

## **Exhibit D**



July 29, 2019

VIA EMAIL

Ms. Yasmin Guevara  
New York State Department of Environmental Conservation - Region 8  
Division of Solid and Hazardous Materials  
6274 East Avon-Lima Road  
Avon, New York 14414

**RE: Hakes C&D, Campbell N.Y.  
Hakes C&D Landfill Permit No. 8-4630-00010/00001-0  
2019 2nd Quarter Leachate Radionuclide Monitoring Results**

Dear Ms. Guevara:

Enclosed please find a copy of the radionuclide sampling and analysis report for leachate sampling conducted during the second quarter 2019. This report is being submitted as required by the facility Environmental Monitoring Plan. Should you have any questions or require clarification of the enclosed data, please do not hesitate to contact me at 603-545-7125 or at russell.anderson@casella.com.

Sincerely,

**CASELLA WASTE SERVICES**

A handwritten signature in black ink that reads "Russell Anderson". The signature is written in a cursive style with a large, prominent "R" and "A".

Russell Anderson  
Manager of Compliance

cc: Larry Shilling, Casella  
Charles Plank, Casella  
Theodore Rahon, CoPhysics  
Jonathan Brandes, On-Site  
Richard Clarkson, NYSDEC  
Timothy Rice, NYSDEC  
Greg MacLean, NYSDEC

Enclosures



## ON-SITE TECHNICAL SERVICES, INC

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72 Railroad Avenue  
Wellsville, New York 14895

Phone: (585) 593-1824  
Fax: (585) 593-7471

July 29, 2019

Mr. Russell Anderson  
Casella Waste Systems, Inc.  
4376 Manning Ridge Road  
Campbell, New York 14870

Re: Hakes C & D Landfill Campbell, New York – 2<sup>nd</sup> Quarter 2019 Radionuclide Test Results

Dear Russell:

The purpose of this letter is to present results of the leachate radiological sampling conducted at the Hakes C & D Landfill during the second quarter 2019. Leachate sampling and analysis for radionuclides is required as detailed in section 2.6.3 of the April 2015 Environmental Monitoring Plan (EMP). The initial radiological sampling and analysis of each landfill cell and combined leachate was completed in May 2012. Therefore, the sampling required in the second quarter 2019 includes only landfill cells which have received gas well waste. Currently, the cells containing gas well waste includes cells 5 through 8. Leachate from cell 7 drains through cell 4 and cell 8A leachate flows through cell 3. Therefore, second quarter 2019 leachate samples were collected from cells 3, 4, 5, 6 and 8B-D. Samples were collected by On-Site on May 1, 2019 and analyzed by ALS Environmental (ALS) located in Fort Collins, Colorado. ALS Fort Collins is a New York State accredited laboratory. Attached Table 1 displays the current and historic leachate radionuclide results from leachate sampling conducted between the second quarter 2017 and second quarter 2019. Also enclosed are the second quarter 2019 field sampling forms and laboratory analytical report.

If you have any questions regarding the information in this submittal, please call me at 585-593-1824.

Sincerely,

A handwritten signature in black ink, appearing to read "Jonathan E. Brandes".

Jonathan E. Brandes, P.G.  
Senior Geologist

Enclosures

Table 1

**Leachate Radionuclide Analytical Results**  
**Second Quarter 2017 through Second Quarter 2019**  
**Hakes C and D Landfill**  
**Campbell, New York**

Parameter	Cell 3 Leachate 6/6/2017	Cell 3 Leachate 11/17/2017	Cell 3 Leachate 2/27/2018	Cell 3 Leachate 6/26/2018	Cell 3 Leachate 11/8/2018	Cell 3 Leachate 5/1/2019	Cell 4 Leachate 6/6/2017	Cell 4 Leachate 11/17/2017	Cell 4 Leachate 2/27/2018	Cell 4 Leachate 6/26/2018	Cell 4 Leachate 11/8/2018	Cell 4 Leachate 5/1/2019
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**Field Parameters**

Field pH (std. units)	6.78	6.91	6.69	6.87	6.81	7.11	6.83	7.14	6.86	7.08	7.1	7.11
ORP (mV)	-323.8	-151.7	30.6	33.7	-138.7	-219.3	2.8	-213.7	11.6	-136.4	-204.8	-156.7
Specific Conductivity (us/cm)	9085	7443	6191	7430	6443	7708	6304	6889	6379	7893	6219	6095
Temperature (deg. C)	21.7	16.8	17	26.9	13.9	14.8	19.7	16.6	18.3	26.4	13	15.2
Turbidity (NTU)	69.2	140	20.6	48.4	76.6	77.1	14.7	42.1	76.1	87	61	77.1

**Radionuclide Act + Unc (MDC) pCi/L**

Lead-210, Dissolved (Eichrom)			0.11 ± 0.58 (0.97)			-0.37 ± 0.45 (0.9)			0.52 ± 0.61 (0.98)			-0.37 ± 0.43 (0.88)	-0.42 ± 0.36 (0.71)
Lead-210, Total (Eichrom)			0.62 ± 0.57 (0.9)			0.21 ± 0.49 (0.83)			0.59 ± 0.57 (0.9)			-0.42 ± 0.42 (0.86)	-0.38 ± 0.37 (0.72)
Radium-226, Dissolved (EPA 903.1)	1.75 ± 1.10 (0.473)	2.69 ± 0.78 (0.22)	1.37 ± 0.46 (0.23)	1.18 ± 0.56 (0.44)	1 ± 1.3 (2)	2.1 ± 1.1 (1.1)	2.57 ± 1.30 (0.436)	1.59 ± 0.51 (0.24)	1.36 ± 0.44 (0.11)	2.54 ± 0.95 (0.36)	2.3 ± 1.4 (1.5)	2.8 ± 1.4 (1.1)	
Radium-226, Total (EPA 903.1)	2.85 ± 1.53 (0.552)	2.8 ± 0.78 (0.17)	2.67 ± 0.77 (0.18)	1.39 ± 0.57 (0.36)	1.2 ± 1.1 (1.3)	2.9 ± 1.4 (1.3)	2.58 ± 1.51 (1.79)	2.53 ± 0.72 (0.21)	2.16 ± 0.64 (0.21)	2.57 ± 0.91 (0.45)	2.4 ± 1.4 (1.4)	1.31 ± 0.92 (1.15)	
Radium-228, Dissolved (EPA 904.0)	3.25 ± 0.960 (1.15)	1.83 ± 0.57 (0.62)	1.11 ± 0.44 (0.65)	1.9 ± 0.68 (0.92)	2.1 ± 1.5 (2.9)	2.67 ± 0.78 (0.8)	3.88 ± 0.957 (0.821)	2.48 ± 0.71 (0.63)	0.71 ± 0.37 (0.64)	2.14 ± 0.73 (0.92)	1.7 ± 1.5 (3.1)	2.11 ± 0.7 (0.9)	
Radium-228, Total (EPA 904.0)	3.9 ± 1.30 (1.88)	2.02 ± 0.63 (0.71)	0.75 ± 0.37 (0.65)	4.2 ± 1.1 (0.8)	2.3 ± 1.5 (2.9)	3.3 ± 0.97 (0.96)	2.72 ± 0.892 (1.26)	2.22 ± 0.68 (0.74)	1.7 ± 0.56 (0.71)	2.32 ± 0.76 (0.9)	3.9 ± 2.1 (3.8)	1.52 ± 0.55 (0.78)	
Total Uranium, Dissolved (ASTM D5174-97)	0.00359 ± 0.156 (0.385)						0.000711 ± 0.033 (0.385)						
Total Uranium, Dissolved (EPA 908.0)						< (0.0992)	0.29 ± 0.15 (0.13)				0.899 ± 0.243 (0.12)	0.22 ± 0.12 (0.11)	
Total Uranium, Dissolved (HASL-300)		0.29 ± 0.19 (0.22)	0.35 ± 0.16 (0.12)	0.27 ± 0.14 (0.14)				0.48 ± 0.18 (0.1)	1.15 ± 0.28 (0.11)	0.73 ± 0.21 (0.11)			
Total Uranium, Total (ASTM D5174-97)	0.00251 ± 0.127 (0.385)						0.000764 ± 0.029 (0.385)						
Total Uranium, Total (EPA 908.0)						< (0.0657)	0.25 ± 0.13 (0.12)				0.86 ± 0.2744 (0.116)	0.29 ± 0.16 (0.15)	
Total Uranium, Total (HASL-300)		0.31 ± 0.15 (0.15)	0.37 ± 0.15 (0.12)	0.35 ± 0.15 (0.12)				0.56 ± 0.19 (0.1)	1.14 ± 0.35 (0.18)	0.84 ± 0.25 (0.13)			

Parameter	Cell 5 Leachate 6/6/2017	Cell 5 Leachate 11/17/2017	Cell 5 Leachate 6/26/2018	Cell 5 Leachate 11/8/2018	Cell 5 Leachate 5/1/2019	Cell 6 Leachate 6/6/2017	Cell 6 Leachate 11/17/2017	Cell 6 Leachate 6/26/2018	Cell 6 Leachate 11/8/2018	Cell 6 Leachate 5/1/2019	Cell 8 Leachate 6/6/2017	Cell 8 Leachate 11/17/2017	Cell 8 Leachate 2/27/2018	Cell 8 Leachate 6/26/2018	Cell 8 Leachate 11/8/2018	Cell 8 Leachate 5/1/2019
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**Field Parameters**

Field pH (std. units)	6.79	6.88	6.88	6.81	6.95	6.84	6.97	6.99	7.03	7.15	6.74	6.62	6.47	6.62	6.51	6.58
ORP (mV)	-205.9	-102.1	-85.2	-142.7	-140.8	-291.7	-239.1	-305.9	-196	-252.6	-257.4	-13.5	10	-208.4	-95.7	-54.4
Specific Conductivity (us/cm)	6221	6278	8030	7890	8522	12178	10151	11169	7566	9445	5306	2286	1577	3300	3718	5416
Temperature (deg. C)	21.9	16.2	28.4	13.2	15.5	24.6	19.2	29.7	14.8	17	22	14	16	28.2	15.6	14.4
Turbidity (NTU)	64.3	41.6	78.8	79.3	49.3	67.4	107	26.3	35.9	35.9	38.4	140	111	> 1000	> 1000	> 1000

**Radionuclide Act + Unc (MDC) pCi/L**

Lead-210, Dissolved (Eichrom)				2.42 ± 0.95 (0.89)	-0.43 ± 0.35 (0.69)				-0.31 ± 0.46 (0.91)	0.02 ± 0.4 (0.72)			0.36 ± 0.6 (0.98)		0.53 ± 0.56 (0.87)	0.03 ± 0.4 (0.71)
Lead-210, Total (Eichrom)				-0.25 ± 0.44 (0.87)	-0.26 ± 0.36 (0.69)				-0.32 ± 0.43 (0.85)	1.46 ± 0.64 (0.71)			0.19 ± 0.59 (0.98)		0.01 ± 0.46 (0.84)	-0.12 ± 0.37 (0.69)
Radium-226, Dissolved (EPA 903.1)	0.898 ± 0.933 (1.39)	1.07 ± 0.36 (0.16)	0 ± 0.17 (0.25)	0 ± 0.72 (1.59)	0.83 ± 0.74 (0.99)	2.34 ± 1.21 (1.01)	2.77 ± 0.78 (0.19)	2.4 ± 1.2 (1.1)	1.5 ± 1.4 (2.2)	1.9 ± 0.99 (0.67)	1.51 ± 1.00 (0.455)	0.88 ± 0.31 (0.16)	0.59 ± 0.27 (0.23)	0.16 ± 0.3 (0.52)	1.1 ± 1.4 (2.2)	0.4 ± 0.71 (1.21)
Radium-226, Total (EPA 903.1)	1.35 ± 1.30 (1.87)	1.07 ± 0.36 (0.19)	0.39 ± 0.33 (0.46)	0 ± 0.75 (1.43)	1.27 ± 0.82 (0.72)	2.75 ± 1.80 (1.84)	1.81 ± 0.53 (0.12)	2.11 ± 0.75 (0.3)	2.6 ± 1.4 (1)	2.7 ± 1.3 (0.9)	2.43 ± 2.24 (1.32)	1.38 ± 0.45 (0.18)	0.89 ± 0.34 (0.2)	2.4 ± 0.83 (0.35)	0.28 ± 0.88 (1.67)	0.52 ± 0.62 (0.94)
Radium-228, Dissolved (EPA 904.0)	2.42 ± 0.699 (0.785)	1.85 ± 0.57 (0.61)	0.69 ± 0.46 (0.89)	0.3 ± 1.6 (3.5)	1.05 ± 0.47 (0.78)	2.07 ± 0.649 (0.807)	3.1 ± 0.84 (0.62)	2.28 ± 0.72 (0.82)	1.9 ± 1.6 (3.2)	2.15 ± 0.68 (0.8)	1.65 ± 0.611 (0.89)	1.38 ± 0.51 (0.72)	0.96 ± 0.4 (0.63)	1.68 ± 0.62 (0.87)	2.5 ± 1.6 (3)	0.54 ± 0.42 (0.82)
Radium-228, Total (EPA 904.0)	1.32 ± 0.846 (1.64)	1.07 ± 0.46 (0.75)	0.97 ± 0.49 (0.86)	2.9 ± 1.9 (3.5)	0.97 ± 0.44 (0.74)	2.4 ± 1.04 (1.77)	1.18 ± 0.46 (0.7)	2.64 ± 0.83 (0.9)	4.7 ± 1.9 (3.1)	1.89 ± 0.63 (0.82)	1.77 ± 1.34 (2.7)	1.46 ± 0.54 (0.79)	0.7 ± 0.38 (0.68)	1.71 ± 0.62 (0.85)	0.7 ± 1.3 (2.8)	1.17 ± 0.51 (0.82)
Total Uranium, Dissolved (ASTM D5174-97)	0.000797 ± 0.036 (0.385)					0.00105 ± 0.047 (0.385)					0.000911 ± 0.047 (0.385)					
Total Uranium, Dissolved (EPA 908.0)				< (0.075)	1.31 ± 0.32 (0.17)				0.418 ± 0.158 (0.0902)	0.46 ± 0.18 (0.13)					< (0.0523)	2.65 ± 0.47 (0.13)
Total Uranium, Dissolved (HASL-300)		0.75 ± 0.2 (0.1)	0.51 ± 0.19 (0.13)				0.32 ± 0.13 (0.09)	0.63 ± 0.19 (0.1)				0.59 ± 0.21 (0.16)	0.5 ± 0.2 (0.15)	4.22 ± 0.66 (0.11)		
Total Uranium, Total (ASTM D5174-97)	0.000733 ± 0.034 (0.385)					0.00112 ± 0.039 (0.385)					0.000866 ± 0.046 (0.385)					
Total Uranium, Total (EPA 908.0)				< (0.0897)	1.25 ± 0.31 (0.14)				< (0.0809)	0.41 ± 0.16 (0.12)					< (0.0914)	3.63 ± 0.62 (0.15)
Total Uranium, Total (HASL-300)		0.82 ± 0.26 (0.15)	0.52 ± 0.18 (0.13)				0.25 ± 0.19 (0.23)	0.67 ± 0.2 (0.12)				0.65 ± 0.18 (0.12)	0.52 ± 0.16 (0.06)	7.8 ± 1 (0.2)		

**Notes:**

Act + Unc (MDC) = Activity ± Uncertainty (Minimum Detectable Concentration)

pCi/L = picocuries per liter

Dissolved - Indicates sample filtered with 0.45 micron filter prior to analysis.

Each of EPA 903.1, EPA 904.0, EPA 908.0, ASTM D5174-97, HASL-300 are laboratory analysis methods.

# Groundwater Suppression and Leachate Sampling Field Form

## On-Site Technical Services, Inc.

Project: Hakes C&D Landfill, Campbell, New York

Date: 5-1-19

Sampling Location: Cell-3 Sample ID: Cell3-0519 Arrival Time: 1100

### Weather Conditions:

Temp. 49 °F ( ) Sunny ( ) Partly Cloudy (X) Cloudy ( ) Light Rain ( ) Hvy. Rain ( ) Snow

Wind Conditions: 0-5mph

### Location Type

( ) Groundwater Suppression (X) Leachate ( ) Secondary Leachate ( ) Surface Water/Sediment ( ) Res. Water  
( ) Other \_\_\_\_\_

### Flow and Depth Information (as appropriate)

Depth: NA Estimated Flow: \_\_\_\_\_

Comments: MANUAL Switch activated by Mike & Helper

### Field Parameters (as appropriate)

Meter: YSI (sn: 146100804), Hach 2100P (sn: 13309)

Field Parameters tested in: ( ) Submerged Probe (X) Cup

Note: Turbidity measured from a vial grab sample

Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)
<u>1120</u>	<u>7.11</u>	<u>7708</u>	<u>77.1</u>	<u>NA</u>	<u>14.8</u>	<u>-219.3</u>

### Sample Information

Sample Type: (X) Grab ( ) Composite Sample Location: (X) Discharge Pipe ( ) Pond ( ) Ditch

Location Description/Condition: Riser discharge pipe

Sample Collection Equipment/Method: Ded 5gal Bucket Sample Time: 1120

Sample Description (clarity/color): Slightly Cloudy Sample Odor (Y) or (N) Explain: \_\_\_\_\_  
with light Amber tint

Other Observations/Comments: \_\_\_\_\_

Analysis Requested: RAD Number of Containers: 8

Sampling Completion: Time 1138 Date 5-1-19 Samplers K DYE

# Groundwater Suppression and Leachate Sampling Field Form

## On-Site Technical Services, Inc.

Project: Hakes C&D Landfill, Campbell, New York

Date: 5-1-19

Sampling Location: Cell-4 Sample ID: Cell4-0519 Arrival Time: 1146

**Weather Conditions:**

Temp. 56° F ( ) Sunny ( ) Partly Cloudy (  ) Cloudy ( ) Light Rain ( ) Hvy. Rain ( ) Snow

Wind Conditions: 0-10mph

**Location Type**

( ) Groundwater Suppression (  ) Leachate ( ) Secondary Leachate ( ) Surface Water/Sediment ( ) Res. Water  
( ) Other \_\_\_\_\_

**Flow and Depth Information (as appropriate)**

Depth: NA Estimated Flow: \_\_\_\_\_

Comments: MANUAL ~~SW~~ operated switch by Mike + helper

**Field Parameters (as appropriate)**

Meter: YSI (sn: 142100804), Hach 2100P (sn: 13309)

Field Parameters tested in: ( ) Submerged Probe (  ) Cup

Note: Turbidity measured from a vial grab sample

Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)
<u>1200</u>	<u>7.11</u>	<u>6095</u>	<u>77.1</u>	<u>NA</u>	<u>15.2</u>	<u>-156.7</u>

**Sample Information**

Sample Type: (  ) Grab ( ) Composite Sample Location: (  ) Discharge Pipe ( ) Pond ( ) Ditch

Location Description/Condition: Riser discharge pipe

Sample Collection Equipment/Method: Ded 5 gal Bucket Sample Time: 1200

Sample Description (clarity/color): Slightly Cloudy with light Amber tint Sample Odor (  ) (N) Explain: Slight leachate odor

Other Observations/Comments: \_\_\_\_\_

Analysis Requested: RAD Number of Containers: 8

Sampling Completion: Time 1216 Date 5-1-19 Samplers K Dye

# Groundwater Suppression and Leachate Sampling Field Form On-Site Technical Services, Inc.

Project: Hakes C&D Landfill, Campbell, New York

Date: 5-1-19

Sampling Location: Cell-5

Sample ID: Cell5-0519

Arrival Time: 1220

### Weather Conditions:

Temp. 59° F ( ) Sunny ( ) Partly Cloudy (X) Cloudy ( ) Light Rain ( ) Hvy. Rain ( ) Snow

Wind Conditions: 0-10 mph

### Location Type

( ) Groundwater Suppression (X) Leachate ( ) Secondary Leachate ( ) Surface Water/Sediment ( ) Res. Water  
( ) Other \_\_\_\_\_

### Flow and Depth Information (as appropriate)

Depth: NA Estimated Flow: \_\_\_\_\_

Comments: MANUAL Switch operated by Mike + Helper

### Field Parameters (as appropriate)

Meter: YSI (sn: 146100804), Hach 2100P (sn: 13309)

Field Parameters tested in: ( ) Submerged Probe (X) Cup  
Note: Turbidity measured from a vial grab sample

Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)
<u>1235</u>	<u>6.95</u>	<u>8522</u>	<u>49.3</u>	<u>NA</u>	<u>15.5</u>	<u>-140.8</u>

### Sample Information

Sample Type: (X) Grab ( ) Composite Sample Location: (X) Discharge Pipe ( ) Pond ( ) Ditch

Location Description/Condition: Riser discharge pipe

Sample Collection Equipment/Method: Ded 5 gal Bucket

Sample Time: 1235

Sample Description (clarity/color): Slightly Cloudy  
Slight Amber tint

Sample Odor (Y) or (N) Explain: light leachate odor

Other Observations/Comments: \_\_\_\_\_

Analysis Requested: RAD

Number of Containers: 8

Sampling Completion: Time 1250 Date 5-1-19 Samplers K D E

# Groundwater Suppression and Leachate Sampling Field Form

## On-Site Technical Services, Inc.

Project: Hakes C&D Landfill, Campbell, New York

Date: 5-1-19

Sampling Location: Cell-6 Sample ID: Cell6-0519 Arrival Time: 1255

### Weather Conditions:

Temp. 57° F ( ) Sunny ( ) Partly Cloudy  Cloudy ( ) Light Rain ( ) Hvy. Rain ( ) Snow

Wind Conditions: 0-10mph

### Location Type

( ) Groundwater Suppression  Leachate ( ) Secondary Leachate ( ) Surface Water/Sediment ( ) Res. Water  
( ) Other \_\_\_\_\_

### Flow and Depth Information (as appropriate)

Depth: NA Estimated Flow: \_\_\_\_\_

Comments: MANUAL Switch operated by Mike & Helper

### Field Parameters (as appropriate)

Meter: YSI (sn: 142100804), Hach 2100P (sn: 13309)

Field Parameters tested in: ( ) Submerged Probe  Cup  
Note: Turbidity measured from a vial grab sample

Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)
<u>1310</u>	<u>7.15</u>	<u>9445</u>	<u>35.9</u>	<u>NA</u>	<u>17.0</u>	<u>-252.6</u>

### Sample Information

Sample Type:  Grab ( ) Composite Sample Location:  Discharge Pipe ( ) Pond ( ) Ditch

Location Description/Condition: Riser discharge pipe

Sample Collection Equipment/Method: 5 gal Bucket Sample Time: 1310

Sample Description (clarity/color): Slightly cloudy with light amber tint Sample Odor (Y) or (N) Explain: leachate odor

Other Observations/Comments: \_\_\_\_\_

Analysis Requested: RAD Number of Containers: 8

Sampling Completion: Time 1329 Date 5-1-19 Samplers R D E



# Groundwater Suppression and Leachate Sampling Field Form

## On-Site Technical Services, Inc.

Project: Hakes C&D Landfill, Campbell, New York

Date: 5-1-19

Sampling Location: Cell-8B Sample ID: Cell8B-0519 Arrival Time: 1000

### Weather Conditions:

Temp. 49 ° F ( ) Sunny ( ) Partly Cloudy (  ) Cloudy ( ) Light Rain ( ) Hvy. Rain ( ) Snow

Wind Conditions: 0-10mph

### Location Type

( ) Groundwater Suppression (  ) Leachate ( ) Secondary Leachate ( ) Surface Water/Sediment ( ) Res. Water  
( ) Other \_\_\_\_\_

### Flow and Depth Information (as appropriate)

Depth: NA Estimated Flow: \_\_\_\_\_

Comments: Manual Switch Activated by Mike + Helper

### Field Parameters (as appropriate)

Meter: YSI (sn: 144100804), Hach 2100P (sn: 13309)

Field Parameters tested in: ( ) Submerged Probe (  ) Cup  
Note: Turbidity measured from a vial grab sample

Time	pH	Conductivity (us/cm)	Turbidity (ntu)	D.O. (mg/L)	Temp. (°C)	ORP (mV)
<u>1030</u>	<u>6.58</u>	<u>5416</u>	<u>&gt;1000</u>	<u>NA</u>	<u>14.4</u>	<u>-56.4</u>

### Sample Information

Sample Type: (  ) Grab ( ) Composite Sample Location: (  ) Discharge Pipe ( ) Pond ( ) Ditch

Location Description/Condition: Riser Discharge pipe

Sample Collection Equipment/Method: Jed 5 gal Bucket Sample Time: 1030

Sample Description (clarity/color): Cloudy Black Color Sample Odor (  ) (Y) or (N) Explain: leachate odor

Other Observations/Comments: Noticed significant amount of Solids in Sample mixed in Extra 5 gal Bucket to agitate sample.

Analysis Requested: RAD Number of Containers: 108

Sampling Completion: Time 1053 Date 5-1-19 Samplers K DYE



June 03, 2019

Service Request No:R1903920

Russell Anderson  
Casella Waste Systems - Hakes Billing  
4 Chenell Drive Suite 200  
Concord, NH 03301

**Laboratory Results for: Hakes C&D Landfill - Leachate RAD.**

Dear Russell,

Enclosed are the results of the sample(s) submitted to our laboratory May 02, 2019  
For your reference, these analyses have been assigned our service request number **R1903920**.

All testing was performed according to our laboratory's quality assurance program and met the requirements of the TNI standards except as noted in the case narrative report. Any testing not included in the lab's accreditation is identified on a Non-Certified Analytes report. All results are intended to be considered in their entirety. ALS Environmental is not responsible for use of less than the complete report. Results apply only to the individual samples submitted to the lab for analysis, as listed in the report. The measurement uncertainty of the results included in this report is within that expected when using the prescribed method(s), and represented by Laboratory Control Sample control limits. Any events, such as QC failures or Holding Time exceedances, which may add to the uncertainty are explained in the report narrative or are flagged with qualifiers. The flags are explained in the Report Qualifiers and Definitions page of this report.

Please contact me if you have any questions. My extension is 7472. You may also contact me via email at [Janice.Jaeger@alsglobal.com](mailto:Janice.Jaeger@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Janice Jaeger  
Project Manager

CC: Jon Brandes

**ADDRESS**

1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623

**PHONE** +1 585 288 5380 | **FAX** +1 585 288 8475

ALS Group USA, Corp.  
dba ALS Environmental



# Narrative Documents

**ALS Environmental—Rochester Laboratory**  
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623  
Phone (585) 288-5380 Fax (585) 288-8475  
[www.alsglobal.com](http://www.alsglobal.com)



**Client:** Casella Waste Systems (Hampden ME)  
**Project:** Hakes C&D Landfill - Leachate RAD.  
**Sample Matrix:** Water

**Service Request:** R1903920  
**Date Received:** 05/02/2019

**CASE NARRATIVE**

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier II level requested by the client.

**Sample Receipt:**

Ten water samples were received for analysis at ALS Environmental on 05/02/2019. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

**Subcontracted Analytical Parameters:**

One or more samples were subcontracted to another laboratory for testing. The certified analytical report from the subcontractor has been included in its entirety at the end of this report and includes the name and address of the subcontracted laboratory.

A handwritten signature in black ink, appearing to read "Samantha", is written over a horizontal line.

Approved by \_\_\_\_\_

Date 06/03/2019



## Sample Receipt Information

**ALS Environmental—Rochester Laboratory**  
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623  
Phone (585) 288-5380 Fax (585) 288-8475  
[www.alsglobal.com](http://www.alsglobal.com)





# Cooler Receipt and Preservation Check Form

R1903920

5

Casella Waste Systems - Hakes Billing  
Hakes C&D Landfill - Leachate RAD.



Project/Client Casella - Hakes Folder Number \_\_\_\_\_

Cooler received on 5/2/19 by: @

COURIER: ALS UPS FEDEX VELOCITY CLIENT

1	Were Custody seals on outside of cooler?	<input checked="" type="radio"/> Y	<input type="radio"/> N
2	Custody papers properly completed (ink, signed)?	<input checked="" type="radio"/> Y	<input type="radio"/> N
3	Did all bottles arrive in good condition (unbroken)?	<input checked="" type="radio"/> Y	<input type="radio"/> N
4	Circle: <u>Wet Ice</u> Dry Ice Gel packs present?	<input checked="" type="radio"/> Y	<input type="radio"/> N

5a	Perchlorate samples have required headspace?	<input type="radio"/> Y	<input type="radio"/> N	<input checked="" type="radio"/> NA
5b	Did VOA vials, <u>Air</u> or <u>Sulfide</u> have sig* bubbles?	<input checked="" type="radio"/> Y	<input checked="" type="radio"/> N	<input type="radio"/> NA
6	Where did the bottles originate?	<u>ALS/ROC</u>	CLIENT	
7	Soil VOA received as: Bulk Encore 5035set	<input checked="" type="radio"/> NA		

8. Temperature Readings Date: 5/2/19 Time: 0940 ID: IR#7 IR#10 From: Temp Blank Sample Bottle

Observed Temp (°C)	<u>0.8</u>	<u>1.8</u>	<u>3.9</u>	<u>4.2</u>	<u>2.4</u>	<u>3.8</u>	
Correction Factor (°C)	<u>-</u>	<u>+0.3</u>	<u>→</u>			<u>+0.3</u>	
Corrected Temp (°C)	<u>0.8</u>	<u>2.1</u>	<u>4.2</u>	<u>4.5</u>	<u>2.7</u>	<u>4.1</u>	
Temp from: Type of bottle	<u>-</u>	<u>Out tube</u>	<u>→</u>			<u>-</u>	
Within 0-6°C?	<input checked="" type="radio"/> Y <input type="radio"/> N	<input checked="" type="radio"/> Y <input type="radio"/> N	<input checked="" type="radio"/> Y <input type="radio"/> N	<input checked="" type="radio"/> Y <input type="radio"/> N	<input checked="" type="radio"/> Y <input type="radio"/> N	<input checked="" type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N
If <0°C, were samples frozen?	<input type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N	<input type="radio"/> Y <input type="radio"/> N

If out of Temperature, note packing/ice condition: \_\_\_\_\_ Ice melted Poorly Packed (described below) Same Day Rule  
& Client Approval to Run Samples: \_\_\_\_\_ Standing Approval Client aware at drop-off Client notified by: \_\_\_\_\_

All samples held in storage location: R002 by @ on 5/2/19 at 0950  
5035 samples placed in storage location: \_\_\_\_\_ by \_\_\_\_\_ on \_\_\_\_\_ at \_\_\_\_\_

Cooler Breakdown/Preservation Check\*\*: Date: 5/2/19 Time: 1020 by: @

- 9. Were all bottle labels complete (i.e. analysis, preservation, etc.)?  YES  NO
- 10. Did all bottle labels and tags agree with custody papers?  YES  NO
- 11. Were correct containers used for the tests indicated?  YES  NO
- 12. Were 5035 vials acceptable (no extra labels, not leaking)?  YES  NO  N/A
- 13. Air Samples: Cassettes / Tubes Intact with MS? Canisters Pressurized Tedlar® Bags Inflated  N/A

pH	Lot of test paper	Reagent	Preserved?		Lot Received	Exp	Sample ID Adjusted	Vol. Added	Lot Added	Final pH
			Yes	No						
≥12		NaOH								
≤2		HNO <sub>3</sub>			<u>B2801E</u>	<u>4/70</u>				
≤2		H <sub>2</sub> SO <sub>4</sub>								
<4		NaHSO <sub>4</sub>								
5-9		For 608pest			No=Notify for 3day					
Residual Chlorine (-)		For CN, Phenol, 625, 608pest, 522			If +, contact PM to add Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> (625, 608, CN), ascorbic (phenol).					
		Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>								
		ZnAcetate	-	-						
		HCl	**	**						

\*\*VOAs and 1664 Not to be tested before analysis. Otherwise, all bottles of all samples with chemical preservatives are checked (not just representatives).

Bottle lot numbers: 032518-2ABF  
Explain all Discrepancies/ Other Comments:

CLRES	BULK
DO	FLDT
HPROD	HGFB
HTR	LL3541
PH	<u>SUB</u>
SO3	MARRS
ALS	REV

Labels secondary reviewed by: @  
PC Secondary Review: 4/16/19 \*significant air bubbles: VOA > 5-6 mm : WC > 1 in. diameter



## Miscellaneous Forms

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## REPORT QUALIFIERS AND DEFINITIONS

<p>U Analyte was analyzed for but not detected. The sample quantitation limit has been corrected for dilution and for percent moisture, unless otherwise noted in the case narrative.</p> <p>J Estimated value due to either being a Tentatively Identified Compound (TIC) or that the concentration is between the MRL and the MDL. Concentrations are not verified within the linear range of the calibration. For DoD: concentration &gt;40% difference between two GC columns (pesticides/Aroclors).</p> <p>B Analyte was also detected in the associated method blank at a concentration that may have contributed to the sample result.</p> <p>E Inorganics- Concentration is estimated due to the serial dilution was outside control limits.</p> <p>E Organics- Concentration has exceeded the calibration range for that specific analysis.</p> <p>D Concentration is a result of a dilution, typically a secondary analysis of the sample due to exceeding the calibration range or that a surrogate has been diluted out of the sample and cannot be assessed.</p> <p>* Indicates that a quality control parameter has exceeded laboratory limits. Under the “Notes” column of the Form I, this qualifier denotes analysis was performed out of Holding Time.</p> <p>H Analysis was performed out of hold time for tests that have an “immediate” hold time criteria.</p> <p># Spike was diluted out.</p>	<p>+ Correlation coefficient for MSA is &lt;0.995.</p> <p>N Inorganics- Matrix spike recovery was outside laboratory limits.</p> <p>N Organics- Presumptive evidence of a compound (reported as a TIC) based on the MS library search.</p> <p>S Concentration has been determined using Method of Standard Additions (MSA).</p> <p>W Post-Digestion Spike recovery is outside control limits and the sample absorbance is &lt;50% of the spike absorbance.</p> <p>P Concentration &gt;40% difference between the two GC columns.</p> <p>C Confirmed by GC/MS</p> <p>Q DoD reports: indicates a pesticide/Aroclor is not confirmed (<math>\geq 100\%</math> Difference between two GC columns).</p> <p>X See Case Narrative for discussion.</p> <p>MRL Method Reporting Limit. Also known as: LOQ Limit of Quantitation (LOQ) The lowest concentration at which the method analyte may be reliably quantified under the method conditions.</p> <p>MDL Method Detection Limit. A statistical value derived from a study designed to provide the lowest concentration that will be detected 99% of the time. Values between the MDL and MRL are estimated (see J qualifier).</p> <p>LOD Limit of Detection. A value at or above the MDL which has been verified to be detectable.</p> <p>ND Non-Detect. Analyte was not detected at the concentration listed. Same as U qualifier.</p>
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### Rochester Lab ID # for State Certifications<sup>1</sup>

Connecticut ID # PH0556	Maine ID #NY0032	Pennsylvania ID# 68-786
Delaware Approved	New Hampshire ID # 2941	Rhode Island ID # 158
DoD ELAP #65817	New York ID # 10145	Virginia #460167
Florida ID # E87674	North Carolina #676	

<sup>1</sup> Analyses were performed according to our laboratory’s NELAP-approved quality assurance program and any applicable state or agency requirements. The test results meet requirements of the current NELAP/TNI standards or state or agency requirements, where applicable, except as noted in the case narrative. Since not all analyte/method/matrix combinations are offered for state/NELAC accreditation, this report may contain results which are not accredited. For a specific list of accredited analytes, contact the laboratory or go to <https://www.alsglobal.com/locations/americas/north-america/usa/new-york/rochester-environmental>

# ALS Laboratory Group

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## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.



## INORGANIC PREPARATION METHODS

The preparation methods associated with this report are found in these tables unless discussed in the case narrative.

### Water/Liquid Matrix

Analytical Method	Preparation Method
200.7	200.2
200.8	200.2
6010C	3005A/3010A
6020A	ILM05.3
9014 Cyanide Reactivity	SW846 Ch7, 7.3.4.2
9034 Sulfide Reactivity	SW846 Ch7, 7.3.4.2
9034 Sulfide Acid Soluble	9030B
9056A Bomb (Halogens)	5050A
9066 Manual Distillation	9065
SM 4500-CN-E Residual Cyanide	SM 4500-CN-G
SM 4500-CN-E WAD Cyanide	SM 4500-CN-I

### Solid/Soil/Non-Aqueous Matrix

Analytical Method	Preparation Method
6010C	3050B
6020A	3050B
6010C TCLP (1311) extract	3005A/3010A
6010 SPLP (1312) extract	3005A/3010A
7196A	3060A
7199	3060A
9056A Halogens/Halides	5050
300.0 Anions/ 350.1/ 353.2/ SM 2320B/ SM 5210B/ 9056A Anions	DI extraction

For analytical methods not listed, the preparation method is the same as the analytical method reference.



## Subcontracted Analytical Parameters

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[www.alsglobal.com](http://www.alsglobal.com)



Friday, May 31, 2019

Janice Jaeger  
ALS Environmental  
1565 Jefferson Rd., Bldg 300  
Rochester, NY 14623

Re: ALS Workorder: 1905105  
Project Name:  
Project Number: R1903920

Dear Ms. Jaeger:

Ten water samples were received from ALS Environmental, on 5/7/2019. The samples were scheduled for the following analyses:

Lead-210

Radium-226

Radium-228

Total Uranium

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental  
Jeff R. Kujawa  
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280



## 1905105

### **Radium-228:**

The samples were analyzed for the presence of  $^{228}\text{Ra}$  by low background gas flow proportional counting of  $^{228}\text{Ac}$ , which is the ingrown progeny of  $^{228}\text{Ra}$ , according to EPA method 904.0. Samples 1905105-6 through -10 were filtered and preserved prior to analysis.

All acceptance criteria were met.

### **Radium-226:**

The samples were prepared and analyzed according to EPA method 903.1. Samples 1905105-6 through -10 were filtered and preserved prior to analysis.

All acceptance criteria were met.

### **Total Uranium:**

The samples were analyzed for the presence of isotopic and total uranium according to EPA method 908.0. Samples 1905105-6 through -10 were filtered and preserved prior to analysis.

All acceptance criteria were met.

### **Lead-210:**

The samples were analyzed for the presence of  $^{210}\text{Pb}$  according to the Eichrom method. Samples 1905105-6 through -10 were filtered and preserved prior to analysis.

All acceptance criteria were met.

# ALS -- Fort Collins

## Sample Number(s) Cross-Reference Table

---

**OrderNum:** 1905105

**Client Name:** ALS Environmental

**Client Project Name:**

**Client Project Number:** R1903920

**Client PO Number:** R1903920

---

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
Cell 8B-0519	1905105-1		WATER	01-May-19	10:30
Cell 3-0519	1905105-2		WATER	01-May-19	11:20
Cell 4-0519	1905105-3		WATER	01-May-19	12:00
Cell 5-0519	1905105-4		WATER	01-May-19	12:35
Cell 6-05-19	1905105-5		WATER	01-May-19	13:10
Cell 8B-0519 Diss	1905105-6		WATER	01-May-19	10:30
Cell 3-0519 Diss	1905105-7		WATER	01-May-19	11:20
Cell 4-0519 Diss	1905105-8		WATER	01-May-19	12:00
Cell 5-0519 Diss	1905105-9		WATER	01-May-19	12:35
Cell 6-05-19 Diss	1905105-10		WATER	01-May-19	13:10



# ALS Environmental Chain of Custody

1565 Jefferson Rd, Building 300 • Rochester, NY 14623 • 585-288-5380 • FAX 585-288-8475

ALS Contact: Janice Jaeger

Project Number: R1903920  
 Project Manager: Janice Jaeger  
 QAP: LAB QAP

1905105

Lab Code	Sample ID	# of Cont.	Matrix	Sample			Lab ID	Radium 226	Radium 228
				Date	Time	Fort Collins ALS			
<del>R1903920-001</del>	Cell 8B-0519	4	Water	5/1/19	1030	Fort Collins ALS	X	X	
<del>R1903920-002</del>	Cell 8B-0519 Diss		Water	5/1/19	1030	Fort Collins ALS	X	X	
<del>R1903920-003</del>	Cell 3-0519		Water	5/1/19	1120	Fort Collins ALS	X	X	
<del>R1903920-004</del>	Cell 3-0519 Diss		Water	5/1/19	1120	Fort Collins ALS	X	X	
<del>R1903920-005</del>	Cell 4-0519		Water	5/1/19	1200	Fort Collins ALS	X	X	
<del>R1903920-006</del>	Cell 4-0519 Diss		Water	5/1/19	1200	Fort Collins ALS	X	X	
<del>R1903920-007</del>	Cell 5-0519		Water	5/1/19	1235	Fort Collins ALS	X	X	
<del>R1903920-008</del>	Cell 5-0519 Diss		Water	5/1/19	1235	Fort Collins ALS	X	X	
<del>R1903920-009</del>	Cell 6-0519		Water	5/1/19	1310	Fort Collins ALS	X	X	
<del>R1903920-010</del>	Cell 6-0519 Diss		Water	5/1/19	1310	Fort Collins ALS	X	X	

Misc Out 1  
 Pd-210  
 Na U  
 908.0

Folder Comments:  
 Report Total Uranium only - none of the isotopes  
 , need in lab filter

Special Instructions/Comments <i>standard add</i>	Turnaround Requirements <input type="checkbox"/> RUSH (Surcharges Apply) PLEASE CIRCLE WORK DAYS 1 2 3 4 5 <input checked="" type="checkbox"/> STANDARD	Report Requirements <input type="checkbox"/> I. Results Only <input checked="" type="checkbox"/> II. Results + QC Summaries <input type="checkbox"/> III. Results + QC and Calibration Summaries <input type="checkbox"/> IV. Data Validation Report with Raw Data PQL/MDL/J <u>N</u> EDD <u>Y</u>	Invoice Information PO# 58R1903920 Bill to
	Requested FAX Date: _____ Requested Report Date: <u>05/13/19</u>	NPDES	

H - Test is On Hold P - Test is Authorized for Prep Only

Requested By: *Shayda 5/6/19* 1000 Received By: *C. Jumbly 5-7-19 0958* Airbill Number: \_\_\_\_\_  
 of

# ALS Environmental Chain of Custody

1565 Jefferson Rd, Building 300 • Rochester, NY 14623 • 585-288-5380 • FAX 585-288-8475

ALS Contact: Janice Jaeger

Project Number: R1903920  
 Project Manager: Janice Jaeger  
 QAP: LAB QAP

1905105

Special Instructions/Comments	Turnaround Requirements	Report Requirements	Invoice Information
NPDES  H - Test is On Hold      P - Test is Authorized for Prep Only	Turnaround Requirements ___ RUSH (Surcharges Apply) PLEASE CIRCLE WORK DAYS 1 2 3 4 5 ___ STANDARD Requested FAX Date: _____ Requested Report Date: <u>05/13/19</u>	Report Requirements ___ I. Results Only ___ II. Results + QC Summaries ___ III. Results + QC and Calibration Summaries ___ IV. Data Validation Report with Raw Data PQL/MDL/J <u>N</u> EDD <u>Y</u>	Invoice Information PO# 58R1903920  Bill to

Received By: C. Jumbly 5-7-19 0955 Airbill Number: \_\_\_\_\_



ALS Environmental - Fort Collins  
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS-Rochester

Workorder No: 1905105

Project Manager: JK

Initials: CD Date: 5-7-19

1. Are airbills / shipping documents present and/or removable?		DROP OFF	<input checked="" type="radio"/> YES	<input type="radio"/> NO			
2. Are custody seals on <b>shipping</b> containers intact?		NONE	<input checked="" type="radio"/> YES	<input type="radio"/> NO *			
3. Are custody seals on <b>sample</b> containers intact?		<input checked="" type="radio"/> NONE	<input type="radio"/> YES	<input type="radio"/> NO *			
4. Is there a COC (chain-of-custody) present?			<input checked="" type="radio"/> YES	<input type="radio"/> NO *			
5. Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)			<input checked="" type="radio"/> YES	<input type="radio"/> NO *			
6. Are short-hold samples present?			<input type="radio"/> YES	<input checked="" type="radio"/> NO			
7. Are all samples within holding times for the requested analyses?			<input checked="" type="radio"/> YES	<input type="radio"/> NO *			
8. Were all sample containers received intact? (not broken or leaking)			<input checked="" type="radio"/> YES	<input type="radio"/> NO *			
9. Is there sufficient sample for the requested analyses?			<input checked="" type="radio"/> YES	<input type="radio"/> NO *			
10. Are all samples in the proper containers for the requested analyses?			<input checked="" type="radio"/> YES	<input type="radio"/> NO *			
11. Are all aqueous samples preserved correctly, if required? (excluding volatiles)		N/A	<input type="radio"/> YES	<input checked="" type="radio"/> NO *			
12. Are all aqueous non-preserved samples pH 4-9?		N/A	<input checked="" type="radio"/> YES	<input type="radio"/> NO *			
13. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)		<input checked="" type="radio"/> N/A	<input type="radio"/> YES	<input type="radio"/> NO			
14. Were the samples shipped on ice?			<input type="radio"/> YES	<input checked="" type="radio"/> NO			
15. Were cooler temperatures measured at 0.1-6.0°C?	IR gun used*:	#1	#3	#4	<input checked="" type="radio"/> RAD ONLY	<input type="radio"/> YES	<input checked="" type="radio"/> NO
Cooler #: <u>1</u> <u>2</u> <u>3</u>							
Temperature (°C): <u>Amb</u> <u>Amb</u> <u>Amb</u>							
No. of custody seals on cooler: <u>1</u> <u>1</u> <u>1</u>							
External µR/hr reading: <u>10</u> <u>10</u> <u>10</u>							
Background µR/hr reading: <u>11</u>							
Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? <input checked="" type="radio"/> YES / <input type="radio"/> NO / <input type="radio"/> N/A (If no, see Form 008.)							

\* Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.

All client bottle ID's vs ALS lab ID's double-checked by: CDJ

If applicable, was the client contacted? YES / NO /  N/A Contact: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Project Manager Signature / Date: [Signature] 5-8-19



ALS Environmental - Fort Collins  
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS - Rochester

Workorder No: 1905105

Project Manager: JK

Initials: CDT Date: 5-7-19

**Additional Information:**

pH	SAMPLE	initial pH	Vol. Added	Final pH
	1905105-1	7	3 ml	< 2
	1905105-2	7	3 ml	< 2
	1905105-3	7	3.5 ml	< 2
	1905105-4	7	3.0 ml	REACTION STOPPED
	1905105-5	6	3.0 ml	REACTION

HNO<sub>3</sub> lot no 197345

4 bottles in each sample were checked individually.

If applicable, was the client contacted? YES / NO / NA Contact: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Project Manager Signature / Date: \_\_\_\_\_



1905105

ORIG: ID:ONHA (585) 672-7464  
SHIP:  
ALJ ENVIRONMENTAL  
1535 JEFFERSON RD  
BLDG: 300 SUITE 360  
ROCHESTER, NY 14623  
UNITED STATES US

SHIP DATE: 06MAY19  
ACTWGT: 50.00 LB  
CAD: 0342584/CAFE3211

BILL THIRD PARTY

TO **SAMPLE RECEIVING**  
**ALS LABS - FT. COLLINS**  
**225 COMMERCE DRIVE**

10-1  
Amb

**FORT COLLINS CO 80524**

(877) 490-1611

REF:

DEPT:



**FedEx**  
Express

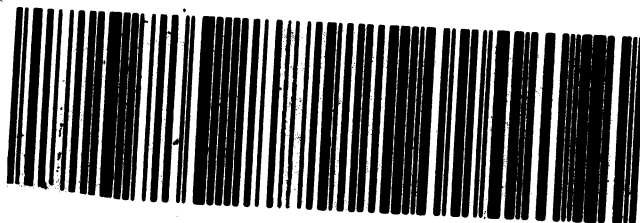


1 of 3  
TRK# 4846 1680 5459  
0201  
## MASTER ##

**TUE - 07 MAY 3:00P**  
**STANDARD OVERNIGHT**

**XH FTCA**

**80524**  
**CO-US DEN**



7-10

1905105

ORIGIN ID: QNHA (58) 72-7464  
 SMO  
 ALS ENVIRONMENTAL  
 1585 JEFFERSON  
 BLDG 300 SUITE 3  
 ROCHESTER, NY  
 UNITED STATES

SHIP DATE: 06MAY19  
 ACTWGT: 49.00 LB  
 CAD: 0342584/CAFE3211

BILL THIRD PARTY

**SAMPLE RECEIVING**  
**ALS LAB FT. COLLINS**  
**225 COMMERCE DRIVE**

**FORT COLLINS CO 80524**

(970) 490-161 REF: DEPT:

**10-1**  
**Amb**

551C1/PAGE/104C

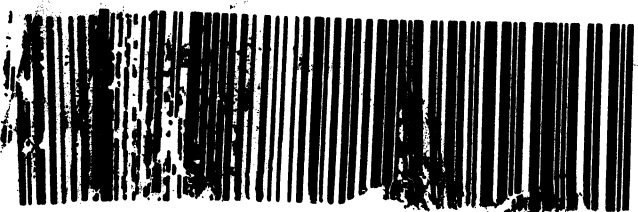


13  
 1680 5460  
 0263 1689 5459 0201

**TUE - 07 MAY 3:00P**  
**STANDARD OVERNIGHT**

**FTCA**

**80524**  
**CO-US DEN**



3-6

**Client:** ALS Environmental  
**Project:** R1903920  
**Sample ID:** Cell 8B-0519  
**Legal Location:**  
**Collection Date:** 5/1/2019 10:30

**Date:** 31-May-19  
**Work Order:** 1905105  
**Lab ID:** 1905105-1  
**Matrix:** WATER  
**Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>Lead-210 by Liquid Scintillation</b>						
Pb-210	-0.12 (+/- 0.37)	U	<b>SOP 704</b> 0.69	pCi/l	Prep Date: <b>5/10/2019</b> NA	PrepBy: <b>JXH</b> 5/15/2019 15:05
Carr: LEAD	89.3		40-110	%REC	DL = NA	5/15/2019 15:05
<b>Radium-226 by Radon Emanation - Method 903.1</b>						
Ra-226	0.52 (+/- 0.62)	U	<b>SOP 783</b> 0.94	pCi/l	Prep Date: <b>5/22/2019</b> NA	PrepBy: <b>JXH</b> 5/31/2019 11:08
Carr: BARIUM	93.5		40-110	%REC	DL = NA	5/31/2019 11:08
<b>Radium-228 Analysis by GFPC</b>						
Ra-228	1.17 (+/- 0.51)		<b>SOP 724</b> 0.82	pCi/l	Prep Date: <b>5/16/2019</b> NA	PrepBy: <b>RGS</b> 5/23/2019 10:26
Carr: BARIUM	83.4		40-110	%REC	DL = NA	5/23/2019 10:26
<b>Total Uranium by Alpha Spectroscopy</b>						
Tracer: U-232	60.4		<b>SOP 714</b> 30-110	%REC	Prep Date: <b>5/23/2019</b> DL = NA	PrepBy: <b>TRS</b> 5/29/2019 13:13
<b>U-234</b>	<b>1.94 (+/- 0.46)</b>		<b>0.13</b>	<b>pCi/l</b>	NA	5/29/2019 13:13
U-235	0.074 (+/- 0.073)	U	0.088	pCi/l	NA	5/29/2019 13:13
<b>U-238</b>	<b>1.62 (+/- 0.4)</b>		<b>0.09</b>	<b>pCi/l</b>	NA	5/29/2019 13:13
<b>URANIUM, TOTAL</b>	<b>3.63 (+/- 0.62)</b>		<b>0.15</b>	<b>pCi/l</b>	NA	5/29/2019 13:13



**Client:** ALS Environmental  
**Project:** R1903920  
**Sample ID:** Cell 3-0519  
**Legal Location:**  
**Collection Date:** 5/1/2019 11:20

**Date:** 31-May-19  
**Work Order:** 1905105  
**Lab ID:** 1905105-2  
**Matrix:** WATER  
**Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>Lead-210 by Liquid Scintillation</b>						
Pb-210	-0.33 (+/- 0.36)	U	0.71	pCi/l	NA	5/15/2019 16:17
Carr: LEAD	87.6		40-110	%REC	DL = NA	5/15/2019 16:17
<b>Radium-226 by Radon Emanation - Method 903.1</b>						
Ra-226	2.9 (+/- 1.4)	M3	1.3	pCi/l	NA	5/31/2019 11:08
Carr: BARIUM	89		40-110	%REC	DL = NA	5/31/2019 11:08
<b>Radium-228 Analysis by GFPC</b>						
Ra-228	3.3 (+/- 0.97)		0.96	pCi/l	NA	5/23/2019 10:26
Carr: BARIUM	70.4		40-110	%REC	DL = NA	5/23/2019 10:26
<b>Total Uranium by Alpha Spectroscopy</b>						
Tracer: U-232	66.7		30-110	%REC	DL = NA	5/29/2019 13:13
U-234	0.102 (+/- 0.077)		0.082	pCi/l	NA	5/29/2019 13:13
U-235	0.014 (+/- 0.053)	U	0.039	pCi/l	NA	5/29/2019 13:13
U-238	0.138 (+/- 0.094)		0.11	pCi/l	NA	5/29/2019 13:13
URANIUM, TOTAL	0.25 (+/- 0.13)		0.12	pCi/l	NA	5/29/2019 13:13

**Client:** ALS Environmental  
**Project:** R1903920  
**Sample ID:** Cell 4-0519  
**Legal Location:**  
**Collection Date:** 5/1/2019 12:00

**Date:** 31-May-19  
**Work Order:** 1905105  
**Lab ID:** 1905105-3  
**Matrix:** WATER  
**Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>Lead-210 by Liquid Scintillation</b>						
Pb-210	-0.38 (+/- 0.37)	U	0.72	pCi/l	NA	5/15/2019 17:28
Carr: LEAD	85.9		40-110	%REC	DL = NA	5/15/2019 17:28
<b>Radium-226 by Radon Emanation - Method 903.1</b>						
Ra-226	1.31 (+/- 0.92)	M3	1.15	pCi/l	NA	5/31/2019 11:08
Carr: BARIUM	93.2		40-110	%REC	DL = NA	5/31/2019 11:08
<b>Radium-228 Analysis by GFPC</b>						
Ra-228	1.52 (+/- 0.55)		0.78	pCi/l	NA	5/23/2019 10:26
Carr: BARIUM	87.8		40-110	%REC	DL = NA	5/23/2019 10:26
<b>Total Uranium by Alpha Spectroscopy</b>						
Tracer: U-232	53		30-110	%REC	DL = NA	5/29/2019 13:13
U-234	0.18 (+/- 0.12)		0.13	pCi/l	NA	5/29/2019 13:13
U-235	0.005 (+/- 0.065)	U	0.118	pCi/l	NA	5/29/2019 13:13
U-238	0.105 (+/- 0.082)		0.041	pCi/l	NA	5/29/2019 13:13
URANIUM, TOTAL	0.29 (+/- 0.16)		0.15	pCi/l	NA	5/29/2019 13:13

**Client:** ALS Environmental  
**Project:** R1903920  
**Sample ID:** Cell 5-0519  
**Legal Location:**  
**Collection Date:** 5/1/2019 12:35

**Date:** 31-May-19  
**Work Order:** 1905105  
**Lab ID:** 1905105-4  
**Matrix:** WATER  
**Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>Lead-210 by Liquid Scintillation</b>						
Pb-210	-0.26 (+/- 0.36)	U	0.69	pCi/l	NA	5/15/2019 18:38
Carr: LEAD	88.2		40-110	%REC	DL = NA	5/15/2019 18:38
<b>Radium-226 by Radon Emanation - Method 903.1</b>						
Ra-226	1.27 (+/- 0.82)		0.72	pCi/l	NA	5/31/2019 11:08
Carr: BARIUM	91		40-110	%REC	DL = NA	5/31/2019 11:08
<b>Radium-228 Analysis by GFPC</b>						
Ra-228	0.97 (+/- 0.44)		0.74	pCi/l	NA	5/23/2019 10:26
Carr: BARIUM	94		40-110	%REC	DL = NA	5/23/2019 10:26
<b>Total Uranium by Alpha Spectroscopy</b>						
Tracer: U-232	60.1		30-110	%REC	DL = NA	5/29/2019 13:13
U-234	0.8 (+/- 0.25)		0.1	pCi/l	NA	5/29/2019 13:13
U-235	0.01 (+/- 0.058)	U	0.087	pCi/l	NA	5/29/2019 13:13
U-238	0.44 (+/- 0.17)		0.1	pCi/l	NA	5/29/2019 13:13
URANIUM, TOTAL	1.25 (+/- 0.31)		0.14	pCi/l	NA	5/29/2019 13:13

Client: ALS Environmental  
 Project: R1903920  
 Sample ID: Cell 6-05-19  
 Legal Location:  
 Collection Date: 5/1/2019 13:10

Date: 31-May-19  
 Work Order: 1905105  
 Lab ID: 1905105-5  
 Matrix: WATER  
 Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>Lead-210 by Liquid Scintillation</b>			<b>SOP 704</b>		Prep Date: <b>5/10/2019</b>	PrepBy: <b>JXH</b>
<b>Pb-210</b>	1.46 (+/- 0.64)		<b>0.71</b>	<b>pCi/l</b>	NA	5/15/2019 19:48
Carr: LEAD	87.3		40-110	%REC	DL = NA	5/15/2019 19:48
<b>Radium-226 by Radon Emanation - Method 903.1</b>			<b>SOP 783</b>		Prep Date: <b>5/22/2019</b>	PrepBy: <b>JXH</b>
<b>Ra-226</b>	2.7 (+/- 1.3)		<b>0.9</b>	<b>pCi/l</b>	NA	5/31/2019 11:08
Carr: BARIUM	87.1		40-110	%REC	DL = NA	5/31/2019 11:08
<b>Radium-228 Analysis by GFPC</b>			<b>SOP 724</b>		Prep Date: <b>5/16/2019</b>	PrepBy: <b>RGS</b>
<b>Ra-228</b>	1.89 (+/- 0.63)		<b>0.82</b>	<b>pCi/l</b>	NA	5/23/2019 10:26
Carr: BARIUM	89.8		40-110	%REC	DL = NA	5/23/2019 10:26
<b>Total Uranium by Alpha Spectroscopy</b>			<b>SOP 714</b>		Prep Date: <b>5/23/2019</b>	PrepBy: <b>TRS</b>
Tracer: U-232	66.4		30-110	%REC	DL = NA	5/29/2019 13:13
<b>U-234</b>	0.18 (+/- 0.1)		<b>0.09</b>	<b>pCi/l</b>	NA	5/29/2019 13:13
U-235	0.029 (+/- 0.053)	U	0.039	pCi/l	NA	5/29/2019 13:13
<b>U-238</b>	0.2 (+/- 0.11)		<b>0.1</b>	<b>pCi/l</b>	NA	5/29/2019 13:13
<b>URANIUM, TOTAL</b>	0.41 (+/- 0.16)		<b>0.12</b>	<b>pCi/l</b>	NA	5/29/2019 13:13

**Client:** ALS Environmental  
**Project:** R1903920  
**Sample ID:** Cell 8B-0519 Diss  
**Legal Location:**  
**Collection Date:** 5/1/2019 10:30

**Date:** 31-May-19  
**Work Order:** 1905105  
**Lab ID:** 1905105-6  
**Matrix:** WATER  
**Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>Dissolved Lead-210 by Liquid Scintillation</b>						
			<b>SOP 704</b>		Prep Date: <b>5/10/2019</b>	PrepBy: <b>JXH</b>
Pb-210	0.03 (+/- 0.4)	U	0.71	pCi/l	NA	5/15/2019 20:59
Carr: LEAD	86.6		40-110	%REC	DL = NA	5/15/2019 20:59
<b>Dissolved Radium-226 by Radon Emanation - Method 903.</b>						
			<b>SOP 783</b>		Prep Date: <b>5/22/2019</b>	PrepBy: <b>JXH</b>
Ra-226	0.4 (+/- 0.71)	U,M	1.21	pCi/l	NA	5/31/2019 11:08
Carr: BARIUM	92.7		40-110	%REC	DL = NA	5/31/2019 11:08
<b>Dissolved Radium-228 Analysis by GFPC</b>						
			<b>SOP 724</b>		Prep Date: <b>5/16/2019</b>	PrepBy: <b>RGS</b>
Ra-228	0.54 (+/- 0.42)	U	0.82	pCi/l	NA	5/23/2019 10:26
Carr: BARIUM	91.2		40-110	%REC	DL = NA	5/23/2019 10:26
<b>Dissolved Total Uranium by Alpha Spectroscopy</b>						
			<b>SOP 714</b>		Prep Date: <b>5/23/2019</b>	PrepBy: <b>TRS</b>
Tracer: U-232	67.9		30-110	%REC	DL = NA	5/29/2019 13:13
<b>U-234</b>	<b>1.37 (+/- 0.34)</b>		<b>0.07</b>	<b>pCi/l</b>	NA	5/29/2019 13:13
U-235	0.055 (+/- 0.065)	U	0.105	pCi/l	NA	5/29/2019 13:13
<b>U-238</b>	<b>1.23 (+/- 0.32)</b>		<b>0.1</b>	<b>pCi/l</b>	NA	5/29/2019 13:13
<b>URANIUM, TOTAL</b>	<b>2.65 (+/- 0.47)</b>		<b>0.13</b>	<b>pCi/l</b>	NA	5/29/2019 13:13

**Client:** ALS Environmental  
**Project:** R1903920  
**Sample ID:** Cell 3-0519 Diss  
**Legal Location:**  
**Collection Date:** 5/1/2019 11:20

**Date:** 31-May-19  
**Work Order:** 1905105  
**Lab ID:** 1905105-7  
**Matrix:** WATER  
**Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>Dissolved Lead-210 by Liquid Scintillation</b>						
			<b>SOP 704</b>	Prep Date: <b>5/10/2019</b>		PrepBy: <b>JXH</b>
Pb-210	-0.39 (+/- 0.36)	U	0.71	pCi/l	NA	5/15/2019 22:09
Carr: LEAD	87.3		40-110	%REC	DL = NA	5/15/2019 22:09
<b>Dissolved Radium-226 by Radon Emanation - Method 903.</b>						
			<b>SOP 783</b>	Prep Date: <b>5/22/2019</b>		PrepBy: <b>JXH</b>
Ra-226	2.1 (+/- 1.1)	M3	1.1	pCi/l	NA	5/31/2019 11:08
Carr: BARIUM	89.9		40-110	%REC	DL = NA	5/31/2019 11:08
<b>Dissolved Radium-228 Analysis by GFPC</b>						
			<b>SOP 724</b>	Prep Date: <b>5/16/2019</b>		PrepBy: <b>RGS</b>
Ra-228	2.67 (+/- 0.78)		0.8	pCi/l	NA	5/23/2019 10:26
Carr: BARIUM	87		40-110	%REC	DL = NA	5/23/2019 10:26
<b>Dissolved Total Uranium by Alpha Spectroscopy</b>						
			<b>SOP 714</b>	Prep Date: <b>5/23/2019</b>		PrepBy: <b>TRS</b>
Tracer: U-232	57.6		30-110	%REC	DL = NA	5/29/2019 13:13
U-234	0.21 (+/- 0.12)		0.1	pCi/l	NA	5/29/2019 13:13
U-235	-0.012 (+/- 0.06)	U	0.108	pCi/l	NA	5/29/2019 13:13
U-238	0.092 (+/- 0.075)		0.076	pCi/l	NA	5/29/2019 13:13
URANIUM, TOTAL	0.29 (+/- 0.15)		0.13	pCi/l	NA	5/29/2019 13:13

**Client:** ALS Environmental  
**Project:** R1903920  
**Sample ID:** Cell 4-0519 Diss  
**Legal Location:**  
**Collection Date:** 5/1/2019 12:00

**Date:** 31-May-19  
**Work Order:** 1905105  
**Lab ID:** 1905105-8  
**Matrix:** WATER  
**Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>Dissolved Lead-210 by Liquid Scintillation</b>						
			<b>SOP 704</b>		Prep Date: <b>5/10/2019</b>	PrepBy: <b>JXH</b>
Pb-210	-0.42 (+/- 0.36)	U	0.71	pCi/l	NA	5/16/2019 00:29
Carr: LEAD	87.6		40-110	%REC	DL = NA	5/16/2019 00:29
<b>Dissolved Radium-226 by Radon Emanation - Method 903.</b>						
			<b>SOP 783</b>		Prep Date: <b>5/22/2019</b>	PrepBy: <b>JXH</b>
Ra-226	2.8 (+/- 1.4)	M3	1.1	pCi/l	NA	5/31/2019 11:08
Carr: BARIUM	88.6		40-110	%REC	DL = NA	5/31/2019 11:08
<b>Dissolved Radium-228 Analysis by GFPC</b>						
			<b>SOP 724</b>		Prep Date: <b>5/16/2019</b>	PrepBy: <b>RGS</b>
Ra-228	2.11 (+/- 0.7)		0.9	pCi/l	NA	5/23/2019 10:26
Carr: BARIUM	80		40-110	%REC	DL = NA	5/23/2019 10:26
<b>Dissolved Total Uranium by Alpha Spectroscopy</b>						
			<b>SOP 714</b>		Prep Date: <b>5/23/2019</b>	PrepBy: <b>TRS</b>
Tracer: U-232	56.9		30-110	%REC	DL = NA	5/29/2019 13:13
<b>U-234</b>	<b>0.111 (+/- 0.084)</b>		<b>0.089</b>	<b>pCi/l</b>	NA	5/29/2019 13:13
U-235	0.052 (+/- 0.066)	U	0.105	pCi/l	NA	5/29/2019 13:13
<b>U-238</b>	<b>0.054 (+/- 0.054)</b>		<b>0.036</b>	<b>pCi/l</b>	NA	5/29/2019 13:13
<b>URANIUM, TOTAL</b>	<b>0.22 (+/- 0.12)</b>		<b>0.11</b>	<b>pCi/l</b>	NA	5/29/2019 13:13

**Client:** ALS Environmental  
**Project:** R1903920  
**Sample ID:** Cell 5-0519 Diss  
**Legal Location:**  
**Collection Date:** 5/1/2019 12:35

**Date:** 31-May-19  
**Work Order:** 1905105  
**Lab ID:** 1905105-9  
**Matrix:** WATER  
**Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>Dissolved Lead-210 by Liquid Scintillation</b>						
			<b>SOP 704</b>	Prep Date: <b>5/10/2019</b>		PrepBy: <b>JXH</b>
Pb-210	-0.43 (+/- 0.35)	U	0.69	pCi/l	NA	5/16/2019 01:39
Carr: LEAD	90		40-110	%REC	DL = NA	5/16/2019 01:39
<b>Dissolved Radium-226 by Radon Emanation - Method 903.</b>						
			<b>SOP 783</b>	Prep Date: <b>5/22/2019</b>		PrepBy: <b>JXH</b>
Ra-226	0.83 (+/- 0.74)	U	0.99	pCi/l	NA	5/31/2019 11:08
Carr: BARIUM	93.7		40-110	%REC	DL = NA	5/31/2019 11:08
<b>Dissolved Radium-228 Analysis by GFPC</b>						
			<b>SOP 724</b>	Prep Date: <b>5/16/2019</b>		PrepBy: <b>RGS</b>
Ra-228	1.05 (+/- 0.47)		0.78	pCi/l	NA	5/23/2019 10:26
Carr: BARIUM	92.3		40-110	%REC	DL = NA	5/23/2019 10:26
<b>Dissolved Total Uranium by Alpha Spectroscopy</b>						
			<b>SOP 714</b>	Prep Date: <b>5/23/2019</b>		PrepBy: <b>TRS</b>
Tracer: U-232	55.4		30-110	%REC	DL = NA	5/29/2019 13:13
<b>U-234</b>	<b>0.78 (+/- 0.25)</b>		<b>0.13</b>	<b>pCi/l</b>	NA	5/29/2019 13:13
U-235	0.005 (+/- 0.06)	U	0.109	pCi/l	NA	5/29/2019 13:13
<b>U-238</b>	<b>0.53 (+/- 0.2)</b>		<b>0.1</b>	<b>pCi/l</b>	NA	5/29/2019 13:13
<b>URANIUM, TOTAL</b>	<b>1.31 (+/- 0.32)</b>		<b>0.17</b>	<b>pCi/l</b>	NA	5/29/2019 13:13



**Client:** ALS Environmental  
**Project:** R1903920  
**Sample ID:** Cell 6-05-19 Diss  
**Legal Location:**  
**Collection Date:** 5/1/2019 13:10

**Date:** 31-May-19  
**Work Order:** 1905105  
**Lab ID:** 1905105-10  
**Matrix:** WATER  
**Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>Dissolved Lead-210 by Liquid Scintillation</b>						
Pb-210	0.02 (+/- 0.4)	U	0.72	pCi/l	NA	5/16/2019 02:49
Carr: LEAD	85.8		40-110	%REC	DL = NA	5/16/2019 02:49
<b>Dissolved Radium-226 by Radon Emanation - Method 903.</b>						
Ra-226	1.9 (+/- 0.99)		0.67	pCi/l	NA	5/31/2019 11:25
Carr: BARIUM	89.5		40-110	%REC	DL = NA	5/31/2019 11:25
<b>Dissolved Radium-228 Analysis by GFPC</b>						
Ra-228	2.15 (+/- 0.68)		0.8	pCi/l	NA	5/23/2019 10:26
Carr: BARIUM	87.5		40-110	%REC	DL = NA	5/23/2019 10:26
<b>Dissolved Total Uranium by Alpha Spectroscopy</b>						
Tracer: U-232	55.8		30-110	%REC	DL = NA	5/29/2019 13:13
U-234	0.21 (+/- 0.12)		0.11	pCi/l	NA	5/29/2019 13:13
U-235	0.021 (+/- 0.061)	U	0.11	pCi/l	NA	5/29/2019 13:13
U-238	0.23 (+/- 0.12)		0.08	pCi/l	NA	5/29/2019 13:13
URANIUM, TOTAL	0.46 (+/- 0.18)		0.13	pCi/l	NA	5/29/2019 13:13

**Client:** ALS Environmental  
**Project:** R1903920  
**Sample ID:** Cell 6-05-19 Diss  
**Legal Location:**  
**Collection Date:** 5/1/2019 13:10

**Date:** 31-May-19  
**Work Order:** 1905105  
**Lab ID:** 1905105-10  
**Matrix:** WATER  
**Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
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**Explanation of Qualifiers**

**Radiochemistry:**

- "Report Limit" is the MDC
- U or ND - Result is less than the sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
- Y2 - Chemical Yield outside default limits.
- W - DER is greater than Warning Limit of 1.42
- \* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
- # - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
- G - Sample density differs by more than 15% of LCS density.
- D - DER is greater than Control Limit
- M - Requested MDC not met.
- M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
- L - LCS Recovery below lower control limit.
- H - LCS Recovery above upper control limit.
- P - LCS, Matrix Spike Recovery within control limits.
- N - Matrix Spike Recovery outside control limits
- NC - Not Calculated for duplicate results less than 5 times MDC
- B - Analyte concentration greater than MDC.
- B3 - Analyte concentration greater than MDC but less than Requested MDC.

**Inorganics:**

- B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).
- U or ND - Indicates that the compound was analyzed for but not detected.
- E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.
- M - Duplicate injection precision was not met.
- N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.
- Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.
- \* - Duplicate analysis (relative percent difference) not within control limits.
- S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

**Organics:**

- U or ND - Indicates that the compound was analyzed for but not detected.
- B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.
- E - Analyte concentration exceeds the upper level of the calibration range.
- J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).
- A - A tentatively identified compound is a suspected aldol-condensation product.
- X - The analyte was diluted below an accurate quantitation level.
- \* - The spike recovery is equal to or outside the control criteria used.
- + - The relative percent difference (RPD) equals or exceeds the control criteria.
- G - A pattern resembling gasoline was detected in this sample.
- D - A pattern resembling diesel was detected in this sample.
- M - A pattern resembling motor oil was detected in this sample.
- C - A pattern resembling crude oil was detected in this sample.
- 4 - A pattern resembling JP-4 was detected in this sample.
- 5 - A pattern resembling JP-5 was detected in this sample.
- H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.
- L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.
- Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
  - gasoline
  - JP-8
  - diesel
  - mineral spirits
  - motor oil
  - Stoddard solvent
  - bunker C

ALS -- Fort Collins

Date: 5/31/2019 2:35:

Client: ALS Environmental  
 Work Order: 1905105  
 Project: R1903920

**QC BATCH REPORT**

Batch ID: **RE190522-2-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS		Sample ID: <b>RE190522-2</b>			Units: <b>pCi/l</b>		Analysis Date: <b>5/31/2019 11:25</b>				
Client ID:		Run ID: <b>RE190522-2A</b>			Prep Date: <b>5/22/2019</b>		DF: <b>NA</b>				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	55 (+/- 14)	0	47.86		115	67-120					P
Carr: BARIUM	15390		15810		97.4	40-110					

LCSD		Sample ID: <b>RE190522-2</b>			Units: <b>pCi/l</b>		Analysis Date: <b>5/31/2019 11:25</b>				
Client ID:		Run ID: <b>RE190522-2A</b>			Prep Date: <b>5/22/2019</b>		DF: <b>NA</b>				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	46 (+/- 12)	1	47.86		96.1	67-120		55	0.5	2.1	P
Carr: BARIUM	15360		15810		97.2	40-110		15390			

MB		Sample ID: <b>RE190522-2</b>			Units: <b>pCi/l</b>		Analysis Date: <b>5/31/2019 11:25</b>				
Client ID:		Run ID: <b>RE190522-2A</b>			Prep Date: <b>5/22/2019</b>		DF: <b>NA</b>				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0 (+/- 0.33)	0.64									U
Carr: BARIUM	15180		15810		96	40-110					

The following samples were analyzed in this batch:

1905105-1	1905105-2	1905105-3
1905105-4	1905105-5	

Client: ALS Environmental  
 Work Order: 1905105  
 Project: R1903920

# QC BATCH REPORT

Batch ID: **as190523-3-2** Instrument ID **AlphaSpec2** Method: **Total Uranium by Alpha Spectro**

**DUP** Sample ID: **1905105-4** Units: **pCi/l** Analysis Date: **5/29/2019 13:13**  
 Client ID: **Cell 5-0519** Run ID: **UAS190523-3UT** Prep Date: **5/23/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
U-234	0.98 (+/- 0.27)	0.09						0.8	0.5	2.1	
U-235	0.029 (+/- 0.053)	0.039						0.01	0.2	2.1	U
U-238	0.69 (+/- 0.22)	0.09						0.44	0.9	2.1	
URANIUM, TOTAL	1.7 (+/- 0.35)	0.12						1.25	1.9	2.1	
Tracer: U-232	6	0.1	9.183		65.7	30-110		5.52			

**LCS** Sample ID: **as190523-3** Units: **pCi/l** Analysis Date: **5/30/2019 07:17**  
 Client ID: Run ID: **UAS190523-3UT** Prep Date: **5/23/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
U-234	4.45 (+/- 0.78)	0.03	4.22		106	82-122					P
U-235	0.191 (+/- 0.075)	0.044	0.2017		94.8						
U-238	4.81 (+/- 0.84)	0.04	4.382		110	78-126					P
URANIUM, TOTAL	9.4 (+/- 1.1)	0.1	8.804		107	82-122					P
Tracer: U-232	3.41	0.06	4.592		74.2	30-110					

**MB** Sample ID: **as190523-3** Units: **pCi/l** Analysis Date: **5/30/2019 07:17**  
 Client ID: Run ID: **UAS190523-3UT** Prep Date: **5/23/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
U-234	-0.011 (+/- 0.027)	0.074									U
U-235	0.005 (+/- 0.032)	0.047									U
U-238	-0.003 (+/- 0.027)	0.04									U
URANIUM, TOTAL	-0.008 (+/- 0.049)	0.081									U
Tracer: U-232	2.37	0.04	4.592		51.6	30-110					

The following samples were analyzed in this batch:

1905105-1	1905105-2	1905105-3
1905105-4		

Client: ALS Environmental  
 Work Order: 1905105  
 Project: R1903920

# QC BATCH REPORT

Batch ID: **RA190516-1-1** Instrument ID **LB4100-C** Method: **Radium-228 Analysis by GFPC**

LCS		Sample ID: <b>RA190516-1</b>		Units: <b>pCi/l</b>		Analysis Date: <b>5/23/2019 10:26</b>					
Client ID:		Run ID: <b>RA190516-1A</b>			Prep Date: <b>5/16/2019</b>		DF: <b>NA</b>				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-228	14.3 (+/- 3.4)	0.8	14.39		99.3	70-130					P
Carr: BARIUM	31560		33690		93.7	40-110					

LCSD		Sample ID: <b>RA190516-1</b>		Units: <b>pCi/l</b>		Analysis Date: <b>5/23/2019 10:26</b>					
Client ID:		Run ID: <b>RA190516-1A</b>			Prep Date: <b>5/16/2019</b>		DF: <b>NA</b>				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-228	15.5 (+/- 3.7)	0.8	14.39		108	70-130		14.3	0.2	2.1	P
Carr: BARIUM	30770		33690		91.3	40-110		31560			

MB		Sample ID: <b>RA190516-1</b>		Units: <b>pCi/l</b>		Analysis Date: <b>5/23/2019 10:26</b>					
Client ID:		Run ID: <b>RA190516-1A</b>			Prep Date: <b>5/16/2019</b>		DF: <b>NA</b>				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-228	-0.15 (+/- 0.35)	0.8									U
Carr: BARIUM	30810		33690		91.5	40-110					

The following samples were analyzed in this batch:

1905105-1	1905105-2	1905105-3
1905105-4	1905105-5	1905105-6
1905105-7	1905105-8	1905105-9
1905105-10		

Client: ALS Environmental  
 Work Order: 1905105  
 Project: R1903920

# QC BATCH REPORT

Batch ID: **PB190508-1-1** Instrument ID **LIQSCINT** Method: **Lead-210 by Liquid Scintillatio**

LCS		Sample ID: <b>PB190508-1</b>		Units: <b>ug</b>		Analysis Date: <b>5/16/2019 05:09</b>					
Client ID:		Run ID: <b>PB190508-1A</b>			Prep Date: <b>5/10/2019</b>		DF: <b>NA</b>				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Carr: LEAD	632.6		833.6		75.9	40-110					
Pb-210	41 (+/- 9.9)	0.4	40.27		102	75-125					P

LCSD		Sample ID: <b>PB190508-1</b>		Units: <b>ug</b>		Analysis Date: <b>5/16/2019 06:19</b>					
Client ID:		Run ID: <b>PB190508-1A</b>			Prep Date: <b>5/10/2019</b>		DF: <b>NA</b>				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Carr: LEAD	620.8		839.4		74	40-110		632.6			
Pb-210	40.7 (+/- 9.9)	0.4	40.27		101	75-125		41	0.02	2.1	P

MB		Sample ID: <b>PB190508-1</b>		Units: <b>ug</b>		Analysis Date: <b>5/16/2019 03:59</b>					
Client ID:		Run ID: <b>PB190508-1A</b>			Prep Date: <b>5/10/2019</b>		DF: <b>NA</b>				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Carr: LEAD	639.3		832.1		76.8	40-110					
Pb-210	-0.21 (+/- 0.21)	0.4									U

The following samples were analyzed in this batch:

1905105-1	1905105-2	1905105-3
1905105-4	1905105-5	