

Our ref: 12576482-LTR-4

January 31, 2025

Mr. Geoffrey Spain  
Environmental Engineer  
Land Quality Bureau  
Iowa Department of Natural Resources  
502 East 9<sup>th</sup> Street  
Des Moines, Iowa 50319-0034

2024 Annual Leachate Report  
Neal North Energy Center Coal Combustion Residue Monofill  
Sergeant Bluff, Iowa  
Permit No. 97-SDP-12-95

Dear Mr. Spain:

On behalf of MidAmerican Energy Company (MidAmerican), GHD prepared this Leachate Report to document leachate management activities for the Neal North Energy Center Coal Combustion Residue (CCR) Monofill (Neal North Monofill). The Neal North Monofill leachate management is conducted under the May 26, 2021 Leachate Control Plan which was incorporated into the Operating Permit by special provision X.6.

## 1. Current Operation

Cell 1 and Cell 2 are equipped with leachate collection and transfer systems. Leachate is pumped from Cell 1 and Cell 2 through buried pipe and a conveyance manhole to the Leachate Pond. In November 2019, a rain cover was deployed over the majority of Cell 2 in an effort to reduce leachate generation. The scrim-reinforced plastic was anchored with Wind Defender<sup>®</sup>. The effectiveness of the rain cover in reducing leachate generation is discussed in Section 1.2. Filling operations will continue in the Cell 1 area until the Cell 2 rain cover is removed.

### 1.1 Leachate Head

In accordance with the Operating Permit, MidAmerican is to maintain less than 12 inches of leachate on the liner system. MidAmerican monitors the depth by obtaining monthly leachate head measurements at the Cell 1 and Cell 2 leachate sump locations. Table 1 presents monthly leachate head measurements for the Cell 1 and Cell 2 sumps for the reporting months of January 2024 to December 2024.

In Cell 1, leachate head was maintained at less than 12 inches above the liner throughout the reporting period, except July 2024 when 14 inches of leachate head was reported. In May 2024, the Cell 1 transducer was out of service and was operational by June 2024. In Cell 2, leachate head was maintained at less than 12 inches above the liner in January, February, and October 2024. In June, July, September, November, and December 2024, leachate head was greater than 12 inches above the liner. Beginning in March 2024, the Cell 2 transducer was out of service and was replaced in June 2024. The Cell 2 transducer was also out of service in August 2024 due to a breaker issue which was rectified by the next reading in September 2024. The leachate transfer pump was also out of service during portions of 2024. A replacement leachate transfer pump was not

readily available; while the replacement pump was on backorder from the manufacturer, MidAmerican utilized water trucks to transfer leachate from the transfer manhole to the leachate pond.

## 1.2 Leachate Volume

Between startup in September 2009 and March 13, 2018, the leachate transfer manhole totalizer recorded the removal of 24,032,618 gallons of leachate; with the reconfiguration of the leachate management system, a new totalizer was installed in 2018. The new totalizer recorded 14,455,155 gallons through December 31, 2024. During this reporting period (readings collected December 22, 2023 through December 31, 2024), a total of 176,642 gallons of leachate removal was recorded at the leachate totalizer. The totalizer was out of service in March, April, May, and August 2024. The leachate totalizer volumes since 2019 are summarized in Inset 1. The reduction in leachate volume is attributed to both the installation of the rain cover over Cell 2 in November 2019, less precipitation in recent years, and maintenance of the totalizer during 2024.

*Inset 1 Annual Leachate Totalizer Volumes*

Reporting Period	Annual Leachate Volume (gallons)
2019	4,570,213
2020	2,465,745
2021	1,634,504
2022	722,251
2023	893,346
2024	176,642

Note: The leachate totalizer was out of service for approximately four months during 2024.

## 1.3 Leachate Sampling

Table 2 provides analytical results for the leachate samples collected from 2016 through 2024. The laboratory analytical report for the 2024 sample is provided in Attachment A. The leachate analyte list was modified in 2016 to align the monitoring with Federal CCR rule groundwater monitoring constituents.

## 1.4 Overall Operation

Leachate is pumped from the Neal North Monofill to the Leachate Pond in accordance with the Operating Permit. Evaporators were previously deployed in the leachate pond. In June 2020 use of the evaporators was discontinued due to concerns about long-term management of drift. The mechanical evaporators are no longer in use.

The leachate system continues to prevent the migration of leachate to groundwater. The pumps and transducers have been replaced following maintenance of the system during 2024 and are now functioning properly. Leachate head in Cell 2 is expected to return to less than 12 inches above the liner during 2025.

## 2. Closing

If you have any questions, please contact Josh Love of MidAmerican at (712) 277-6367 or Michael Alowitz

Sincerely,



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PR/Is/LTR-4



**Kevin G. Armstrong, C.P.G., P.M.P.**  
Project Director

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Encl.: Table 1 – Sump Leachate Head Measurements  
Table 2 – Leachate Analytical Results  
Attachment A – Laboratory Analytical Report

Copy to: Kenna Anderson, MidAmerican  
Josh Love, MidAmerican  
Justin Terrell, MidAmerican

**Sump Leachate Head Measurements  
MidAmerican Energy Company  
Neal North CCR Monofill - Sergeant Bluff, Iowa**

<b>Date</b>	<b>Cell 1 Leachate Head (inches above liner)</b>	<b>Cell 2 Leachate Head (inches above liner)</b>
1/10/2024	4.8	10.6
2/7/2024	4.8	11
3/27/2024	4.8	Out of Service
4/29/2024	5.9	Out of Service
5/30/2024	Out of Service	Out of Service
6/21/2024	4.0	88.2
7/31/2024	14.0	83.9
8/21/2024	4.3	Out of Service
9/27/2024	2.7	39.2
10/30/2024	4.0	-2.1
11/27/2024	1.0	24
12/30/2024	7.6	31.8

Table 2

**Leachate Analytical Results**  
**MidAmerican Energy Company**  
**Neal North CCR Monofill - Sergeant Bluff, Iowa**

Analyte	Units	Leachate-1116 11/8/2016	Leachate-0917 09/12/2017	Leachate-0818 08/28/2018	Leachate-0919 09/19/2019	Leachate-0920 09/23/2020	Leachate-0721 07/15/2021	Leachate-0922 09/15/2022	Leachate-0923 09/14/2023	Leachate-0924 09/12/2024
<b>Appendix III</b>										
Boron	mg/L	5.35	3.49	6.60	5.85	4.69	2.04	2.09	1.86	3.27
Calcium	mg/L	113	191	254	95.9	164	321	295	321	264
Chloride	mg/L	149	271	476	84.9	379	283	407	255	722
Fluoride	mg/L	0.558	0.500 U	0.500 U	0.619	0.500 U	0.500 U	0.500 U	1.00 U	1.00 U
pH, lab	s.u.	11.1	9.8	11.1	11.3	8.8 J	8.3 J	8.3 J	8.1 J	8.6 J
Sulfate	mg/L	1410	1570	1530	1240	1720	774	856	735	1190
Total dissolved solids (TDS)	mg/L	3080	2670	3850	2460	3570	1940	2420	1990	3420
<b>Appendix IV</b>										
Antimony	mg/L	0.00152	0.00100 U	0.00300 U	0.00100 U	0.00100 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Arsenic	mg/L	0.0151	0.0193	0.0178	0.0124	0.0140	0.00448	0.00517	0.00405	0.00549
Barium	mg/L	0.0775	0.157	0.111	0.0901	0.0914	0.0715	0.0806	0.0836	0.0779
Beryllium	mg/L	0.00100 U	0.00100 U	0.00300 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Cadmium	mg/L	0.000500 U	0.000500 U	0.00150 U	0.000469	0.000548	0.000100 U	0.000100 U	0.000200 U	0.000200 U
Chromium	mg/L	0.131	0.485	0.792	0.456	0.373	0.0515	0.0611	0.0384	0.0444
Cobalt	mg/L	0.00266	0.00330	0.00213	0.00481	0.00528	0.00116	0.00116	0.000593	0.00185
Lead	mg/L	0.000500 U	0.00290	0.00150 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lithium	mg/L	0.100 U	0.0120	0.0300 U	0.0100 U	0.0111	0.0100 U	0.0100 U	0.0108	0.0100 U
Mercury	mg/L	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U
Molybdenum	mg/L	0.682	0.626	1.53	1.03	1.52	0.127	0.149	0.0927	0.345
Radium-226 & 228	pCi/L	1.80	1.05	0.314	0.101	0.974 U	0.793	1.11	1.62	1.16
Selenium	mg/L	0.172	0.208	0.435	0.299	0.425	0.0249	0.0455	0.0465	0.0783
Thallium	mg/L	0.00100 U	0.00100 U	0.00300 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U

## Notes:

U - Not detected at the associated reporting limit.

J - Estimated concentration.

s.u. - Standard Units.

mg/L - Milligrams per liter.

pCi/L - Picocuries per liter.

# **Attachment A**

**Laboratory Analytical Report**



# ANALYTICAL REPORT

## PREPARED FOR

Attn: Kevin Armstrong  
GHD Services Inc.  
11228 Aurora Avenue  
Des Moines, Iowa 50322-7905

Generated 10/10/2024 2:54:57 PM

## JOB DESCRIPTION

MEC Neal North Energy Center CCR  
Neal North Closed Monofill - Leachate

## JOB NUMBER

310-290593-1

# Eurofins Cedar Falls

## Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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## Authorization



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# Case Narrative

Client: GHD Services Inc.  
Project: MEC Neal North Energy Center CCR

Job ID: 310-290593-1

**Job ID: 310-290593-1**

**Eurofins Cedar Falls**

## Job Narrative 310-290593-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers and/or narrative comments are included to explain any exceptions, if applicable.

- Matrix QC may not be reported if insufficient sample is provided or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

### Receipt

The sample was received on 9/13/2024 4:26 PM. Unless otherwise noted below, the sample arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 1.8°C.

### HPLC/IC

Method 9056A\_ORGFM\_28D: The following sample was diluted due to the nature of the sample matrix: Leachate-0924 (310-290593-1). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

### Metals

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

### General Chemistry

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Eurofins Cedar Falls

# Case Narrative

Client: GHD Services Inc.  
Project: MEC Neal North Energy Center CCR

Job ID: 310-290593-1

**Job ID: 310-290593-2**

**Eurofins Cedar Falls**

## Job Narrative 310-290593-2

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers and/or narrative comments are included to explain any exceptions, if applicable.

- Matrix QC may not be reported if insufficient sample is provided or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

### Receipt

The sample was received on 9/13/2024 4:26 PM. Unless otherwise noted below, the sample arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 1.8°C.

### Gas Flow Proportional Counter

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

### Rad

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Eurofins Cedar Falls

# Sample Summary

Client: GHD Services Inc.  
Project/Site: MEC Neal North Energy Center CCR

Job ID: 310-290593-1

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<u>Lab Sample ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Collected</u>	<u>Received</u>
310-290593-1	Leachate-0924	Water	09/12/24 18:15	09/13/24 16:26

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# Client Sample Results

Client: GHD Services Inc.  
Project/Site: MEC Neal North Energy Center CCR

Job ID: 310-290593-1

**Client Sample ID: Leachate-0924**

**Lab Sample ID: 310-290593-1**

Date Collected: 09/12/24 18:15

Matrix: Water

Date Received: 09/13/24 16:26

**Method: SW846 9056A - Anions, Ion Chromatography**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Chloride</b>	<b>722</b>		50.0		mg/L			09/21/24 08:48	50
Fluoride	<1.00		1.00		mg/L			09/20/24 16:25	5
<b>Sulfate</b>	<b>1190</b>		50.0		mg/L			09/21/24 08:48	50

**Method: SW846 6020B - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		09/17/24 09:30	09/24/24 18:42	1
<b>Arsenic</b>	<b>0.00549</b>		0.00200		mg/L		09/17/24 09:30	09/24/24 18:42	1
<b>Barium</b>	<b>0.0779</b>		0.00200		mg/L		09/17/24 09:30	09/25/24 20:20	1
Beryllium	<0.00100		0.00100		mg/L		09/17/24 09:30	09/24/24 18:42	1
<b>Boron</b>	<b>3.27</b>		0.100		mg/L		09/17/24 09:30	09/24/24 18:42	1
Cadmium	<0.000200		0.000200		mg/L		09/17/24 09:30	09/25/24 20:20	1
<b>Calcium</b>	<b>264</b>		0.500		mg/L		09/17/24 09:30	09/24/24 18:42	1
<b>Chromium</b>	<b>0.0444</b>		0.00500		mg/L		09/17/24 09:30	09/24/24 18:42	1
<b>Cobalt</b>	<b>0.00185</b>		0.000500		mg/L		09/17/24 09:30	09/24/24 18:42	1
Lithium	<0.0100		0.0100		mg/L		09/17/24 09:30	09/24/24 18:42	1
Lead	<0.000500		0.000500		mg/L		09/17/24 09:30	09/25/24 20:20	1
<b>Molybdenum</b>	<b>0.345</b>		0.00200		mg/L		09/17/24 09:30	09/24/24 18:42	1
<b>Selenium</b>	<b>0.0783</b>		0.00500		mg/L		09/17/24 09:30	09/24/24 18:42	1
Thallium	<0.00100		0.00100		mg/L		09/17/24 09:30	09/24/24 18:42	1

**Method: SW846 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/17/24 14:05	09/18/24 14:55	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Total Dissolved Solids (SM 2540C)</b>	<b>3420</b>		250		mg/L			09/16/24 21:05	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
<b>pH (SM 4500 H+ B)</b>	<b>8.6</b>	<b>HF</b>	1.0		SU			09/13/24 17:20	1

**Method: SW846 9315 - Radium-226 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
<b>Radium-226</b>	<b>0.275</b>		0.124	0.126	1.00	0.138	pCi/L	09/18/24 08:38	10/10/24 08:12	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Barium	92.1		30 - 110					09/18/24 08:38	10/10/24 08:12	1

**Method: SW846 9320 - Radium-228 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	<0.985	U	0.650	0.655	1.00	0.985	pCi/L	09/18/24 08:41	10/02/24 14:04	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Barium	92.1		30 - 110					09/18/24 08:41	10/02/24 14:04	1
Y Carrier	75.5		30 - 110					09/18/24 08:41	10/02/24 14:04	1

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# Client Sample Results

Client: GHD Services Inc.  
Project/Site: MEC Neal North Energy Center CCR

Job ID: 310-290593-1

**Client Sample ID: Leachate-0924**

**Lab Sample ID: 310-290593-1**

Date Collected: 09/12/24 18:15

Matrix: Water

Date Received: 09/13/24 16:26

**Method: TAL-STL Ra226\_Ra228 - Combined Radium-226 and Radium-228**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.16		0.662	0.667	5.00	0.985	pCi/L		10/10/24 14:19	1

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# Definitions/Glossary

Client: GHD Services Inc.  
Project/Site: MEC Neal North Energy Center CCR

Job ID: 310-290593-1

## Qualifiers

### General Chemistry

Qualifier	Qualifier Description
HF	Parameter with a holding time of 15 minutes. Test performed by laboratory at client's request. Sample was analyzed outside of hold time.

### Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# QC Sample Results

Client: GHD Services Inc.  
Project/Site: MEC Neal North Energy Center CCR

Job ID: 310-290593-1

## Method: 9056A - Anions, Ion Chromatography

**Lab Sample ID: MB 310-433888/3**  
**Matrix: Water**  
**Analysis Batch: 433888**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<1.00		1.00		mg/L			09/20/24 12:36	1
Fluoride	<0.200		0.200		mg/L			09/20/24 12:36	1
Sulfate	<1.00		1.00		mg/L			09/20/24 12:36	1

**Lab Sample ID: LCS 310-433888/4**  
**Matrix: Water**  
**Analysis Batch: 433888**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	10.0	9.697		mg/L		97	90 - 110
Fluoride	2.00	2.043		mg/L		102	90 - 110
Sulfate	10.0	10.23		mg/L		102	90 - 110

## Method: 6020B - Metals (ICP/MS)

**Lab Sample ID: MB 310-433328/1-A**  
**Matrix: Water**  
**Analysis Batch: 434220**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 433328**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		09/17/24 09:30	09/24/24 17:34	1
Arsenic	<0.00200		0.00200		mg/L		09/17/24 09:30	09/24/24 17:34	1
Beryllium	<0.00100		0.00100		mg/L		09/17/24 09:30	09/24/24 17:34	1
Boron	<0.100		0.100		mg/L		09/17/24 09:30	09/24/24 17:34	1
Calcium	<0.500		0.500		mg/L		09/17/24 09:30	09/24/24 17:34	1
Chromium	<0.00500		0.00500		mg/L		09/17/24 09:30	09/24/24 17:34	1
Cobalt	<0.000500		0.000500		mg/L		09/17/24 09:30	09/24/24 17:34	1
Lithium	<0.0100		0.0100		mg/L		09/17/24 09:30	09/24/24 17:34	1
Molybdenum	<0.00200		0.00200		mg/L		09/17/24 09:30	09/24/24 17:34	1
Selenium	<0.00500		0.00500		mg/L		09/17/24 09:30	09/24/24 17:34	1
Thallium	<0.00100		0.00100		mg/L		09/17/24 09:30	09/24/24 17:34	1

**Lab Sample ID: MB 310-433328/1-A**  
**Matrix: Water**  
**Analysis Batch: 434346**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 433328**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	<0.00200		0.00200		mg/L		09/17/24 09:30	09/25/24 19:29	1
Cadmium	<0.000200		0.000200		mg/L		09/17/24 09:30	09/25/24 19:29	1
Lead	<0.000500		0.000500		mg/L		09/17/24 09:30	09/25/24 19:29	1

**Lab Sample ID: LCS 310-433328/2-A**  
**Matrix: Water**  
**Analysis Batch: 434220**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 433328**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	0.200	0.2153		mg/L		108	80 - 120
Arsenic	0.200	0.2067		mg/L		103	80 - 120
Beryllium	0.100	0.09253		mg/L		93	80 - 120
Boron	0.200	0.1814		mg/L		91	80 - 120

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# QC Sample Results

Client: GHD Services Inc.  
 Project/Site: MEC Neal North Energy Center CCR

Job ID: 310-290593-1

## Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 310-433328/2-A  
 Matrix: Water  
 Analysis Batch: 434220

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA  
 Prep Batch: 433328

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Calcium	2.00	1.736		mg/L		87	80 - 120
Chromium	0.100	0.09973		mg/L		100	80 - 120
Cobalt	0.100	0.09501		mg/L		95	80 - 120
Lithium	0.200	0.1973		mg/L		99	80 - 120
Molybdenum	0.200	0.1852		mg/L		93	80 - 120
Selenium	0.400	0.3622		mg/L		91	80 - 120
Thallium	0.100	0.09919		mg/L		99	80 - 120

Lab Sample ID: LCS 310-433328/2-A  
 Matrix: Water  
 Analysis Batch: 434346

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA  
 Prep Batch: 433328

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Barium	0.100	0.09894		mg/L		99	80 - 120
Cadmium	0.100	0.09309		mg/L		93	80 - 120
Lead	0.200	0.1966		mg/L		98	80 - 120

## Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-433386/1-A  
 Matrix: Water  
 Analysis Batch: 433591

Client Sample ID: Method Blank  
 Prep Type: Total/NA  
 Prep Batch: 433386

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/17/24 14:05	09/18/24 14:25	1

Lab Sample ID: LCS 310-433386/2-A  
 Matrix: Water  
 Analysis Batch: 433591

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA  
 Prep Batch: 433386

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00167	0.001762		mg/L		106	80 - 120

## Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 310-433337/1  
 Matrix: Water  
 Analysis Batch: 433337

Client Sample ID: Method Blank  
 Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<50.0		50.0		mg/L			09/16/24 21:05	1

Lab Sample ID: LCS 310-433337/2  
 Matrix: Water  
 Analysis Batch: 433337

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Dissolved Solids	1000	1000		mg/L		100	88 - 110

# QC Sample Results

Client: GHD Services Inc.  
Project/Site: MEC Neal North Energy Center CCR

Job ID: 310-290593-1

## Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-433184/1  
Matrix: Water  
Analysis Batch: 433184

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
pH	7.00	7.0		SU		100	98 - 102

## Method: 9315 - Radium-226 (GFPC)

Lab Sample ID: MB 160-680020/1-A  
Matrix: Water  
Analysis Batch: 682913

Client Sample ID: Method Blank  
Prep Type: Total/NA  
Prep Batch: 680020

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.1179		0.0751	0.0759	1.00	0.0994	pCi/L	09/18/24 08:38	10/10/24 07:58	1
Carrier	MB %Yield	MB Qualifier	Limits					Prepared	Analyzed	Dil Fac
Barium	99.0		30 - 110					09/18/24 08:38	10/10/24 07:58	1

Lab Sample ID: LCS 160-680020/2-A  
Matrix: Water  
Analysis Batch: 682913

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA  
Prep Batch: 680020

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits
Radium-226	9.58	9.842		1.04	1.00	0.103	pCi/L	103	75 - 125
Carrier	LCS %Yield	LCS Qualifier	Limits						
Barium	98.5		30 - 110						

## Method: 9320 - Radium-228 (GFPC)

Lab Sample ID: MB 160-680022/1-A  
Matrix: Water  
Analysis Batch: 681767

Client Sample ID: Method Blank  
Prep Type: Total/NA  
Prep Batch: 680022

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	<0.565	U	0.360	0.362	1.00	0.565	pCi/L	09/18/24 08:41	10/02/24 11:56	1
Carrier	MB %Yield	MB Qualifier	Limits					Prepared	Analyzed	Dil Fac
Barium	99.0		30 - 110					09/18/24 08:41	10/02/24 11:56	1
Y Carrier	72.1		30 - 110					09/18/24 08:41	10/02/24 11:56	1

Lab Sample ID: LCS 160-680022/2-A  
Matrix: Water  
Analysis Batch: 681767

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA  
Prep Batch: 680022

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits
Radium-228	8.46	10.10		1.36	1.00	0.528	pCi/L	119	75 - 125

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# QC Sample Results

Client: GHD Services Inc.  
Project/Site: MEC Neal North Energy Center CCR

Job ID: 310-290593-1

## Method: 9320 - Radium-228 (GFPC) (Continued)

Lab Sample ID: LCS 160-680022/2-A  
Matrix: Water  
Analysis Batch: 681767

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA  
Prep Batch: 680022

Carrier	LCS		Limits
	%Yield	Qualifier	
Barium	98.5		30 - 110
Y Carrier	77.8		30 - 110

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# QC Association Summary

Client: GHD Services Inc.  
Project/Site: MEC Neal North Energy Center CCR

Job ID: 310-290593-1

## HPLC/IC

### Analysis Batch: 433888

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-290593-1	Leachate-0924	Total/NA	Water	9056A	
310-290593-1	Leachate-0924	Total/NA	Water	9056A	
MB 310-433888/3	Method Blank	Total/NA	Water	9056A	
LCS 310-433888/4	Lab Control Sample	Total/NA	Water	9056A	

## Metals

### Prep Batch: 433328

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-290593-1	Leachate-0924	Total/NA	Water	3005A	
MB 310-433328/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-433328/2-A	Lab Control Sample	Total/NA	Water	3005A	

### Prep Batch: 433386

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-290593-1	Leachate-0924	Total/NA	Water	7470A	
MB 310-433386/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-433386/2-A	Lab Control Sample	Total/NA	Water	7470A	

### Analysis Batch: 433591

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-290593-1	Leachate-0924	Total/NA	Water	7470A	433386
MB 310-433386/1-A	Method Blank	Total/NA	Water	7470A	433386
LCS 310-433386/2-A	Lab Control Sample	Total/NA	Water	7470A	433386

### Analysis Batch: 434220

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-290593-1	Leachate-0924	Total/NA	Water	6020B	433328
MB 310-433328/1-A	Method Blank	Total/NA	Water	6020B	433328
LCS 310-433328/2-A	Lab Control Sample	Total/NA	Water	6020B	433328

### Analysis Batch: 434346

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-290593-1	Leachate-0924	Total/NA	Water	6020B	433328
MB 310-433328/1-A	Method Blank	Total/NA	Water	6020B	433328
LCS 310-433328/2-A	Lab Control Sample	Total/NA	Water	6020B	433328

## General Chemistry

### Analysis Batch: 433184

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-290593-1	Leachate-0924	Total/NA	Water	SM 4500 H+ B	
LCS 310-433184/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	

### Analysis Batch: 433337

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-290593-1	Leachate-0924	Total/NA	Water	SM 2540C	
MB 310-433337/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-433337/2	Lab Control Sample	Total/NA	Water	SM 2540C	

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# QC Association Summary

Client: GHD Services Inc.  
Project/Site: MEC Neal North Energy Center CCR

Job ID: 310-290593-1

## Rad

### Prep Batch: 680020

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-290593-1	Leachate-0924	Total/NA	Water	PrecSep-21	
MB 160-680020/1-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-680020/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	

### Prep Batch: 680022

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-290593-1	Leachate-0924	Total/NA	Water	PrecSep_0	
MB 160-680022/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-680022/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	

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# Lab Chronicle

Client: GHD Services Inc.  
 Project/Site: MEC Neal North Energy Center CCR

Job ID: 310-290593-1

**Client Sample ID: Leachate-0924**

**Lab Sample ID: 310-290593-1**

**Date Collected: 09/12/24 18:15**

**Matrix: Water**

**Date Received: 09/13/24 16:26**

<u>Prep Type</u>	<u>Batch Type</u>	<u>Batch Method</u>	<u>Run</u>	<u>Dilution Factor</u>	<u>Batch Number</u>	<u>Analyst</u>	<u>Lab</u>	<u>Prepared or Analyzed</u>
Total/NA	Analysis	9056A		5	433888	HE7K	EET CF	09/20/24 16:25
Total/NA	Analysis	9056A		50	433888	HE7K	EET CF	09/21/24 08:48
Total/NA	Prep	3005A			433328	QTZ5	EET CF	09/17/24 09:30
Total/NA	Analysis	6020B		1	434346	NFT2	EET CF	09/25/24 20:20
Total/NA	Prep	3005A			433328	QTZ5	EET CF	09/17/24 09:30
Total/NA	Analysis	6020B		1	434220	NFT2	EET CF	09/24/24 18:42
Total/NA	Prep	7470A			433386	DHM5	EET CF	09/17/24 14:05
Total/NA	Analysis	7470A		1	433591	DHM5	EET CF	09/18/24 14:55
Total/NA	Analysis	SM 2540C		1	433337	MDU9	EET CF	09/16/24 21:05
Total/NA	Analysis	SM 4500 H+ B		1	433184	A3GU	EET CF	09/13/24 17:20
Total/NA	Prep	PrecSep-21			680020	BCE	EET SL	09/18/24 08:38
Total/NA	Analysis	9315		1	683026	FLC	EET SL	10/10/24 08:12
Total/NA	Prep	PrecSep_0			680022	BCE	EET SL	09/18/24 08:41
Total/NA	Analysis	9320		1	681767	SWS	EET SL	10/02/24 14:04
Total/NA	Analysis	Ra226_Ra228		1	683076	CAH	EET SL	10/10/24 14:19

**Laboratory References:**

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

EET SL = Eurofins St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566



# Accreditation/Certification Summary

Client: GHD Services Inc.  
Project/Site: MEC Neal North Energy Center CCR

Job ID: 310-290593-1

## Laboratory: Eurofins Cedar Falls

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-25

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
6020B	3005A	Water	Lithium

## Laboratory: Eurofins St. Louis

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Iowa	State	373	12-01-24

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
9315	PrecSep-21	Water	Radium-226
9320	PrecSep_0	Water	Radium-228
Ra226_Ra228		Water	Combined Radium 226 + 228

# Method Summary

Client: GHD Services Inc.  
Project/Site: MEC Neal North Energy Center CCR

Job ID: 310-290593-1

Method	Method Description	Protocol	Laboratory
9056A	Anions, Ion Chromatography	SW846	EET CF
6020B	Metals (ICP/MS)	SW846	EET CF
7470A	Mercury (CVAA)	SW846	EET CF
SM 2540C	Solids, Total Dissolved (TDS)	SM	EET CF
SM 4500 H+ B	pH	SM	EET CF
9315	Radium-226 (GFPC)	SW846	EET SL
9320	Radium-228 (GFPC)	SW846	EET SL
Ra226_Ra228	Combined Radium-226 and Radium-228	TAL-STL	EET SL
3005A	Preparation, Total Metals	SW846	EET CF
7470A	Preparation, Mercury	SW846	EET CF
PrecSep_0	Preparation, Precipitate Separation	None	EET SL
PrecSep-21	Preparation, Precipitate Separation (21-Day In-Growth)	None	EET SL

#### Protocol References:

None = None

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

#### Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

EET SL = Eurofins St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566





Environment Testing  
America



310-290593 Chain of Custody

**Cooler/Sample Receipt and Temperature Log Form**

<b>Client Information</b>			
Client: <u>GHD</u>			
City/State:	CITY <u>Des Moines</u>	STATE <u>IA</u>	Project:
<b>Receipt Information</b>			
Date/Time Received:	DATE <u>9/13/22</u>	TIME <u>1626</u>	Received By: <u>PH</u>
Delivery Type. <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
<b>Condition of Cooler/Containers</b>			
Sample(s) received in Cooler?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____
Multiple Coolers?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # _____ of _____
Cooler Custody Seals Present?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Sample Custody Seals Present?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Trip Blank Present?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓
<b>Temperature Record</b>			
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE			
Thermometer ID: <u>V</u>		Correction Factor (°C): <u>0</u>	
• <b>Temp Blank Temperature</b> – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>1.8</u>		Corrected Temp (°C): <u>1.8</u>	
• <b>Sample Container Temperature</b>			
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
<b>Exceptions Noted</b>			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g , bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE If yes, contact PM before proceeding If no, proceed with login			
<b>Additional Comments</b>			



**Chain of Custody Record**

Test-America Lies Mines SC  
 21-

eurofins

<b>Client Information</b>		Lab P.M. Zach Bindert		Carrier Tracking No(s):	
Client Contact: Kevin Armstrong		E-Mail: zach.bindert@eurofins.com		State of Origin: Iowa	
Company: GHD Services Inc.		PWSID: 712-898-9021		COC No:	
Address: 11228 Aurora Avenue		City: Des Moines		Page: Page 1 of 1	
State, Zip: IA, 50322-7905		Compliance Project: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Job #:	
Phone: 515-414-3935		PO #: 340-017045		Preservation Codes:	
Email: Kevin.Armstrong@ghd.com		WO #: 12576482-003 01		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 X - Trizma Y - EDTA Z - other (specify)	
Project Name: Neal North Closed CCR Monofill (IDNR)		Project #: 31017263		Other:	
Site: Neal North Closed CCR Monofill		SSOW#: 12576482-002		Special Instructions/Note:	

  

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (w=water, s=solid, o=water, a=air)	Preservation Code:	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	9316_Ra226 - Standard Target List	9320_Ra228 - Standard Target List	9066A_ORFM_28D - Chloride, Fluoride & Sulfate	6020B_7470A - Appendix III and IV Metals	2640C_Calcd_SMA600_H+	Total Number of Containers	Special Instructions/Note:
Leachate-0924	9/12/24	1815	G	Leachate		N	N	X	X	X	X	N	5	
PR														

  

<b>Possible Hazard Identification</b>		<input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological	
Deliverable Requested I, II, III, IV, Other (specify)		Special Instructions/QC Requirements: Database Facility Code 11114642-GD-MidAmeri	
Empty Kit Relinquished by		Date:	
Relinquished by: <i>Paul Richards</i>	Date/Time: 9/13/24 1300	Company: GHD	Received by: <i>James Koux</i>
Relinquished by:	Date/Time:	Company:	Received by: <i>PH</i>
Relinquished by:	Date/Time:	Company:	Received by:
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.	



# Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 310-290593-1

**Login Number: 290593**

**List Number: 1**

**Creator: Hirsch, Preston**

**List Source: Eurofins Cedar Falls**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



# Tracer/Carrier Summary

Client: GHD Services Inc.  
Project/Site: MEC Neal North Energy Center CCR

Job ID: 310-290593-1

## Method: 9315 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

### Percent Yield (Acceptance Limits)

Lab Sample ID	Client Sample ID	Ba (30-110)							
310-290593-1	Leachate-0924	92.1							
LCS 160-680020/2-A	Lab Control Sample	98.5							
MB 160-680020/1-A	Method Blank	99.0							

#### Tracer/Carrier Legend

Ba = Barium

## Method: 9320 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

### Percent Yield (Acceptance Limits)

Lab Sample ID	Client Sample ID	Ba (30-110)	Y (30-110)						
310-290593-1	Leachate-0924	92.1	75.5						
LCS 160-680022/2-A	Lab Control Sample	98.5	77.8						
MB 160-680022/1-A	Method Blank	99.0	72.1						

#### Tracer/Carrier Legend

Ba = Barium

Y = Y Carrier