171.A	39,507		250	1,250	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
 H – Analysis exceeded holding time
 J – Estimated value detected below the RL/MRL
 S – Spike recovery outside acceptance limits
 U – Analyte not detected
 X – See case narrative



Analytical Report

37

Client: Cotter Corp
Analyte: Copper, Cu - Dis

Prep Date: 02/28/2018
Analysis Date: 03/03/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: USEPA 200.9
Instrument: iCE 3500, STPGFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #1	02/23/18	418171.A	1.66		0.21	1.07	µg/L

Client: Cotter Corp
Analyte: Copper, Cu - T

Prep Date: 02/28/2018
Analysis Date: 03/03/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: USEPA 200.9
Instrument: iCE 3500, STPGFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #1	02/23/18	418171.A	6.76		0.21	1.07	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Confidential and Privileged

16-Mar-18

Client: Cotter Corp
Analyte: Silver, Ag - T

Prep Date: 02/28/2018
Analysis Date: 03/02/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: USEPA 200.9
Instrument: iCE 3500, STPGFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #1	02/23/18	418171.A	U		0.036	0.18	µg/L

Client: Cotter Corp
Analyte: Lead, Pb - T

Prep Date: 02/28/2018
Analysis Date: 03/07/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: USEPA 200.9
Instrument: iCE 3500, STPGFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #1	02/23/18	418171.A	0.912		0.04	0.18	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Client: Cotter Corp
Analyte: Manganese, Mn - Dis

Prep Date: 02/28/2018
Analysis Date: 03/07/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: Std. Methods 200.9
Instrument: iCE 3500, GFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 10
Analyst: SE

Location ID	Smp Date	SCG #	Results	Flags	MDL	RL	Units
SUMP #1	02/23/18	418171.A	11.2		0.7	3.3	µg/L

Client: Cotter Corp
Analyte: Manganese, Mn - T

Prep Date: 02/28/2018
Analysis Date: 03/07/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: Std. Methods 200.9
Instrument: iCE 3500, GFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 10
Analyst: SE

Location ID	Smp Date	SCG #	Results	Flags	MDL	RL	Units
SUMP #1	02/23/18	418171.A	40.2		0.7	3.3	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Client: Cotter Corp
Analyte: Zinc, Zn - Dis

Prep Date: 02/28/2018
Analysis Date: 03/01/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

Location ID	Smp Date	SCG #	Results	Flags	MDL	RL	Units
SUMP #1	02/23/18	418171.A	120		1.6	8.08	µg/L

Client: Cotter Corp
Analyte: Zinc, Zn - T

Prep Date: 02/28/2018
Analysis Date: 03/01/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

Location ID	Smp Date	SCG #	Results	Flags	MDL	RL	Units
SUMP #1	02/23/18	418171.A	161		1.6	8.08	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Client: Cotter Corp
Analyte: Iron, Fe - Dis

Prep Date: 02/28/2018
Analysis Date: 03/01/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #1	02/23/18	418171.A	U		4.0	10.0	µg/L

Client: Cotter Corp
Analyte: Iron, Fe - Total

Prep Date: 02/28/2018
Analysis Date: 03/01/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #1	02/23/18	418171.A	116		4.0	10.0	µg/L

Qualifiers:

E - Extrapolated value. Value exceeds calibration range
H - Analysis exceeded holding time
J - Estimated value detected below the RL/MRL
S - Spike recovery outside acceptance limits
U - Analyte not detected
X - See case narrative

Client: Cotter Corp
Analyte: Residue – filterable (TDS)

Prep Date: 02/28/2018
Analysis Date: 02/29/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 2540 C
Analytical Method ID: Std. Methods 2540 C
Instrument: AE-240 Dual Range Analytical Balance

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 100 mL
Analyst: ND

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
SUMP #1	02/23/18	418171.A	549		10	mg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative



Trust our People. Trust our Data.
www.energylab.com

Billings, MT 800.735.4489 • Casper, WY 888.235.0515
Gillette, WY 866.686.7175 • Helena, MT 877.472.0711

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Cotter Corporation
Project: Schwartzwalder Mine
Lab ID: C18030035-008
Client Sample ID: Sump 4

Report Date: 03/26/18
Collection Date: 02/23/18 00:31
Date Received: 03/01/18
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.53	mg/L		0.01		E353.2	03/05/18 10:12 / dmb
Phosphorus, Total as P	0.017	mg/L		0.005		E365.1	03/02/18 16:21 / dmb
METALS, DISSOLVED							
Aluminum	ND	mg/L		0.2		E200.8	03/05/18 16:13 / eli-b
Antimony	ND	mg/L		0.001		E200.8	03/05/18 16:13 / eli-b
Molybdenum	0.027	mg/L		0.005		E200.8	03/05/18 16:13 / eli-b
Thallium	ND	mg/L		0.0002		E200.8	03/05/18 16:13 / eli-b
Uranium	1.28	mg/L		0.0002		E200.8	03/05/18 16:13 / eli-b
METALS, TOTAL							
Aluminum	0.6	mg/L		0.2		E200.8	03/07/18 16:08 / eli-b
Antimony	ND	mg/L		0.001		E200.8	03/07/18 16:08 / eli-b
Arsenic	ND	mg/L		0.001		E200.8	03/07/18 16:08 / eli-b
Mercury	ND	mg/L		0.0001		E245.1	03/06/18 12:32 / eli-b
Thallium	ND	mg/L		0.0002		E200.8	03/07/18 19:01 / eli-b
RADIONUCLIDES, DISSOLVED							
Radium 226	1.3	pCi/L				E903.0	03/13/18 07:16 / arh
Radium 226 precision (±)	0.4	pCi/L				E903.0	03/13/18 07:16 / arh
Radium 226 MDC	0.2	pCi/L				E903.0	03/13/18 07:16 / arh
RADIONUCLIDES, TOTAL							
Gross Alpha	733	pCi/L				E900.0	03/15/18 14:46 / trs
Gross Alpha precision (±)	143	pCi/L				E900.0	03/15/18 14:46 / trs
Gross Alpha MDC	2.9	pCi/L				E900.0	03/15/18 14:46 / trs
Gross Beta	225	pCi/L				E900.0	03/15/18 14:46 / trs
Gross Beta precision (±)	23.1	pCi/L				E900.0	03/15/18 14:46 / trs
Gross Beta MDC	4.2	pCi/L				E900.0	03/15/18 14:46 / trs
CLIENT PROVIDED FIELD PARAMETERS							
Field Conductivity	796	umhos/cm				FIELD	02/23/18 00:31 / ***
Field pH	7.34	s.u.				FIELD	02/23/18 00:31 / ***
Field Temperature, C	15.0	°C				FIELD	02/23/18 00:31 / ***
Oxidation-Reduction Potential (ORP)	384.8	mV				FIELD	02/23/18 00:31 / ***
*** Field data provided by client							

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

Client: Cotter Corp
 Analyte: Bicarbonate (As HCO₃)

Prep Date: 03/06/2018
 Analysis Date: 03/06/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 2320 B.
 Analytical Method ID: Std. Methods 2320 B.
 Instrument: Titrimetric
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 100 mL
 Analyst: SE

<u>Location ID</u>	<u>SmpDate</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
SUMP #4	02/23/18	418172.A	257		10	mg/L

Client: Cotter Corp
 Analyte: Alkalinity (total as CaCO₃)

Prep Date: 03/06/2018
 Analysis Date: 03/06/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 2320 B.
 Analytical Method ID: Std. Methods 2320 B.
 Instrument: Titrimetric
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 100 mL
 Analyst: SE

<u>Location ID</u>	<u>SmpDate</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
SUMP #4	02/23/18	418172.A	257		10	mg/L

Qualifiers:
 E – Extrapolated value. Value exceeds calibration range
 H – Analysis exceeded holding time
 J – Estimated value detected below the RL/MRL
 S – Spike recovery outside acceptance limits
 U – Analyte not detected
 X – See case narrative

Confidential and Privileged

16-Mar-18

Client: Cotter Corp
Analyte: Chloride

Prep Date: 03/06/2018
Analysis Date: 03/06/2018
Approved Method Source: 40 CFR 136.3
Prep ID: SM 4500-Cl--1997
Analytical Method ID: SM 4500-Cl--1997
Instrument: Titrimetric

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 100 mL
Analyst: SE

<u>Location ID</u>	<u>SmpDate</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
SUMP #4	02/23/18	418172.A	11		2	mg/L

Client: Cotter Corp
Analyte: Sulfate, SO₄²⁻

Prep Date: 03/06/2018
Analysis Date: 03/06/2018
Approved Method Source: 40 CFR 136.3
Prep ID: ASTM D516-07
Analytical Method ID: ASTM D516-07
Instrument: Evo 160, UV/VIS

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 100 mL Dilution Factor: 10
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #4	02/23/18	418172.A	204		1.2	5.9	mg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Client: Cotter Corp
Analyte: Calcium, Ca – Dis

Prep Date: 02/28/2018
 Analysis Date: 03/05/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3074 E.
 Analytical Method ID: Std. Methods 3111 B.
 Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 100
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #4	02/23/18	418172.A	103,575		1,000	5,000	µg/L

Client: Cotter Corp
Analyte: Magnesium, Mg – Dis

Prep Date: 02/28/2018
 Analysis Date: 03/05/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3074 E.
 Analytical Method ID: Std. Methods 3111 B.
 Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 100
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #4	02/23/18	418172.A	37,063		60	310	µg/L

Qualifiers:
 E – Extrapolated value. Value exceeds calibration range
 H – Analysis exceeded holding time
 J – Estimated value detected below the RL/MRL
 S – Spike recovery outside acceptance limits
 U – Analyte not detected
 X – See case narrative

Confidential and Privileged

21-Mar-18

Client: Cotter Corp
Analyte: Potassium, K – Dis

Prep Date: 02/28/2018
Analysis Date: 03/05/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 10
Analyst: SE

Location ID	Smp Date	SCG #	Results	Flags	MDL	RL	Units
SUMP #4	02/23/18	418172.A	2,912		100	600	µg/L

Client: Cotter Corp
Analyte: Sodium, Na – Dis

Prep Date: 02/28/2018
Analysis Date: 03/05/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 100
Analyst: SE

Location ID	Smp Date	SCG #	Results	Flags	MDL	RL	Units
SUMP #4	02/23/18	418172.A	33,224		250	1,250	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Client: Cotter Corp
Analyte: Copper, Cu - Dis

Prep Date: 02/28/2018
Analysis Date: 03/03/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: USEPA 200.9
Instrument: iCE 3500, STPGFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #4	02/23/18	418172.A	2.66		0.21	1.07	µg/L

Client: Cotter Corp
Analyte: Copper, Cu - T

Prep Date: 02/28/2018
Analysis Date: 03/03/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: USEPA 200.9
Instrument: iCE 3500, STPGFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #4	02/23/18	418172.A	6.14		0.21	1.07	µg/L

Qualifiers:
E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Confidential and Privileged

16-Mar-18



Analytical Report

48

Client: Cotter Corp
Analyte: Silver, Ag - T

Prep Date: 02/28/2018
Analysis Date: 03/02/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: USEPA 200.9
Instrument: iCE 3500, STPGFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #4	02/23/18	418172.A	U		0.036	0.18	µg/L

Client: Cotter Corp
Analyte: Lead, Pb - T

Prep Date: 02/28/2018
Analysis Date: 03/07/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: USEPA 200.9
Instrument: iCE 3500, STPGFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #4	02/23/18	418172.A	1.76		0.04	0.18	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Confidential and Privileged

16-Mar-18

Client: Cotter Corp
Analyte: Manganese, Mn - Dis

Prep Date: 02/28/2018
Analysis Date: 03/07/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: Std. Methods 200.9
Instrument: iCE 3500, GFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 10
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #4	02/23/18	418172.A	86.8		0.7	3.3	µg/L

Client: Cotter Corp
Analyte: Manganese, Mn - T

Prep Date: 02/28/2018
Analysis Date: 03/07/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: Std. Methods 200.9
Instrument: iCE 3500, GFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 10
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #4	02/23/18	418172.A	121		0.7	3.3	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Client: Cotter Corp
Analyte: Zinc, Zn - Dis

Prep Date: 02/28/2018
Analysis Date: 03/01/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

Location ID	Smp Date	SCG #	Results	Flags	MDL	RL	Units
SUMP #4	02/23/18	418172.A	U		1.6	8.08	µg/L

Client: Cotter Corp
Analyte: Zinc, Zn - T

Prep Date: 02/28/2018
Analysis Date: 03/01/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

Location ID	Smp Date	SCG #	Results	Flags	MDL	RL	Units
SUMP #4	02/23/18	418172.A	U		1.6	8.08	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Client: Cotter Corp
Analyte: Iron, Fe - Dis

Prep Date: 02/28/2018
Analysis Date: 03/01/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #4	02/23/18	418172.A	102		4.0	10.0	µg/L

Client: Cotter Corp
Analyte: Iron, Fe - Total

Prep Date: 02/28/2018
Analysis Date: 03/01/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3074 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SUMP #4	02/23/18	418172.A	348		4.0	10.0	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Client: Cotter Corp
Analyte: Residue – filterable (TDS)

Prep Date: 02/28/2018
Analysis Date: 02/29/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 2540 C
Analytical Method ID: Std. Methods 2540 C
Instrument: AE-240 Dual Range Analytical Balance

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 100 mL
Analyst: ND

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
SUMP #4	02/23/18	418172.A	530		10	mg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
 H – Analysis exceeded holding time
 J – Estimated value detected below the RL/MRL
 S – Spike recovery outside acceptance limits
 U – Analyte not detected
 X – See case narrative



Trust our People. Trust our Data.
www.energylab.com

Billings, MT 800.735.4489 • Casper, WY 888.235.0515
Gillette, WY 866.686.7175 • Helena, MT 877.472.0711

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Cotter Corporation
Project: Schwartzwalder Mine
Lab ID: C18030035-009
Client Sample ID: MW 9

Report Date: 03/26/18
Collection Date: 02/26/18 10:03
Date Received: 03/01/18
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	1.03	mg/L		0.01		E353.2	03/05/18 10:13 / dmb
Phosphorus, Total as P	0.019	mg/L		0.005		E365.1	03/02/18 16:23 / dmb
METALS, DISSOLVED							
Aluminum	ND	mg/L		0.2		E200.8	03/05/18 16:22 / eli-b
Antimony	ND	mg/L		0.001		E200.8	03/05/18 16:22 / eli-b
Molybdenum	0.030	mg/L		0.005		E200.8	03/05/18 16:22 / eli-b
Thallium	ND	mg/L		0.0002		E200.8	03/05/18 16:22 / eli-b
Uranium	2.15	mg/L		0.0002		E200.8	03/06/18 16:32 / eli-b
METALS, TOTAL							
Aluminum	ND	mg/L		0.2		E200.8	03/07/18 16:37 / eli-b
Antimony	ND	mg/L		0.001		E200.8	03/07/18 16:37 / eli-b
Arsenic	ND	mg/L		0.001		E200.8	03/07/18 16:37 / eli-b
Mercury	ND	mg/L		0.0001		E245.1	03/06/18 12:34 / eli-b
Thallium	ND	mg/L		0.0002		E200.8	03/07/18 19:29 / eli-b
RADIONUCLIDES, DISSOLVED							
Radium 226	0.3	pCi/L				E903.0	03/13/18 07:16 / arh
Radium 226 precision (±)	0.2	pCi/L				E903.0	03/13/18 07:16 / arh
Radium 226 MDC	0.2	pCi/L				E903.0	03/13/18 07:16 / arh
RADIONUCLIDES, TOTAL							
Gross Alpha	1810	pCi/L				E900.0	03/15/18 14:46 / trs
Gross Alpha precision (±)	351	pCi/L				E900.0	03/15/18 14:46 / trs
Gross Alpha MDC	4.1	pCi/L				E900.0	03/15/18 14:46 / trs
Gross Beta	280	pCi/L				E900.0	03/15/18 14:46 / trs
Gross Beta precision (±)	28.6	pCi/L				E900.0	03/15/18 14:46 / trs
Gross Beta MDC	3.9	pCi/L				E900.0	03/15/18 14:46 / trs
CLIENT PROVIDED FIELD PARAMETERS							
Field Conductivity	1164	umhos/cm				FIELD	02/26/18 10:03 / ***
Field pH	7.03	s.u.				FIELD	02/26/18 10:03 / ***
Field Temperature, C	8.1	°C				FIELD	02/26/18 10:03 / ***
Oxidation-Reduction Potential (ORP)	407.5	mV				FIELD	02/26/18 10:03 / ***
*** Field data provided by client							

Report RL - Analyte reporting limit.
Definitions: QCL - Quality control limit.
MDC - Minimum detectable concentration

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

Client: Cotter Corp
 Analyte: Bicarbonate (As HCO₃)

Prep Date: 03/06/2018
 Analysis Date: 03/06/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 2320 B.
 Analytical Method ID: Std. Methods 2320 B.
 Instrument: Titrimetric
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 100 mL
 Analyst: SE

<u>Location ID</u>	<u>SmpDate</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
MW #9	02/26/18	418174.A	231		10	mg/L

Client: Cotter Corp
 Analyte: Alkalinity (total as CaCO₃)

Prep Date: 03/06/2018
 Analysis Date: 03/06/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 2320 B.
 Analytical Method ID: Std. Methods 2320 B.
 Instrument: Titrimetric
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 100 mL
 Analyst: SE

<u>Location ID</u>	<u>SmpDate</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
MW #9	02/26/18	418174.A	231		10	mg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
 H – Analysis exceeded holding time
 J – Estimated value detected below the RL/MRL
 S – Spike recovery outside acceptance limits
 U – Analyte not detected
 X – See case narrative

Client: Cotter Corp
Analyte: Chloride

Prep Date: 03/06/2018
Analysis Date: 03/06/2018
Approved Method Source: 40 CFR 136.3
Prep ID: SM 4500-Cl--1997
Analytical Method ID: SM 4500-Cl--1997
Instrument: Titrimetric

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 100 mL
Analyst: SE

<u>Location ID</u>	<u>SmpDate</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
MW #9	02/26/18	418174.A	22		2	mg/L

Client: Cotter Corp
Analyte: Sulfate, SO₄²⁻

Prep Date: 03/06/2018
Analysis Date: 03/06/2018
Approved Method Source: 40 CFR 136.3
Prep ID: ASTM D516-07
Analytical Method ID: ASTM D516-07
Instrument: Evo 160, UV/VIS

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 100 mL Dilution Factor: 10
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
MW #9	02/26/18	418174.A	418		1.2	5.9	mg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Client: Cotter Corp
Analyte: Calcium, Ca – Dis

Prep Date: 02/28/2018
Analysis Date: 03/05/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 100
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
MW #9	02/26/18	418174.A	158,998		1,000	5,000	µg/L

Client: Cotter Corp
Analyte: Magnesium, Mg – Dis

Prep Date: 02/28/2018
Analysis Date: 03/05/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 100
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
MW #9	02/26/18	418174.A	63,401		60	310	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Client: Cotter Corp
Analyte: Potassium, K – Dis

Prep Date: 02/28/2018
 Analysis Date: 03/05/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3030 E.
 Analytical Method ID: Std. Methods 3111 B.
 Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 10
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
MW #9	02/26/18	418174.A	5,355		100	600	µg/L

Client: Cotter Corp
Analyte: Sodium, Na – Dis

Prep Date: 02/28/2018
 Analysis Date: 03/05/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3030 E.
 Analytical Method ID: Std. Methods 3111 B.
 Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 100
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
MW #9	02/26/18	418174.A	85,970		250	1,250	µg/L

Qualifiers:
 E – Extrapolated value. Value exceeds calibration range
 H – Analysis exceeded holding time
 J – Estimated value detected below the RL/MRL
 S – Spike recovery outside acceptance limits
 U – Analyte not detected
 X – See case narrative

Client: Cotter Corp
Analyte: Copper, Cu - Dis

Prep Date: 02/28/2018
Analysis Date: 03/03/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: USEPA 200.9
Instrument: iCE 3500, STPGFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

Location ID	Smp Date	SCG #	Results	Flags	MDL	RL	Units
MW #9	02/26/18	418174.A	2.91		0.21	1.07	µg/L

Client: Cotter Corp
Analyte: Copper, Cu - T

Prep Date: 02/28/2018
Analysis Date: 03/03/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: USEPA 200.9
Instrument: iCE 3500, STPGFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

Location ID	Smp Date	SCG #	Results	Flags	MDL	RL	Units
MW #9	02/26/18	418174.A	3.77		0.21	1.07	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative



Analytical Report

58

Client: Cotter Corp
Analyte: Silver, Ag - T

Prep Date: 02/28/2018
Analysis Date: 03/02/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: USEPA 200.9
Instrument: iCE 3500, STPGFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
MW #9	02/26/18	418174.A	U		0.036	0.18	µg/L

Client: Cotter Corp
Analyte: Lead, Pb - T

Prep Date: 02/28/2018
Analysis Date: 03/07/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: USEPA 200.9
Instrument: iCE 3500, STPGFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
MW #9	02/26/18	418174.A	0.351		0.04	0.18	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Confidential and Privileged

16-Mar-18

Client: Cotter Corp
 Analyte: Manganese, Mn - Dis

Prep Date: 02/28/2018
 Analysis Date: 03/07/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3030 E.
 Analytical Method ID: Std. Methods 200.9
 Instrument: iCE 3500, GFAA
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 10
 Analyst: SE

Location ID	Smp Date	SCG #	Results	Flags	MDL	RL	Units
MW #9	02/26/18	418174.A	5.5		0.7	3.3	µg/L

Client: Cotter Corp
 Analyte: Manganese, Mn - T

Prep Date: 02/28/2018
 Analysis Date: 03/07/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3030 E.
 Analytical Method ID: Std. Methods 200.9
 Instrument: iCE 3500, GFAA
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 10
 Analyst: SE

Location ID	Smp Date	SCG #	Results	Flags	MDL	RL	Units
MW #9	02/26/18	418174.A	35.7		0.7	3.3	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
 H – Analysis exceeded holding time
 J – Estimated value detected below the RL/MRL
 S – Spike recovery outside acceptance limits
 U – Analyte not detected
 X – See case narrative

Client: Cotter Corp
Analyte: Zinc, Zn - Dis

Prep Date: 02/28/2018
Analysis Date: 03/01/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
MW #9	02/26/18	418174.A	8.59		1.6	8.08	µg/L

Client: Cotter Corp
Analyte: Zinc, Zn - T

Prep Date: 02/28/2018
Analysis Date: 03/01/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
MW #9	02/26/18	418174.A	9.30		1.6	8.08	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Client: Cotter Corp
Analyte: Iron, Fe - Dis

Prep Date: 02/28/2018
Analysis Date: 03/01/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
MW #9	02/26/18	418174.A	U		4.0	10.0	µg/L

Client: Cotter Corp
Analyte: Iron, Fe - Total

Prep Date: 02/28/2018
Analysis Date: 03/01/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
MW #9	02/26/18	418174.A	U		4.0	10.0	µg/L

Qualifiers:
E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Confidential and Privileged

16-Mar-18

Client: Cotter Corp
Analyte: Residue – filterable (TDS)

Prep Date: 02/28/2018
Analysis Date: 02/29/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 2540 C
Analytical Method ID: Std. Methods 2540 C
Instrument: AE-240 Dual Range Analytical Balance

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 100 mL
Analyst: ND

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
MW #9	02/26/18	418174.A	880		10	mg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative



February 2018 Schwartzwalder Surface Water Report

Contents:

- AWD, code1, Sampled on: 05FEB2018, ELI: C18020275-001
- BPL, code1, Sampled on: 05FEB2018, ELI: C18020275-002
- AWD, table1, Sampled on: 13FEB2018
 - ELI: C18020442-001
 - SCG: 418126.A
- BPL, table1, Sampled on: 13FEB2018
 - ELI: C18020442-002
 - SCG: 418127.A
- ARH, code3, Sampled on: 13FEB2018, ELI: C18020442-004
- FBRG, code3, Sampled on: 13FEB2018, ELI: C18020442-003
- LLHG, code3, Sampled on: 13FEB2018, ELI: C18020442-005
- AWD, code1, Sampled on: 21FEB2018, ELI: C18030035-001
- BPL, code1, Sampled on: 21FEB2018, ELI: C18030035-002
- AWD, code1, Sampled on: 26FEB2018, ELI: C18030035-010
- BPL, code1, Sampled on: 26FEB2018, ELI: C18030035-011



Trust our People. Trust our Data.
www.energylab.com

Billings, MT 800.735.4489 • Casper, WY 888.235.0515
Gillette, WY 866.686.7175 • Helena, MT 877.472.0711

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Cotter Corporation
Project: Schwartzwalder Mine
Lab ID: C18020275-001
Client Sample ID: SW-AWD

Report Date: 03/08/18
Collection Date: 02/05/18 13:54
Date Received: 02/12/18
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS, DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	02/15/18 15:27 / eli-b
Uranium	0.0054	mg/L		0.0003		E200.8	02/15/18 15:27 / eli-b
CLIENT PROVIDED FIELD PARAMETERS							
Field Conductivity	251	umhos/cm				FIELD	02/05/18 13:54 / ***
Field pH	7.95	s.u.				FIELD	02/05/18 13:54 / ***
Field Temperature, C	2.0	°C				FIELD	02/05/18 13:54 / ***
*** Field data provided by client							

Report RL - Analyte reporting limit.
Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



Trust our People. Trust our Data.
www.energylab.com

Billings, MT 800.735.4489 • Casper, WY 888.235.0515
Gillette, WY 866.686.7175 • Helena, MT 877.472.0711

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Cotter Corporation
Project: Schwartzwalder Mine
Lab ID: C18020275-002
Client Sample ID: SW-BPL

Report Date: 03/08/18
Collection Date: 02/05/18 14:28
Date Received: 02/12/18
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS, DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	02/15/18 15:30 / eli-b
Uranium	0.0108	mg/L		0.0003		E200.8	02/15/18 15:30 / eli-b
CLIENT PROVIDED FIELD PARAMETERS							
Field Conductivity	243	umhos/cm				FIELD	02/05/18 14:28 / ***
Field pH	7.92	s.u.				FIELD	02/05/18 14:28 / ***
Field Temperature, C	2.6	°C				FIELD	02/05/18 14:28 / ***

*** Field data provided by client

Report RL - Analyte reporting limit.
Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



Trust our People. Trust our Data.
www.energylab.com

Billings, MT 800.735.4489 • Casper, WY 888.235.0515
Gillette, WY 866.686.7175 • Helena, MT 877.472.0711

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Cotter Corporation
Project: Schwartzwalder Mine
Lab ID: C18020442-001
Client Sample ID: SW-AWD

Report Date: 03/26/18
Collection Date: 02/13/18 11:20
DateReceived: 02/16/18
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Fluoride	0.3	mg/L		0.1		A4500-F C	02/20/18 12:42 / mvr
INORGANICS							
Cyanide, Weak Acid Dissociable	ND	mg/L		0.005		Kelada-01	02/22/18 10:18 / eli-b
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.01	mg/L		0.01		E353.2	02/26/18 15:39 / dmb
Phosphorous, Total as Phosphate	ND	mg/L		0.03		Calculation	03/16/18 11:27 / sec
Phosphorus, Total as P	ND	mg/L		0.005		E365.1	02/27/18 11:07 / dmb
METALS, DISSOLVED							
Aluminum	ND	mg/L		0.2		E200.7	02/26/18 12:31 / eli-b
Antimony	ND	mg/L		0.001		E200.8	02/26/18 16:47 / eli-b
Molybdenum	ND	mg/L		0.005		E200.8	02/26/18 16:47 / eli-b
Thallium	ND	mg/L		0.0002		E200.8	02/26/18 16:47 / eli-b
Uranium	0.0027	mg/L		0.0002		E200.8	02/26/18 16:47 / eli-b
METALS, TOTAL							
Aluminum	ND	mg/L		0.2		E200.7	02/23/18 01:49 / eli-b
Antimony	ND	mg/L		0.001		E200.8	02/23/18 06:07 / eli-b
Arsenic	ND	mg/L		0.001		E200.8	02/23/18 06:07 / eli-b
Boron	ND	mg/L		0.1		E200.7	02/23/18 01:49 / eli-b
Mercury	ND	mg/L		0.0001		E245.1	03/02/18 15:13 / eli-b
Molybdenum	ND	mg/L		0.005		E200.7	02/23/18 01:49 / eli-b
Thallium	ND	mg/L		0.0002		E200.8	02/23/18 06:07 / eli-b
Uranium	0.0026	mg/L		0.0002		E200.8	02/23/18 06:07 / eli-b
RADIONUCLIDES, DISSOLVED							
Radium 226	0.1	pCi/L	U			E903.0	03/05/18 14:33 / arh
Radium 226 precision (±)	0.1	pCi/L				E903.0	03/05/18 14:33 / arh
Radium 226 MDC	0.2	pCi/L				E903.0	03/05/18 14:33 / arh
RADIONUCLIDES, TOTAL							
Gross Alpha	3.6	pCi/L				E900.0	02/22/18 23:32 / trs
Gross Alpha precision (±)	1.7	pCi/L				E900.0	02/22/18 23:32 / trs
Gross Alpha MDC	1.6	pCi/L				E900.0	02/22/18 23:32 / trs
Gross Beta	-0.9	pCi/L	U			E900.0	02/22/18 23:32 / trs
Gross Beta precision (±)	2.2	pCi/L				E900.0	02/22/18 23:32 / trs
Gross Beta MDC	3.7	pCi/L				E900.0	02/22/18 23:32 / trs
Radium 226	0.2	pCi/L				E903.0	03/19/18 10:09 / arh
Radium 226 precision (±)	0.1	pCi/L				E903.0	03/19/18 10:09 / arh
Radium 226 MDC	0.1	pCi/L				E903.0	03/19/18 10:09 / arh
Radium 228	0.7	pCi/L	U			RA-05	03/23/18 10:39 / plj
Radium 228 precision (±)	0.7	pCi/L				RA-05	03/23/18 10:39 / plj
Radium 228 MDC	1.2	pCi/L				RA-05	03/23/18 10:39 / plj

Report RL - Analyte reporting limit.
Definitions: QCL - Quality control limit.
MDC - Minimum detectable concentration

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
U - Not detected at minimum detectable concentration



Trust our People. Trust our Data.
www.energylab.com

Billings, MT 800.735.4489 • Casper, WY 888.235.0515
Gillette, WY 866.686.7175 • Helena, MT 877.472.0711

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Cotter Corporation
Project: Schwartzwalder Mine
Lab ID: C18020442-001
Client Sample ID: SW-AWD

Report Date: 03/26/18
Collection Date: 02/13/18 11:20
Date Received: 02/16/18
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
RADIONUCLIDES, TOTAL							
Radium 226 + Radium 228	0.9	pCi/L	U			A7500-RA	03/23/18 16:21 / sec
Radium 226 + Radium 228 precision (±)	0.7	pCi/L				A7500-RA	03/23/18 16:21 / sec
Radium 226 + Radium 228 MDC	1.2	pCi/L				A7500-RA	03/23/18 16:21 / sec
CLIENT PROVIDED FIELD PARAMETERS							
Field Conductivity	270	umhos/cm				FIELD	02/13/18 11:20 / ***
Field pH	7.97	s.u.				FIELD	02/13/18 11:20 / ***
Field Temperature, C	1.3	°C				FIELD	02/13/18 11:20 / ***
*** Field data provided by client							

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
U - Not detected at minimum detectable concentration

Client: Cotter Corp
 Analyte: Bicarbonate (As HCO₃)

Prep Date: 02/24/2018
 Analysis Date: 02/24/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 2320 B.
 Analytical Method ID: Std. Methods 2320 B.
 Instrument: Titrimetric
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 100 mL
 Analyst: SE

<u>Location ID</u>	<u>SmpDate</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
SW-AWD	02/13/18	418126.A	66		10	mg/L

Client: Cotter Corp
 Analyte: Alkalinity (total as CaCO₃)

Prep Date: 02/24/2018
 Analysis Date: 02/24/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 2320 B.
 Analytical Method ID: Std. Methods 2320 B.
 Instrument: Titrimetric
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 100 mL
 Analyst: SE

<u>Location ID</u>	<u>SmpDate</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
SW-AWD	02/13/18	418126.A	66		10	mg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
 H – Analysis exceeded holding time
 J – Estimated value detected below the RL/MRL
 S – Spike recovery outside acceptance limits
 U – Analyte not detected
 X – See case narrative

Confidential and Privileged

2-Mar-18

Client: Cotter Corp
Analyte: Chloride

Prep Date: 02/16/2018
Analysis Date: 02/16/2018
Approved Method Source: 40 CFR 136.3
Prep ID: SM 4500-Cl--1997
Analytical Method ID: SM 4500-Cl--1997
Instrument: Titrimetric

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 100 mL
Analyst: SE

<u>Location ID</u>	<u>SmpDate</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
SW-AWD	02/13/18	418126.A	46		2	mg/L

Client: Cotter Corp
Analyte: Sulfate, SO_4^{2-}

Prep Date: 02/20/2018
Analysis Date: 02/20/2018
Approved Method Source: 40 CFR 136.3
Prep ID: ASTM D516-07
Analytical Method ID: ASTM D516-07
Instrument: Evo 160, UV/VIS

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 100 mL Dilution Factor: 2
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SW-AWD	02/13/18	418126.A	19.2		0.24	1.18	mg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Client: Cotter Corp
Analyte: Calcium, Ca – Dis

Prep Date: 02/15/2018
 Analysis Date: 02/27/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3030 E.
 Analytical Method ID: Std. Methods 3111 B.
 Instrument: iCE 3500, FLAA
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 25
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SW-AWD	02/13/18	418126.A	28,077		250	1,250	µg/L

Client: Cotter Corp
Analyte: Magnesium, Mg – Dis

Prep Date: 02/15/2018
 Analysis Date: 02/22/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3030 E.
 Analytical Method ID: Std. Methods 3111 B.
 Instrument: iCE 3500, FLAA
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 50
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SW-AWD	02/13/18	418126.A	7,233		30	155	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
 H – Analysis exceeded holding time
 J – Estimated value detected below the RL/MRL
 S – Spike recovery outside acceptance limits
 U – Analyte not detected
 X – See case narrative



Analytical Report

6

Client: Cotter Corp
Analyte: Potassium, K – Dis

Prep Date: 02/15/2018
Analysis Date: 02/22/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SW-AWD	02/13/18	418126.A	1,588		10	60	µg/L

Client: Cotter Corp
Analyte: Sodium, Na – Dis

Prep Date: 02/15/2018
Analysis Date: 02/21/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 100
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SW-AWD	02/13/18	418126.A	13,329		250	1,250	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Confidential and Privileged

2-Mar-18

Client: Cotter Corp
 Analyte: Copper, Cu - Dis

Prep Date: 02/15/2018
 Analysis Date: 02/17/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3030 E.
 Analytical Method ID: USEPA 200.9
 Instrument: iCE 3500, STPGFAA

Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 1
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SW-AWD	02/13/18	418126.A	0.251	J	0.21	1.07	µg/L

Client: Cotter Corp
 Analyte: Copper, Cu - T

Prep Date: 02/15/2018
 Analysis Date: 02/17/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3030 E.
 Analytical Method ID: USEPA 200.9
 Instrument: iCE 3500, STPGFAA

Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 1
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SW-AWD	02/13/18	418126.A	0.451		0.21	1.07	µg/L

Qualifiers:
 E – Extrapolated value. Value exceeds calibration range
 H – Analysis exceeded holding time
 J – Estimated value detected below the RL/MRL
 S – Spike recovery outside acceptance limits
 U – Analyte not detected
 X – See case narrative

Confidential and Privileged

2-Mar-18

Client: Cotter Corp
Analyte: Silver, Ag - Dis

Prep Date: 02/15/2018
 Analysis Date: 02/19/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3030 E.
 Analytical Method ID: USEPA 200.9
 Instrument: iCE 3500, STPGFAA
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 1
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SW-AWD	02/13/18	418126.A	U		0.036	0.18	µg/L

Client: Cotter Corp
Analyte: Silver, Ag - T

Prep Date: 02/15/2018
 Analysis Date: 02/19/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3030 E.
 Analytical Method ID: USEPA 200.9
 Instrument: iCE 3500, STPGFAA
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 1
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SW-AWD	02/13/18	418126.A	U		0.036	0.18	µg/L

Qualifiers:
 E - Extrapolated value. Value exceeds calibration range
 H - Analysis exceeded holding time
 J - Estimated value detected below the RL/MRL
 S - Spike recovery outside acceptance limits
 U - Analyte not detected
 X - See case narrative

Confidential and Privileged

2-Mar-18

Client: Cotter Corp
Analyte: Chromium, Cr - T

Prep Date: 02/15/2018
 Analysis Date: 02/19/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3030 E.
 Analytical Method ID: USEPA 200.9
 Instrument: iCE 3500, STPGFAA
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 1
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SW-AWD	02/13/18	418126.A	4.81		0.06	0.31	µg/L

Client: Cotter Corp
Analyte: Lead, Pb - T

Prep Date: 02/15/2018
 Analysis Date: 02/17/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3030 E.
 Analytical Method ID: USEPA 200.9
 Instrument: iCE 3500, STPGFAA
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 1
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SW-AWD	02/13/18	418126.A	0.08	J	0.04	0.18	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
 H – Analysis exceeded holding time
 J – Estimated value detected below the RL/MRL
 S – Spike recovery outside acceptance limits
 U – Analyte not detected
 X – See case narrative



Analytical Report

10

Client: Cotter Corp
Analyte: Manganese, Mn - Dis

Prep Date: 02/15/2018
Analysis Date: 02/20/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: Std. Methods 200.9
Instrument: iCE 3500, GFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SW-AWD	02/13/18	418126.A	6.89		0.07	0.33	µg/L

Client: Cotter Corp
Analyte: Manganese, Mn - T

Prep Date: 02/15/2018
Analysis Date: 02/20/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: Std. Methods 200.9
Instrument: iCE 3500, GFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SW-AWD	02/13/18	418126.A	12.8		0.07	0.33	µg/L

Qualifiers:

E - Extrapolated value. Value exceeds calibration range
H - Analysis exceeded holding time
J - Estimated value detected below the RL/MRL
S - Spike recovery outside acceptance limits
U - Analyte not detected
X - See case narrative

Confidential and Privileged

2-Mar-18

Client: Cotter Corp
 Analyte: Zinc, Zn - Dis

Prep Date: 02/15/2018
 Analysis Date: 02/17/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3030 E.
 Analytical Method ID: Std. Methods 3111 B.
 Instrument: iCE 3500, FLAA
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 1
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SW-AWD	02/13/18	418126.A	U		1.6	8.08	µg/L

Client: Cotter Corp
 Analyte: Zinc, Zn - T

Prep Date: 02/15/2018
 Analysis Date: 02/17/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3030 E.
 Analytical Method ID: Std. Methods 3111 B.
 Instrument: iCE 3500, FLAA
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 1
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SW-AWD	02/13/18	418126.A	U		1.6	8.08	µg/L

Qualifiers:
 E – Extrapolated value. Value exceeds calibration range
 H – Analysis exceeded holding time
 J – Estimated value detected below the RL/MRL
 S – Spike recovery outside acceptance limits
 U – Analyte not detected
 X – See case narrative

Confidential and Privileged

2-Mar-18



Analytical Report

12

Client: Cotter Corp
Analyte: Iron, Fe - Dis

Prep Date: 02/15/2018
Analysis Date: 02/17/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: Std. Methods 200.9
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SW-AWD	02/13/18	418126.A	37.0		4	10	µg/L

Client: Cotter Corp
Analyte: Iron, Fe - T

Prep Date: 02/15/2018
Analysis Date: 02/17/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: Std. Methods 200.9
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SW-AWD	02/13/18	418126.A	90.8		4	10	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Confidential and Privileged

2-Mar-18

Client: Cotter Corp
 Analyte: Residue – non, filterable (TSS)

Prep Date: 02/19/2018
 Analysis Date: 02/20/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 2540 D
 Analytical Method ID: Std. Methods 2540 D
 Instrument: AE-240 Dual Range Analytical Balance
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 100 mL
 Analyst: SB

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
SW-AWD	02/13/18	418126.A	4.4		4	mg/L

Client: Cotter Corp
 Analyte: Residue – filterable (TDS)

Prep Date: 02/19/2018
 Analysis Date: 02/20/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 2540 C
 Analytical Method ID: Std. Methods 2540 C
 Instrument: AE-240 Dual Range Analytical Balance
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 100 mL
 Analyst: SB

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
SW-AWD	02/13/18	418126.A	176		10	mg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
 H – Analysis exceeded holding time
 J – Estimated value detected below the RL/MRL
 S – Spike recovery outside acceptance limits
 U – Analyte not detected
 X – See case narrative



Trust our People. Trust our Data.
www.energylab.com

Billings, MT 800.735.4489 • Casper, WY 888.235.0515
Gillette, WY 866.686.7175 • Helena, MT 877.472.0711

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Cotter Corporation
Project: Schwartzwalder Mine
Lab ID: C18020442-002
Client Sample ID: SW-BPL

Report Date: 03/26/18
Collection Date: 02/13/18 11:36
Date Received: 02/16/18
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Fluoride	0.2	mg/L		0.1		A4500-F C	02/20/18 12:45 / mvr
INORGANICS							
Cyanide, Weak Acid Dissociable	0.007	mg/L		0.005		Kelada-01	02/22/18 10:26 / eli-b
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.02	mg/L		0.01		E353.2	02/26/18 15:41 / dmb
Phosphorous, Total as Phosphate	ND	mg/L		0.03		Calculation	03/16/18 11:27 / sec
Phosphorus, Total as P	ND	mg/L		0.005		E365.1	02/27/18 11:10 / dmb
METALS, DISSOLVED							
Aluminum	ND	mg/L		0.2		E200.8	02/22/18 21:27 / eli-b
Antimony	ND	mg/L		0.001		E200.8	02/22/18 21:27 / eli-b
Molybdenum	ND	mg/L		0.005		E200.8	02/23/18 19:28 / eli-b
Thallium	ND	mg/L		0.0002		E200.8	02/22/18 21:27 / eli-b
Uranium	0.0103	mg/L		0.0002		E200.8	02/23/18 19:28 / eli-b
METALS, TOTAL							
Aluminum	ND	mg/L		0.2		E200.7	02/23/18 02:01 / eli-b
Antimony	ND	mg/L		0.001		E200.8	02/23/18 06:10 / eli-b
Arsenic	ND	mg/L		0.001		E200.8	02/23/18 06:10 / eli-b
Boron	ND	mg/L		0.1		E200.7	02/23/18 02:01 / eli-b
Mercury	ND	mg/L		0.0001		E245.1	03/02/18 15:15 / eli-b
Molybdenum	ND	mg/L		0.005		E200.7	02/23/18 02:01 / eli-b
Thallium	ND	mg/L		0.0002		E200.8	02/23/18 06:10 / eli-b
Uranium	0.0111	mg/L		0.0002		E200.8	02/23/18 06:10 / eli-b
RADIONUCLIDES, DISSOLVED							
Radium 226	0.7	pCi/L				E903.0	03/05/18 14:33 / arh
Radium 226 precision (±)	0.2	pCi/L				E903.0	03/05/18 14:33 / arh
Radium 226 MDC	0.2	pCi/L				E903.0	03/05/18 14:33 / arh
RADIONUCLIDES, TOTAL							
Gross Alpha	7.3	pCi/L				E900.0	02/22/18 23:32 / trs
Gross Alpha precision (±)	2.2	pCi/L				E900.0	02/22/18 23:32 / trs
Gross Alpha MDC	1.6	pCi/L				E900.0	02/22/18 23:32 / trs
Gross Beta	1.6	pCi/L	U			E900.0	02/22/18 23:32 / trs
Gross Beta precision (±)	1.2	pCi/L				E900.0	02/22/18 23:32 / trs
Gross Beta MDC	3.2	pCi/L				E900.0	02/22/18 23:32 / trs
Radium 226	0.4	pCi/L				E903.0	03/19/18 10:09 / arh
Radium 226 precision (±)	0.2	pCi/L				E903.0	03/19/18 10:09 / arh
Radium 226 MDC	0.2	pCi/L				E903.0	03/19/18 10:09 / arh
Radium 228	1.7	pCi/L				RA-05	03/13/18 08:09 / plj
Radium 228 precision (±)	0.7	pCi/L				RA-05	03/13/18 08:09 / plj
Radium 228 MDC	1.3	pCi/L				RA-05	03/13/18 08:09 / plj

Report RL - Analyte reporting limit.
Definitions: QCL - Quality control limit.
MDC - Minimum detectable concentration

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
U - Not detected at minimum detectable concentration



Trust our People. Trust our Data.
www.energylab.com

Billings, MT 800.735.4489 • Casper, WY 888.235.0515
Gillette, WY 866.686.7175 • Helena, MT 877.472.0711

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Cotter Corporation
Project: Schwartzwalder Mine
Lab ID: C18020442-002
Client Sample ID: SW-BPL

Report Date: 03/26/18
Collection Date: 02/13/18 11:36
Date Received: 02/16/18
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
RADIONUCLIDES, TOTAL							
Radium 226 + Radium 228	2.1	pCi/L				A7500-RA	03/21/18 19:03 / sec
Radium 226 + Radium 228 precision ($\pm$)	0.7	pCi/L				A7500-RA	03/21/18 19:03 / sec
Radium 226 + Radium 228 MDC	1.3	pCi/L				A7500-RA	03/21/18 19:03 / sec
CLIENT PROVIDED FIELD PARAMETERS							
Field Conductivity	239	umhos/cm				FIELD	02/13/18 11:36 / ***
Field pH	7.75	s.u.				FIELD	02/13/18 11:36 / ***
Field Temperature, C	4.7	°C				FIELD	02/13/18 11:36 / ***

*** Field data provided by client

Report
Definitions: RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

Client: Cotter Corp
 Analyte: Bicarbonate (As HCO₃)

Prep Date: 02/24/2018
 Analysis Date: 02/24/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 2320 B.
 Analytical Method ID: Std. Methods 2320 B.
 Instrument: Titrimetric
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 100 mL
 Analyst: SE

<u>Location ID</u>	<u>SmpDate</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
SW-BPL	02/14/18	418127.A	72		10	mg/L

Client: Cotter Corp
 Analyte: Alkalinity (total as CaCO₃)

Prep Date: 02/24/2018
 Analysis Date: 02/24/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 2320 B.
 Analytical Method ID: Std. Methods 2320 B.
 Instrument: Titrimetric
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 100 mL
 Analyst: SE

<u>Location ID</u>	<u>SmpDate</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
SW-BPL	02/14/18	418127.A	72		10	mg/L

Qualifiers:
 E – Extrapolated value. Value exceeds calibration range
 H – Analysis exceeded holding time
 J – Estimated value detected below the RL/MRL
 S – Spike recovery outside acceptance limits
 U – Analyte not detected
 X – See case narrative

Confidential and Privileged

2-Mar-18

Client: Cotter Corp
Analyte: Chloride

Prep Date: 02/16/2018
Analysis Date: 02/16/2018
Approved Method Source: 40 CFR 136.3
Prep ID: SM 4500-Cl--1997
Analytical Method ID: SM 4500-Cl--1997
Instrument: Titrimetric

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 100 mL
Analyst: SE

<u>Location ID</u>	<u>SmpDate</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
SW-BPL	02/14/18	418127.A	39		2	mg/L

Client: Cotter Corp
Analyte: Sulfate, SO₄²⁻

Prep Date: 02/20/2018
Analysis Date: 02/20/2018
Approved Method Source: 40 CFR 136.3
Prep ID: ASTM D516-07
Analytical Method ID: ASTM D516-07
Instrument: Evo 160, UV/VIS

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 100 mL Dilution Factor: 2
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SW-BPL	02/14/18	418127.A	22.5		0.24	1.18	mg/L

Qualifiers:

E - Extrapolated value. Value exceeds calibration range
H - Analysis exceeded holding time
J - Estimated value detected below the RL/MRL
S - Spike recovery outside acceptance limits
U - Analyte not detected
X - See case narrative

Client: Cotter Corp
 Analyte: Calcium, Ca – Dis

Prep Date: 02/15/2018
 Analysis Date: 02/27/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3030 E.
 Analytical Method ID: Std. Methods 3111 B.
 Instrument: iCE 3500, FLAA
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 50
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SW-BPL	02/14/18	418127.A	48,079		500	2,500	µg/L

Client: Cotter Corp
 Analyte: Magnesium, Mg – Dis

Prep Date: 02/15/2018
 Analysis Date: 02/22/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3030 E.
 Analytical Method ID: Std. Methods 3111 B.
 Instrument: iCE 3500, FLAA
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 50
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SW-BPL	02/14/18	418127.A	6,836		30	155	µg/L

Qualifiers:
 E – Extrapolated value. Value exceeds calibration range
 H – Analysis exceeded holding time
 J – Estimated value detected below the RL/MRL
 S – Spike recovery outside acceptance limits
 U – Analyte not detected
 X – See case narrative

Confidential and Privileged

2-Mar-18

Client: Cotter Corp
Analyte: Potassium, K – Dis

Prep Date: 02/15/2018
 Analysis Date: 02/22/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3030 E.
 Analytical Method ID: Std. Methods 3111 B.
 Instrument: iCE 3500, FLAA
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 1
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SW-BPL	02/14/18	418127.A	1,606		10	60	µg/L

Client: Cotter Corp
Analyte: Sodium, Na – Dis

Prep Date: 02/15/2018
 Analysis Date: 02/21/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3030 E.
 Analytical Method ID: Std. Methods 3111 B.
 Instrument: iCE 3500, FLAA
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 100
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SW-BPL	02/14/18	418127.A	16,586		250	1,250	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
 H – Analysis exceeded holding time
 J – Estimated value detected below the RL/MRL
 S – Spike recovery outside acceptance limits
 U – Analyte not detected
 X – See case narrative

Client: Cotter Corp
 Analyte: Copper, Cu - Dis

Prep Date: 02/15/2018
 Analysis Date: 02/17/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3030 E.
 Analytical Method ID: USEPA 200.9
 Instrument: iCE 3500, STPGFAA
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 1
 Analyst: SE

Location ID	Smp Date	SCG #	Results	Flags	MDL	RL	Units
SW-BPL	02/14/18	418127.A	U		0.21	1.07	µg/L

Client: Cotter Corp
 Analyte: Copper, Cu - T

Prep Date: 02/15/2018
 Analysis Date: 02/17/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3030 E.
 Analytical Method ID: USEPA 200.9
 Instrument: iCE 3500, STPGFAA
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 1
 Analyst: SE

Location ID	Smp Date	SCG #	Results	Flags	MDL	RL	Units
SW-BPL	02/14/18	418127.A	U	J	0.21	1.07	µg/L

Qualifiers:
 E – Extrapolated value. Value exceeds calibration range
 H – Analysis exceeded holding time
 J – Estimated value detected below the RL/MRL
 S – Spike recovery outside acceptance limits
 U – Analyte not detected
 X – See case narrative

Confidential and Privileged

2-Mar-18

Client: Cotter Corp
Analyte: Silver, Ag - Dis

Prep Date: 02/15/2018
 Analysis Date: 02/19/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3030 E.
 Analytical Method ID: USEPA 200.9
 Instrument: iCE 3500, STPGFAA
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 1
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SW-BPL	02/14/18	418127.A	U		0.036	0.18	µg/L

Client: Cotter Corp
Analyte: Silver, Ag - T

Prep Date: 02/15/2018
 Analysis Date: 02/19/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3030 E.
 Analytical Method ID: USEPA 200.9
 Instrument: iCE 3500, STPGFAA
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 1
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SW-BPL	02/14/18	418127.A	U		0.036	0.18	µg/L

Qualifiers:
 E - Extrapolated value. Value exceeds calibration range
 H - Analysis exceeded holding time
 J - Estimated value detected below the RL/MRL
 S - Spike recovery outside acceptance limits
 U - Analyte not detected
 X - See case narrative

Confidential and Privileged

2-Mar-18



Analytical Report

20

Client: Cotter Corp
Analyte: Chromium, Cr - T

Prep Date: 02/15/2018
Analysis Date: 02/19/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: USEPA 200.9
Instrument: iCE 3500, STPGFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SW-BPL	02/14/18	418127.A	0.50		0.06	0.31	µg/L

Client: Cotter Corp
Analyte: Lead, Pb - T

Prep Date: 02/15/2018
Analysis Date: 02/17/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: USEPA 200.9
Instrument: iCE 3500, STPGFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SW-BPL	02/14/18	418127.A	0.103	J	0.04	0.18	µg/L

Qualifiers:

E - Extrapolated value Value exceeds calibration range
H - Analysis exceeded holding time
J - Estimated value detected below the RL/MRL
S - Spike recovery outside acceptance limits
U - Analyte not detected
X - See case narrative

Confidential and Privileged

2-Mar-18



Analytical Report

21

Client: Cotter Corp
Analyte: Manganese, Mn - Dis

Prep Date: 02/15/2018
Analysis Date: 02/20/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: Std. Methods 200.9
Instrument: iCE 3500, GFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 10
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SW-BPL	02/14/18	418127.A	27.0		0.70	3.3	µg/L

Client: Cotter Corp
Analyte: Manganese, Mn - T

Prep Date: 02/15/2018
Analysis Date: 02/20/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: Std. Methods 200.9
Instrument: iCE 3500, GFAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 10
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SW-BPL	02/14/18	418127.A	34.9		0.70	3.3	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Confidential and Privileged

2-Mar-18

Client: Cotter Corp
Analyte: Zinc, Zn - Dis

Prep Date: 02/15/2018
Analysis Date: 02/17/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SW-BPL	02/14/18	418127.A	U		1.6	8.08	µg/L

Client: Cotter Corp
Analyte: Zinc, Zn - T

Prep Date: 02/15/2018
Analysis Date: 02/17/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 3030 E.
Analytical Method ID: Std. Methods 3111 B.
Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 50 mL Dilution Factor: 1
Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SW-BPL	02/14/18	418127.A	U		1.6	8.08	µg/L

Qualifiers:
E - Extrapolated value. Value exceeds calibration range
H - Analysis exceeded holding time
J - Estimated value detected below the RL/MRL
S - Spike recovery outside acceptance limits
U - Analyte not detected
X - See case narrative

Confidential and Privileged

2-Mar-18

Client: Cotter Corp
 Analyte: Iron, Fe - Dis

Prep Date: 02/15/2018
 Analysis Date: 02/17/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3030 E.
 Analytical Method ID: Std. Methods 200.9
 Instrument: iCE 3500, FLAA
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 1
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SW-BPL	02/14/18	418127.A	86.6		4	10	µg/L

Client: Cotter Corp
 Analyte: Iron, Fe - T

Prep Date: 02/15/2018
 Analysis Date: 02/17/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3030 E.
 Analytical Method ID: Std. Methods 200.9
 Instrument: iCE 3500, FLAA
 Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 1
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
SW-BPL	02/14/18	418127.A	223		4	10	µg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
 H – Analysis exceeded holding time
 J – Estimated value detected below the RL/MRL
 S – Spike recovery outside acceptance limits
 U – Analyte not detected
 X – See case narrative



Analytical Report

24

Client: Cotter Corp
Analyte: Residue – non, filterable (TSS)

Prep Date: 02/19/2018
Analysis Date: 02/20/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 2540 D
Analytical Method ID: Std. Methods 2540 D
Instrument: AE-240 Dual Range Analytical Balance

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 100 mL
Analyst: SB

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
SW-BPL	02/14/18	418127.A	6.5		4	mg/L

Client: Cotter Corp
Analyte: Residue – filterable (TDS)

Prep Date: 02/19/2018
Analysis Date: 02/20/2018
Approved Method Source: 40 CFR 136.3
Prep ID: Std. Methods 2540 C
Analytical Method ID: Std. Methods 2540 C
Instrument: AE-240 Dual Range Analytical Balance

Matrix: Aqueous (water, wastewater, groundwater)
Sample volume used: 100 mL
Analyst: SB

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
SW-BPL	02/14/18	418127.A	188		10	mg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
H – Analysis exceeded holding time
J – Estimated value detected below the RL/MRL
S – Spike recovery outside acceptance limits
U – Analyte not detected
X – See case narrative

Confidential and Privileged

2-Mar-18



Trust our People. Trust our Data.
www.energylab.com

Billings, MT 800.735.4489 • Casper, WY 888.235.0515
Gillette, WY 866.686.7175 • Helena, MT 877.472.0711

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Cotter Corporation
Project: Schwartzwalder Mine
Lab ID: C18020442-004
Client Sample ID: SW-ARH

Report Date: 03/26/18
Collection Date: 02/13/18 13:43
Date Received: 02/16/18
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS, DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	02/22/18 21:33 / eli-b
Uranium	0.0152	mg/L		0.0003		E200.8	02/23/18 19:35 / eli-b
METALS, TOTAL							
Arsenic	ND	mg/L		0.001		E200.8	02/23/18 06:17 / eli-b
Uranium	0.0156	mg/L		0.0003		E200.8	02/23/18 06:17 / eli-b
RADIONUCLIDES, DISSOLVED							
Radium 226	0.3	pCi/L				E903.0	03/05/18 16:07 / arh
Radium 226 precision (±)	0.2	pCi/L				E903.0	03/05/18 16:07 / arh
Radium 226 MDC	0.2	pCi/L				E903.0	03/05/18 16:07 / arh
RADIONUCLIDES, TOTAL							
Radium 226	0.3	pCi/L				E903.0	03/05/18 16:07 / arh
Radium 226 precision (±)	0.1	pCi/L				E903.0	03/05/18 16:07 / arh
Radium 226 MDC	0.2	pCi/L				E903.0	03/05/18 16:07 / arh
CLIENT PROVIDED FIELD PARAMETERS							
Field Conductivity	264	umhos/cm				FIELD	02/13/18 13:43 / ***
Field pH	8.28	s.u.				FIELD	02/13/18 13:43 / ***
Field Temperature, C	4.8	°C				FIELD	02/13/18 13:43 / ***

*** Field data provided by client

Report RL - Analyte reporting limit.
Definitions: QCL - Quality control limit.
MDC - Minimum detectable concentration

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



Trust our People. Trust our Data.
www.energylab.com

Billings, MT 800.735.4489 • Casper, WY 888.235.0515
Gillette, WY 866.686.7175 • Helena, MT 877.472.0711

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Cotter Corporation
Project: Schwartzwalder Mine
Lab ID: C18020442-003
Client Sample ID: SW-FBRG

Report Date: 03/26/18
Collection Date: 02/13/18 13:29
Date Received: 02/16/18
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS, DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	02/22/18 21:30 / eli-b
Uranium	0.0116	mg/L		0.0003		E200.8	02/23/18 19:32 / eli-b
METALS, TOTAL							
Arsenic	ND	mg/L		0.001		E200.8	02/23/18 06:13 / eli-b
Uranium	0.0120	mg/L		0.0003		E200.8	02/23/18 06:13 / eli-b
RADIONUCLIDES, DISSOLVED							
Radium 226	0.3	pCi/L				E903.0	03/05/18 14:33 / arh
Radium 226 precision (±)	0.1	pCi/L				E903.0	03/05/18 14:33 / arh
Radium 226 MDC	0.2	pCi/L				E903.0	03/05/18 14:33 / arh
RADIONUCLIDES, TOTAL							
Radium 226	0.7	pCi/L				E903.0	03/05/18 14:33 / arh
Radium 226 precision (±)	0.2	pCi/L				E903.0	03/05/18 14:33 / arh
Radium 226 MDC	0.2	pCi/L				E903.0	03/05/18 14:33 / arh
CLIENT PROVIDED FIELD PARAMETERS							
Field Conductivity	237	umhos/cm				FIELD	02/13/18 13:29 / ***
Field pH	8.06	s.u.				FIELD	02/13/18 13:29 / ***
Field Temperature, C	5.1	°C				FIELD	02/13/18 13:29 / ***

*** Field data provided by client

Report RL - Analyte reporting limit.
Definitions: QCL - Quality control limit.
MDC - Minimum detectable concentration

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



Trust our People. Trust our Data.
www.energylab.com

Billings, MT 800.735.4489 • Casper, WY 888.235.0515
Gillette, WY 866.686.7175 • Helena, MT 877.472.0711

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Cotter Corporation
Project: Schwartzwalder Mine
Lab ID: C18020442-005
Client Sample ID: SW-LLHG

Report Date: 03/26/18
Collection Date: 02/13/18 13:57
Date Received: 02/16/18
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS, DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	02/22/18 21:37 / eli-b
Uranium	0.0154	mg/L		0.0003		E200.8	02/23/18 19:39 / eli-b
METALS, TOTAL							
Arsenic	ND	mg/L		0.001		E200.8	02/23/18 06:20 / eli-b
Uranium	0.0165	mg/L		0.0003		E200.8	02/23/18 06:20 / eli-b
RADIONUCLIDES, DISSOLVED							
Radium 226	0.4	pCi/L				E903.0	03/05/18 16:07 / arh
Radium 226 precision (±)	0.1	pCi/L				E903.0	03/05/18 16:07 / arh
Radium 226 MDC	0.2	pCi/L				E903.0	03/05/18 16:07 / arh
RADIONUCLIDES, TOTAL							
Radium 226	0.5	pCi/L				E903.0	03/05/18 16:07 / arh
Radium 226 precision (±)	0.2	pCi/L				E903.0	03/05/18 16:07 / arh
Radium 226 MDC	0.2	pCi/L				E903.0	03/05/18 16:07 / arh
CLIENT PROVIDED FIELD PARAMETERS							
Field Conductivity	266	umhos/cm				FIELD	02/13/18 13:57 / ***
Field pH	8.21	s.u.				FIELD	02/13/18 13:57 / ***
Field Temperature, C	3.2	°C				FIELD	02/13/18 13:57 / ***

*** Field data provided by client

Report RL - Analyte reporting limit.
Definitions: QCL - Quality control limit.
MDC - Minimum detectable concentration

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



Trust our People. Trust our Data.
www.energylab.com

Billings, MT 800.735.4489 • Casper, WY 888.235.0515
Gillette, WY 866.686.7175 • Helena, MT 877.472.0711

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Cotter Corporation
Project: Schwartzwalder Mine
Lab ID: C18030035-001
Client Sample ID: SW-AWD

Report Date: 03/26/18
Collection Date: 02/21/18 11:33
Date Received: 03/01/18
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS, DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	03/05/18 15:50 / eli-b
Uranium	0.0025	mg/L		0.0003		E200.8	03/05/18 15:50 / eli-b
CLIENT PROVIDED FIELD PARAMETERS							
Field Conductivity	237	umhos/cm				FIELD	02/21/18 11:33 / ***
Field pH	8.16	s.u.				FIELD	02/21/18 11:33 / ***
Field Temperature, C	3.1	°C				FIELD	02/21/18 11:33 / ***
*** Field data provided by client							

Report RL - Analyte reporting limit.
Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



Trust our People. Trust our Data.
www.energylab.com

Billings, MT 800.735.4489 • Casper, WY 888.235.0515
Gillette, WY 866.686.7175 • Helena, MT 877.472.0711

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Cotter Corporation
Project: Schwartzwalder Mine
Lab ID: C18030035-002
Client Sample ID: SW-BPL

Report Date: 03/26/18
Collection Date: 02/21/18 11:47
Date Received: 03/01/18
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS, DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	03/05/18 15:53 / eli-b
Uranium	0.0105	mg/L		0.0003		E200.8	03/05/18 15:53 / eli-b
CLIENT PROVIDED FIELD PARAMETERS							
Field Conductivity	224	umhos/cm				FIELD	02/21/18 11:47 / ***
Field pH	7.92	s.u.				FIELD	02/21/18 11:47 / ***
Field Temperature, C	4.0	°C				FIELD	02/21/18 11:47 / ***
*** Field data provided by client							

Report
Definitions: RL - Analyte reporting limit.
QCL - Quality control limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



Trust our People. Trust our Data.
www.energylab.com

Billings, MT 800.735.4489 • Casper, WY 888.235.0515
Gillette, WY 866.686.7175 • Helena, MT 877.472.0711

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Cotter Corporation
Project: Schwartzwalder Mine
Lab ID: C18030035-010
Client Sample ID: SW-AWD

Report Date: 03/26/18
Collection Date: 02/26/18 11:25
Date Received: 03/01/18
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS, DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	03/05/18 16:25 / eli-b
Uranium	0.0025	mg/L		0.0003		E200.8	03/06/18 16:36 / eli-b
CLIENT PROVIDED FIELD PARAMETERS							
Field Conductivity	263	umhos/cm				FIELD	02/26/18 11:25 / ***
Field pH	7.82	s.u.				FIELD	02/26/18 11:25 / ***
Field Temperature, C	5.3	°C				FIELD	02/26/18 11:25 / ***

*** Field data provided by client

Report
Definitions: RL - Analyte reporting limit.
QCL - Quality control limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



Trust our People. Trust our Data.
www.energylab.com

Billings, MT 800.735.4489 • Casper, WY 888.235.0515
Gillette, WY 866.686.7175 • Helena, MT 877.472.0711

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Cotter Corporation
Project: Schwartzwalder Mine
Lab ID: C18030035-011
Client Sample ID: SW-BPL

Report Date: 03/26/18
Collection Date: 02/26/18 11:37
Date Received: 03/01/18
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS, DISSOLVED							
Arsenic	ND	mg/L		0.001		E200.8	03/05/18 16:28 / eli-b
Uranium	0.0098	mg/L		0.0003		E200.8	03/06/18 17:03 / eli-b
CLIENT PROVIDED FIELD PARAMETERS							
Field Conductivity	209	umhos/cm				FIELD	02/26/18 11:37 / ***
Field pH	7.83	s.u.				FIELD	02/26/18 11:37 / ***
Field Temperature, C	5.5	°C				FIELD	02/26/18 11:37 / ***
*** Field data provided by client							

Report RL - Analyte reporting limit.
Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

Date	Mine Pool Depth (Average)	Distance below Steve Level (ft)	Elevation of Water Level (ft)
2/1/2018	126.22	168.21	6433.79
2/2/2018	125.46	168.97	6433.03
2/3/2018	125.65	168.78	6433.22
2/4/2018	124.79	169.64	6432.36
2/5/2018	124.6	169.83	6432.17
2/6/2018	124.89	169.54	6432.46
2/7/2018	124.13	170.3	6431.7
2/8/2018	124.32	170.11	6431.89
2/9/2018	123.56	170.87	6431.13
2/10/2018	122.7	171.73	6430.27
2/11/2018	110.43	184	6418
2/12/2018	110.43	184	6418
2/13/2018	110.43	184	6418
2/14/2018	110.34	184.09	6417.91
2/15/2018	111.11	183.32	6418.68
2/16/2018	110.77	183.66	6418.34
2/17/2018	110.6	183.83	6418.17
2/18/2018	111.2	183.23	6418.77
2/19/2018	#REF!	#REF!	#REF!
2/20/2018	112.57	181.86	6420.14
2/21/2018	112.23	182.2	6419.8
2/22/2018	112.23	182.2	6419.8
2/23/2018	112.14	182.29	6419.71
2/24/2018	111.89	182.54	6419.46
2/25/2018	111.71	182.72	6419.28
2/26/2018	111.8	182.63	6419.37
2/27/2018	111.2	183.23	6418.77
2/28/2018	111.71	182.72	6419.28