

**CTEH - ER**

Sample Delivery Group: L1847157  
Samples Received: 04/12/2025  
Project Number: PROJ-054017  
Description: Bishop Loss of Containment Incident

Report To: CTEH  
5120 North Shore Drive  
North Little Rock, AR 72118

Entire Report Reviewed By:



Jared Starkey  
Project Manager

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**Pace Analytical National**12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 [mydata.pacelabs.com](https://mydata.pacelabs.com)

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# SAMPLE SUMMARY

## GACO0411S001 L1847157-01 Solids and Chemical Materials

Collected by  
Lisa Howes

Collected date/time  
04/11/25 15:50

Received date/time  
04/12/25 11:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method DOE Ga-01-R/901.1	WG2490096	1	04/12/25 19:50	04/14/25 11:34	ZRG	Mt. Juliet, TN

<sup>1</sup>Cp

<sup>2</sup>Tc

<sup>3</sup>Ss

## GACO0411S002 L1847157-02 Solids and Chemical Materials

Collected by  
Lisa Howes

Collected date/time  
04/11/25 16:25

Received date/time  
04/12/25 11:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method DOE Ga-01-R/901.1	WG2490096	1	04/12/25 19:50	04/14/25 12:50	ZRG	Mt. Juliet, TN

<sup>4</sup>Cn

<sup>5</sup>Sr

## GACO0411S003 L1847157-03 Solids and Chemical Materials

Collected by  
Lisa Howes

Collected date/time  
04/11/25 16:40

Received date/time  
04/12/25 11:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method DOE Ga-01-R/901.1	WG2490096	1	04/14/25 10:38	04/14/25 13:10	ZRG	Mt. Juliet, TN

<sup>6</sup>Qc

<sup>7</sup>Gl

<sup>8</sup>Al

## GACO0411S004 L1847157-04 Solids and Chemical Materials

Collected by  
Lisa Howes

Collected date/time  
04/11/25 16:50

Received date/time  
04/12/25 11:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method DOE Ga-01-R/901.1	WG2490096	1	04/14/25 10:38	04/14/25 14:04	ZRG	Mt. Juliet, TN

<sup>9</sup>Sc

## GACO0411S005 L1847157-05 Solids and Chemical Materials

Collected by  
Lisa Howes

Collected date/time  
04/11/25 17:05

Received date/time  
04/12/25 11:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method DOE Ga-01-R/901.1	WG2490096	1	04/12/25 19:50	04/14/25 14:11	ZRG	Mt. Juliet, TN

# CASE NARRATIVE

Unless qualified or notated within the narrative below, all sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Jared Starkey  
Project Manager



Radiochemistry by Method DOE Ga-01-R/901.1

Analyte	Result pCi/g	Qualifier	2 sigma CE + / -	TPU + / -	MDA pCi/g	Lc pCi/g	Analysis Date date / time	Batch
Actinium-228 (Ra-228)	0.857		0.282	0.282	0.536	0.228	04/14/2025 11:34	<a href="#">WG2490096</a>
Bismuth-214 (Ra-226)	0.798		0.212	0.212	0.260	0.113	04/14/2025 11:34	<a href="#">WG2490096</a>
Lead-214	0.866		0.180	0.180	0.263	0.118	04/14/2025 11:34	<a href="#">WG2490096</a>
Thorium-234 (U-238)	0.309	U	1.14	1.14	2.57	1.01	04/14/2025 11:34	<a href="#">WG2490096</a>
Radium-226 (186 KeV)	1.08	U	0.722	0.722	1.28	0.588	04/14/2025 11:34	<a href="#">WG2490096</a>

<sup>1</sup>Cp

<sup>2</sup>Tc

<sup>3</sup>Ss

<sup>4</sup>Cn

<sup>5</sup>Sr

<sup>6</sup>Qc

<sup>7</sup>Gl

<sup>8</sup>Al

<sup>9</sup>Sc

Radiochemistry by Method DOE Ga-01-R/901.1

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/g		+ / -	+ / -	pCi/g	pCi/g	date / time	
Actinium-228 (Ra-228)	0.710		0.284	0.284	0.570	0.247	04/14/2025 12:50	<a href="#">WG2490096</a>
Bismuth-214 (Ra-226)	0.959		0.221	0.221	0.254	0.111	04/14/2025 12:50	<a href="#">WG2490096</a>
Lead-214	0.725		0.157	0.157	0.233	0.104	04/14/2025 12:50	<a href="#">WG2490096</a>
Thorium-234 (U-238)	0.505	U	1.08	1.08	2.33	0.914	04/14/2025 12:50	<a href="#">WG2490096</a>
Radium-226 (186 KeV)	1.33		0.696	0.696	1.19	0.546	04/14/2025 12:50	<a href="#">WG2490096</a>

<sup>1</sup>Cp

<sup>2</sup>Tc

<sup>3</sup>Ss

<sup>4</sup>Cn

<sup>5</sup>Sr

<sup>6</sup>Qc

<sup>7</sup>Gl

<sup>8</sup>Al

<sup>9</sup>Sc

Radiochemistry by Method DOE Ga-01-R/901.1

Analyte	Result pCi/g	Qualifier	2 sigma CE + / -	TPU + / -	MDA pCi/g	Lc pCi/g	Analysis Date date / time	Batch
Actinium-228 (Ra-228)	0.875		0.225	0.225	0.379	0.165	04/14/2025 13:10	<a href="#">WG2490096</a>
Bismuth-214 (Ra-226)	0.553		0.147	0.147	0.188	0.0837	04/14/2025 13:10	<a href="#">WG2490096</a>
Lead-214	0.775		0.112	0.112	0.131	0.0587	04/14/2025 13:10	<a href="#">WG2490096</a>
Thorium-234 (U-238)	0.214	<u>U</u>	0.597	0.597	1.38	0.551	04/14/2025 13:10	<a href="#">WG2490096</a>
Radium-226 (186 KeV)	0.743		0.418	0.418	0.665	0.311	04/14/2025 13:10	<a href="#">WG2490096</a>

<sup>1</sup>Cp

<sup>2</sup>Tc

<sup>3</sup>Ss

<sup>4</sup>Cn

<sup>5</sup>Sr

<sup>6</sup>Qc

<sup>7</sup>Gl

<sup>8</sup>Al

<sup>9</sup>Sc

Radiochemistry by Method DOE Ga-01-R/901.1

Analyte	Result pCi/g	Qualifier	2 sigma CE + / -	TPU + / -	MDA pCi/g	Lc pCi/g	Analysis Date date / time	Batch
Actinium-228 (Ra-228)	1.18		0.304	0.304	0.466	0.198	04/14/2025 14:04	<a href="#">WG2490096</a>
Bismuth-214 (Ra-226)	0.771		0.201	0.201	0.273	0.121	04/14/2025 14:04	<a href="#">WG2490096</a>
Lead-214	0.900		0.167	0.167	0.226	0.102	04/14/2025 14:04	<a href="#">WG2490096</a>
Thorium-234 (U-238)	-0.0240	<u>U</u>	1.12	1.12	2.53	1.00	04/14/2025 14:04	<a href="#">WG2490096</a>
Radium-226 (186 KeV)	1.64		0.723	0.723	1.20	0.558	04/14/2025 14:04	<a href="#">WG2490096</a>

<sup>1</sup>Cp

<sup>2</sup>Tc

<sup>3</sup>Ss

<sup>4</sup>Cn

<sup>5</sup>Sr

<sup>6</sup>Qc

<sup>7</sup>Gl

<sup>8</sup>Al

<sup>9</sup>Sc



Radiochemistry by Method DOE Ga-01-R/901.1

Analyte	Result pCi/g	Qualifier	2 sigma CE + / -	TPU + / -	MDA pCi/g	Lc pCi/g	Analysis Date date / time	Batch
Actinium-228 (Ra-228)	1.02		0.250	0.250	0.445	0.194	04/14/2025 14:11	<a href="#">WG2490096</a>
Bismuth-214 (Ra-226)	0.892		0.188	0.188	0.223	0.0998	04/14/2025 14:11	<a href="#">WG2490096</a>
Lead-214	0.794		0.122	0.122	0.149	0.0669	04/14/2025 14:11	<a href="#">WG2490096</a>
Thorium-234 (U-238)	0.691	<u>U</u>	0.698	0.698	1.47	0.585	04/14/2025 14:11	<a href="#">WG2490096</a>
Radium-226 (186 KeV)	0.905		0.460	0.460	0.723	0.337	04/14/2025 14:11	<a href="#">WG2490096</a>

<sup>1</sup>Cp

<sup>2</sup>Tc

<sup>3</sup>Ss

<sup>4</sup>Cn

<sup>5</sup>Sr

<sup>6</sup>Qc

<sup>7</sup>Gl

<sup>8</sup>Al

<sup>9</sup>Sc

Method Blank (MB)

(MB) R4199335-1 04/14/25 11:30

Analyte	MB Result pCi/g	MB Qualifier	MB 2 sigma CE + / -	MB MDA pCi/g	MB Lc pCi/g
Actinium-228 (Ra-228)	0.0284	⌋	0.113	0.334	0.132
Americium-241	0.0208	⌋	0.133	0.254	0.116
Bismuth-214 (Ra-226)	0.0276	⌋	0.101	0.206	0.0875
Cesium-137	0.0249	⌋	0.0561	0.110	0.0461
Cobalt-60	-0.0166	⌋	0.0334	0.108	0.0406
Lead-214	0.182	⌋	0.0818	0.169	0.0731
Radium-226 (186 KeV)	0.277	⌋	0.518	0.918	0.415
Thorium-234 (U-238)	0.938	⌋	0.574	1.09	0.417

L1847539-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1847539-01 04/14/25 12:52 • (DUP) R4199335-3 04/14/25 11:33

Analyte	Original Result pCi/g	Original 2 sigma CE + / -	Original MDA pCi/g	Original Lc pCi/g	DUP Result pCi/g	DUP 2 sigma CE + / -	DUP MDA pCi/g	DUP Lc pCi/g	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Actinium-228 (Ra-228)	0.356	0.115	0.227	0.101	0.249	0.194	0.476	0.206	35.5	0.476	⌋	20	3
Bismuth-214 (Ra-226)	0.392	0.0868	0.108	0.0487	0.294	0.138	0.213	0.0926	28.6	0.600		20	3
Lead-214	0.418	0.0701	0.0938	0.0430	0.412	0.116	0.193	0.0867	1.28	0.0392		20	3
Radium-226 (186 KeV)	0.617	0.377	0.612	0.290	0.205	0.645	1.12	0.526	100	0.552	⌋	20	3
Thorium-234 (U-238)	0.523	0.398	0.830	0.334	0.289	0.480	1.24	0.494	57.7	0.376	⌋	20	3

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4199335-2 04/14/25 11:32 • (LCSD) R4199335-4 04/14/25 12:49

Analyte	Spike Amount pCi/g	LCS Result pCi/g	LCSD Result pCi/g	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Americium-241	36.9	36.5	32.2	98.8	87.2	80.0-120			12.5	20
Cesium-137	53.8	58.5	58.5	109	109	80.0-120			0.0171	20
Cobalt-60	62.9	67.0	65.5	106	104	80.0-120			2.26	20

<sup>1</sup>Cp

<sup>2</sup>Tc

<sup>3</sup>Ss

<sup>4</sup>Cn

<sup>5</sup>Sr

<sup>6</sup>Qc

<sup>7</sup>Gl

<sup>8</sup>Al

<sup>9</sup>Sc

# GLOSSARY OF TERMS

## Guide to Reading and Understanding Your Laboratory Report

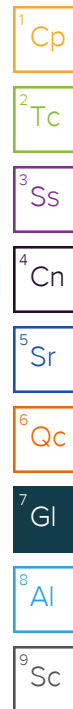
The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

### Abbreviations and Definitions

MDA	Minimum Detectable Activity.
Rec.	Recovery.
RER	Replicate Error Ratio.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
U	Below Detectable Limits: Indicates that the analyte was not detected.



# ACCREDITATIONS & LOCATIONS

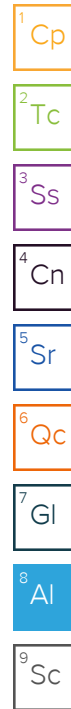
## Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey--NELAP	TN002
California	2932	New Mexico <sup>1</sup>	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina <sup>1</sup>	DW21704
Georgia	NELAP	North Carolina <sup>3</sup>	41
Georgia <sup>1</sup>	923	North Dakota	R-140
Idaho	TN00003	Ohio--VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky <sup>1,6</sup>	KY90010	South Carolina	84004002
Kentucky <sup>2</sup>	16	South Dakota	n/a
Louisiana	AI30792	Tennessee <sup>1,4</sup>	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas <sup>5</sup>	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA -- ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA -- ISO 17025 <sup>5</sup>	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA--Crypto	TN00003		

<sup>1</sup> Drinking Water <sup>2</sup> Underground Storage Tanks <sup>3</sup> Aquatic Toxicity <sup>4</sup> Chemical/Microbiological <sup>5</sup> Mold <sup>6</sup> Wastewater n/a Accreditation not applicable

\* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

\* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.



[illegible]

## Multiple Parcel Form

L# L1847157

[illegible]

Name

Date \_\_\_\_\_