

ANALYTICAL REPORT

PREPARED FOR

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Evergreen Natural Resources LLC
27000 Hwy 12
Trinidad, Colorado 81082

Generated 2/29/2024 9:17:01 AM

JOB DESCRIPTION

909j Water Sampling
909j Water Sampling

JOB NUMBER

280-187007-2

Eurofins Denver

Job Notes

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Authorization



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Table of Contents

Cover Page	1
Table of Contents	3
Definitions	4
Case Narrative	5
Detection Summary	6
Method Summary	7
Sample Summary	8
Client Sample Results	9
QC Sample Results	10
QC Association	12
Chronicle	13
Chain of Custody	14

Definitions/Glossary

Client: Evergreen Natural Resources LLC
Project/Site: 909j Water Sampling

Job ID: 280-187007-2

Qualifiers

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.
α	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

Case Narrative

Client: Evergreen Natural Resources LLC
Project: 909j Water Sampling

Job ID: 280-187007-2

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Job Narrative 280-187007-2

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 are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

- Matrix QC may not be reported if insufficient sample 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.
- Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

This report may include reporting limits (RLs) lower than Eurofins Environmental Testing standard reporting limits. The reported sample results and associated reporting limits are being used specifically to meet the needs of this project. Note that data are not normally reported to these levels without qualification because they are inherently less reliable and potentially less defensible than required by the latest industry standards.

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

Receipt

The sample was received on 1/26/2024 9:20 AM. 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 1.3°C.

Gas Flow Proportional Counter

Method 903.0: Radium 226 prep batch 160-646331: The barium carrier recovery is outside the upper control limit (110%) for the following sample: CINDY H 23-27 (280-187007-1). The QC samples associated with the batch have acceptable carrier recovery indicating the presence of matrix interference.

Method 903.0: Radium-226 prep batch 160-646331: The following sample had Ba carrier recovery above the QC limit: CINDY H 23-27 (280-187007-1). Native Ba was found in the sample, and this value was used to correct the carrier yield. The recovery is now within QC limits.

Method 904.0: Radium 228 prep batch 160-646338: The barium carrier recovery is outside the upper control limit (110%) for the following sample: CINDY H 23-27 (280-187007-1). The QC samples associated with the batch have acceptable carrier recovery indicating the presence of matrix interference.

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.

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Detection Summary

Client: Evergreen Natural Resources LLC
Project/Site: 909j Water Sampling

Job ID: 280-187007-2

Client Sample ID: CINDY H 23-27

Lab Sample ID: 280-187007-1

No Detections.

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12

This Detection Summary does not include radiochemical test results.

Method Summary

Client: Evergreen Natural Resources LLC
Project/Site: 909j Water Sampling

Job ID: 280-187007-2

Method	Method Description	Protocol	Laboratory
903.0	Radium-226 (GFPC)	EPA	EET SL
904.0	Radium-228 (GFPC)	EPA	EET SL
Ra226_Ra228	Combined Radium-226 and Radium-228	TAL-STL	EET SL
PrecSep_0	Preparation, Precipitate Separation	None	EET SL
PrecSep-21	Preparation, Precipitate Separation (21-Day In-Growth)	None	EET SL

Protocol References:

EPA = US Environmental Protection Agency

None = None

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

Laboratory References:

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

Sample Summary

Client: Evergreen Natural Resources LLC
Project/Site: 909j Water Sampling

Job ID: 280-187007-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
280-187007-1	CINDY H 23-27	Water	01/25/24 13:15	01/26/24 09:20

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12

Client Sample Results

Client: Evergreen Natural Resources LLC
Project/Site: 909j Water Sampling

Job ID: 280-187007-2

Client Sample ID: CINDY H 23-27

Lab Sample ID: 280-187007-1

Date Collected: 01/25/24 13:15

Matrix: Water

Date Received: 01/26/24 09:20

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.16		0.186	0.214	1.00	0.116	pCi/L	01/31/24 09:04	02/23/24 12:30	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	104		30 - 110					01/31/24 09:04	02/23/24 12:30	1

Method: EPA 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	1.03		0.357	0.370	1.00	0.429	pCi/L	01/31/24 09:11	02/13/24 11:21	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	104		30 - 110					01/31/24 09:11	02/13/24 11:21	1
Y Carrier	86.4		30 - 110					01/31/24 09:11	02/13/24 11:21	1

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	2.20		0.403	0.427	5.00	0.429	pCi/L		02/23/24 16:58	1

QC Sample Results

Client: Evergreen Natural Resources LLC
Project/Site: 909j Water Sampling

Job ID: 280-187007-2

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-646331/1-A

Matrix: Water

Analysis Batch: 649307

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 646331

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.03443	U	0.0635	0.0636	1.00	0.112	pCi/L	01/31/24 09:04	02/22/24 20:14	1
Carrier	MB %Yield	MB Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	97.2		30 - 110					01/31/24 09:04	02/22/24 20:14	1

Lab Sample ID: LCS 160-646331/2-A

Matrix: Water

Analysis Batch: 649307

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 646331

Analyte		Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits
Radium-226		11.3	11.12		1.15	1.00	0.140	pCi/L	98	75 - 125
Carrier	LCS %Yield	LCS Qualifier	Limits							
Ba Carrier	98.0		30 - 110							

Lab Sample ID: 500-245307-J-1-B MS

Matrix: Water

Analysis Batch: 649399

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Prep Batch: 646331

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits
Radium-226	15.5		11.4	26.54		2.55	1.00	0.126	pCi/L	97	60 - 140
Carrier	MS %Yield	MS Qualifier	Limits								
Ba Carrier	91.1		30 - 110								

Lab Sample ID: 500-245307-J-1-C MSD

Matrix: Water

Analysis Batch: 649399

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

Prep Batch: 646331

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits	RER	RER Limit
Radium-226	15.5		11.4	28.68		2.75	1.00	0.120	pCi/L	116	60 - 140	0.40	1
Carrier	MSD %Yield	MSD Qualifier	Limits										
Ba Carrier	88.8		30 - 110										

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-646338/1-A

Matrix: Water

Analysis Batch: 647950

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 646338

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.05753	U	0.234	0.234	1.00	0.426	pCi/L	01/31/24 09:11	02/13/24 11:15	1

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QC Sample Results

Client: Evergreen Natural Resources LLC
Project/Site: 909j Water Sampling

Job ID: 280-187007-2

Method: 904.0 - Radium-228 (GFPC) (Continued)

Carrier	MB %Yield	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	97.2		30 - 110	01/31/24 09:11	02/13/24 11:15	1
Y Carrier	86.0		30 - 110	01/31/24 09:11	02/13/24 11:15	1

Lab Sample ID: LCS 160-646338/2-A
Matrix: Water
Analysis Batch: 647950

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 646338

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits
Radium-228	9.22	10.28		1.33	1.00	0.496	pCi/L	112	75 - 125

Carrier	LCS %Yield	LCS Qualifier	Limits
Ba Carrier	98.0		30 - 110
Y Carrier	83.4		30 - 110

Lab Sample ID: 500-245307-J-1-E MS
Matrix: Water
Analysis Batch: 647938

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 646338

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits
Radium-228	1.65		9.27	12.11		1.52	1.00	0.470	pCi/L	113	60 - 140

Carrier	MS %Yield	MS Qualifier	Limits
Ba Carrier	91.1		30 - 110
Y Carrier	86.4		30 - 110

Lab Sample ID: 500-245307-J-1-F MSD
Matrix: Water
Analysis Batch: 647938

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 646338

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits	RER	Limit
Radium-228	1.65		9.26	11.79		1.51	1.00	0.544	pCi/L	110	60 - 140	0.11	1

Carrier	MSD %Yield	MSD Qualifier	Limits
Ba Carrier	88.8		30 - 110
Y Carrier	86.4		30 - 110

QC Association Summary

Client: Evergreen Natural Resources LLC
Project/Site: 909j Water Sampling

Job ID: 280-187007-2

Rad

Prep Batch: 646331

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-187007-1	CINDY H 23-27	Total/NA	Water	PrecSep-21	
MB 160-646331/1-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-646331/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
500-245307-J-1-B MS	Matrix Spike	Total/NA	Water	PrecSep-21	
500-245307-J-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	PrecSep-21	

Prep Batch: 646338

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-187007-1	CINDY H 23-27	Total/NA	Water	PrecSep_0	
MB 160-646338/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-646338/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
500-245307-J-1-E MS	Matrix Spike	Total/NA	Water	PrecSep_0	
500-245307-J-1-F MSD	Matrix Spike Duplicate	Total/NA	Water	PrecSep_0	

Lab Chronicle

Client: Evergreen Natural Resources LLC
Project/Site: 909j Water Sampling

Job ID: 280-187007-2

Client Sample ID: CINDY H 23-27
Date Collected: 01/25/24 13:15
Date Received: 01/26/24 09:20

Lab Sample ID: 280-187007-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			995.25 mL	1.0 g	646331	01/31/24 09:04	KAC	EET SL
Total/NA	Analysis	903.0		1	1.0 mL	1.0 mL	649399	02/23/24 12:30	SCB	EET SL
Total/NA	Prep	PrecSep_0			995.25 mL	1.0 g	646338	01/31/24 09:11	KAC	EET SL
Total/NA	Analysis	904.0		1			647938	02/13/24 11:21	SCB	EET SL
Total/NA	Analysis	Ra226_Ra228		1			649555	02/23/24 16:58	EMH	EET SL

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

2/29/2024

Chain of Custody Record



Client Information (Sub Contract Lab) Client Contact: Shipping/Receiving Company: TestAmerica Laboratories, Inc.			Lab PM: Gardner, Matthew O E-Mail: Matthew.Gardner@et.eurofins.com		Carrier Tracking No(s): 280-689869.1 State of Origin: Colorado Page: 1 of 1		COC No: 280-689869.1 Job #: 280-187007-2	
Address: 13715 Rider Trail North, Earth City, MO, 63045 Phone: 314-298-8566(Tel) 314-298-8757(Fax) Email: 314-298-8566(Tel) 314-298-8757(Fax)			Due Date Requested: 2/29/2024 TAT Requested (days): PO # Project #: 28001998 SSOW#: Evergreen Natural Resources		Analysis Requested Preservation Codes: A - HCL M - Hexane B - NaOH N - None C - Zn Acetate O - AsNaO2 D - Nitric Acid P - Na2OAS E - NaHSO4 Q - Na2SO3 F - MeOH R - Na2S2O3 G - Anchlor S - H2SO4 H - Ascorbic Acid T - TSP Dodecahydrate I - Ice U - Acetone J - DI Water V - HCAA K - EDTA W - pH 4-5 L - EDA Y - Trizma Z - other (specify) Other:			
Sample Identification - Client ID (Lab ID) CINDY H 23-27 (280-187007-1)			Sample Date: 1/25/24 Sample Time: 13:15 Mountain		Sample Type (C=comp, G=grab): Preservation Code: Matrix (W=water, B=soil, O=other):		Field Filtered Sample (Yes or No): <input checked="" type="checkbox"/> Perform MS/MSD (Yes or No): <input checked="" type="checkbox"/> Ra26Ra228_GFP: <input checked="" type="checkbox"/> 903.0/PreSep_21 Standard Target List: <input checked="" type="checkbox"/> 904.0/PreSep_0 Standard Target List: <input checked="" type="checkbox"/>	
Total Number of Containers: 2			Special Instructions/Note:					
Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/test/main being analyzed, the samples must be shipped back to the Eurofins TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins TestAmerica.								
Possible Hazard Identification Unconfirmed Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2								
Empty Kit Relinquished by:			Date:		Time:			
Relinquished by: WILL HARRIS			Date/Time: 1-29-24 14:05		Company: FEET DEN			
Relinquished by:			Date/Time:		Company:			
Relinquished by:			Date/Time:		Company:			
Custody Seal No.: Δ Yes Δ No			Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:			