TRANSMITTAL

AAI

Ardaman & Associates, Inc.

To: ERM
840 W. Sam Houston Pkwy. Suite 600
Houston, TX 77024
Phone: (832) 786-5006
Attention: Dave Angle

Date: February 22, 2021
Job No.: 21-83-3852
Project: JLS/0519829
From: Chandler M. Willis

COPIES	DESCRIPTION
1	Laboratory Test Results (1)
1	Grain Size Curve (1)
1	Chain of Custody (1)

THESE ARE TRANSMITTED:

■ **FOR YOUR USE** ☐ **FOR REVIEW & COMMENT** ■ **AS REQUESTED**

Reviewed By:

Chandler M. Willis

Laboratory Manager

Approved By:

Megan Bourgeois, P.E.

Laboratory Director

AASHTO Accredited Laboratory
LELAP Certificate No. 02052

316 HIGHLANDIA DRIVE
BATON ROUGE, LA 70810
PHONE: (225) 752-4790
FAX: (225) 752-4878

JLS/0519829
LABORATORY TEST RESULTS
TABLE 1

			ASTM D2216			ASTM D854	ASTM D5084	ASTM D4972	ASTM D2974	ASTM D4318			ASTM D422	ASTM D2487
Date Tested	Sample ID	Depth (ft.)	Moisture Content (%)	Dry Density (lbs./cu.ft.)	Total Porosity (decimal)	Specific Gravity	Permeability (cm/sec)	Soil pH	Organic Content (%)	Atterberg Limits			Particle Size Analysis	Classification
										LL	PL	PI		
2/22/2021	JLS-2	42-44	35.4	84.9			$8.3x10^{-8}$							Gray clay
2/22/2021	JLS-2	43-44	35.2										*	Gray FAT CLAY (CH)

NOTE:
(1) FOC = Organic Content divided by 174.
(2) * See Particle Size Analysis Graph.
(3) NP = Non Plastic

Project: JLS/0519829

Client: ERM

Ardaman & Associates, Inc.

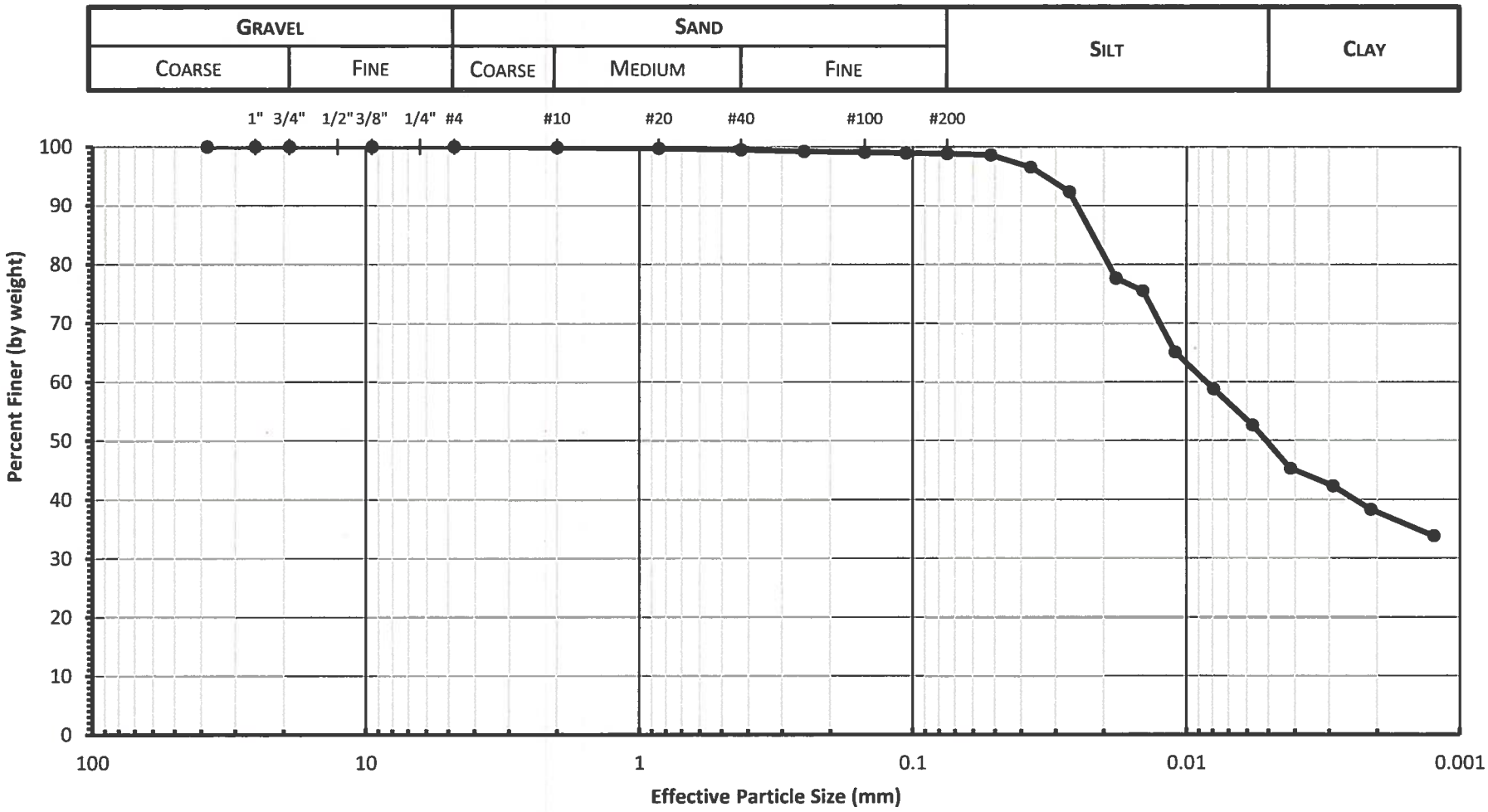
File No.: 21-83-3852

Date: 2/22/2021

ARD ENVIRONMENTAL TABLE 21-83-3852.GPJ LOG01.GDT 2/22/21

Client: ERM
Project: JLS/0519829
AAI Project No.21-83-3852

PARTICLE SIZE ANALYSIS
(ASTM D422)



SAMPLE IDENTIFICATION		VISUAL IDENTIFICATION	% GRAVEL	% SAND	% SILT	% CLAY
BORING	DEPTH (FT)					
JLS-2	43-44	Gray FAT CLAY (CH)	0.0	1.2	49.7	49.2

Ardaman & Associates, Inc.

Baton Rouge Geotechnical Laboratory
AASHTO Accredited Laboratory
LELAP Certificate No. 02052

316 Highlandia Drive
Baton Rouge, LA 70810
225-752-4790 (phone)
225-752-4878 (fax)

21-83-3852

Chain of Custody Record

Ardaman & Associates, Inc.

Geotechnical, Environmental and Materials Consultants
316 Highlandia Drive
Baton Rouge, LA 70810

Client: ERM	Address: 840 W. Sam Houston Pkwy N, Suite 600 Houston, TX 77024	Phone Number: 504.810.1764 Fax Number:	Date: 2/5/21
Billing Contact/Address: (If different from above)	P.O. Number:	Project Name: JLS / 0519829	Project Number: 0519829
			Site/Location: DSS-1 WH/Hydro 0622

Collected Date	Collected Time	Sample Identification	Matrix (Soil, Sludge, Water, Oil, Other)	Sample Container	Moisture Content (ASTM D2216)	Atterberg Limits (ASTM D4318)	Sieve Analysis (ASTM D422)	Specific Gravity (ASTM D 854)	Constant Head Permeability (ASTM D 2434)	Falling Head Permeability (ASTM D 5084)	Organic Content (ASTM D 2974)	Soil pH (ASTM D 2976)	Total Porosity	Vertical Perm	Grain Size	Soil Classification
2/3/21	1340	JLS-2 43-44'	Soil	ziploc											X	X
2/4/21	0900	JLS-2 42-44'	Soil	Geoprobe liner										X		

Relinquished By: (Signature)	Date/Time	Recieved By: (Signature)	Date/Time	Remarks:
	2/5/21 1530		2/5/21 @1530	

Relinquished By: (Signature)	Date/Time	Recieved By: (Signature)	Date/Time
	2/8/21 0840		2/8/21 @ 8:40am

LELAP CERTIFICATE NUMBER: 01955
DOD-ELAP ACCREDITATION NUMBER: 74960

ANALYTICAL RESULTS

PERFORMED BY

Pace Analytical Gulf Coast
7979 Innovation Park Dr.
Baton Rouge, LA 70820
(225) 769-4900

Report Date 03/03/2021

Report # 221020810

Project 0519829 JLS

Deliver To	***Additional Recipients***
Jonathan Miller ERM 3838 N. Causeway Blvd. Suite 3000 LA 70002	Guy Guinot, ERM

Laboratory Endorsement

Sample analysis was performed in accordance with approved methodologies provided by the Environmental Protection Agency or other recognized agencies. The samples and their corresponding extracts will be maintained for a period of 30 days unless otherwise arranged. Following this retention period the samples will be disposed in accordance with Pace Gulf Coast's Standard Operating Procedures.

Common Abbreviations that may be Utilized in this Report

ND	Indicates the result was Not Detected at the specified reporting limit
NO	Indicates the sample did not ignite when preliminary test performed for EPA Method 1030
DO	Indicates the result was Diluted Out
MI	Indicates the result was subject to Matrix Interference
TNTC	Indicates the result was Too Numerous To Count
SUBC	Indicates the analysis was Sub-Contracted
FLD	Indicates the analysis was performed in the Field
DL	Detection Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
RE	Re-analysis
CF	HPLC or GC Confirmation
00:01	Reported as a time equivalent to 12:00 AM

Reporting Flags that may be Utilized in this Report

J or I	Indicates the result is between the MDL and LOQ
J	DOD flag on analyte in the parent sample for MS/MSD outside acceptance criteria
U	Indicates the compound was analyzed for but not detected
B or V	Indicates the analyte was detected in the associated Method Blank
Q	Indicates a non-compliant QC Result (See Q Flag Application Report)
*****	Indicates a non-compliant or not applicable QC recovery or RPD – see narrative
E	Organics - The result is estimated because it exceeded the instrument calibration range
E	Metals - % diference for the serial dilution is > 10%
L	Reporting Limits adjusted to meet risk-based limit.
P	RPD between primary and confirmation result is greater than 40
DL	Diluted analysis – when appended to Client Sample ID

Sample receipt at Pace Gulf Coast is documented through the attached chain of custody. In accordance with NELAC, this report shall be reproduced only in full and with the written permission of Pace Gulf Coast. The results contained within this report relate only to the samples reported. The documented results are presented within this report.

This report pertains only to the samples listed in the Report Sample Summary and should be retained as a permanent record thereof. The results contained within this report are intended for the use of the client. Any unauthorized use of the information contained in this report is prohibited.

I certify that this data package is in compliance with The NELAC Institute (TNI) Standard 2009 and terms and conditions of the contract and Statement of Work both technically and for completeness, for other than the conditions in the case narrative. Release of the data contained in this hardcopy data package and in the computer readable data submitted has been authorized by the Quality Assurance Manager or his/her designee, as verified by the following signature.

Estimated uncertainty of measurement is available upon request. This report is in compliance with the DOD QSM as specified in the contract if applicable.

Authorized Signature
Pace Gulf Coast Report 221020810

Certifications

Certification	Certification Number
DOD ELAP	74960
Alabama	01955
Arkansas	88-0655
Colorado	01955
Delaware	01955
Florida	E87854
Georgia	01955
Hawaii	01955
Idaho	01955
Illinois	200048
Indiana	01955
Kansas	E-10354
Kentucky	95
Louisiana	01955
Maryland	01955
Massachusetts	01955
Michigan	01955
Mississippi	01955
Missouri	01955
Montana	N/A
Nebraska	01955
New Mexico	01955
North Carolina	618
North Dakota	R-195
Oklahoma	9403
South Carolina	73006001
South Dakota	01955
Tennessee	01955
Texas	T104704178
Vermont	01955
Virginia	460215
Washington	C929
USDA Soil Permit	P330-16-00234

Case Narrative

Client: ERM-Baton Rouge **Report:** 221020810

Pace Analytical Gulf Coast received and analyzed the sample(s) listed
on the Report Sample Summary page of this report. Receipt of the sample(s) is documented
by the attached chain of custody. This applies only to the sample(s) listed in this report.
No sample integrity or quality control exceptions were identified unless noted below.

PROJECT MANAGER COMMENTS

Per Brian Woodbury's e-mail dated 03/02/21 - run all PAH samples that were extracted and held. (Anna Kinchen 03/02/2021 10:12)

SEMI-VOLATILES GAS CHROMATOGRAPHY

In the MADEP EPH Revision 1.1 (LA) analysis for prep batch 703614, the LCS/LCSD RPD is a above the control limit for Aliphatic >C10-C12, Aliphatic >C12-C16, and Unadjusted >C10-C12 Aromatics. All recoveries are acceptable.

METALS

In the EPA 1312/6020B analysis for prep batch 703538, the MS and/or MSD recovery is outside the control limits for Barium. The LCS recovery is within control limits. This indicates the analysis is in control and the sample is affected by matrix interference. A post-digestion spike was performed on the QC sample for this batch.

In the EPA 6020B analysis for prep batch 703502, Barium was detected in the method blank at a concentration > LOQ but < 10% the concentration in the associated samples.

Sample Summary

LAB ID	Client ID	Matrix	Collect Date	Receive Date
22102081001	JLS-23 0-2'	Solid	02/02/2021 09:45	02/08/2021 08:16
22102081002	JLS-23 2-3.5'	Solid	02/02/2021 10:15	02/08/2021 08:16
22102081003	MW-3 0-2'	Solid	02/04/2021 11:15	02/08/2021 08:16
22102081004	MW-3 2-4'	Solid	02/04/2021 11:20	02/08/2021 08:16
22102081005	MW-3 24-26'	Solid	02/04/2021 12:12	02/08/2021 08:16
22102081006	MW-2 0-2'	Solid	02/05/2021 08:20	02/08/2021 08:16
22102081007	MW-2 2-4'	Solid	02/05/2021 08:25	02/08/2021 08:16
22102081008	MW-1 0-2'	Solid	02/05/2021 12:20	02/08/2021 08:16
22102081009	MW-1 2-4'	Solid	02/05/2021 12:25	02/08/2021 08:16
22102081010	MW-1 24-26'	Solid	02/05/2021 12:50	02/08/2021 08:16

Sample Results

JLS-23 0-2'

Collect Date 02/02/2021 09:45 **LAB ID** 22102081001
Receive Date 02/08/2021 08:16 **Matrix** Solid

EPA 1312/6020B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/09/2021 07:30	703538	EPA 3010A	1	02/10/2021 14:52	LWZ	703722

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	0.0012	0.0010	mg/L
7440-39-3	Barium	0.063	0.0010	mg/L

EPA 9060A *Results Reported on Dry Weight Basis

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/11/2021 12:40	PLH	703834

CAS#	Parameter	Result	LOQ	Units
C-012	Total Organic Carbon	25500	250	mg/kg

SM 2540 G-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/24/2021 13:30	CJS	704501

CAS#	Parameter	Result	LOQ	Units
WET-037	Total Moisture	54.8	0.010	%

JLS-23 2-3.5'

Collect Date 02/02/2021 10:15 **LAB ID** 22102081002
Receive Date 02/08/2021 08:16 **Matrix** Solid

EPA 1312/6020B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/09/2021 07:30	703538	EPA 3010A	1	02/10/2021 15:10	LWZ	703722

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	0.0012	0.0010	mg/L
7440-39-3	Barium	0.067	0.0010	mg/L

EPA 9060A *Results Reported on Dry Weight Basis

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/11/2021 15:22	PLH	703834

CAS#	Parameter	Result	LOQ	Units
C-012	Total Organic Carbon	82600	250	mg/kg

SM 2540 G-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/24/2021 13:30	CJS	704501

CAS#	Parameter	Result	LOQ	Units
WET-037	Total Moisture	62.9	0.010	%

Sample Results

MW-3 0-2'

Collect Date	02/04/2021 11:15	**LAB ID**	22102081003
Receive Date	02/08/2021 08:16	**Matrix**	Solid

EPA 8270C SIM

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/11/2021 09:00	703820	EPA 3546	1	02/12/2021 10:56	SMH	703915

CAS#	Parameter	Result	LOQ	Units
91-57-6	2-Methylnaphthalene	ND	0.00326	mg/kg
83-32-9	Acenaphthene	ND	0.00651	mg/kg
208-96-8	Acenaphthylene	ND	0.00651	mg/kg
120-12-7	Anthracene	ND	0.00326	mg/kg
56-55-3	Benzo(a)anthracene	ND	0.00651	mg/kg
50-32-8	Benzo(a)pyrene	ND	0.00326	mg/kg
205-99-2	Benzo(b)fluoranthene	ND	0.00651	mg/kg
207-08-9	Benzo(k)fluoranthene	ND	0.00326	mg/kg
218-01-9	Chrysene	ND	0.00651	mg/kg
53-70-3	Dibenz(a,h)anthracene	ND	0.00651	mg/kg
206-44-0	Fluoranthene	ND	0.00326	mg/kg
86-73-7	Fluorene	ND	0.00326	mg/kg
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.00326	mg/kg
91-20-3	Naphthalene	ND	0.00326	mg/kg
85-01-8	Phenanthrene	ND	0.00326	mg/kg
129-00-0	Pyrene	ND	0.00326	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
7297-45-2	2-Methylnaphthalene-d10	0.3290	.267	mg/kg	81	47 - 120
93951-69-0	Fluoranthene-d10	0.3290	.276	mg/kg	84	47 - 120

MADEP VPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1000	02/10/2021 16:43	JAR	703741

CAS#	Parameter	Result	LOQ	Units
GCSV-02-10	Aliphatic >C8-C10	ND	60.8	mg/kg
GCSV-02-30	Aliphatic C6-C8	ND	60.8	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
615-59-8	2,5-Dibromotoluene	61.30	62.3	mg/kg	102	60 - 140

MADEP VPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1000	02/10/2021 16:43	JAR	703743

CAS#	Parameter	Result	LOQ	Units
GCSV-02-14	Aromatic >C8-C10	ND	52.0	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
615-59-8	2,5-Dibromotoluene	46.60	34.1	mg/kg	73	60 - 140

Sample Results

MW-3 0-2'

Collect Date	02/04/2021 11:15	**LAB ID**	22102081003
Receive Date	02/08/2021 08:16	**Matrix**	Solid

MADEP EPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/09/2021 10:00	703614	MADEP EPH Revision 1.1 (LA)	1	02/12/2021 21:49	MFS	703963

CAS#	Parameter	Result	LOQ	Units
GCSV-02-11	Aliphatic >C10-C12	ND	6.00	mg/kg
GCSV-02-12	Aliphatic >C12-C16	ND	6.00	mg/kg
GCSV-02-31	Aliphatic >C16-C35	ND	6.00	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
3386-33-2	1-Chlorooctadecane	4	1.99	mg/kg	50	40 - 140

MADEP EPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/09/2021 10:00	703614	MADEP EPH Revision 1.1 (LA)	1	02/12/2021 21:29	MFS	703965

CAS#	Parameter	Result	LOQ	Units
GCSV-05-18	Aromatic >C21-C35	ND	6.00	mg/kg
GCSV-02-15	Unadjusted >C10-C12 Aromatics	ND	6.00	mg/kg
GCSV-02-16	Unadjusted >C12-C16 Aromatics	ND	6.00	mg/kg
GCSV-02-17	Unadjusted >C16-C21 Aromatics	ND	6.00	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
580-13-2	2-Bromonaphthalene	4	5.39	mg/kg	135	40 - 140
321-60-8	2-Fluorobiphenyl	4	5.33	mg/kg	133	40 - 140

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/08/2021 10:30	703502	EPA 3050B	10	02/09/2021 12:58	LWZ	703641

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	0.98	0.40	mg/kg
7440-39-3	Barium	99.9	0.40	mg/kg

SM 2540 G-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/24/2021 13:30	CJS	704501

CAS#	Parameter	Result	LOQ	Units
WET-037	Total Moisture	57.9	0.010	%

Sample Results

MW-3 2-4'

Collect Date	02/04/2021 11:20	**LAB ID**	22102081004
Receive Date	02/08/2021 08:16	**Matrix**	Solid

EPA 8270C SIM

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/11/2021 09:00	703820	EPA 3546	1	02/12/2021 11:15	SMH	703915

CAS#	Parameter	Result	LOQ	Units
91-57-6	2-Methylnaphthalene	ND	0.00326	mg/kg
83-32-9	Acenaphthene	ND	0.00651	mg/kg
208-96-8	Acenaphthylene	ND	0.00651	mg/kg
120-12-7	Anthracene	ND	0.00326	mg/kg
56-55-3	Benzo(a)anthracene	ND	0.00651	mg/kg
50-32-8	Benzo(a)pyrene	ND	0.00326	mg/kg
205-99-2	Benzo(b)fluoranthene	ND	0.00651	mg/kg
207-08-9	Benzo(k)fluoranthene	ND	0.00326	mg/kg
218-01-9	Chrysene	ND	0.00651	mg/kg
53-70-3	Dibenz(a,h)anthracene	ND	0.00651	mg/kg
206-44-0	Fluoranthene	ND	0.00326	mg/kg
86-73-7	Fluorene	ND	0.00326	mg/kg
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.00326	mg/kg
91-20-3	Naphthalene	ND	0.00326	mg/kg
85-01-8	Phenanthrene	ND	0.00326	mg/kg
129-00-0	Pyrene	ND	0.00326	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
7297-45-2	2-Methylnaphthalene-d10	0.3290	.253	mg/kg	77	47 - 120
93951-69-0	Fluoranthene-d10	0.3290	.26	mg/kg	79	47 - 120

MADEP VPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1000	02/10/2021 17:14	JAR	703741

CAS#	Parameter	Result	LOQ	Units
GCSV-02-10	Aliphatic >C8-C10	ND	54.4	mg/kg
GCSV-02-30	Aliphatic C6-C8	ND	54.4	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
615-59-8	2,5-Dibromotoluene	58.70	58.9	mg/kg	100	60 - 140

MADEP VPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1000	02/10/2021 17:14	JAR	703743

CAS#	Parameter	Result	LOQ	Units
GCSV-02-14	Aromatic >C8-C10	ND	56.0	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
615-59-8	2,5-Dibromotoluene	61.30	44.1	mg/kg	72	60 - 140

Sample Results

MW-3 2-4'

Collect Date	02/04/2021 11:20	**LAB ID**	22102081004
Receive Date	02/08/2021 08:16	**Matrix**	Solid

MADEP EPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/09/2021 10:00	703614	MADEP EPH Revision 1.1 (LA)	1	02/12/2021 22:27	MFS	703963

CAS#	Parameter	Result	LOQ	Units
GCSV-02-11	Aliphatic >C10-C12	ND	5.83	mg/kg
GCSV-02-12	Aliphatic >C12-C16	ND	5.83	mg/kg
GCSV-02-31	Aliphatic >C16-C35	ND	5.83	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
3386-33-2	1-Chlorooctadecane	3.88	2.18	mg/kg	56	40 - 140

MADEP EPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/09/2021 10:00	703614	MADEP EPH Revision 1.1 (LA)	1	02/12/2021 21:49	MFS	703965

CAS#	Parameter	Result	LOQ	Units
GCSV-05-18	Aromatic >C21-C35	ND	5.83	mg/kg
GCSV-02-15	Unadjusted >C10-C12 Aromatics	ND	5.83	mg/kg
GCSV-02-16	Unadjusted >C12-C16 Aromatics	ND	5.83	mg/kg
GCSV-02-17	Unadjusted >C16-C21 Aromatics	ND	5.83	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
580-13-2	2-Bromonaphthalene	3.88	4.29	mg/kg	110	40 - 140
321-60-8	2-Fluorobiphenyl	3.88	4.24	mg/kg	109	40 - 140

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/08/2021 10:30	703502	EPA 3050B	10	02/09/2021 13:02	LWZ	703641

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	2.30	0.40	mg/kg
7440-39-3	Barium	91.5	0.40	mg/kg

SM 2540 G-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/24/2021 13:30	CJS	704501

CAS#	Parameter	Result	LOQ	Units
WET-037	Total Moisture	62.5	0.010	%

Sample Results

MW-3 24-26'

Collect Date	02/04/2021 12:12	**LAB ID**	22102081005
Receive Date	02/08/2021 08:16	**Matrix**	Solid

EPA 8270C SIM

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/11/2021 09:00	703820	EPA 3546	1	02/12/2021 11:33	SMH	703915

CAS#	Parameter	Result	LOQ	Units
91-57-6	2-Methylnaphthalene	ND	0.00326	mg/kg
83-32-9	Acenaphthene	ND	0.00651	mg/kg
208-96-8	Acenaphthylene	ND	0.00651	mg/kg
120-12-7	Anthracene	ND	0.00326	mg/kg
56-55-3	Benzo(a)anthracene	ND	0.00651	mg/kg
50-32-8	Benzo(a)pyrene	ND	0.00326	mg/kg
205-99-2	Benzo(b)fluoranthene	ND	0.00651	mg/kg
207-08-9	Benzo(k)fluoranthene	ND	0.00326	mg/kg
218-01-9	Chrysene	ND	0.00651	mg/kg
53-70-3	Dibenz(a,h)anthracene	ND	0.00651	mg/kg
206-44-0	Fluoranthene	ND	0.00326	mg/kg
86-73-7	Fluorene	ND	0.00326	mg/kg
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.00326	mg/kg
91-20-3	Naphthalene	ND	0.00326	mg/kg
85-01-8	Phenanthrene	ND	0.00326	mg/kg
129-00-0	Pyrene	ND	0.00326	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
7297-45-2	2-Methylnaphthalene-d10	0.3290	.228	mg/kg	69	47 - 120
93951-69-0	Fluoranthene-d10	0.3290	.233	mg/kg	71	47 - 120

MADEP VPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1000	02/10/2021 17:42	JAR	703741

CAS#	Parameter	Result	LOQ	Units
GCSV-02-10	Aliphatic >C8-C10	ND	32.8	mg/kg
GCSV-02-30	Aliphatic C6-C8	ND	32.8	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
615-59-8	2,5-Dibromotoluene	42.70	43.1	mg/kg	101	60 - 140

MADEP VPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1000	02/10/2021 17:42	JAR	703743

CAS#	Parameter	Result	LOQ	Units
GCSV-02-14	Aromatic >C8-C10	ND	42.3	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
615-59-8	2,5-Dibromotoluene	58.70	42.6	mg/kg	73	60 - 140

Sample Results

MW-3 24-26'

Collect Date	02/04/2021 12:12	**LAB ID**	22102081005
Receive Date	02/08/2021 08:16	**Matrix**	Solid

MADEP EPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/09/2021 10:00	703614	MADEP EPH Revision 1.1 (LA)	1	02/12/2021 22:46	MFS	703963

CAS#	Parameter	Result	LOQ	Units
GCSV-02-11	Aliphatic >C10-C12	ND	6.00	mg/kg
GCSV-02-12	Aliphatic >C12-C16	ND	6.00	mg/kg
GCSV-02-31	Aliphatic >C16-C35	ND	6.00	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
3386-33-2	1-Chlorooctadecane	4	2.43	mg/kg	61	40 - 140

MADEP EPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/09/2021 10:00	703614	MADEP EPH Revision 1.1 (LA)	1	02/12/2021 22:27	MFS	703965

CAS#	Parameter	Result	LOQ	Units
GCSV-05-18	Aromatic >C21-C35	ND	6.00	mg/kg
GCSV-02-15	Unadjusted >C10-C12 Aromatics	ND	6.00	mg/kg
GCSV-02-16	Unadjusted >C12-C16 Aromatics	ND	6.00	mg/kg
GCSV-02-17	Unadjusted >C16-C21 Aromatics	ND	6.00	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
580-13-2	2-Bromonaphthalene	4	4.45	mg/kg	111	40 - 140
321-60-8	2-Fluorobiphenyl	4	4.37	mg/kg	109	40 - 140

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/08/2021 10:30	703502	EPA 3050B	10	02/09/2021 13:09	LWZ	703641

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	1.33	0.38	mg/kg
7440-39-3	Barium	38.9	0.38	mg/kg

SM 2540 G-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/24/2021 13:30	CJS	704501

CAS#	Parameter	Result	LOQ	Units
WET-037	Total Moisture	25.2	0.010	%

Sample Results

MW-2 0-2'	**Collect Date**	02/05/2021 08:20	**LAB ID**	22102081006
	Receive Date	02/08/2021 08:16	**Matrix**	Solid

EPA 8270C SIM

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/11/2021 09:00	703820	EPA 3546	1	02/12/2021 11:51	SMH	703915

CAS#	Parameter	Result	LOQ	Units
91-57-6	2-Methylnaphthalene	ND	0.00324	mg/kg
83-32-9	Acenaphthene	ND	0.00647	mg/kg
208-96-8	Acenaphthylene	ND	0.00647	mg/kg
120-12-7	Anthracene	ND	0.00324	mg/kg
56-55-3	Benzo(a)anthracene	ND	0.00647	mg/kg
50-32-8	Benzo(a)pyrene	0.00407	0.00324	mg/kg
205-99-2	Benzo(b)fluoranthene	ND	0.00647	mg/kg
207-08-9	Benzo(k)fluoranthene	0.00562	0.00324	mg/kg
218-01-9	Chrysene	ND	0.00647	mg/kg
53-70-3	Dibenz(a,h)anthracene	ND	0.00647	mg/kg
206-44-0	Fluoranthene	ND	0.00324	mg/kg
86-73-7	Fluorene	ND	0.00324	mg/kg
193-39-5	Indeno(1,2,3-cd)pyrene	0.00551	0.00324	mg/kg
91-20-3	Naphthalene	ND	0.00324	mg/kg
85-01-8	Phenanthrene	ND	0.00324	mg/kg
129-00-0	Pyrene	ND	0.00324	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
7297-45-2	2-Methylnaphthalene-d10	0.3270	.243	mg/kg	74	47 - 120
93951-69-0	Fluoranthene-d10	0.3270	.252	mg/kg	77	47 - 120

MADEP VPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1000	02/10/2021 18:13	JAR	703741

CAS#	Parameter	Result	LOQ	Units
GCSV-02-10	Aliphatic >C8-C10	ND	53.5	mg/kg
GCSV-02-30	Aliphatic C6-C8	ND	53.5	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
615-59-8	2,5-Dibromotoluene	62.70	63.9	mg/kg	102	60 - 140

MADEP VPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1000	02/10/2021 18:13	JAR	703743

CAS#	Parameter	Result	LOQ	Units
GCSV-02-14	Aromatic >C8-C10	ND	41.5	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
615-59-8	2,5-Dibromotoluene	42.70	31.2	mg/kg	73	60 - 140

Sample Results

MW-2 0-2'

Collect Date	02/05/2021 08:20	**LAB ID**	22102081006
Receive Date	02/08/2021 08:16	**Matrix**	Solid

MADEP EPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/09/2021 10:00	703614	MADEP EPH Revision 1.1 (LA)	1	02/12/2021 23:05	MFS	703963

CAS#	Parameter	Result	LOQ	Units
GCSV-02-11	Aliphatic >C10-C12	ND	5.83	mg/kg
GCSV-02-12	Aliphatic >C12-C16	ND	5.83	mg/kg
GCSV-02-31	Aliphatic >C16-C35	ND	5.83	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
3386-33-2	1-Chlorooctadecane	3.88	1.79	mg/kg	46	40 - 140

MADEP EPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/09/2021 10:00	703614	MADEP EPH Revision 1.1 (LA)	1	02/12/2021 22:46	MFS	703965

CAS#	Parameter	Result	LOQ	Units
GCSV-05-18	Aromatic >C21-C35	ND	5.83	mg/kg
GCSV-02-15	Unadjusted >C10-C12 Aromatics	ND	5.83	mg/kg
GCSV-02-16	Unadjusted >C12-C16 Aromatics	ND	5.83	mg/kg
GCSV-02-17	Unadjusted >C16-C21 Aromatics	ND	5.83	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
580-13-2	2-Bromonaphthalene	3.88	4.35	mg/kg	112	40 - 140
321-60-8	2-Fluorobiphenyl	3.88	4.25	mg/kg	109	40 - 140

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/08/2021 10:30	703502	EPA 3050B	10	02/09/2021 13:12	LWZ	703641

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	2.31	0.39	mg/kg
7440-39-3	Barium	108	0.39	mg/kg

SM 2540 G-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/24/2021 13:30	CJS	704501

CAS#	Parameter	Result	LOQ	Units
WET-037	Total Moisture	54.9	0.010	%

Sample Results

MW-2 2-4'

Collect Date	02/05/2021 08:25	**LAB ID**	22102081007
Receive Date	02/08/2021 08:16	**Matrix**	Solid

EPA 8270C SIM

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/11/2021 09:00	703820	EPA 3546	1	02/12/2021 12:10	SMH	703915

CAS#	Parameter	Result	LOQ	Units
91-57-6	2-Methylnaphthalene	ND	0.00330	mg/kg
83-32-9	Acenaphthene	ND	0.00660	mg/kg
208-96-8	Acenaphthylene	ND	0.00660	mg/kg
120-12-7	Anthracene	ND	0.00330	mg/kg
56-55-3	Benzo(a)anthracene	ND	0.00660	mg/kg
50-32-8	Benzo(a)pyrene	ND	0.00330	mg/kg
205-99-2	Benzo(b)fluoranthene	ND	0.00660	mg/kg
207-08-9	Benzo(k)fluoranthene	ND	0.00330	mg/kg
218-01-9	Chrysene	ND	0.00660	mg/kg
53-70-3	Dibenz(a,h)anthracene	ND	0.00660	mg/kg
206-44-0	Fluoranthene	ND	0.00330	mg/kg
86-73-7	Fluorene	ND	0.00330	mg/kg
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.00330	mg/kg
91-20-3	Naphthalene	ND	0.00330	mg/kg
85-01-8	Phenanthrene	ND	0.00330	mg/kg
129-00-0	Pyrene	ND	0.00330	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
7297-45-2	2-Methylnaphthalene-d10	0.3330	.236	mg/kg	71	47 - 120
93951-69-0	Fluoranthene-d10	0.3330	.241	mg/kg	72	47 - 120

MADEP VPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1000	02/10/2021 18:42	JAR	703741

CAS#	Parameter	Result	LOQ	Units
GCSV-02-10	Aliphatic >C8-C10	ND	51.1	mg/kg
GCSV-02-30	Aliphatic C6-C8	ND	51.1	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
615-59-8	2,5-Dibromotoluene	60.80	62.3	mg/kg	102	60 - 140

MADEP VPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1000	02/10/2021 18:42	JAR	703743

CAS#	Parameter	Result	LOQ	Units
GCSV-02-14	Aromatic >C8-C10	ND	52.2	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
615-59-8	2,5-Dibromotoluene	62.70	46.6	mg/kg	74	60 - 140

Sample Results

MW-2 2-4'

Collect Date	02/05/2021 08:25	**LAB ID**	22102081007
Receive Date	02/08/2021 08:16	**Matrix**	Solid

MADEP EPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/09/2021 10:00	703614	MADEP EPH Revision 1.1 (LA)	1	02/12/2021 23:24	MFS	703963

CAS#	Parameter	Result	LOQ	Units
GCSV-02-11	Aliphatic >C10-C12	ND	6.00	mg/kg
GCSV-02-12	Aliphatic >C12-C16	ND	6.00	mg/kg
GCSV-02-31	Aliphatic >C16-C35	10.9	6.00	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
3386-33-2	1-Chlorooctadecane	4	3.43	mg/kg	86	40 - 140

MADEP EPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/09/2021 10:00	703614	MADEP EPH Revision 1.1 (LA)	1	02/12/2021 23:05	MFS	703965

CAS#	Parameter	Result	LOQ	Units
GCSV-05-18	Aromatic >C21-C35	ND	6.00	mg/kg
GCSV-02-15	Unadjusted >C10-C12 Aromatics	ND	6.00	mg/kg
GCSV-02-16	Unadjusted >C12-C16 Aromatics	ND	6.00	mg/kg
GCSV-02-17	Unadjusted >C16-C21 Aromatics	ND	6.00	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
580-13-2	2-Bromonaphthalene	4	4.73	mg/kg	118	40 - 140
321-60-8	2-Fluorobiphenyl	4	4.64	mg/kg	116	40 - 140

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/08/2021 10:30	703502	EPA 3050B	10	02/09/2021 13:19	LWZ	703641

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	1.78	0.36	mg/kg
7440-39-3	Barium	112	0.36	mg/kg

SM 2540 G-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/24/2021 13:30	CJS	704501

CAS#	Parameter	Result	LOQ	Units
WET-037	Total Moisture	51.4	0.010	%

Sample Results

MW-1 0-2'	**Collect Date**	02/05/2021 12:20	**LAB ID**	22102081008
	Receive Date	02/08/2021 08:16	**Matrix**	Solid

EPA 8270C SIM

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/11/2021 09:00	703820	EPA 3546	1	02/12/2021 12:28	SMH	703915

CAS#	Parameter	Result	LOQ	Units
91-57-6	2-Methylnaphthalene	ND	0.00328	mg/kg
83-32-9	Acenaphthene	ND	0.00656	mg/kg
208-96-8	Acenaphthylene	ND	0.00656	mg/kg
120-12-7	Anthracene	ND	0.00328	mg/kg
56-55-3	Benzo(a)anthracene	ND	0.00656	mg/kg
50-32-8	Benzo(a)pyrene	ND	0.00328	mg/kg
205-99-2	Benzo(b)fluoranthene	ND	0.00656	mg/kg
207-08-9	Benzo(k)fluoranthene	ND	0.00328	mg/kg
218-01-9	Chrysene	ND	0.00656	mg/kg
53-70-3	Dibenz(a,h)anthracene	ND	0.00656	mg/kg
206-44-0	Fluoranthene	ND	0.00328	mg/kg
86-73-7	Fluorene	ND	0.00328	mg/kg
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.00328	mg/kg
91-20-3	Naphthalene	ND	0.00328	mg/kg
85-01-8	Phenanthrene	ND	0.00328	mg/kg
129-00-0	Pyrene	ND	0.00328	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
7297-45-2	2-Methylnaphthalene-d10	0.3310	.244	mg/kg	74	47 - 120
93951-69-0	Fluoranthene-d10	0.3310	.249	mg/kg	75	47 - 120

MADEP VPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1000	02/10/2021 19:13	JAR	703741

CAS#	Parameter	Result	LOQ	Units
GCSV-02-10	Aliphatic >C8-C10	ND	52.3	mg/kg
GCSV-02-30	Aliphatic C6-C8	ND	52.3	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
615-59-8	2,5-Dibromotoluene	59.50	61.2	mg/kg	103	60 - 140

MADEP VPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1000	02/10/2021 19:13	JAR	703743

CAS#	Parameter	Result	LOQ	Units
GCSV-02-14	Aromatic >C8-C10	ND	53.1	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
615-59-8	2,5-Dibromotoluene	60.80	45.4	mg/kg	75	60 - 140

Sample Results

MW-1 0-2'

Collect Date	02/05/2021 12:20	**LAB ID**	22102081008
Receive Date	02/08/2021 08:16	**Matrix**	Solid

MADEP EPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/09/2021 10:00	703614	MADEP EPH Revision 1.1 (LA)	1	02/12/2021 23:43	MFS	703963

CAS#	Parameter	Result	LOQ	Units
GCSV-02-11	Aliphatic >C10-C12	ND	5.88	mg/kg
GCSV-02-12	Aliphatic >C12-C16	ND	5.88	mg/kg
GCSV-02-31	Aliphatic >C16-C35	ND	5.88	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
3386-33-2	1-Chlorooctadecane	3.92	2.02	mg/kg	51	40 - 140

MADEP EPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/09/2021 10:00	703614	MADEP EPH Revision 1.1 (LA)	1	02/12/2021 23:24	MFS	703965

CAS#	Parameter	Result	LOQ	Units
GCSV-05-18	Aromatic >C21-C35	ND	5.88	mg/kg
GCSV-02-15	Unadjusted >C10-C12 Aromatics	ND	5.88	mg/kg
GCSV-02-16	Unadjusted >C12-C16 Aromatics	ND	5.88	mg/kg
GCSV-02-17	Unadjusted >C16-C21 Aromatics	ND	5.88	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
580-13-2	2-Bromonaphthalene	3.92	4.12	mg/kg	105	40 - 140
321-60-8	2-Fluorobiphenyl	3.92	4.03	mg/kg	103	40 - 140

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/08/2021 10:30	703502	EPA 3050B	10	02/09/2021 13:23	LWZ	703641

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	3.28	0.38	mg/kg
7440-39-3	Barium	104	0.38	mg/kg

SM 2540 G-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/24/2021 13:30	CJS	704501

CAS#	Parameter	Result	LOQ	Units
WET-037	Total Moisture	55.6	0.010	%

Sample Results

MW-1 2-4'

Collect Date	02/05/2021 12:25	**LAB ID**	22102081009
Receive Date	02/08/2021 08:16	**Matrix**	Solid

EPA 8270C SIM

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/11/2021 09:00	703820	EPA 3546	1	02/12/2021 12:46	SMH	703915

CAS#	Parameter	Result	LOQ	Units
91-57-6	2-Methylnaphthalene	ND	0.00330	mg/kg
83-32-9	Acenaphthene	ND	0.00660	mg/kg
208-96-8	Acenaphthylene	ND	0.00660	mg/kg
120-12-7	Anthracene	ND	0.00330	mg/kg
56-55-3	Benzo(a)anthracene	ND	0.00660	mg/kg
50-32-8	Benzo(a)pyrene	ND	0.00330	mg/kg
205-99-2	Benzo(b)fluoranthene	ND	0.00660	mg/kg
207-08-9	Benzo(k)fluoranthene	ND	0.00330	mg/kg
218-01-9	Chrysene	ND	0.00660	mg/kg
53-70-3	Dibenz(a,h)anthracene	ND	0.00660	mg/kg
206-44-0	Fluoranthene	ND	0.00330	mg/kg
86-73-7	Fluorene	ND	0.00330	mg/kg
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.00330	mg/kg
91-20-3	Naphthalene	ND	0.00330	mg/kg
85-01-8	Phenanthrene	ND	0.00330	mg/kg
129-00-0	Pyrene	ND	0.00330	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
7297-45-2	2-Methylnaphthalene-d10	0.3330	.23	mg/kg	69	47 - 120
93951-69-0	Fluoranthene-d10	0.3330	.236	mg/kg	71	47 - 120

MADEP VPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1000	02/10/2021 19:42	JAR	703741

CAS#	Parameter	Result	LOQ	Units
GCSV-02-10	Aliphatic >C8-C10	ND	55.6	mg/kg
GCSV-02-30	Aliphatic C6-C8	ND	55.6	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
615-59-8	2,5-Dibromotoluene	61.90	63.8	mg/kg	103	60 - 140

MADEP VPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1000	02/10/2021 19:42	JAR	703743

CAS#	Parameter	Result	LOQ	Units
GCSV-02-14	Aromatic >C8-C10	ND	54.2	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
615-59-8	2,5-Dibromotoluene	59.50	44.8	mg/kg	75	60 - 140

Sample Results

MW-1 2-4'

Collect Date	02/05/2021 12:25	**LAB ID**	22102081009
Receive Date	02/08/2021 08:16	**Matrix**	Solid

MADEP EPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/09/2021 10:00	703614	MADEP EPH Revision 1.1 (LA)	1	02/13/2021 00:02	MFS	703963

CAS#	Parameter	Result	LOQ	Units
GCSV-02-11	Aliphatic >C10-C12	ND	6.00	mg/kg
GCSV-02-12	Aliphatic >C12-C16	ND	6.00	mg/kg
GCSV-02-31	Aliphatic >C16-C35	ND	6.00	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
3386-33-2	1-Chlorooctadecane	4	2.27	mg/kg	57	40 - 140

MADEP EPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/09/2021 10:00	703614	MADEP EPH Revision 1.1 (LA)	1	02/12/2021 23:43	MFS	703965

CAS#	Parameter	Result	LOQ	Units
GCSV-05-18	Aromatic >C21-C35	ND	6.00	mg/kg
GCSV-02-15	Unadjusted >C10-C12 Aromatics	ND	6.00	mg/kg
GCSV-02-16	Unadjusted >C12-C16 Aromatics	ND	6.00	mg/kg
GCSV-02-17	Unadjusted >C16-C21 Aromatics	ND	6.00	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
580-13-2	2-Bromonaphthalene	4	4.3	mg/kg	108	40 - 140
321-60-8	2-Fluorobiphenyl	4	4.21	mg/kg	105	40 - 140

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/08/2021 10:30	703502	EPA 3050B	10	02/09/2021 14:11	LWZ	703641

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	3.17	0.36	mg/kg
7440-39-3	Barium	104	0.36	mg/kg

SM 2540 G-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/24/2021 13:30	CJS	704501

CAS#	Parameter	Result	LOQ	Units
WET-037	Total Moisture	58.6	0.010	%

Sample Results

MW-1 24-26'

Collect Date	02/05/2021 12:50	**LAB ID**	22102081010
Receive Date	02/08/2021 08:16	**Matrix**	Solid

EPA 8270C SIM

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/11/2021 09:00	703820	EPA 3546	1	02/12/2021 13:05	SMH	703915

CAS#	Parameter	Result	LOQ	Units
91-57-6	2-Methylnaphthalene	ND	0.00326	mg/kg
83-32-9	Acenaphthene	ND	0.00651	mg/kg
208-96-8	Acenaphthylene	ND	0.00651	mg/kg
120-12-7	Anthracene	ND	0.00326	mg/kg
56-55-3	Benzo(a)anthracene	ND	0.00651	mg/kg
50-32-8	Benzo(a)pyrene	ND	0.00326	mg/kg
205-99-2	Benzo(b)fluoranthene	ND	0.00651	mg/kg
207-08-9	Benzo(k)fluoranthene	ND	0.00326	mg/kg
218-01-9	Chrysene	ND	0.00651	mg/kg
53-70-3	Dibenz(a,h)anthracene	ND	0.00651	mg/kg
206-44-0	Fluoranthene	ND	0.00326	mg/kg
86-73-7	Fluorene	ND	0.00326	mg/kg
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.00326	mg/kg
91-20-3	Naphthalene	ND	0.00326	mg/kg
85-01-8	Phenanthrene	ND	0.00326	mg/kg
129-00-0	Pyrene	ND	0.00326	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
7297-45-2	2-Methylnaphthalene-d10	0.3290	.239	mg/kg	73	47 - 120
93951-69-0	Fluoranthene-d10	0.3290	.252	mg/kg	77	47 - 120

MADEP VPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1000	02/10/2021 20:12	JAR	703741

CAS#	Parameter	Result	LOQ	Units
GCSV-02-10	Aliphatic >C8-C10	ND	33.6	mg/kg
GCSV-02-30	Aliphatic C6-C8	ND	33.6	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
615-59-8	2,5-Dibromotoluene	45.80	47.2	mg/kg	103	60 - 140

MADEP VPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1000	02/10/2021 20:12	JAR	703743

CAS#	Parameter	Result	LOQ	Units
GCSV-02-14	Aromatic >C8-C10	ND	33.6	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
615-59-8	2,5-Dibromotoluene	45.80	34.3	mg/kg	75	60 - 140

Sample Results

MW-1 24-26'

Collect Date	02/05/2021 12:50	**LAB ID**	22102081010
Receive Date	02/08/2021 08:16	**Matrix**	Solid

MADEP EPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/09/2021 10:00	703614	MADEP EPH Revision 1.1 (LA)	1	02/13/2021 00:22	MFS	703963

CAS#	Parameter	Result	LOQ	Units
GCSV-02-11	Aliphatic >C10-C12	ND	6.00	mg/kg
GCSV-02-12	Aliphatic >C12-C16	ND	6.00	mg/kg
GCSV-02-31	Aliphatic >C16-C35	ND	6.00	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
3386-33-2	1-Chlorooctadecane	4	2.51	mg/kg	63	40 - 140

MADEP EPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/09/2021 10:00	703614	MADEP EPH Revision 1.1 (LA)	1	02/13/2021 00:02	MFS	703965

CAS#	Parameter	Result	LOQ	Units
GCSV-05-18	Aromatic >C21-C35	ND	6.00	mg/kg
GCSV-02-15	Unadjusted >C10-C12 Aromatics	ND	6.00	mg/kg
GCSV-02-16	Unadjusted >C12-C16 Aromatics	ND	6.00	mg/kg
GCSV-02-17	Unadjusted >C16-C21 Aromatics	ND	6.00	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
580-13-2	2-Bromonaphthalene	4	4.91	mg/kg	123	40 - 140
321-60-8	2-Fluorobiphenyl	4	4.84	mg/kg	121	40 - 140

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/08/2021 10:30	703502	EPA 3050B	10	02/09/2021 13:48	LWZ	703641

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	3.11	0.40	mg/kg
7440-39-3	Barium	45.3	0.40	mg/kg

SM 2540 G-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/24/2021 13:30	CJS	704501

CAS#	Parameter	Result	LOQ	Units
WET-037	Total Moisture	22.0	0.010	%

GC/MS Semi-Volatiles QC Summary

Analytical Batch	Client ID	MB703820		LCS703820				LCSD703820				
703915	LAB ID	2144353		2144354				2144355				
Prep Batch	Sample Type	MB		LCS				LCSD				
703820	Prep Date	02/11/21 09:00		02/11/21 09:00				02/11/21 09:00				
Prep Method	Analysis Date	02/12/21 09:06		02/12/21 09:25				02/12/21 09:43				
EPA 3546	Matrix	Solid		Solid				Solid				
EPA 8270C SIM		Units Result	mg/kg LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
2-Methylnaphthalene	91-57-6	ND	0.00326	0.329	0.292	89	39 - 114	0.329	0.251	76	15	20
Acenaphthene	83-32-9	ND	0.00651	0.329	0.319	97	44 - 111	0.329	0.271	82	16	20
Acenaphthylene	208-96-8	ND	0.00651	0.329	0.295	90	39 - 116	0.329	0.252	77	16	20
Anthracene	120-12-7	ND	0.00326	0.329	0.267	81	50 - 114	0.329	0.238	72	11	20
Benzo(a)anthracene	56-55-3	ND	0.00651	0.329	0.321	98	54 - 122	0.329	0.276	84	15	20
Benzo(a)pyrene	50-32-8	ND	0.00326	0.329	0.327	99	50 - 125	0.329	0.282	86	15	20
Benzo(b)fluoranthene	205-99-2	ND	0.00651	0.329	0.327	99	53 - 128	0.329	0.280	85	15	20
Benzo(k)fluoranthene	207-08-9	ND	0.00326	0.329	0.338	103	56 - 123	0.329	0.292	89	15	20
Chrysene	218-01-9	ND	0.00651	0.329	0.325	99	57 - 118	0.329	0.279	85	15	20
Dibenz(a,h)anthracene	53-70-3	ND	0.00651	0.329	0.352	107	50 - 129	0.329	0.301	92	16	20
Fluoranthene	206-44-0	ND	0.00326	0.329	0.313	95	55 - 119	0.329	0.268	81	15	20
Fluorene	86-73-7	ND	0.00326	0.329	0.312	95	47 - 114	0.329	0.266	81	16	20
Indeno(1,2,3-cd)pyrene	193-39-5	ND	0.00326	0.329	0.351	107	49 - 130	0.329	0.301	92	15	20
Naphthalene	91-20-3	ND	0.00326	0.329	0.296	90	38 - 111	0.329	0.254	77	15	20
Phenanthrene	85-01-8	ND	0.00326	0.329	0.294	89	49 - 113	0.329	0.251	76	16	20
Pyrene	129-00-0	ND	0.00326	0.329	0.301	92	55 - 117	0.329	0.259	79	15	20
Surrogate												
2-Methylnaphthalene-d10	7297-45-2	.238	72	.329	.253	77	47 - 120	.329	.223	68	NA	NA
Fluoranthene-d10	93951-69-0	.239	73	.329	.262	80	47 - 120	.329	.232	71	NA	NA

Analytical Batch	Client ID	MW-1 24-26'		2143004MS				2143004MSD				
703915	LAB ID	22102081010		2144356				2144357				
Prep Batch	Sample Type	SAMPLE		MS				MSD				
703820	Prep Date	02/11/2021 09:00		02/11/21 09:00				02/11/21 09:00				
Prep Method	Analysis Date	02/12/2021 13:05		02/12/21 13:23				02/12/21 13:41				
EPA 3546	Matrix	Solid		Solid				Solid				
EPA 8270C SIM		Units Result	mg/kg LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
2-Methylnaphthalene	91-57-6	0.00	0.00326	0.419	0.321	77	39 - 114	0.414	0.335	81	4	20
Acenaphthene	83-32-9	0.00	0.00651	0.419	0.346	83	44 - 111	0.414	0.366	88	6	20
Acenaphthylene	208-96-8	0.00	0.00651	0.419	0.327	78	39 - 116	0.414	0.343	83	5	20
Anthracene	120-12-7	0.00	0.00326	0.419	0.311	74	50 - 114	0.414	0.316	76	2	20
Benzo(a)anthracene	56-55-3	0.00	0.00651	0.419	0.354	84	54 - 122	0.414	0.384	93	8	20
Benzo(a)pyrene	50-32-8	0.00	0.00326	0.419	0.360	86	50 - 125	0.414	0.391	95	8	20
Benzo(b)fluoranthene	205-99-2	0.00	0.00651	0.419	0.354	84	53 - 128	0.414	0.382	92	8	20
Benzo(k)fluoranthene	207-08-9	0.00	0.00326	0.419	0.367	88	56 - 123	0.414	0.401	97	9	20
Chrysene	218-01-9	0.00	0.00651	0.419	0.354	84	57 - 118	0.414	0.384	93	8	20
Dibenz(a,h)anthracene	53-70-3	0.00	0.00651	0.419	0.370	88	50 - 129	0.414	0.405	98	9	20
Fluoranthene	206-44-0	0.00	0.00326	0.419	0.342	82	55 - 119	0.414	0.364	88	6	20
Fluorene	86-73-7	0.00	0.00326	0.419	0.338	81	47 - 114	0.414	0.367	89	8	20
Indeno(1,2,3-cd)pyrene	193-39-5	0.00	0.00326	0.419	0.371	89	49 - 130	0.414	0.408	98	9	20
Naphthalene	91-20-3	0.00	0.00326	0.419	0.323	77	38 - 111	0.414	0.342	83	6	20
Phenanthrene	85-01-8	0.00	0.00326	0.419	0.318	76	49 - 113	0.414	0.340	82	7	20
Pyrene	129-00-0	0.00	0.00326	0.419	0.328	78	55 - 117	0.414	0.354	85	7	20
Surrogate												
2-Methylnaphthalene-d10	7297-45-2	.239	73	.333	.224	67	47 - 120	.329	.236	72	NA	NA
Fluoranthene-d10	93951-69-0	.252	77	.333	.231	69	47 - 120	.329	.248	75	NA	NA

GC Volatiles QC Summary

Analytical Batch	Client ID	MB703741		LCS703741				LCSD703741				
703741	LAB ID	2144049		2144050				2144051				
	Sample Type	MB		LCS				LCSD				
	Prep Date											
	Analysis Date	02/10/21 12:00		02/10/21 08:55				02/10/21 10:22				
	Matrix	Solid		Solid				Solid				
MADEP VPH Revision 1.1 (LA)		Units Result	mg/kg LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Aliphatic >C8-C10	GCSV-02-10	ND	1.50	5.00	5.06	101	60 - 140	5.00	5.39	108	6	30
Aliphatic C6-C8	GCSV-02-30	ND	1.50	7.50	8.17	109	60 - 140	7.50	8.22	110	1	30
Surrogate												
2,5-Dibromotoluene	615-59-8	2.55	102	2.5	2.53	101	60 - 140	2.5	2.52	101	NA	NA

Analytical Batch	Client ID	MB703743		LCS703743				LCSD703743				
703743	LAB ID	2144053		2144054				2144055				
	Sample Type	MB		LCS				LCSD				
	Prep Date											
	Analysis Date	02/10/21 12:00		02/10/21 08:55				02/10/21 10:22				
	Matrix	Solid		Solid				Solid				
MADEP VPH Revision 1.1 (LA)		Units Result	mg/kg LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Aromatic >C8-C10	GCSV-02-14	ND	1.50	7.50	6.66	89	60 - 140	7.50	6.75	90	1	30
Surrogate												
2,5-Dibromotoluene	615-59-8	1.83	73	2.5	1.85	74	60 - 140	2.5	1.84	74	NA	NA

GC Semi-Volatiles QC Summary

Analytical Batch	Client ID	MB703614	LCS703614	LCSD703614
703963	LAB ID	2143398	2143399	2143400
Prep Batch	Sample Type	MB	LCS	LCSD
703614	Prep Date	02/09/21 10:00	02/09/21 10:00	02/09/21 10:00
Prep Method	Analysis Date	02/12/21 16:43	02/12/21 17:02	02/12/21 17:21
MADEP EPH Revision 1.1 (LA)	Matrix	Solid	Solid	Solid

MADEP EPH Revision 1.1 (LA)		Units Result	mg/kg LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Aliphatic >C10-C12	GCSV-02-11	ND	6.00	10.0	5.41	54	30 - 140	10.0	4.12	41	27*	25
Aliphatic >C12-C16	GCSV-02-12	ND	6.00	10.0	4.84	48	40 - 140	10.0	6.73	67	33*	25
Aliphatic >C16-C35	GCSV-02-31	ND	6.00	45.0	34.0	76	40 - 140	45.0	39.9	89	16	25
Surrogate												
1-Chlorooctadecane	3386-33-2	2.45	61	4	2.09	52	40 - 140	4	1.81	45	NA	NA

Analytical Batch	Client ID	MB703614	LCS703614	LCSD703614
703965	LAB ID	2143398	2143399	2143400
Prep Batch	Sample Type	MB	LCS	LCSD
703614	Prep Date	02/09/21 10:00	02/09/21 10:00	02/09/21 10:00
Prep Method	Analysis Date	02/12/21 13:24	02/12/21 17:21	02/12/21 14:02
MADEP EPH Revision 1.1 (LA)	Matrix	Solid	Solid	Solid

MADEP EPH Revision 1.1 (LA)		Units Result	mg/kg LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Aromatic >C21-C35	GCSV-05-18	ND	6.00	50.0	44.0	88	40 - 140	50.0	43.9	88	0	25
Unadjusted >C10-C12 Aromatics	GCSV-02-15	ND	6.00	5.00	2.98	60	30 - 140	5.00	5.06	101	52*	25
Unadjusted >C12-C16 Aromatics	GCSV-02-16	ND	6.00	20.0	16.1	81	40 - 140	20.0	20.1	101	22	25
Unadjusted >C16-C21 Aromatics	GCSV-02-17	ND	6.00	10.0	9.96	100	40 - 140	10.0	10.3	103	3	25
Surrogate												
2-Bromonaphthalene	580-13-2	5.21	130	4	4.71	118	40 - 140	4	4.81	120	NA	NA
2-Fluorobiphenyl	321-60-8	5.06	127	4	4.66	117	40 - 140	4	4.73	118	NA	NA

Inorganics QC Summary

Analytical Batch	Client ID	MB703538		LCS703538			
703722	LAB ID	2143138		2143139			
Prep Batch	Sample Type	MB		LCS			
703538	Prep Date	02/09/21 07:30		02/09/21 07:30			
Prep Method	Analysis Date	02/10/21 14:19		02/10/21 14:22			
EPA 3010A	Matrix	Water		Water			
EPA 1312/6020B		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Arsenic	7440-38-2	ND	0.0010	0.050	0.054	108	80 - 120
Barium	7440-39-3	ND	0.0010	0.050	0.054	108	80 - 120

Analytical Batch	Client ID	JLS-23 0-2'		2142995MS				2142995MSD				
703722	LAB ID	22102081001		2143320				2143321				
Prep Batch	Sample Type	SAMPLE		MS				MSD				
703538	Prep Date	02/09/2021 07:30		02/09/21 07:30				02/09/21 07:30				
Prep Method	Analysis Date	02/10/2021 14:52		02/10/21 14:56				02/10/21 14:59				
EPA 3010A	Matrix	Water		Water				Water				
EPA 1312/6020B		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Arsenic	7440-38-2	0.0012	0.0010	0.050	0.054	105	80 - 120	0.050	0.054	105	0	20
Barium	7440-39-3	0.063	0.0010	0.050	0.13	131*	80 - 120	0.050	0.14	157*	7	20

Analytical Batch	Client ID	MB703502		LCS703502				LCSD703502				
703641	LAB ID	2143008		2143010				2143009				
Prep Batch	Sample Type	MB		LCS				LCSD				
703502	Prep Date	02/08/21 10:30		02/08/21 10:30				02/08/21 10:30				
Prep Method	Analysis Date	02/09/21 12:51		02/09/21 13:16				02/09/21 13:05				
EPA 3050B	Matrix	Solid		Solid				Solid				
EPA 6020B		Units Result	mg/kg LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Arsenic	7440-38-2	ND	0.040	2.00	2.09	104	80 - 120	2.00	2.07	103	1	20
Barium	7440-39-3	0.11	0.040	2.00	2.19	109	80 - 120	2.00	2.14	107	2	20

General Chemistry QC Summary

Analytical Batch	Client ID	JLS-23 0-2'		2142995DUP		
704501	LAB ID	22102081001		2147834		
	Sample Type	SAMPLE		DUP		
	Prep Date	NA				
	Analysis Date	02/24/2021 13:30		02/24/21 13:30		
	Matrix	Solid		Solid		
SM 2540 G-2011		Units Result	% LOQ	Result	RPD	RPD Limit
Total Moisture	WET-037	54.8	0.010	53.0	3	25

Analytical Batch	Client ID	MB703834		LCS703834			
703834	LAB ID	2144415		2144416			
	Sample Type	MB		LCS			
	Prep Date						
	Analysis Date	02/11/21 10:12		02/11/21 10:32			
	Matrix	Solid		Solid			
EPA 9060A		Units Result	mg/kg LOQ	Spike Added	Result	%R	Control Limits%R
Total Organic Carbon	C-012	ND	250	2000	1890	94	69 - 128

CHAIN-OF-CUSTODY Analytical Request Document

Pace Analytical

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Wor

Client ID: 4271 - ERM-Baton Rouge

SDG: 221020810

PM: AMK

ALL SHAD

Company: ERM

Billing Information: SAME

Address: 840 W Sam Houston Pkwy N Suite 600 Houston, TX 77024

Report To: Jonathan Miller

Email To:

Copy To: Dave Angle

Site Collection Info/Address:

Customer Project Name/Number: JLS / 05119829

State: / County/City: Time Zone Collected: [ ]PT [ ]MT [ ]CT [ ]ET

Phone: 504, 810, 1764

Email: Jonathan.Miller@erm.com

Site/Facility ID #:

Compliance Monitoring? [ ] Yes [ ] No

Collected By (print): Charles Trahan

Purchase Order #:

Quote #:

DW PWS ID #:

DW Location Code:

Collected By (signature):

Turnaround Date Required:

Immediately Packed on Ice: [X] Yes [ ] No

Sample Disposal: [ ] Dispose as appropriate [ ] Return [ ] Archive: _____ [ ] Hold: _____

Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply)

Field Filtered (if applicable): [ ] Yes [ ] No

Analysis: _____

Container Preservative Ty

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	SPLP Ba	SPLP As	TOC	Ba, As	VPH	EPH	PAH (extract + hold)						Lab Sample # / Comments
JLS-23 0-2'	SL	G	2/2/21	0945				3	X	X	X										1
JLS-23 2-3.5'			〃	1015				3	X	X	X										2
MW-3 0-2'			2/4/21	1115				6				X	X	X	X						3
MW-3 2-4'			〃	1120				6				X	X	X	X						4
MW-3 24-26'			〃	1212				6				X	X	X	X						5
MW-2 0-2'			2/5/21	0820				6				X	X	X	X						6
MW-2 2-4'			〃	0835				6				X	X	X	X						7
MW-1 0-2'								6				X	X	X	X						8
MW-1 2-4'								6				X	X	X	X						9
MW-1 24-26'								6				X	X	X	X						10

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y	N	NA
Custody Signatures Present	Y	N	NA
Collector Signature Present	Y	N	NA
Bottles Intact	Y	N	NA
Correct Bottles	Y	N	NA
Sufficient Volume	Y	N	NA
Samples Received on Ice	Y	N	NA
VOA - Headspace Acceptable	Y	N	NA
USDA Regulated Soils	Y	N	NA
Samples in Holding Time	Y	N	NA
Residual Chlorine Present	Y	N	NA
Cl Strips: _____			
Sample pH Acceptable	Y	N	NA
pH Strips: _____			
Sulfide Present	Y	N	NA
Lead Acetate Strips: _____			

LAB USE ONLY:
Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #: 2536215

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: E34
Cooler 1 Temp Upon Receipt: 0.3 oC
Cooler 1 Therm Corr. Factor: _____ oC
Cooler 1 Corrected Temp: _____ oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
	2/5/21 1530		2/5/21 @ 1530
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
	2/8/21 0816	PACE	2/8/21 0816
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: _____ of: _____

SAMPLE RECEIVING CHECKLIST

SAMPLE DELIVERY GROUP 221020810	
Client **PM** AMK 4271 - ERM-Baton Rouge	**Transport Method** CUSTOMER
Profile Number 286447	**Received By** McCune, Dodie N.
Line Item(s) 2 - Solid	**Receive Date(s)** 02/08/21

CHECKLIST	YES	NO
Samples received with proper thermal preservation?	☑	☐
Radioactivity is <1600 cpm? If no, record cpm value in notes section.	☑	☐
COC relinquished and complete (including sampleIDs, collect times, and sampler)?	☐	☑
All containers received in good condition and within hold time?	☑	☐
All sample labels and containers received match the chain of custody?	☑	☐
Preservative added to any containers?	☐	☑
If received, was headspace for VOC water containers < 6mm?	☑	☐
Samples collected in containers provided by Pace Gulf Coast?	☑	☐

COOLERS

Airbill	Thermometer ID: E34	Temp °C
		0.3

DISCREPANCIES

None

LAB PRESERVATIONS

None

NOTES NO SAMPLE COLLECT TIMES LISTED-LOGGED PER CONTAINER

LELAP CERTIFICATE NUMBER: 01955
DOD-ELAP ACCREDITATION NUMBER: 74960

ANALYTICAL RESULTS

PERFORMED BY

Pace Analytical Gulf Coast
7979 Innovation Park Dr.
Baton Rouge, LA 70820
(225) 769-4900

Report Date 03/24/2021

Report # 221021109

Project 0519829 JLS

Deliver To	***Additional Recipients***
Jonathan Miller ERM 3838 N. Causeway Blvd. Suite 3000 Metairie, LA 70002	Guy Guinot, ERM

Laboratory Endorsement

Sample analysis was performed in accordance with approved methodologies provided by the Environmental Protection Agency or other recognized agencies. The samples and their corresponding extracts will be maintained for a period of 30 days unless otherwise arranged. Following this retention period the samples will be disposed in accordance with Pace Gulf Coast's Standard Operating Procedures.

Common Abbreviations that may be Utilized in this Report

ND	Indicates the result was Not Detected at the specified reporting limit
NO	Indicates the sample did not ignite when preliminary test performed for EPA Method 1030
DO	Indicates the result was Diluted Out
MI	Indicates the result was subject to Matrix Interference
TNTC	Indicates the result was Too Numerous To Count
SUBC	Indicates the analysis was Sub-Contracted
FLD	Indicates the analysis was performed in the Field
DL	Detection Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
RE	Re-analysis
CF	HPLC or GC Confirmation
00:01	Reported as a time equivalent to 12:00 AM

Reporting Flags that may be Utilized in this Report

J or I	Indicates the result is between the MDL and LOQ
J	DOD flag on analyte in the parent sample for MS/MSD outside acceptance criteria
U	Indicates the compound was analyzed for but not detected
B or V	Indicates the analyte was detected in the associated Method Blank
Q	Indicates a non-compliant QC Result (See Q Flag Application Report)
*****	Indicates a non-compliant or not applicable QC recovery or RPD – see narrative
E	Organics - The result is estimated because it exceeded the instrument calibration range
E	Metals - % diference for the serial dilution is > 10%
L	Reporting Limits adjusted to meet risk-based limit.
P	RPD between primary and confirmation result is greater than 40
DL	Diluted analysis – when appended to Client Sample ID

Sample receipt at Pace Gulf Coast is documented through the attached chain of custody. In accordance with NELAC, this report shall be reproduced only in full and with the written permission of Pace Gulf Coast. The results contained within this report relate only to the samples reported. The documented results are presented within this report.

This report pertains only to the samples listed in the Report Sample Summary and should be retained as a permanent record thereof. The results contained within this report are intended for the use of the client. Any unauthorized use of the information contained in this report is prohibited.

I certify that this data package is in compliance with The NELAC Institute (TNI) Standard 2009 and terms and conditions of the contract and Statement of Work both technically and for completeness, for other than the conditions in the case narrative. Release of the data contained in this hardcopy data package and in the computer readable data submitted has been authorized by the Quality Assurance Manager or his/her designee, as verified by the following signature.

Estimated uncertainty of measurement is available upon request. This report is in compliance with the DOD QSM as specified in the contract if applicable.

Authorized Signature
Pace Gulf Coast Report 221021109

Certifications

Certification	Certification Number
DOD ELAP	74960
Alabama	01955
Arkansas	88-0655
Colorado	01955
Delaware	01955
Florida	E87854
Georgia	01955
Hawaii	01955
Idaho	01955
Illinois	200048
Indiana	01955
Kansas	E-10354
Kentucky	95
Louisiana	01955
Maryland	01955
Massachusetts	01955
Michigan	01955
Mississippi	01955
Missouri	01955
Montana	N/A
Nebraska	01955
New Mexico	01955
North Carolina	618
North Dakota	R-195
Oklahoma	9403
South Carolina	73006001
South Dakota	01955
Tennessee	01955
Texas	T104704178
Vermont	01955
Virginia	460215
Washington	C929
USDA Soil Permit	P330-16-00234

Case Narrative

Client: ERM-Baton Rouge **Report:** 221021109

Pace Analytical Gulf Coast received and analyzed the sample(s) listed on the Report Sample Summary page of this report. Receipt of the sample(s) is documented by the attached chain of custody. This applies only to the sample(s) listed in this report. No sample integrity or quality control exceptions were identified unless noted below.

MISCELLANEOUS

See subcontract laboratory report case narrative.

Sample Summary

LAB ID	Client ID	Matrix	Collect Date	Receive Date
22102110901	MW-1	Water	02/09/2021 10:15	02/10/2021 14:15
22102110902	MW-3	Water	02/09/2021 12:15	02/10/2021 14:15
22102110903	MW-2	Water	02/09/2021 14:15	02/10/2021 14:15

Page intentionally left blank.

Client ID: 4271 - ERM-Baton Rouge
SDG: 221021109
PM: AMK

CHAIN-OF-CUSTODY Analytical Request Document

Pace Analytical

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workorder/
MT

ALL SHADED A

Company: ERM	Billing Information: SAME
Address: 9400 Sam Houston Pkwy N. Suite 600 Houston TX 77064	
Report To: Jonathan Miller	Email To:
Copy To: Dave Angle	Site Collection Info/Address:
Customer Project Name/Number: JLS / 0519829	State: / County/City: Time Zone Collected: [ ]PT [ ]MT [ ]CT [ ]ET
Phone: 504.810.1764 Email: Jonathan.Miller@erm.com	Site/Facility ID #: Compliance Monitoring? [ ] Yes [ ] No
Collected By (print): R. Charles Tinker	Purchase Order #: Quote #: DW PWS ID #: DW Location Code:
Collected By (signature):	Turnaround Date Required: STD Immediately Packed on Ice: [X] Yes [ ] No
Sample Disposal: [ ] Dispose as appropriate [ ] Return [ ] Archive: [ ] Hold:	Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply) Field Filtered (if applicable): [X] Yes [ ] No Analysis: Diss. Metals

Container Preservative Type **: 3 3 1 1 U U 1

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	BTEX	VPH/EPH	Total Metals	Diss. Metals	Cl, TDS, Carb/Bicarb Alk	SO4, Br	Ra 226/228 (sub to Eberline) *	Lab Sample # / Comments
MW-1	GW	G	2/9/21	1015					X	X	X	X	X	X	X	1
MW-3	GW	G		1215					X	X	X	X	X	X	X	2
MW-2	GW	G		1415					X	X	X	X	X	X	X	3
TB-01																

* RADS only in this WO

AMK 2/10/21

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y N NA
Custody Signatures Present	Y N NA
Collector Signature Present	Y N NA
Bottles Intact	Y N NA
Correct Bottles	Y N NA
Sufficient Volume	Y N NA
Samples Received on Ice	Y N NA
VOA - Headspace Acceptable	Y N NA
USDA Regulated Soils	Y N NA
Samples in Holding Time	Y N NA
Residual Chlorine Present	Y N NA
Cl Strips: _____	
Sample pH Acceptable	Y N NA
pH Strips: _____	
Sulfide Present	Y N NA
Lead Acetate Strips: _____	

LAB USE ONLY:
Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards:
Total Metals: As, Ba, Sr, Fe, Mn, Ca, Na, Mg, K
Diss Metals: As, Ba, Sr, Fe, Mn

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #: 2536218

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: _____
Cooler 1 Temp Upon Receipt: _____oC
Cooler 1 Therm Corr. Factor: _____oC
Cooler 1 Corrected Temp: _____oC
Comments: 1.3 EBL

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO Page: _____ of:

	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature)	2/10/21 1415		2/10/21 @1415
Relinquished by/Company: (Signature)	2/10/21 @1522		2.10.21 1415
Relinquished by/Company: (Signature)		Received by/Company: (Signature)	

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:

SAMPLE RECEIVING CHECKLIST

SAMPLE DELIVERY GROUP 221021109	
Client **PM** AMK 4271 - ERM-Baton Rouge	**Transport Method** CUST
Profile Number 286447	**Received By** Jenkins, Mark A.
Line Item(s) 1 - Waters - BTEX	**Receive Date(s)** 02/10/21

CHECKLIST	YES	NO
Samples received with proper thermal preservation?	☑	☐
Radioactivity is <1600 cpm? If no, record cpm value in notes section.	☑	☐
COC relinquished and complete (including sampleIDs, collect times, and sampler)?	☑	☐
All containers received in good condition and within hold time?	☑	☐
All sample labels and containers received match the chain of custody?	☑	☐
Preservative added to any containers?	☐	☑
If received, was headspace for VOC water containers < 6mm?	☑	☐
Samples collected in containers provided by Pace Gulf Coast?	☑	☐

COOLERS

Airbill	Thermometer ID: E34	Temp °C
		1.3

DISCREPANCIES

None

LAB PRESERVATIONS

None

NOTES

Revision 1.6

PACE GULF COAST

PO# 221021109
Project: 221021109

STANDARD LEVEL IV
REPORT OF ANALYSIS

WORK ORDER #21-02080-OR

March 19, 2021

EBERLINE ANALYTICAL/OAK RIDGE LABORATORY
OAK RIDGE, TN

TABLE OF CONTENTS

Eberline Services – Oak Ridge Laboratory

LABORATORY DATA SUPPORT CHECKLIST

MP-001-3

Eberline Services Work Order # 21•02080

The checklist items listed below are to be initialed by appropriate staff upon completion/verification.

Date for Partial	Initials	Date	Initials	Checklist Items
		2/23/21	TSS	Sample Log-In
		3/5/21		Data Compilation
		3-16-21	ALT	First Technical Data Review
		3/17/21	MM	Second Technical Data Review
		3/18/21		Data Entry/Electronic Deliverable
		3/18/21		Case Narrative
		3/18/21	CW	Electronic Deliverable Proof
		3/18/21	MM	Samples Analyzed within Holding Time Yes? ☑ No? ☐
		3/18/21	MM	QA/QC Review
				Client in Possession of Data Electronic or Hard Copy
				Invoiced by Laboratory

Technical/Clerical Corrections, Signatures Needed, Problems, Etc	Date/Initials

Date package approved by: _____ 3/18/21

Laboratory Manager Date

Copy No. _____

SECTION I

CHAIN OF CUSTODY
& pH CHECK

Pace Analytical
www.pacelabs.com

CHAIN OF CUSTODY RECORD

PAGC USE ONLY

7979 Innovation Park Drive | Baton Rouge, LA 70820-7402
225.769.4900 | www.gcal.com

REC'D FEB 23 2021

21-02080

Report To:		Bill To:	
Client:	Eberline	Client:	Pace Gulf Coast
Address:	601 Scarboro Road	Address:	7979 Innovation Park Dr.
	Oak Ridge, TN 37830		Baton Rouge, LA 70820
Contact:	Sample Receiving	Contact:	Anna Kinchen
Phone:	865-481-0683	Phone:	225-769-4900
Email:		Email:	subcontract-data@gcal.com

P.O. Number: 221021109

Project Name/Number: **221021109**

Sampled By:

Analytical Requests & Method

Custody Seal:
Used: ☐ Yes ☐ No
Intact: ☐ Yes ☐ No

Temperature: _____

☐ Dissolved Analysis Requested
☐ Field Filtered
☐ Lab Filtered

	Matrix[1]	Date	Time (2400)	Comp	Grab	Sample Description	No. of Containers	Radium 226	Radium 228	← Preservative / Notes ↓	GCAL ID
4	W	02/09/21	1015			MW-1	2	X	X		
5	W	02/09/21	1215			MW-3	2	X	X		
6	W	02/09/21	1415			MW-02	2	X	X		

Airbill Number:

Turn Around Time(Business Days): ☐ RUSH* _____ Days ☐ Standard (per contract/quote)

Relinquished by: (Signature)	Date/Time:	Received by: (Signature)	Date/Time:
	2/18/21 1433		2/23/21 1055
Relinquished by: (Signature)	Date/Time:	Received by: (Signature)	Date/Time:
Relinquished by: (Signature)	Date/Time:	Received by: (Signature)	Date/Time:

Notes:

[1]**Matrix: W = Water, S=Solid, L=Liquid, T=Tissue.**

*- Requires prior approval, Rush charges may apply. We cannot accept verbal changes. Please email written changes to your PAGC Project Manager.

EBERLINE SERVICES
Oak Ridge Laboratory

Internal Chain of Custody

Work Order #	21-02080
Lab Deadline	3/9/2021
Analysis	Ra226 - Level 4
Sample Matrix	Water

Comments	Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
	04	60	V1.2
	05	40	V1.2
	06	50	V1.2

	Location (circle one)					Initials	Date
Received by	(Sample Storage)	Rough Prep	Prep	Separations	Count Room	[illegible]	[illegible] 1080
Relinquished by	Sample Storage	Rough Prep	(Prep)	Separations	Count Room	[illegible]	[illegible] 0910
Received by	Sample Storage	Rough Prep	Prep	(Separations)	Count Room	AY	2/26/21 1054
Relinquished by	Sample Storage	Rough Prep	Prep	(Separations)	Count Room	AY	3/2/21 0843
Received by	Sample Storage	Rough Prep	Prep	Separations	(Count Room)	KB	3/2/21 0843
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	(Count Room)	KB	3/2/21 1408
Received by	(Sample Storage)	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		

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EBERLINE SERVICES
Oak Ridge Laboratory

Internal Chain of Custody

Work Order #	21-02080
Lab Deadline	3/9/2021
Analysis	Ra228 - Level 4
Sample Matrix	Water

Comments

Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
04	60	V1.2
05	40	V1.2
06	50	V1.2

	Location (circle one)					Initials	Date
Received by	(Sample Storage)	Rough Prep	Prep	Separations	Count Room	[illegible]	2/25/21 1030
Relinquished by	Sample Storage	Rough Prep	(Prep)	Separations	Count Room	[illegible]	2/26/21 0910
Received by	Sample Storage	Rough Prep	Prep	(Separations)	Count Room	AY	2/26/21 1054
Relinquished by	Sample Storage	Rough Prep	Prep	(Separations)	Count Room	AY	3/2/21 0843
Received by	Sample Storage	Rough Prep	Prep	Separations	(Count Room)	ICB	3/2/21 0843
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	(Count Room)	ICB	3/2/21 1459
Received by	Sample Storage	Rough Prep	Prep	(Separations)	Count Room	AY	3/2/21 1502
Relinquished by	Sample Storage	Rough Prep	Prep	(Separations)	Count Room	AY	3/3/21 1503
Received by	Sample Storage	Rough Prep	Prep	Separations	(Count Room)	ICB	3/3/21 1505
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	(Count Room)	ICB	3/3/21 1720
Received by	(Sample Storage)	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		

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EBERLINE SERVICES

Sample Receiving Report
(Volumes, pH, & CPM)

Internal Work Order
21-02080
Received By
RSPENCER

FR	ClientID	# Btls	Comments	Matrix	Storage	Rec Vol Ttl	CPM Max
01	LCS	0		WA	V1.2		
02	BLANK	0		WA	V1.2		
03	DUP	0		WA	V1.2		
04	MW-1	4		WA	V1.2	4.00	60
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	1.0000	30
			2	7	7	1.0000	50
			3	7	7	1.0000	40
			4	7	7	1.0000	60
05	MW-3	4		WA	V1.2	3.70	40
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	1.0000	20
			2	7	7	1.0000	30
			3	7	7	1.0000	40
			4	7	7	0.7000	20
06	MW-02	4		WA	V1.2	4.00	50
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	1.0000	20
			2	7	7	1.0000	30
			3	7	7	1.0000	50
			4	7	7	1.0000	40

Received by: Randolph Spencer Date: 2-23-21

SECTION II

SAMPLE ACKNOWLEDGEMENT

Client Name	Contract/PO	Project Type	Date Received	Required Turnaround Days	Eberline Services Work Order
Pace Gulf Coast	221021109	Environmental	02/23/2021	21	21-02080
Project Name	**Client WO**	**Sample Disp**	**Lab Deadline**	**Internal Deadline**	**Client Deadline**
221021109	221021109	W	03/09/2021	03/15/2021	03/16/2021

Internal ID	Client ID	Sample Date	Matrix	Storage	Ra226	Ra228																							Ttl
01	LCS	02/23/21	WA	V1.2	X	X																							2
02	BLANK	02/23/21	WA	V1.2	X	X																							2
03	DUP	02/23/21	WA	V1.2	X	X																							2
04	MW-1	02/09/21 10:15	WA	V1.2	X	X																							2
05	MW-3	02/09/21 12:15	WA	V1.2	X	X																							2
06	MW-02	02/09/21 14:15	WA	V1.2	X	X																							2
																													0
																													0
																													0
																													0
																													0
																													0
																													0
																													0
																													0
																													0
																													0
																													0
																													0
																													0
Totals Per Analysis (non QA samples)					3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

EBERLINE SERVICES

0010

Sample Log In Report

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830

Voice: (865) 481-0683
Fax: (865) 483-4621

Invoice		Report Data	
	Accounts Payable		Anna Kinchen
	Pace Gulf Coast		Pace Gulf Coast
	7979 Innovation Park Drive		7979 Innovation Park Drive
	Baton Rouge, LA 70820		Baton Rouge, LA 70820
Voice	225-769-4900	Voice	225-769-4900
Fax		Fax	
Contact	Anna Kinchen		
Voice	225-769-4900		
Fax			

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Eberline Services – Oak Ridge Laboratory

SAMPLE RECEIPT CHECKLIST
MP-001-2

WORK ORDER # 21-02080

SAMPLE MATRIX/MATRICES: (CIRCLE ONE OR BOTH)

(AQUEOUS) NON-AQUEOUS

(CIRCLE EITHER YES, NO, OR N/A)

WERE SAMPLES:

Received in good condition?	(Y)	N	
If aqueous, properly preserved	(Y)	N	N/A

WERE CHAIN OF CUSTODY SEALS:

Present on outside of package?	(Y)	N
Unbroken on outside of package?	(Y)	N
Present on samples?	(Y)	N
Unbroken on samples?	(Y)	N
Was chain of custody present upon sample receipt?	(Y)	N

IF THE RESPONSE TO ANY OF THE ABOVE IS **NO**, A DISCREPANT SAMPLE RECEIPT REPORT (DSR) HAS BEEN ISSUED.

REMARKS: COC shows two container per Sample
Received four ~~Samp~~ containers per Sample

SIGNATURE: Randolph Spencer DATE: 2-23-21

SECTION III

CASE NARRATIVE

EBERLINE ANALYTICAL

EBERLINE ANALYTICAL CORPORATION
601 SCARBORO ROAD
OAK RIDGE, TENNESSEE 37830
PHONE (865) 481-0683
FAX (865) 483-4621

EBS-OR-48316

March 24, 2021

Anna Kinchen
Pace Gulf Coast
7979 Innovation Park Drive
Baton Rouge, LA 70820

CASE NARRATIVE - REVISED
Work Order # 21-02080-OR

SAMPLE RECEIPT

This work order contains three water samples received 02/23/2021. Samples were analyzed for Radium-226/228.

CLIENT ID	LAB ID
MW-1	21-02080-04
MW-3	21-02080-05
MW-2	21-02080-06

ANALYTICAL METHODS

Radium-226 was analyzed using EPA Method 903.0 Modified. Radium-228 was analyzed using EPA Method 904.0.

ANALYTICAL RESULTS

Combined Standard Uncertainty is reported at 1-sigma value.

Minimum Detectable Activity (MDA) values for data represented in this report are sample-specific. MDA measurements are determined based on factors and conditions including instrument settings, aliquot size and matrix type.

RADIUM-226

Samples were prepared by removing representative aliquots followed by mixed acid digestions as appropriate. This was followed by precipitations of Radium/Barium Sulfate. Precipitates were dissolved in alkaline EDTA. Radium was selectively precipitated and mounted on micro-porous filter media. Samples were counted by alpha spectroscopy using an energy specific region of interest for Radium-226. The final result was corrected for inherent self-absorption from elemental Barium. Chemical recovery was calculated using a Barium-133 tracer, which was determined by HPGe gamma spectroscopy.

ANALYTICAL RESULTS CONTINUED

RADIUM-226 CONTINUED

Samples demonstrated acceptable results for all Radium-226 analyses. Chemical recovery was acceptable for all samples. The Radium-226 method blank demonstrated an acceptable result. Results for the Radium-226 duplicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Radium-226 laboratory control sample demonstrated an acceptable percent recovery.

RADIUM-228

Following alpha spectroscopy analysis of Radium-226, Barium/Radium Sulfate precipitates were redissolved and allowed for sufficient ingrowth of the Actinium-228 daughter. After ingrowth, Actinium-228 was selectively precipitated. Precipitates were filtered and beta emissions for Actinium-228 were counted on a gas proportional counter. Chemical recovery was determined using a Barium-133 tracer, the activity of which was determined by HPGe gamma spectroscopy and an elemental Yttrium carrier by gravimetric measurements. The product of these two recoveries was used to calculate chemical yield.

Samples demonstrated acceptable results for all Radium-228 analyses. Chemical recovery was acceptable for all samples. The Radium-228 method blank demonstrated an acceptable result. Results for the Radium-228 duplicate demonstrated an acceptable relative percent difference and normalized difference. Results for the Radium-228 laboratory control sample demonstrated an acceptable percent recovery.

CERTIFICATION OF ACCURACY

I certify that this data report complies with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.

M.R. McDougall
Laboratory Manager

Date: 3/24/2021

Eberline Analytical wants and encourages your feedback regarding our performance providing radioanalytical services. Please visit http://eberlineanalytical.com/ to provide us with feedback on our services.

SECTION IV

ANALYTICAL RESULTS SUMMARY

Eberline Analytical
Final Report of Analysis

Report To:
Anna Kinchen
Pace Gulf Coast
7979 Innovation Park Drive
Baton Rouge, LA 70820

Work Order Details:

SDG:	21-02080 REVISED
Purchase Order:	221021109
Analysis Category:	ENVIRONMENTAL
Sample Matrix:	WA

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
21-02080-01	LCS	KNOWN	02/23/21 00:00	2/23/2021	3/2/2021	21-02080	Radium-226	EPA 903.0 Modified	1.00E+01	4.61E-01			pCi/l
21-02080-01	LCS	SPIKE	02/23/21 00:00	2/23/2021	3/2/2021	21-02080	Radium-226	EPA 903.0 Modified	1.07E+01	1.46E+00	2.69E+00	4.54E-01	pCi/l
21-02080-02	MBL	BLANK	02/23/21 00:00	2/23/2021	3/2/2021	21-02080	Radium-226	EPA 903.0 Modified	-2.88E-02	1.23E-01	1.23E-01	3.43E-01	pCi/l
21-02080-03	DUP	MW-1	02/09/21 10:15	2/23/2021	3/2/2021	21-02080	Radium-226	EPA 903.0 Modified	1.01E+00	4.93E-01	5.37E-01	3.92E-01	pCi/l
21-02080-04	DO	MW-1	02/09/21 10:15	2/23/2021	3/2/2021	21-02080	Radium-226	EPA 903.0 Modified	6.81E-01	3.77E-01	4.04E-01	2.89E-01	pCi/l
21-02080-05	TRG	MW-3	02/09/21 12:15	2/23/2021	3/2/2021	21-02080	Radium-226	EPA 903.0 Modified	1.37E+00	5.51E-01	6.23E-01	2.94E-01	pCi/l
21-02080-06	TRG	MW-2	02/09/21 14:15	2/23/2021	3/2/2021	21-02080	Radium-226	EPA 903.0 Modified	5.34E-01	3.64E-01	3.81E-01	2.95E-01	pCi/l
21-02080-01	LCS	KNOWN	02/23/21 00:00	2/23/2021	3/3/2021	21-02080	Radium-228	EPA 904.0	8.94E+00	4.56E-01			pCi/l
21-02080-01	LCS	SPIKE	02/23/21 00:00	2/23/2021	3/3/2021	21-02080	Radium-228	EPA 904.0	9.69E+00	8.44E-01	2.35E+00	9.99E-01	pCi/l
21-02080-02	MBL	BLANK	02/23/21 00:00	2/23/2021	3/3/2021	21-02080	Radium-228	EPA 904.0	2.76E-01	4.08E-01	4.13E-01	8.42E-01	pCi/l
21-02080-03	DUP	MW-1	02/09/21 10:15	2/23/2021	3/3/2021	21-02080	Radium-228	EPA 904.0	9.81E-01	5.03E-01	5.50E-01	9.73E-01	pCi/l
21-02080-04	DO	MW-1	02/09/21 10:15	2/23/2021	3/3/2021	21-02080	Radium-228	EPA 904.0	1.09E+00	4.61E-01	5.23E-01	8.70E-01	pCi/l
21-02080-05	TRG	MW-3	02/09/21 12:15	2/23/2021	3/3/2021	21-02080	Radium-228	EPA 904.0	1.72E+00	4.38E-01	5.86E-01	7.31E-01	pCi/l
21-02080-06	TRG	MW-2	02/09/21 14:15	2/23/2021	3/3/2021	21-02080	Radium-228	EPA 904.0	9.41E-01	5.13E-01	5.55E-01	9.93E-01	pCi/l

0016

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (1-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original

SECTION V

ANALYTICAL STANDARD

Ba-6
(# 6a)

National Institute of Standards & Technology

Certificate

ORIGINAL

Standard Reference Material 4251C
Barium-133 Radioactivity Standard

ORIGINAL

This Standard Reference Material (SRM) consists of radioactive barium-133 chloride, non-radioactive barium chloride, and hydrochloric acid dissolved in 5 mL of distilled water. The solution is contained in a flame-sealed NIST borosilicate-glass ampoule. The SRM is intended for the calibration of ionization chambers and solid-state gamma-ray spectrometry systems.

Radiological Hazard

The SRM ampoule contains barium-133 with a total activity of approximately 2.5 MBq. Barium-133 decays by electron capture and during the decay process X-rays and gamma rays with energies from 4 to 400 keV are emitted. Most of these photons escape from the SRM ampoule and can represent a radiation hazard. Approximate unshielded dose rates at several distances (as of the reference time) are given in note [a]*. Appropriate shielding and/or distance should be used to minimize personnel exposure. The SRM should be used only by persons qualified to handle radioactive material.

Chemical Hazard

The SRM ampoule contains hydrochloric acid (HCl) with a concentration of 1 mole per liter of water. The solution is corrosive and represents a health hazard if it comes in contact with eyes or skin. If the ampoule is to be opened to transfer the solution, the recommended procedure is given on page 2. The ampoule should be opened only by persons qualified to handle both radioactive material and strong acid solution.

Storage and Handling

The SRM should be stored and used at a temperature between 5 and 65 °C. The solution in an unopened ampoule should remain stable and homogeneous until at least June 2004.

The ampoule (or any subsequent container) should always be clearly marked as containing radioactive material. If the ampoule is transported it should be packed, marked, labeled, and shipped in accordance with the applicable national, international, and carrier regulations. The solution in the ampoule is a dangerous good (hazardous material) both because of the radioactivity and because of the strong acid.

Preparation

This Standard Reference Material was prepared in the Physics Laboratory, Ionizing Radiation Division, Radioactivity Group, J.M.R. Hutchinson, Group Leader. The overall technical direction and physical measurements leading to certification were provided by L.L. Lucas of the Radioactivity Group and D.B. Golas, Nuclear Energy Institute Research Associate.

The support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program by N.M. Trahey.

Gaithersburg, Maryland 20899
October 1994

Thomas E. Gills, Chief
Standard Reference Materials Program

*Notes and references are on pages 5 and 6.

EBERLINE SERVICES

QUALITY CONTROL PROGRAM
QCP-009

Rev.8; 11/10/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS
SECONDARY DILUTION RECERTIFICATION

	QCP-009-1-A	Date	4/23/20
Solution Reference #	NIST SRM4251C	Solution #	Ba-6a

Principal Radionuclide	Half Life, Years	Half Life, Days
^{133}Ba	1.048E+01	3.828E+03

Radionuclide of Interest	^{133}Ba	Reference Date	9/1/1993 0:00
Parent Solution Conc.	1.48E+05 dpm/ml		

Chemical Composition of Standard Solution
$^{133}BaCl_2$ in 1M HCl

Dilution Instructions: **Dilution Solvent Used** 1M HCl

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution:	25.0000 ml	Final Activity Concentration:	3.6950E+03 dpm/ml
Total Activity:	3.6950E+06 dpm		
Final Volume:	1000.00 ml		

NOTES:

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: April 23, 2021

Verified & Approved By _____ Date: 4/23/20

QC Approval _____ Date: 4/23/20

Ra-5

QA/QC REVIEWED
Date 2/8/94 Initials WT

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Radionuclide:	Ra-226	Customer:	TMA EBERLINE
Half Life:	1600 ± 7 years	P.O.No.:	VH1888
Catalog No.:	7226	Reference Date:	February 1 1994 12:00 PST.
Source No.:	453-26	Contained Radioactivity: (Ra-226)	1.001 μCi.
		Contained Radioactivity: (Ra-226)	37.0 kBq.

Description of Solution

a. Mass of solution:	5.1864 g (in a 5 ml Flame Sealed Ampoule)
b. Chemical form:	Ra(NO3)2 in 1 N HNO3
c. Carrier content:	None added
d. Density:	1.0318 g/ml @ 20°C.

Radioimpurities: None detected(other than daughters)

Radioactive Daughters
Rn-222, Po-218, At-218, Pb-214, Bi-214, Po-214, Tl-210, Pb-210, Bi-210, Po-210 and Tl-206.

Radionuclide Concentration
(Ra-226) 0.1929 μCi/g.

Method of Calibration

Weighed aliquots of the solution were assayed using gamma spectrometry:
Energy peak(s) integrated under: 186 keV.
Branching ratio(s) used: 0.0351 gamma rays per decay.

Uncertainty of Measurement

a. Systematic uncertainty in instrument calibration:	±3.4%
b. Random uncertainty in assay:	±3.1%
c. Random uncertainty in weighing(s):	±0.2%
d. Total uncertainty at the 99% confidence level:	±4.6%

NIST Traceability
This calibration is implicitly traceable to the National Institute of Standards and Technology.

Leak Test(s)
See reverse side for Leak Test(s) applied to this source.

Notes
1. Nuclear data were taken from "Table of Radioactive Isotopes", edited by Virginia S. Shirley, 1986.
2. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15).

Ana U. Kuen
QUALITY CONTROL

Feb. 3, 1994
Date Signed

ISOTOPE PRODUCTS LABORATORIES
1800 North Keystone Street
Burbank, California 91504
(818) 843 - 7000

EBERLINE SERVICES

QUALITY CONTROL PROGRAM
MP 009

Rev.8; 11/01/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
MP 009

CURRENT DATE: 8/28/2020 0:00

SOLUTION REFERENCE #: IPL 453-26 | SOLUTION #: Ra-5

Principal Radionuclide	Half Life, Years	Half Life, Days
^{226}Radium	1.600E+03	5.844E+05

Radionuclide: ^{226}Radium
Reference Date: 2/1/1994 0:00
Certified Activity: 1.001E+00 µCi
Certified Concentration: µCi per gram

Ampoule /Solution Gross: Weight, Grams
Empty Ampoule: Weight, Grams
Solution Net: Weight, Grams
Total Activity in Ampoule: 1.0010 µCi

Chemical Composition of Standard Solution
$^{226}Ra(NO_3)_2$ in 1M HNO_3

Dilution Instructions:

Dilution Solvent Used: 1M HNO_3

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 1.0010 µCi Which Equals 2.222E+06 dpm at the date listed above

And after dilution the activity of this solution is 2.222E+03 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: August 28, 2021

Verified & Approved By _____ Date: 8/28/2020

QC Approval _____ Date: 8/28/20

EBERLINE SERVICES

QUALITY CONTROL PROGRAM
MP 009

Rev.8; 11/01/03
Title: **Radioactive Reference Standards Solutions & Records**

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS
SECONDARY DILUTION RECERTIFICATION

MP 009

Solution Reference #	IPL-453-26	Date	8/28/2020 0:00
		Solution #	Ra-5b

Principal Radionuclide	Half Life, Years	Half Life, Days
^{226}Radium	1.600E+03	5.844E+05

Radionuclide of Interest	^{226}Radium	Reference Date	2/1/1994 0:00
Parent Solution Conc.	2.22E+03 dpm/ml		

Chemical Composition of Standard Solution
$^{226}Ra(NO_3)_2$ in 1M HNO_3

Dilution Instructions: **Dilution Solvent Used** 1M HNO_3

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution:	20.0000	ml
Total Activity:	4.4440E+04	dpm
Final Volume:	1000.00	ml

Final Activity Concentration: 4.4440E+01 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

NOTES:

Expiration Date: 28-Aug-21

Verified & Approved By _____ Date: 8/28/2020 0:00

QC Approval _____ Date: 8/28/20

ANALYTICS #411 Rec'd 2/15/06 R Prentiss

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 • U.S.A.

Phone (404) 352-8677
Fax (404) 352-2837

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

Ra 228

72325-207

Ra-228 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated using a germanium gamma spectrometer system.

Radionuclide purity and calibration were checked using a germanium gamma spectrometer system. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

ISOTOPE:	Ra-228
ACTIVITY (dps):	4.022 E3
HALF-LIFE:	5.75 years
CALIBRATION DATE:	February 10, 2006 12:00 EST
RELATIIVE EXPANDED UNCERTAINTY (k=2):	4.0%

Impurities: γ-impurities <0.1%

5.10721 grams 0.1M HCl solution with 50 µg/g Ba carrier.

P O NUMBER 00003181, Item 1

SOURCE PREPARED BY: M Taskaeva
M. Taskaeva, Radiochemist

Q A APPROVED: WM. 2-13-06

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

MP-009

Rev.8; 1/10/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
RECERTIFICATION
MP 009

		CURRENT DATE	1/11/2021 0:00
SOLUTION REFERENCE #	Analytics 7235-207	**SOLUTION #**	Ra-12

Principal Radionuclide	**Half Life, Years**	**Half Life, Days**
^{228}Ra	5.750E+00	2.100E+03

Radionuclide	^{228}Ra	**Reference Date**	2/10/2006 0:00
Certified Activity	1.087E-01	µCi	
Certified Concentration		µCi per gram	

Ampoule /Solution Gross	9.0741	**Weight, Grams**
Empty Ampoule	3.9858	**Weight, Grams**
Solution Net	5.0883	**Weight, Grams**
Total Activity in Ampoule	0.1087	µCi

Chemical Composition of Standard Solution

$^{228}Ra(NO_3)_2$ in 0.5 M HCl

Dilution Instructions: **Dilution Solvent Used** 0.5 M HCl

Dilute to a volume of 991.00 **Kg**

Certified Total Activity of 0.1087 µCi **Which Equals** 2.413E+05 **dpm at the date listed above**

And after dilution the activity of this solution is 2.435E+02 **dpm/ml**

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: January 11, 2022

Recertified By _____ Date: 1/11/21

QC Approval _____ Date: 1/11/21

SECTION VI

QUALITY CONTROL SAMPLE RESULTS SUMMARY

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
21-02080	Ra226	1	pCi	l	Pace Gulf Coast

Laboratory Control Sample

Analyte		LCS Measured	CSU Measured	LCS Expected	Uncert. Expected	Known	Known Error	Result	CSU	Standard ID	Standard ACT (dpm)	Standard Error	Standard Added (g)
RA-226		106.86%	25.18%	100.00%	4.60%	1.00E+01	4.61E-01	1.07E+01	2.69E+00	Ra-5b	4.39E+01	4.60E+00	5.06E-01

Matrix Spike

Analyte	*Normalized Difference*	*MS Actual % Rec*	*Expected MS Result*	*Expected MS Uncert*	*Actual MS Result*	*Actual MS CSU*	*Sample Result*	*Sample CSU*	*Sample Aliquot*	*Standard ID*	*Standard ACT (dpm)*	*Standard Error %*	*Standard Added (g)*

Replicate Sample

Analyte	*Normalized Difference*	*RPD*	*Original Result*	*Original CSU*	*Replicate Result*	*Replicate CSU*
RA-226	0.95	38.73	6.81E-01	4.04E-01	1.01E+00	5.37E-01

QC Summary

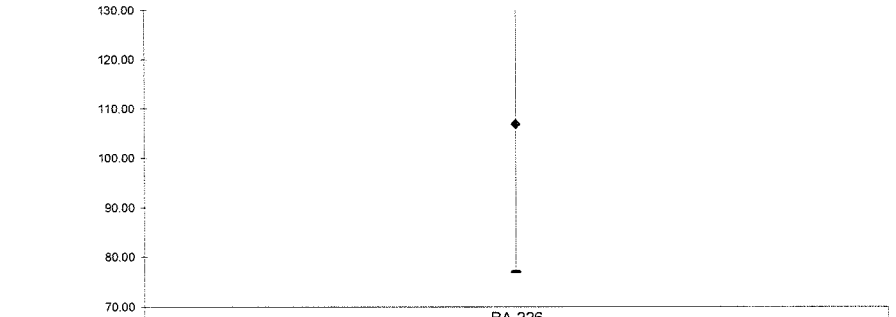
LCS Relative Bias	*LCS % R*		*MS % R*	*MS ND*	*Rep RPD*	*Rep ND*
1.07	OK				NA	OK

0026

Version

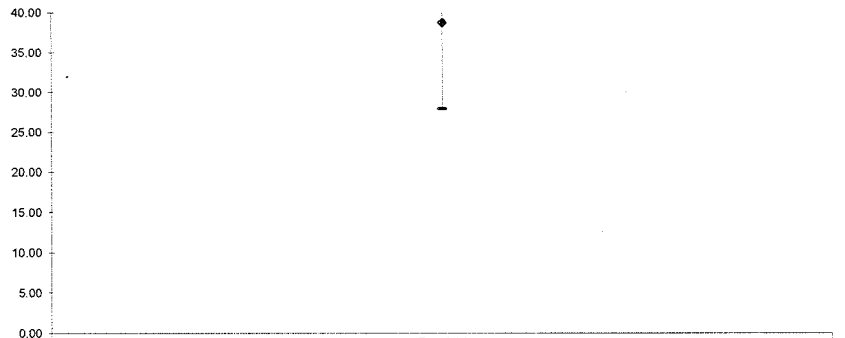
WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
21-02080	Ra226	1	pCi	I	Pace Gulf Coast

LCS % Recovery



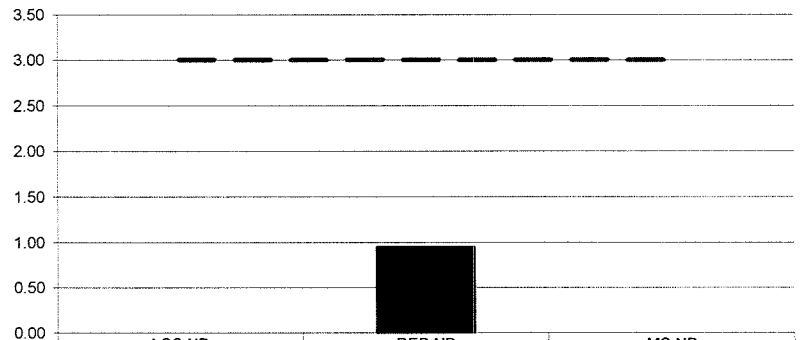
	RA-226
Lower Error	77.07
Upper Error	136.64
%R	106.86
LCL	75
Mean	100
UCL	125

Replicate Sample RPD



	RA-226
Lower Error	49.51
Upper Error	27.95
RPD	38.73
CL	35

Normalized Difference



	LCS ND	REP ND	MS ND
RA-226	0.00	0.95	0.00
UCL	3	3	3

No Matrix Spike

0027

Version

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
21-02080	Ra228	1	pCi	l	Pace Gulf Coast

Laboratory Control Sample

Analyte		LCS Measured	CSU Measured	LCS Expected	Uncert. Expected	Known	Known Error	Result	CSU	Standard ID	Standard ACT (dpm)	Standard Error	Standard Added (g)
RA-228		108.35%	24.26%	100.00%	5.10%	8.94E+00	4.56E-01	9.69E+00	2.35E+00	Ra-12	3.96E+01	5.10E+00	5.01E-01

Matrix Spike

Analyte	*Normalized Difference*	*MS Actual % Rec*	*Expected MS Result*	*Expected MS Uncert*	*Actual MS Result*	*Actual MS CSU*	*Sample Result*	*Sample CSU*	*Sample Aliquot*	*Standard ID*	*Standard ACT (dpm)*	*Standard Error %*	*Standard Added (g)*

Replicate Sample

Analyte	*Normalized Difference*	*RPD*	*Original Result*	*Original CSU*	*Replicate Result*	*Replicate CSU*
RA-228	0.28	10.51	1.09E+00	5.23E-01	9.81E-01	5.50E-01

QC Summary

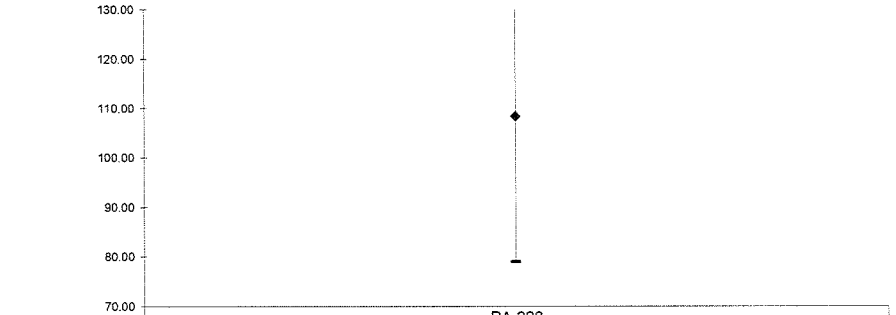
LCS Relative Bias	*LCS % R*		*MS % R*	*MS ND*	*Rep RPD*	*Rep ND*
1.08	OK				NA	OK

0028

Version

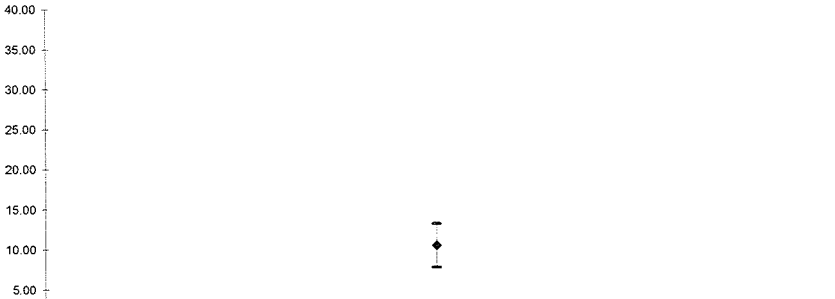
WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
21-02080	Ra228	1	pCi	l	Pace Gulf Coast

LCS % Recovery



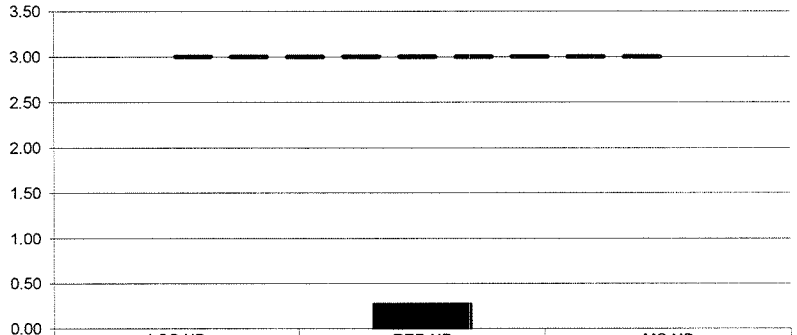
	RA-228
Lower Error	78.99
Upper Error	137.71
%R	108.35
LCL	75
Mean	100
UCL	125

Replicate Sample RPD



	RA-228
Lower Error	13.24
Upper Error	7.79
RPD	10.51
CL	35

Normalized Difference



	LCS ND	REP ND	MS ND
RA-228	0.00	0.28	0.00
UCL	3	3	3

No Matrix Spike

0029

Version

SECTION VII

LABORATORY TECHNICIAN'S NOTES

RA-226 NOTES

EBERLINE SERVICES

Work Order Analysis Notes

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830
Voice: 865.481.0683
www.eberlineservices.com

Internal Work Order	21-02080
Analysis Code	Ra226
Run Number	1

#	Date	Dept	User	Notes
1	02/25/21 10:34	PREP	JHARVEY	ALIQUOTED AND ADDED SPIKE AND TRACER- PH'D SAMPLES- PRECIPITATED WITH BA AND PB CARRIERS AND AMMONIUM SULFATE- DECANTED SAMPLES AND CENTRIFUGED- SUBMITTED RADIUM PRECIP TO SEPARATIONS

JHarvey
2/25/21

EBERLINE SERVICES

Work Order Analysis Notes

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830
Voice: 865.481.0683
www.eberlineservices.com

Internal Work Order	21-02080
Analysis Code	Ra226
Run Number	1

#	Date	Dept	User	Notes
1	02/25/21 10:34	PREP	JHARVEY	ALIQUOTED AND ADDED SPIKE AND TRACER- PH'D SAMPLES- PRECIPITATED WITH BA AND PB CARRIERS AND AMMONIUM SULFATE- DECANTED SAMPLES AND CENTRIFUGED- SUBMITTED RADIUM PRECIP TO SEPARATIONS
2	03/02/21 08:29	CHEM	AYARBER	ADDED EDTA TO SAMPLES AND LET SIT. ADDED AMMONIUM SULFATE AND ACETIC ACID TO SAMPLES. FILTERED ONTO TARED FILTER PAPERS, LET DRY UNDER HEAT LAMP, REWEIGHED, AND SUBMITTED TO COUNT.

3/2/21

EBERLINE SERVICES

Reagents Used in an Analysis

Internal Work Order	
21-02080	
Analysis Code	Run
Ra226	1

Reagent ID	Reagent Name	Reagent Concentration	Analyst ID	Date Recorded
022612P	Ammonium Hydroxide	Reagent Grade	JHARVEY	2/25/2021
022487D02	Ammonium Sulfate	200 mg/ml	JHARVEY	2/25/2021
022147D08	Barium Carrier	1 mg/ml	JHARVEY	2/25/2021
022385D02	Lead Carrier	166 mg/ml	JHARVEY	2/25/2021
022879P	Nitric Acid	Reagent Grade	JHARVEY	2/25/2021
022444P	Acetic Acid	Reagent Grade	AYARBER	3/2/2021
022142D03	Ammonium Sulfate	200 mg/ml	AYARBER	3/2/2021
022266S	EDTA	0.25M	AYARBER	3/2/2021

Alpha Bank I

Date	Sample #	Client	Load time	Count time	Analysis	Tech
2/19/21	System BKgd	Lab	1442	46.40 hrs	NA	KB
2/22/21	Daily Pulser	Lab	0516	10 min	NA	KP
2/22/21	210206 8A (1-3)	Unitech	0809	2hr 50 min	UU	KP
2/22/21	210206 4A (1-3)	UCOR	1105	2hr 50 min	UU	KP
2/23/21	Daily Pulser	Lab	0405	10 min	NA	KP
2/23/21	210205 0A (1-3)	UCOR	0752	2hr 50 min	Am^{241}	KP
2/23/21	210205 0A (8,10,12)	UCOR	1047	2hr 50 min	PU	KB
2/23/21	210206 2A (2-4)	UCOR	1341	2hr 50 min	UU	KB
2/24/21	Daily Pulser	Lab	0307	10 min	NA	KP
2/24/21	210205 0A (1-3)	UCOR	0750	2hr 50 min	Am^{243}	KP
2/24/21	210204 7A (4)	UCOR	1053	2hr 50 min	U NAT	KB
2/24/21	210205 0A (1-2)	UCOR	1054	2hr 50 min	Th	KB
2/24/21	210206 0A (1-3)	UCOR	1349	2hr 50 min	Fuzz	KB
2/25/21	Daily Pulser	Lab	0531	10 min	NA	KP
2/25/21	210204 4B (1-3)	UCOR	0800	2hr 50 min	Pu	KP
2/25/21	210204 4A (10,18)	UCOR	1055	2hr 50 min	Am^{241}	KP
2/25/21	210204 8A (1)	UCOR	1055	2hr 50 min	Ra^{226}	KP
2/25/21	210204 7A (2-4)	UCOR	1353	2hr 50 min	Th^{229}	KB
2/26/21	Daily Pulser	Lab	0421	10 min	NA	KP
2/26/21	CalCheck (10-12)	Lab	0708	2hr 30 min	NA	KP
2/26/21	210204 8A (1-3)	UCOR	1000	2hr 50 min	Np	KP
———	~~Cat KP 2/26/21~~					KP
2/26/21	210204 8A (5)	UCOR	1252	2hr 50 min	Th	KB
2/26/21	210204 8A (1-2)	UCOR	1253	2hr 50 min	Th^{229}	KB
2/26/21	210205 7A (3-4)	Unitech	1550	2hr 50 min	UU	KB
2/27/21	Daily Pulser	Lab	0813	10 min	NA	KP
2/27/21	System BKgd	Lab	0914	16 hr 40 min	NA	KP
3/1/21	Daily Pulser	Lab	0407	10 min	NA	KP
3/1/21	210205 0B (1-3)	UCOR	0809	2hr 50 min	Am^{241}	KP
3/1/21	210206 3A (1-3)	UCOR	1105	2hr 50 min	Ra^{226}	KP
3/2/21	Daily Pulser	Lab	0414	10 min	NA	KP
3/2/21	210205 7A (1-3)	Unitech	0808	2hr 50 min	Pu	KP
3/2/21	210207 0A (4)	Unitech	1103	2hr 50 min	UU	KB
3/2/21	210208 0A (1-2)	Pace Gulf	1103	2hr 50 min	Rad	KB

Alpha Bank 3

Date	Sample #	Client	Load time	Count time	Analysis	Tech
3/1/21	210206 3A (1-4)	UCOR	1106	2hr 50 min	Th	KP
3/1/21	210206 3A (1-4)	UCOR	1107	2hr 50 min	Th^{229}	KP
3/1/21	210204 8A (1-3)	UCOR	1107	2hr 50 min	Pu^{242}	KP
3/1/21	210204 8A (5)	UCOR	1359	2hr 50 min	Pu^{242}	KB
3/1/21	210206 3A (1-4)	UCOR	1400	2hr 50 min	UU	KB
3/1/21	210206 3A (4)	UCOR	1400	2hr 50 min	UU NT	KB
3/1/21	210208 2 1A (1-4)	Fruit Growers	1401	2hr 50 min	UU	KB
3/2/21	Daily Pulser	Lab	0414	10 min	NA	KP
3/2/21	210205 7A (4,5)	Unitech	0808	2hr 50 min	Pu	KP
3/2/21	210207 0A (1-4)	Unitech	0809	2hr 50 min	Th	KP
3/2/21	210207 0A (1-3)	Unitech	0809	2hr 50 min	UU	KP
3/2/21	210204 8A (1-3,5)	UCOR	0809	2hr 50 min	Np	KP
3/2/21	210208 0A (3-6)	Race Gulf	1103	2hr 50 min	Race	KB
3/2/21	210207 9 1A (1-4)	UCOR	1105	2hr 50 min	UU	KB
3/2/21	210207 9 4A (4)	UCOR	1104	2hr 50 min	UU NT	KB
3/2/21	210206 3 1A (1-4)	UCOR	1104	2hr 50 min	Np	KB

RA-228 NOTES

EBERLINE SERVICES

Work Order Analysis Notes

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830
Voice: 865.481.0683
www.eberlineservices.com

Internal Work Order	21-02080
Analysis Code	Ra228
Run Number	1

#	Date	Dept	User	Notes
1	02/25/21 10:35	PREP	JHARVEY	ALIQUOTED AND ADDED SPIKE AND TRACER- PH'D SAMPLES- PRECIPITATED WITH BA AND PB CARRIERS AND AMMONIUM SULFATE- DECANTED SAMPLES AND CENTRIFUGED- SUBMITTED RADIUM PRECIP TO SEPARATIONS

JHarvey
2/25/21

EBERLINE SERVICES

Work Order Analysis Notes

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830
Voice: 865.481.0683
www.eberlineservices.com

Internal Work Order	21-02080
Analysis Code	Ra228
Run Number	1

#	Date	Dept	User	Notes
1	02/25/21 10:35	PREP	JHARVEY	ALIQUOTED AND ADDED SPIKE AND TRACER- PH'D SAMPLES- PRECIPITATED WITH BA AND PB CARRIERS AND AMMONIUM SULFATE- DECANTED SAMPLES AND CENTRIFUGED- SUBMITTED RADIUM PRECIP TO SEPARATIONS
2	03/03/21 15:01	CHEM	AYARBER	ADDED FILTER PAPERS FROM COUNT ROOM TO LABELED C-TUBES, FILLED WITH EDTA SOLUTION AND LET SIT OVERNIGHT. REMOVED FILTER FROM EDTA-ADDED 2MLS YTTRIUM 9MG/ML CARRIER ADDED 18N NAOH TO SAMPLES AND RECORDED T1. HOT BATHED FOR 15 MIN, CENTRIFUGED AND DISCARDED SUPERNANT. ADDED 6N HNO3, DI WATER, AND 10N NAOH. HOT BATHED FOR 15 MIN, CENTRIFUGED AND DISCARDED SUPERNANT. ADDED 1N HNO3, DI WATER, AND AMMONIUM OXALATE. FILTERED ONTO TARED FILTER PAPERS. LET DRY UNDER HEAT LAMP, REWEIGHED AND SUBMITTED TO COUNT.

3/3/21

EBERLINE SERVICES

Reagents Used in an Analysis

Internal Work Order: 21-02080

Analysis Code: Ra228

Run: 1

Reagent ID	Reagent Name	Reagent Concentration	Analyst ID	Date Recorded
022612P	Ammonium Hydroxide	Reagent Grade	JHARVEY	2/25/2021
022487D02	Ammonium Sulfate	200 mg/ml	JHARVEY	2/25/2021
022147D08	Barium Carrier	1 mg/ml	JHARVEY	2/25/2021
022385D02	Lead Carrier	166 mg/ml	JHARVEY	2/25/2021
022879P	Nitric Acid	Reagent Grade	JHARVEY	2/25/2021
022277D01	Ammonium Oxalate	5%	AYARBER	3/3/2021
022128D01	EDTA	0.25M	AYARBER	3/3/2021
021951D10	Nitric Acid	1N	AYARBER	3/3/2021
021951D05	Nitric Acid	6N	AYARBER	3/3/2021
022254D02	Sodium Hydroxide	10M	AYARBER	3/3/2021
022254D01	Sodium Hydroxide	18M	AYARBER	3/3/2021
022255D01	Yttrium Carrier	9 mg/ml	AYARBER	3/3/2021

Red LB4110

Date	Sample #	Client	Load time	Count time	Analysis	Tech
3/1/21	2102084AB (1-4)	Materion	0624	1hr	αβ	KP
3/1/21	2103002 AB(1-3,5)	IKON	1434	2hrs	αβ	KB
3/2/21	Daily BKgd/QC	Lab	0406/0558	1hr/30min	αβ	KP
3/2/21	Cross Talk	Lab	0511	5min	αβ	KP
3/2/21	Cross Talk	Lab	0535	5min	αβ	KP
3/2/21	2103002AB (4)	IKON	0642	2hrs	αβ	KP
	2102063Np (4)	UCOR	0749	10min	Np	KP
3/2/21	2103007AB(1-4)	UCOR	1134	1hr	αβ	KB
3/2/21	2102063cc(1-3,5)	UCOR	1354	30mins	CL36	KB
3/3/21	Daily BKgd/QC	Lab	0439/0541	1hr/30min	αβ	KP
3/3/21	Cross Talk	Lab	0614	5min	αβ	KP
3/3/21	Cross Talk	Lab	0622	5min	αβ	KP
3/3/21	2103008Sr (1)	UCOR	0639	30min	TotSr	KP
3/3/21	2103011AB(2-5)	UCOR	0643	1hr	αβ	KP
3/3/21	2102080RA (1-6)	Pace Gulf	1505	2hrs	Ra3	KB

SECTION VIII

ANALYTICAL DATA (RADIUM-226)

21-02080
Ra226
Run 1

Work Order	21-02080
Analysis Code	Ra226
Run	1
Date Received	2/23/2021
Lab Deadline	3/9/2021
Client	Pace Gulf Coast
Project	221021109
Report Level	4
Activity Units	pCi
Aliquot Units	l
Matrix	WA
Method	EPA 903.0 Modified
Instrument Type	Alpha Spectroscopy
Radiometric Tracer	Ba-133
Radiometric Sol#	Ba-6a
Tracer Act (dpm/g)	403.61
Carrier	
Carrier Conc (mg/ml)	

Internal Fraction	Sample Desc	Client ID	Login CPM	Sample Date	Sample Aliquot
01	LCS	LCS		02/23/21 00:00	1.0000E+00
02	MBL	BLANK		02/23/21 00:00	1.0000E+00
03	DUP	MW-1	60	02/09/21 10:15	1.0000E+00
04	DO	MW-1	60	02/09/21 10:15	1.0000E+00
05	TRG	MW-3	40	02/09/21 12:15	1.0000E+00
06	TRG	MW-02	50	02/09/21 14:15	1.0000E+00

0043

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ^ Indicates estimated SAF value.
** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

21-02080
Ra226
Run 1

Internal Fraction	Sample Desc	Tracer Aliquot (g)	Tracer Total ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	Grav Carrier Added (ml)	Grav Filter Tare (g)	Grav Filter Final (g)	Grav Filter Net (g)	Grav % Rec	Mean % Rec	SAF 1*	SAF 2*
01	LCS	2.2079	891.1	356.0	88.69		0.0200	0.0290	0.0090		88.69	3.00^	1.00
02	MBL	2.2054	890.1	407.0	101.51		0.0197	0.0279	0.0082		101.51	2.82	1.00
03	DUP	2.2104	892.1	396.0	98.54		0.0200	0.0351	0.0151		98.54	3.00^	1.00
04	DO	2.2012	888.4	419.0	104.70		0.0201	0.0347	0.0146		104.70	3.00^	1.00
05	TRG	2.1989	887.5	394.0	98.56		0.0200	0.0323	0.0123		98.56	3.00^	1.00
06	TRG	2.2009	888.3	359.0	89.72		0.0200	0.0294	0.0094		89.72	3.00^	1.00

0044

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ^ Indicates estimated SAF value.
** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

21-02080
Ra226
Run 1

Internal Fraction	Sample Desc	Rough Prep Date	Rough Prep By	Prep Date	Prep By	Sep t0 Date/Time	Sep t0 By	Sep t1 Date/Time	Sep t1 By
01	LCS			02/25/21 10:52	JHARVEY	03/02/21 07:30	AYARBER		
02	MBL			02/25/21 10:52	JHARVEY	03/02/21 07:30	AYARBER		
03	DUP			02/25/21 10:52	JHARVEY	03/02/21 07:30	AYARBER		
04	DO			02/25/21 10:52	JHARVEY	03/02/21 07:30	AYARBER		
05	TRG			02/25/21 10:52	JHARVEY	03/02/21 07:30	AYARBER		
06	TRG			02/25/21 10:52	JHARVEY	03/02/21 07:30	AYARBER		

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ^ Indicates estimated SAF value.
** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Client: Pace Gulf Coast
Eberline Services Work Order: 21-02080
Analysis Code: Ra226
Run: 1

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	RA-226	LCS	LCS	pCi/l	1.07E+01	1.46E+00	4.54E-01	1.00E+01	106.86	OK		OK	
02	RA-226	MBL	BLANK	pCi/l	-2.88E-02	1.23E-01	3.43E-01					OK	OK
03	RA-226	DUP	MW-1	pCi/l	1.01E+00	4.93E-01	3.92E-01				NA	OK	
04	RA-226	DO	MW-1	pCi/l	6.81E-01	3.77E-01	2.89E-01					OK	
05	RA-226	TRG	MW-3	pCi/l	1.37E+00	5.51E-01	2.94E-01					OK	
06	RA-226	TRG	MW-02	pCi/l	5.34E-01	3.64E-01	2.95E-01					OK	

Client: Pace Gulf Coast
Eberline Services Work Order: 21-02080
Analysis Code: Ra226
Run: 1

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	RA-226	LCS	02/23/21 00:00	1.00E+00	88.69	0.00	88.69		3/2/2021 7:30	
02	RA-226	MBL	02/23/21 00:00	1.00E+00	100.00	0.00	101.51		3/2/2021 7:30	
03	RA-226	DUP	02/09/21 10:15	1.00E+00	98.54	0.00	98.54		3/2/2021 7:30	
04	RA-226	DO	02/09/21 10:15	1.00E+00	100.00	0.00	104.70		3/2/2021 7:30	
05	RA-226	TRG	02/09/21 12:15	1.00E+00	98.56	0.00	98.56		3/2/2021 7:30	
06	RA-226	TRG	02/09/21 14:15	1.00E+00	89.72	0.00	89.72		3/2/2021 7:30	

Client: Pace Gulf Coast
Eberline Services Work Order: 21-02080
Analysis Code: Ra226
Run: 1

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	RA-226	LCS	03/02/21 11:03		A_Spec	Alpha_011	170.02	2.22 E+02	2.10 E-02	18.6
02	RA-226	MBL	03/02/21 11:03		A_Spec	Alpha_012	170	-7.20 E-01	1.60 E-02	18.7
03	RA-226	DUP	03/02/21 11:03		A_Spec	Alpha_033	170	1.76 E+01	8.00 E-03	14.1
04	RA-226	DO	03/02/21 11:03		A_Spec	Alpha_034	170	1.33 E+01	4.00 E-03	15.5
05	RA-226	TRG	03/02/21 11:03		A_Spec	Alpha_035	170	2.45 E+01	3.00 E-03	14.4
06	RA-226	TRG	03/02/21 11:03		A_Spec	Alpha_037	170	8.66 E+00	2.00 E-03	14.4

Count Room Report
Client: Pace Gulf Coast

21-02080-Ra226-1 (pCi/l) in WA
Tracer ID: Ba-6a

Internal Fraction	Sample Desc	Client ID	Sample Date	Sample Aliquot	Tracer Aliquot (g)	Tracer ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	SAF 1*	SAF 2*
01	LCS	LCS	02/23/21 00:00	1.0000	2.2079	891.1305	356.0000	88.69	3.00^	1.00
02	MBL	BLANK	02/23/21 00:00	1.0000	2.2054	890.1215	407.0000	101.51	2.82	1.00
03	DUP	MW-1	02/09/21 10:15	1.0000	2.2104	892.1395	396.0000	98.54	3.00^	1.00
04	DO	MW-1	02/09/21 10:15	1.0000	2.2012	888.4263	419.0000	104.70	3.00^	1.00
05	TRG	MW-3	02/09/21 12:15	1.0000	2.1989	887.4980	394.0000	98.56	3.00^	1.00
06	TRG	MW-02	02/09/21 14:15	1.0000	2.2009	888.3052	359.0000	89.72	3.00^	1.00

1-42

33-35, 37

0049

Spike and Tracer Worksheet

Internal Work Order	Run	Analysis Code	Date	Technician	Technician Initials	Witness Initials
21-02080	1	Ra226	2/25/2021 10:37	JHARVEY		

LCS & Matrix Spikes					LCS	MS	LCSD	MSD	LCS		MS		LCSD		MSD	
Isotope	Sol #	Activity dpm/g	Solution Date	Approx Addition	Volume Used (g)	Volume Used (g)	Volume Used (g)	Volume Used (g)	Known pCi	Error Estimate	Added pCi	Error Estimate	Known pCi	Error Estimate	Added pCi	Error Estimate
Ra-226	Ra-5b	43.920	2/25/2021	0.500	0.5062				10.01	0.461	0.00	0.000	0.00	0.000	0.00	0.000

Tracers

fraction	Isotope	Sol #	Activity dpm/g	Solution Date	Volume Used (g)	Approx Addition
01	Ba-133	Ba-6a	403.610	2/25/2021	2.2079	2.5100
02	Ba-133	Ba-6a	403.610	2/25/2021	2.2054	2.5100
03	Ba-133	Ba-6a	403.610	2/25/2021	2.2104	2.5100
04	Ba-133	Ba-6a	403.610	2/25/2021	2.2012	2.5100
05	Ba-133	Ba-6a	403.610	2/25/2021	2.1989	2.5100
06	Ba-133	Ba-6a	403.610	2/25/2021	2.2009	2.5100

Balance Printer Tapes

Tracer	LCS

Matrix Spike

0050

Eberline Analytical
Oak Ridge Laboratory

Aliquot Worksheet

Printed: 2/25/2021 10:53

Work Order	Run	Analysis Code	Rpt Units	Lab Deadline	Technician
21-02080	1	Ra226	liters	3/9/2021	JHARVEY

Lab Fraction	Pace Gulf Coast Client ID	Sample Type	Muffle Data Ratio Post/Pre	Dilution Data No of Dils	Dil Factor	Ratio	Aliquot Data Aliquot	Net Equiv	MS Aliquot Data Aliquot	Net Equiv	H-3 Solids Only Water Added (ml)	H3 Dist Aliq
01	LCS	LCS					1.0000E+00	1.0000E+00				
02	BLANK	MBL					1.0000E+00	1.0000E+00				
03	MW-1	DUP					1.0000E+00	1.0000E+00				
04	MW-1	DO					1.0000E+00	1.0000E+00				
05	MW-3	TRG					1.0000E+00	1.0000E+00				
06	MW-02	TRG					1.0000E+00	1.0000E+00				

Comments	

0051

Technician: _____ Date: 2/25/21

Gravimetric Worksheet

Work Order	Run	Analysis Code	Gravimetric Carrier	Carrier Conc (mg/ml)	Technician
21-02080	**1**	**Ra226**			**AYARBER**

TRetec	Pace Gulf Coast	Sample	Carrier Data	Filter Data			Gravimetric
Fraction	Client ID	Type	Carrier Added (ml)	Filter Tare (g)	Filter Final (g)	Filter Net (g)	% Recovery
01	LCS	LCS		0.0200	0.0290	**0.0090**	
02	BLANK	MBL		0.0197	0.0279	**0.0082**	
03	DUP	DUP		0.0200	0.0351	**0.0151**	
04	MW-1	DO		0.0201	0.0347	**0.0146**	
05	MW-3	TRG		0.0200	0.0323	**0.0123**	
06	MW-02	TRG		0.0200	0.0294	**0.0094**	

0052

Technician: _____ Date: 3/2/21

KB 3/2/21

Apex-Alpha™

Sample Description: SPIKE
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00002879
Batch Identification: 2102080A-RA
Sample Identification: 01
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_011
Chamber Serial Number:
Detector Serial Number: 11
Env. Background: System Bkgd 293433
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
Generic Mult. Factor: 3.000E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 3/2/2021 8:48:20 AM
Acquisition Date/Time: 3/2/2021 11:03:31 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.8869 +/- 0.0000
Counting Efficiency: 0.1863 +/- 0.0032 on 2/28/2020 2:49:50 PM
Effective Efficiency: 0.1652 +/- 0.0028

Control Certificate Name: Ra226_Ra-5b
Chem. Recov. of Control: RA-226 0.356158 +/- 0.027065
Peak Match Tolerance: 0.350 MeV

PEAK AREA REPORT

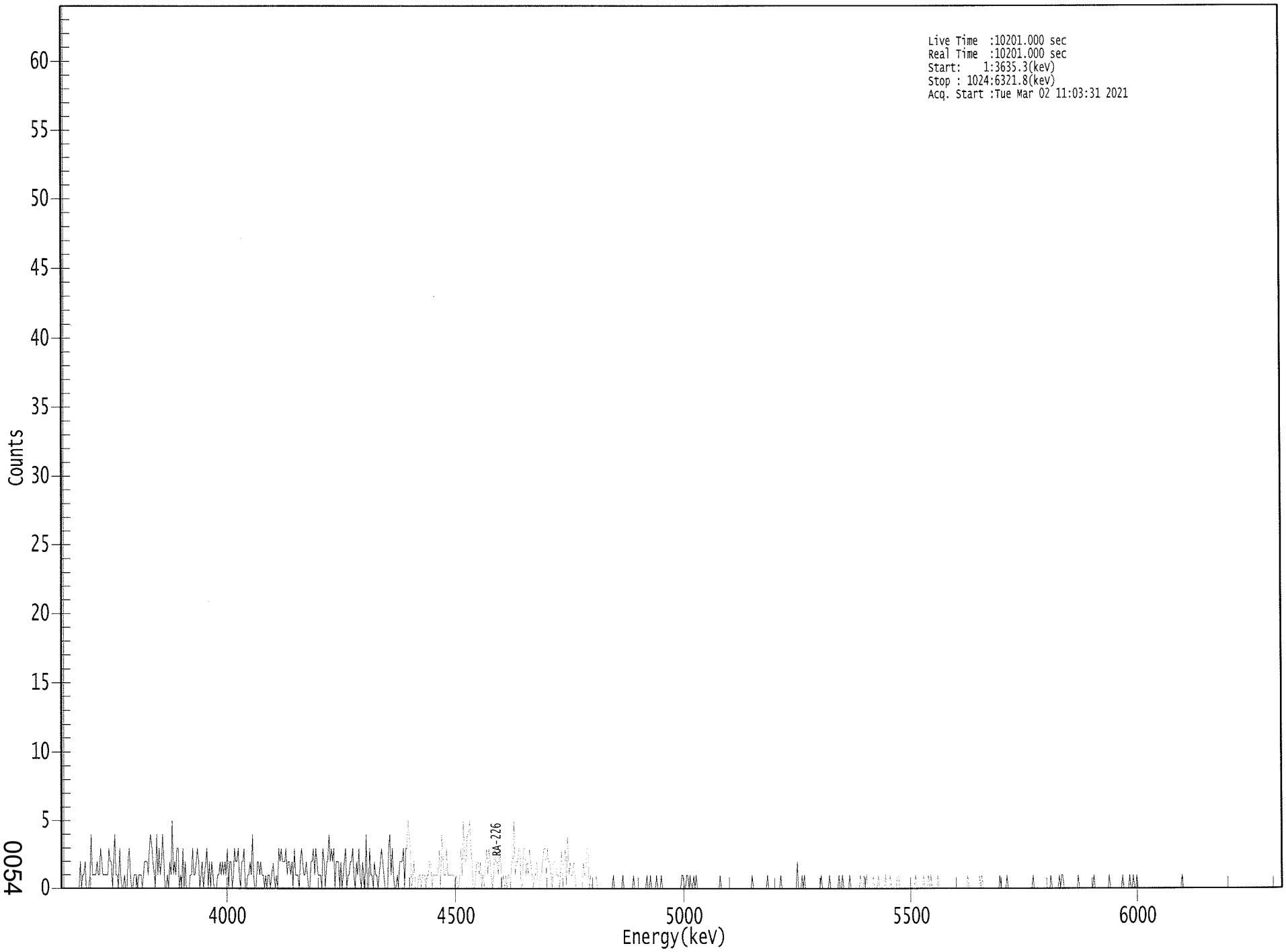
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.500	12.58	65.65	4.42	0.00E+000	2.6
RA-226	4.591	222.43	13.26	3.57	0.00E+000	9.0

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.956	5685.50*	6.36E-001 +/- 4.18E-001	5.15E-001 +/- 1.73E-002
RA-226	0.952	4785.00*	1.07E+001 +/- 1.46E+000	4.54E-001 +/- 1.53E-002

AG
3/2/21

0000287905.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 01

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	2	0	1	1	2	0	0	0
25:	1	4	1	1	1	1	2	1
33:	1	3	2	1	1	1	1	1
41:	3	2	2	0	2	4	1	1
49:	0	3	1	0	0	1	0	0
57:	2	3	1	0	0	1	1	1
65:	0	1	1	1	0	1	2	2
73:	2	1	3	4	3	2	1	0
81:	4	1	3	1	2	4	2	0
89:	0	1	0	2	1	5	1	2
97:	1	3	3	0	1	0	3	0
105:	2	0	0	0	1	1	3	1
113:	1	2	3	2	0	1	2	0
121:	1	2	3	0	2	0	2	1
129:	0	0	0	1	1	2	1	2
137:	1	2	1	3	0	2	2	0
145:	1	3	2	2	3	1	0	2
153:	2	3	0	0	1	1	2	1
161:	4	1	0	0	2	2	1	2
169:	1	1	0	1	0	1	1	0
177:	1	2	1	0	1	0	3	2
185:	3	2	2	2	3	1	2	2
193:	1	2	0	3	1	1	1	0
201:	2	3	2	1	1	2	1	0
209:	0	2	2	3	1	3	2	1
217:	1	1	0	3	2	0	2	2
225:	4	2	3	2	3	0	2	2
233:	2	0	2	0	1	2	3	0
241:	1	1	2	2	3	1	0	2
249:	1	3	1	0	2	1	0	4
257:	0	0	3	1	1	0	2	1
265:	1	0	1	2	3	2	1	0
273:	0	0	3	4	1	3	1	0
281:	0	1	0	2	2	2	3	0
289:	3	3	5	4	3	0	1	2
297:	0	0	0	1	1	0	1	1
305:	1	0	1	1	2	2	0	1
313:	1	1	1	1	3	0	4	2
321:	1	1	3	1	1	1	1	1
329:	1	0	1	0	0	1	3	1
337:	5	2	2	4	4	5	3	2
345:	0	0	1	2	2	1	2	0
353:	1	0	2	3	1	3	2	1
361:	0	1	3	2	2	1	3	2

369:	0	1	0	1	0	1	1	0

Sample Title: 01

Channel								
377:	2	2	5	1	2	2	3	3
385:	0	0	3	3	1	2	1	3
393:	2	1	0	1	1	2	0	0
401:	1	1	2	3	3	1	3	2
409:	2	1	0	2	2	2	1	1
417:	0	1	3	0	2	3	0	4
425:	1	2	1	1	2	1	0	0
433:	0	0	0	0	2	1	1	3
441:	3	0	1	0	0	0	0	1
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	1	0	0
465:	0	0	0	0	0	1	0	0
473:	0	0	0	0	0	0	1	0
481:	0	0	0	0	0	0	0	0
489:	0	1	0	0	1	0	0	0
497:	0	1	0	0	0	1	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	1	1
521:	0	0	1	1	0	1	0	0
529:	1	0	1	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	1	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	1	0	0	0	0	0	0
585:	0	0	0	0	0	0	1	0
593:	0	0	0	0	0	0	0	0
601:	0	1	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	2
617:	0	0	0	1	0	1	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	1	0	0	0	0
641:	0	0	1	0	0	0	0	0
649:	0	0	1	0	0	1	0	0
657:	0	0	0	1	0	0	0	0
665:	0	0	0	0	1	0	0	1
673:	0	1	0	0	0	0	0	1
681:	0	0	0	1	0	0	0	0
689:	0	1	0	0	0	1	0	0
697:	0	0	0	1	1	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	1	0	0	0	0	0
721:	0	1	0	0	0	1	0	1
729:	0	0	0	0	0	1	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	1	0
761:	0	0	0	0	0	0	0	0
769:	1	0	1	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	1	0	0	0	0	0	1
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 01

Channel								
809:	0	0	0	0	0	1	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	1	0	0	0
833:	0	0	0	1	0	1	1	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	1	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	1	0	0	0	0	0	0	0
873:	0	0	0	0	0	1	0	0
881:	0	0	0	0	0	0	0	0
889:	1	0	0	0	0	0	1	0
897:	0	1	0	0	1	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	1	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

KB 3/2/21

Apex-Alpha™

Sample Description: BLANK
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00002878
Batch Identification: 2102080A-RA
Sample Identification: 02
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_012
Chamber Serial Number:
Detector Serial Number: 12
Env. Background: System Bkgd 293434
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
Generic Mult. Factor: 2.820E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 3/2/2021 8:48:20 AM
Acquisition Date/Time: 3/2/2021 11:03:33 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.1871 +/- 0.0032 on 2/28/2020 2:49:50 PM
Effective Efficiency: 0.1871 +/- 0.0032

Peak Match Tolerance: 0.350 MeV

PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.381	-1.55	151.40	2.55	0.00E+000	3.0
RA-226	4.651	-0.72	427.17	2.72	0.00E+000	3.0

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.886	5685.50*	-6.51E-002 +/- 9.86E-002	3.52E-001 +/- 1.18E-002
RA-226	0.977	4785.00*	-2.88E-002 +/- 1.23E-001	3.43E-001 +/- 1.15E-002

AG
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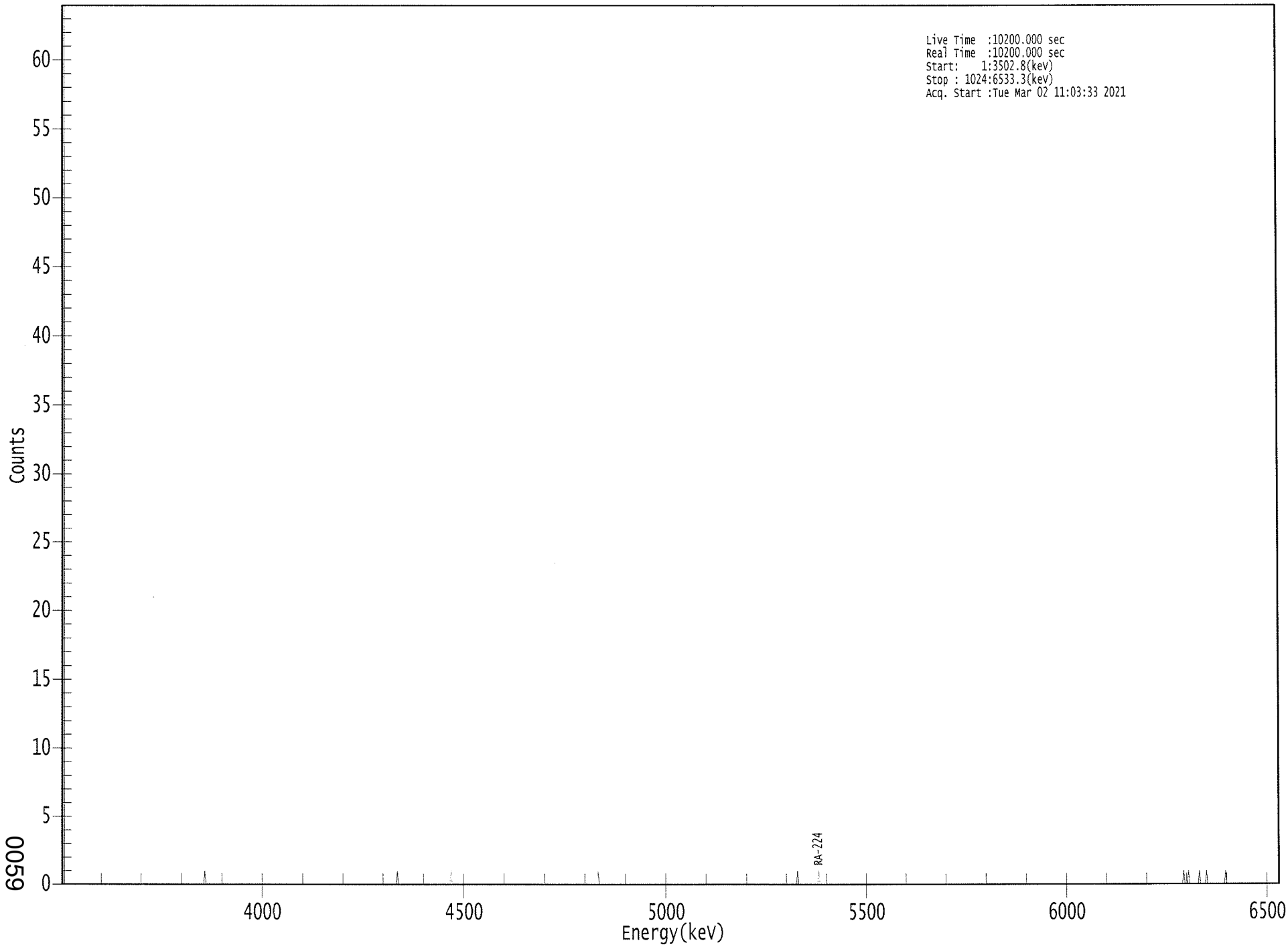
0000287890.CNF



0069

ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 02

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	10200	10200	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	1	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	0
209:	0	0	0	0	0	0	0	0
217:	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0	0
233:	0	0	0	0	0	0	0	0
241:	0	0	0	0	0	0	0	0
249:	0	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	1	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	1	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 02

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	0	0	0	0
401:	0	0	0	0	0	0	0	0
409:	0	0	0	0	0	0	0	0
417:	0	0	0	0	0	0	0	0
425:	0	0	0	0	0	0	0	0
433:	0	0	0	0	0	0	0	0
441:	0	0	0	0	0	0	0	0
449:	0	1	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	1	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	1	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 02

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	1	0
945:	0	0	1	0	0	0	0	0
953:	0	0	0	1	0	0	0	0
961:	0	1	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	1	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

VJB 3/2/21

Sample Description: MW-1 DUP
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00002878
Batch Identification: 2102080A-RA
Sample Identification: 03
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_033
Chamber Serial Number: 04026479A
Detector Serial Number: 91132
Env. Background: System Bkgd 293435
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
Generic Mult. Factor: 3.000E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 2/9/2021 8:48:20 AM
Acquisition Date/Time: 3/2/2021 11:03:34 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9854 +/- 0.0000
Counting Efficiency: 0.1411 +/- 0.0026 on 9/25/2020 1:35:53 PM
Effective Efficiency: 0.1390 +/- 0.0025

Peak Match Tolerance: 0.350 MeV

PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.529	8.15	72.72	0.85	0.00E+000	3.0
RA-226	4.605	17.64	48.73	1.36	0.00E+000	4.5

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.969	5685.50*	4.93E-001 +/- 3.59E-001	3.62E-001 +/- 1.30E-002
RA-226	0.958	4785.00*	1.01E+000 +/- 4.93E-001	3.92E-001 +/- 1.40E-002

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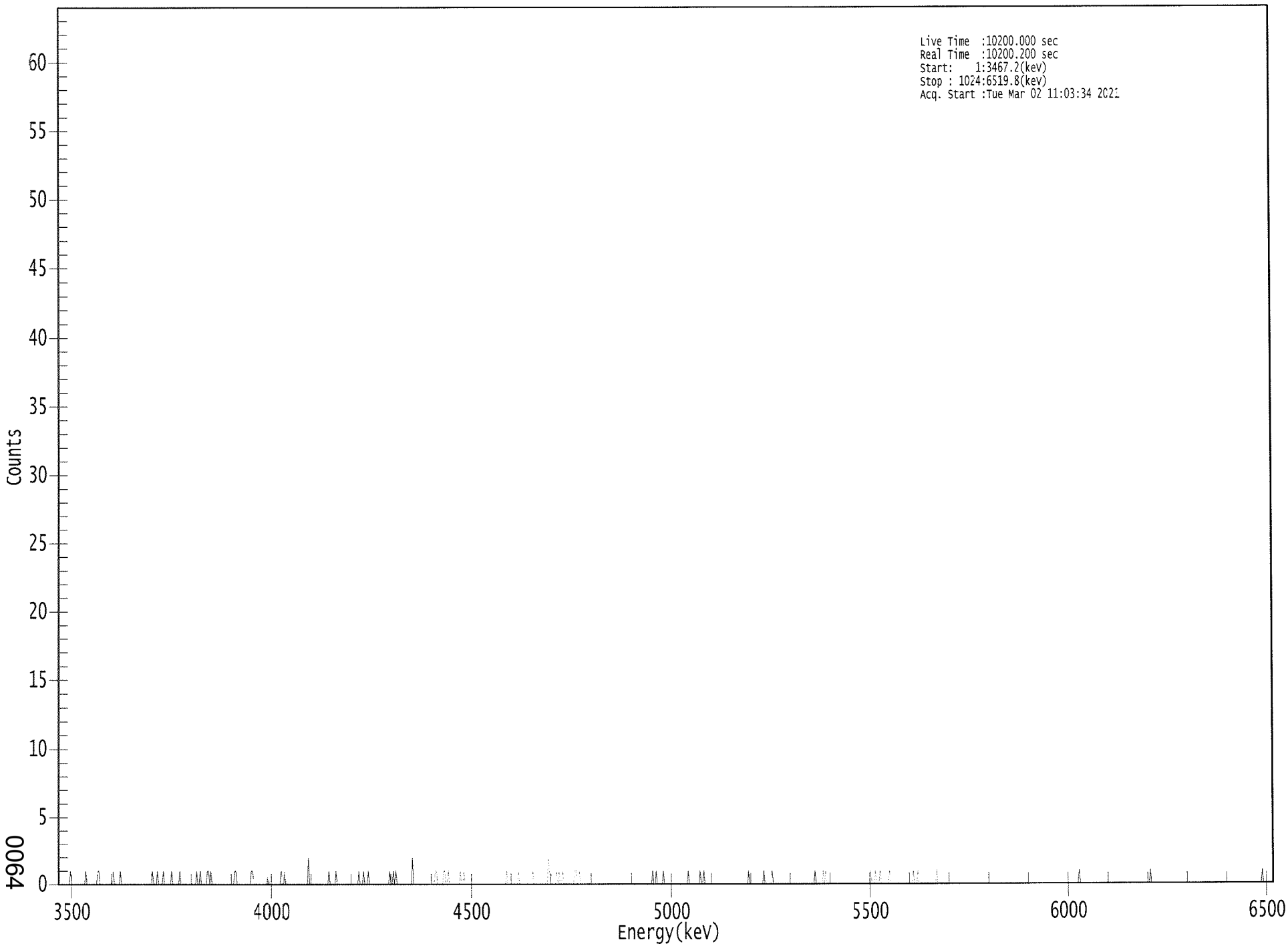
0000287893.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 03

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	1	0	0	0	0	0
17:	0	0	0	0	0	0	0	1
25:	0	0	0	0	0	0	0	0
33:	0	1	1	0	0	0	0	0
41:	0	0	0	0	0	0	1	0
49:	0	0	0	0	1	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	1
81:	0	0	0	1	0	0	0	0
89:	1	0	0	0	0	0	0	1
97:	0	0	0	0	0	0	1	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	1	0	0	1
121:	0	0	0	0	0	1	1	0
129:	1	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	1	1	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	1	1	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	1	0	0	0	0	0	0	0
185:	0	0	0	1	0	0	1	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	0
209:	0	0	2	0	0	0	0	0
217:	0	0	0	0	0	0	0	0
225:	0	0	0	1	0	0	0	0
233:	0	1	0	0	0	0	0	0
241:	0	0	0	0	0	0	0	0
249:	0	0	0	0	1	0	0	0
257:	1	0	0	0	1	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	1	0
281:	0	1	0	1	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	2	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	1	1	0	0
321:	0	0	0	1	1	0	0	1
329:	0	0	0	0	0	0	0	0
337:	0	1	0	0	1	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 03

Channel								
377:	1	0	0	0	0	0	0	0
385:	0	0	1	0	0	0	0	0
393:	0	0	0	0	0	0	1	0
401:	0	0	0	0	0	0	0	0
409:	0	0	0	2	1	0	0	0
417:	0	0	1	0	1	0	0	1
425:	0	0	0	0	0	0	0	0
433:	0	1	1	0	0	1	0	0
441:	0	0	0	0	0	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	1	0	0	1	0	0
505:	0	0	0	1	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	1	0	0	0	0	0	0	0
537:	0	0	1	0	0	1	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	1	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	1	0	0	0	0	0	0	1
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	1	0	0	0	0
641:	0	0	1	0	1	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	1	0	0	0	1	0
689:	0	0	1	0	0	0	0	0
697:	0	0	1	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	1	0
721:	0	0	1	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	1	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 03

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	1	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	1	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	1	0	0
1017:	0	0	0	0	0	0	0	0

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Apex-Alpha™

Sample Description: MW-1
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00002878
Batch Identification: 2102080A-RA
Sample Identification: 04
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_034
Chamber Serial Number: 04026479B
Detector Serial Number: 91136
Env. Background: System Bkgd 293436
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
Generic Mult. Factor: 3.000E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 2/9/2021 8:48:20 AM
Acquisition Date/Time: 3/2/2021 11:03:35 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.1554 +/- 0.0028 on 9/25/2020 10:10:36 AM
Effective Efficiency: 0.1554 +/- 0.0028

Peak Match Tolerance: 0.350 MeV

PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.562	5.32	91.11	0.68	0.00E+000	3.0
RA-226	4.614	13.32	55.28	0.68	0.00E+000	3.0

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.980	5685.50*	2.88E-001 +/- 2.63E-001	3.06E-001 +/- 1.07E-002
RA-226	0.963	4785.00*	6.81E-001 +/- 3.77E-001	2.89E-001 +/- 1.01E-002

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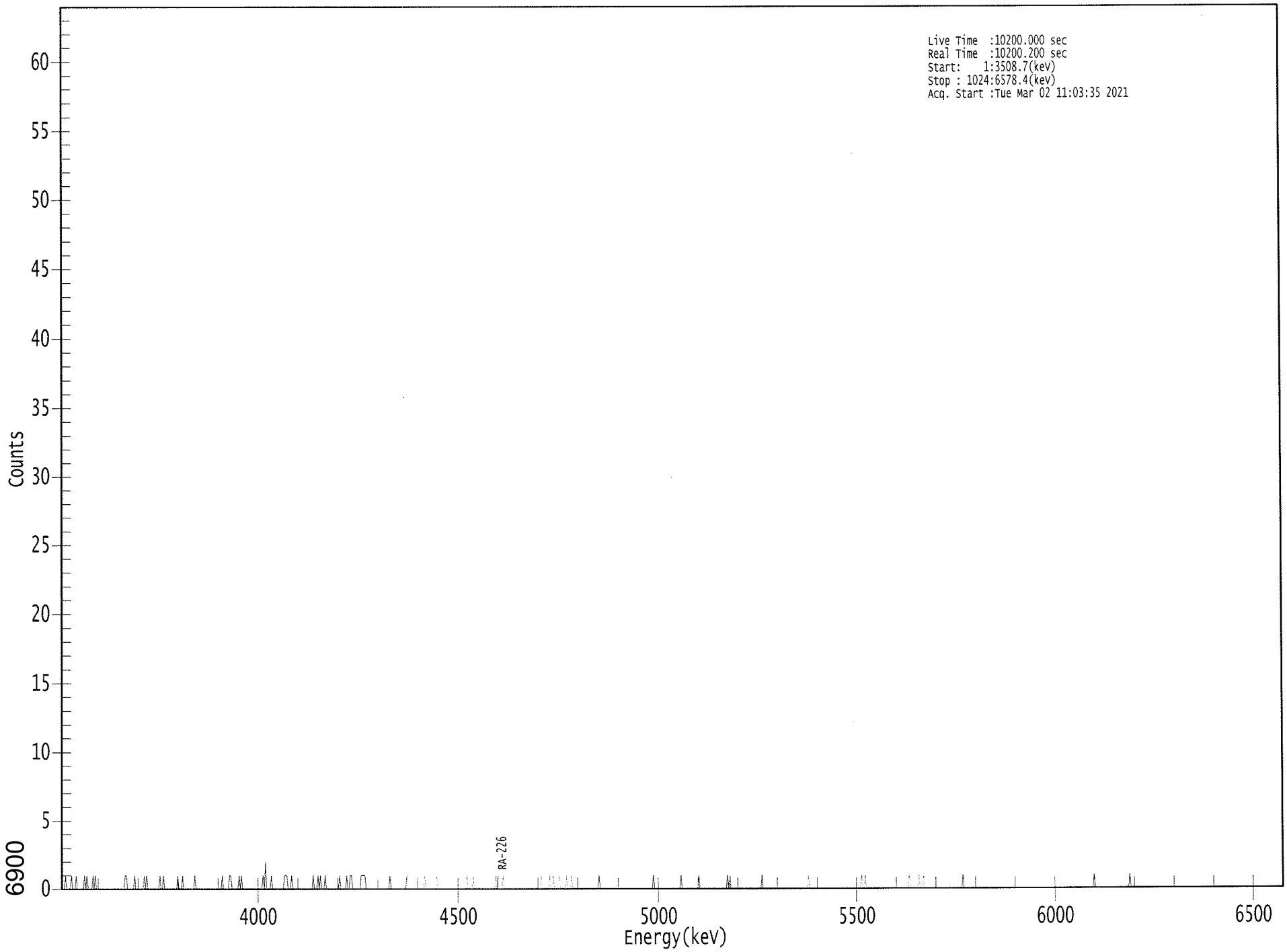
0000287894.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 04

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	1	0	0	0	0
9:	1	0	0	0	1	0	0	0
17:	0	0	0	1	0	1	0	0
25:	0	0	1	0	1	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	1	1	0
57:	0	0	0	0	0	1	0	0
65:	0	0	0	0	0	1	0	1
73:	0	0	0	0	0	0	0	0
81:	0	0	1	0	0	1	0	0
89:	0	0	0	0	0	0	0	0
97:	0	1	0	0	0	1	0	0
105:	0	0	0	0	0	0	0	1
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	1	0
137:	0	0	0	0	1	1	0	0
145:	0	0	0	0	1	0	1	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	1	0	2	0	0	0	0	1
177:	0	0	0	0	0	0	0	0
185:	0	0	1	1	1	0	0	0
193:	1	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	0
209:	0	0	1	0	0	0	1	0
217:	1	0	0	0	1	0	0	0
225:	0	0	0	0	0	0	0	0
233:	1	0	0	0	0	0	1	0
241:	0	1	1	0	0	0	0	0
249:	0	0	1	1	1	1	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	1	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	1	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	1
305:	0	0	0	0	0	0	0	0
313:	0	1	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	1	0	0	0	0	1
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	1	0	1	0	0	0

369:	1	0	0	0	0	0	0	0

Sample Title: 04

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	0	0	0	0
401:	1	0	0	0	0	0	0	1
409:	0	0	1	0	0	0	0	1
417:	0	0	0	0	0	1	0	0
425:	0	1	0	0	0	0	0	0
433:	0	0	0	0	0	0	0	0
441:	0	0	0	0	0	0	0	0
449:	1	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	1	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	1	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	1	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	1	0	1	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	1	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	1
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	1	0	0	1
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	1	0	0	0
713:	0	0	0	0	1	0	0	0
721:	1	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	1	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 04

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	1
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	1	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

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Sample Description: MW-3
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00002878
Batch Identification: 2102080A-RA
Sample Identification: 05
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_035
Chamber Serial Number: 04026477A
Detector Serial Number: 58771
Env. Background: System Bkgd 293437
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
Generic Mult. Factor: 3.000E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 2/9/2021 8:48:20 AM
Acquisition Date/Time: 3/2/2021 11:03:37 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9856 +/- 0.0000
Counting Efficiency: 0.1441 +/- 0.0026 on 2/28/2020 7:44:08 AM
Effective Efficiency: 0.1421 +/- 0.0025

Peak Match Tolerance: 0.350 MeV

PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.545	4.83	91.00	0.17	0.00E+000	3.0
RA-226	4.560	24.49	40.09	0.51	0.00E+000	6.0

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.975	5685.50*	2.86E-001 +/- 2.61E-001	2.47E-001 +/- 8.61E-003
RA-226	0.936	4785.00*	1.37E+000 +/- 5.51E-001	2.94E-001 +/- 1.02E-002

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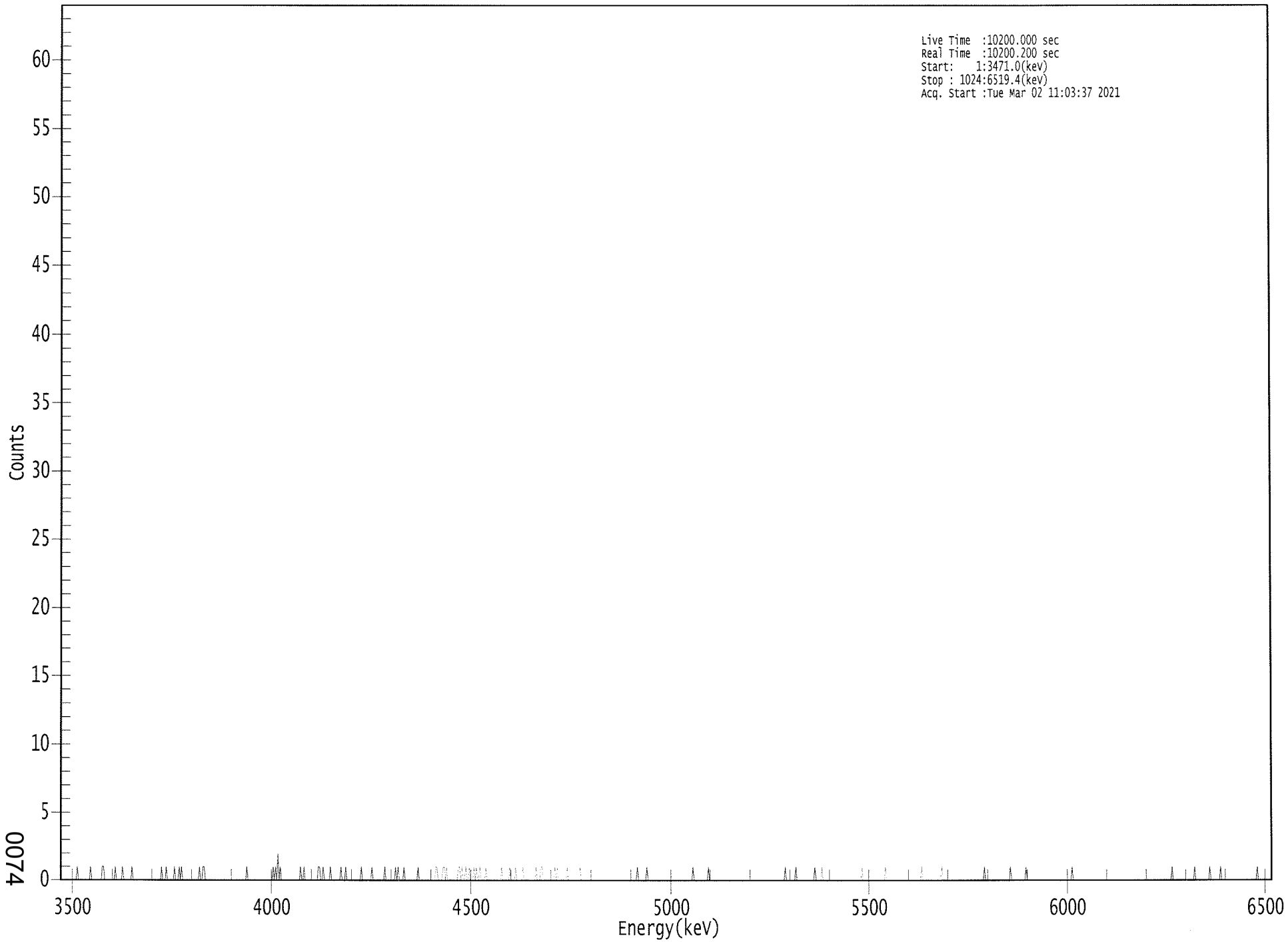
0000287892.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 05

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	1	0
17:	0	0	0	0	0	0	0	0
25:	0	1	0	0	0	0	0	0
33:	0	0	0	1	1	0	0	0
41:	0	0	0	0	0	0	1	0
49:	0	0	0	0	1	0	0	0
57:	0	0	0	0	1	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	1	0	0
89:	0	1	0	0	0	0	0	0
97:	1	0	0	0	1	0	1	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	1	0	0
121:	1	1	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	1	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	1	0	1	0	2
185:	0	1	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	1	0	0	1	0	0
209:	0	0	0	0	0	0	0	0
217:	0	1	1	0	0	1	0	0
225:	0	0	0	1	0	0	0	0
233:	0	0	0	0	1	0	0	0
241:	1	0	0	0	0	0	0	0
249:	0	0	0	0	0	1	0	0
257:	0	0	0	0	0	0	1	0
265:	0	0	0	0	0	0	0	0
273:	0	1	0	0	0	0	0	0
281:	0	0	1	0	1	0	0	0
289:	0	1	0	0	0	0	0	0
297:	0	0	0	0	0	1	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	1	1	0	0
321:	0	0	1	1	0	1	0	0
329:	0	0	0	0	0	0	0	1
337:	1	0	1	0	0	1	0	0
345:	1	0	0	0	1	0	1	0
353:	0	1	0	0	0	0	1	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	1	0	0	0	0

Sample Title: 05

Channel								
377:	0	0	1	0	0	0	0	1
385:	0	0	0	0	0	1	0	0
393:	0	0	0	0	0	0	0	0
401:	1	0	0	0	1	1	0	0
409:	0	0	0	0	0	0	0	0
417:	1	0	1	0	0	0	0	0
425:	0	0	1	0	0	0	0	0
433:	0	0	0	0	0	1	0	0
441:	0	0	0	0	0	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	1	0	0
489:	0	0	0	0	0	1	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	1	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	1	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	1	0	0	0	0	0
617:	0	0	0	1	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	1	0	0	0	0
641:	0	1	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	1	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	1
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	1	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	1
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	1	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	1	0	0	0	0	0	0

Sample Title: 05

Channel								
809:	0	0	0	0	0	0	1	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	1	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	1	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	1	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	1	0	0	0	0	0
977:	0	0	0	1	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	1	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

KB 3/2/21

Sample Description: MW-02
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00002878
Batch Identification: 2102080A-RA
Sample Identification: 06
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_037
Chamber Serial Number: 04026478A
Detector Serial Number: 91133
Env. Background: System Bkgd 293438
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
Generic Mult. Factor: 3.000E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 2/9/2021 8:48:20 AM
Acquisition Date/Time: 3/2/2021 11:03:39 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.8972 +/- 0.0000
Counting Efficiency: 0.1438 +/- 0.0025 on 2/28/2020 7:44:10 AM
Effective Efficiency: 0.1290 +/- 0.0023

Peak Match Tolerance: 0.350 MeV

PEAK AREA REPORT

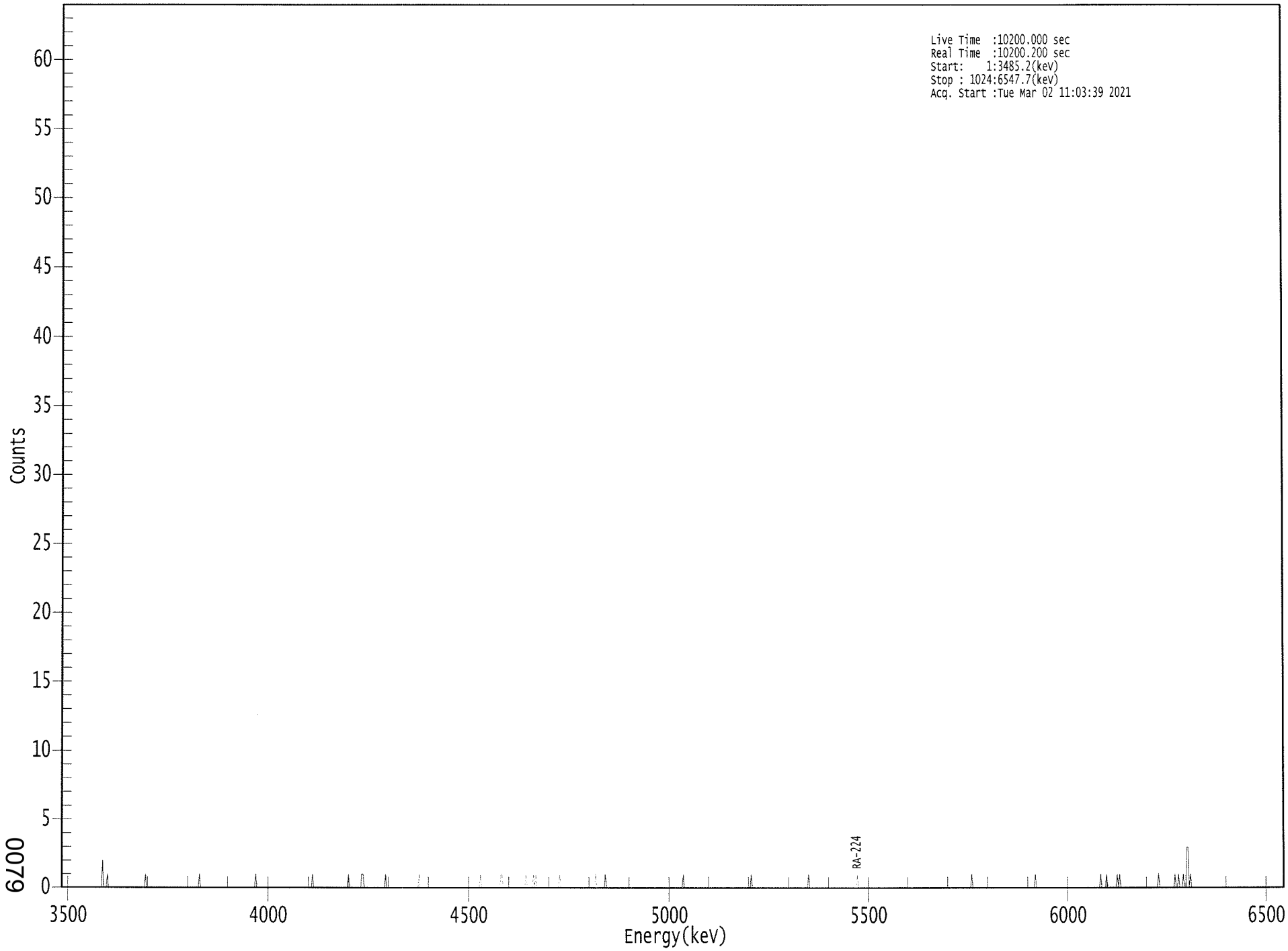
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.473	1.00	277.19	0.00	0.00E+000	3.0
RA-226	4.621	8.66	68.12	0.34	0.00E+000	3.0

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.943	5685.50*	6.52E-002 +/- 1.81E-001	3.91E-001 +/- 1.36E-002
RA-226	0.966	4785.00*	5.34E-001 +/- 3.64E-001	2.95E-001 +/- 1.02E-002

AG
3/2/21

0000287895.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 06

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	2	0	0	0	1	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	1	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	1	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	1	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	0
209:	0	1	0	0	0	0	0	0
217:	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0	0
233:	0	0	0	0	0	0	0	1
241:	0	0	0	0	0	0	0	0
249:	0	0	1	1	0	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	1	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	1	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	1	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	1	1

369:	0	0	0	0	0	0	0	0

Sample Title: 06

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	1	0	0	0	0
393:	0	1	0	1	0	0	0	0
401:	0	0	0	0	0	0	0	0
409:	0	0	0	0	0	0	0	1
417:	0	0	0	0	0	0	0	0
425:	0	0	0	0	0	0	0	0
433:	0	0	0	0	0	0	0	0
441:	0	0	0	0	0	1	0	0
449:	0	0	0	0	0	1	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	1	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	1
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	1
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	1	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	1	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 06

Channel								
809:	0	0	0	0	0	1	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	1	0	0	0
873:	0	1	0	0	0	0	0	0
881:	0	0	1	0	1	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	1	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	1	0	0	1	0
937:	0	0	1	0	0	3	3	0
945:	1	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

3/2/2021 4:34:33 AM

Apex-Alpha™

QA SUMMARY REPORT
Review Of QA Results - Pulser Check

Date : 3/2/2021
Time : 4:34:33 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha_001	21f	ALL	Not Done	
Alpha_002	21f	ALL	Not Done	
Alpha_003	21f	ALL	Not Done	
Alpha_004	21f	ALL	Not Done	
Alpha_005	21f	ALL	Not Done	
Alpha_006	21f	ALL	Not Done	
Alpha_007	21f	ALL	Not Done	
Alpha_008	21f	ALL	Not Done	
Alpha_009	21f	ALL	Not Done	
Alpha_010	21f	ALL	Passed	3/2/2021 4:14:14 AM
Alpha_011	21f	ALL	Passed	3/2/2021 4:14:15 AM
Alpha_012	21f	ALL	Passed	3/2/2021 4:14:16 AM
Alpha_013	21f	ALL	Not Done	
Alpha_014	21f	ALL	Not Done	
Alpha_015	21f	ALL	Not Done	
Alpha_016	21f	ALL	Not Done	
Alpha_033	Alpha Analyst100DC	ALL	Passed	3/2/2021 4:14:17 AM
Alpha_034	Alpha Analyst100DC	ALL	Passed	3/2/2021 4:14:18 AM
Alpha_035	Alpha Analyst100DC	ALL	Passed	3/2/2021 4:14:20 AM
Alpha_036	Alpha Analyst100DC	ALL	Not Done	
Alpha_037	Alpha Analyst100DC	ALL	Passed	3/2/2021 4:14:22 AM
Alpha_038	Alpha Analyst100DC	ALL	Passed	3/2/2021 4:14:24 AM
Alpha_039	Alpha Analyst100DC	ALL	Passed	3/2/2021 4:14:27 AM
Alpha_040	Alpha Analyst100DC	ALL	Passed	3/2/2021 4:14:29 AM
Alpha_041	Alpha Analyst100DC	ALL	Passed	3/2/2021 4:14:32 AM
Alpha_042	Alpha Analyst100DC	ALL	Passed	3/2/2021 4:14:35 AM
Alpha_043	Alpha Analyst100DC	ALL	Not Done	
Alpha_044	Alpha Analyst100DC	ALL	Not Done	
Alpha_045	Alpha Analyst100DC	ALL	Not Done	
Alpha_046	Alpha Analyst100DC	ALL	Not Done	
Alpha_047	Alpha Analyst100DC	ALL	Not Done	
Alpha_048	Alpha Analyst100DC	ALL	Not Done	
Alpha_049	Alpha Analyst100DC	ALL	Not Done	
Alpha_050	Alpha Analyst100DC	ALL	Not Done	
Alpha_051	Alpha Analyst100DC	ALL	Not Done	
Alpha_052	Alpha Analyst100DC	ALL	Not Done	
Alpha_053	Alpha Analyst100DC	ALL	Not Done	
Alpha_054	Alpha Analyst100DC	ALL	Not Done	
Alpha_055	Alpha Analyst100DC	ALL	Not Done	
Alpha_056	Alpha Analyst100DC	ALL	Not Done	
Alpha_057	Alpha Analyst100DC	ALL	Passed	3/2/2021 4:14:37 AM
Alpha_058	Alpha Analyst100DC	ALL	Passed	3/2/2021 4:14:41 AM

3/2/2021 4:34:33 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha_059	Alpha Analyst100DC	ALL	Passed	3/2/2021 4:14:44 AM
Alpha_060	Alpha Analyst100DC	ALL	Passed	3/2/2021 4:14:46 AM

APPROVED BY: KP

APPROVAL DATE: 3/2/21

****
***** L I B R A R Y L I S T I N G R E P O R T *****
****

Nuclide Library Title: Radium

Nuclide Library Description: Ra-226, Po-218, Rn-222

Nuclide Name	Half-Life (Seconds)	Energy (keV)	Energy Uncert. (keV)	Yield (%)	Yield Uncert.(Abs.+-)
PO-218	5.049E+010	6003.000*	0.000	99.9800	0.0000
RN-222	5.049E+010	5490.000*	0.000	99.9200	0.0000
RA-226	5.049E+010	4785.000*	0.000	100.0000	0.0000

* = key line

TOTALS: 3 Nuclides 3 Energy Lines

SECTION IX

ANALYTICAL DATA (RADIUM-228)

21-02080
Ra228
Run 1

Work Order	21-02080
Analysis Code	Ra228
Run	1
Date Received	2/23/2021
Lab Deadline	3/9/2021
Client	Pace Gulf Coast
Project	221021109
Report Level	4
Activity Units	pCi
Aliquot Units	l
Matrix	WA
Method	EPA 904.0
Instrument Type	Alpha/Beta GPC
Radiometric Tracer	Ba-133
Radiometric Sol#	Ba-6a
Tracer Act (dpm/g)	403.17
Carrier	Yttrium
Carrier Conc (mg/ml)	34.65

Internal Fraction	Sample Desc	Client ID	Login CPM	Sample Date	Sample Aliquot
01	LCS	LCS		02/23/21 00:00	1.0000E+00
02	MBL	BLANK		02/23/21 00:00	1.0000E+00
03	DUP	MW-1	60	02/09/21 10:15	1.0000E+00
04	DO	MW-1	60	02/09/21 10:15	1.0000E+00
05	TRG	MW-3	40	02/09/21 12:15	1.0000E+00
06	TRG	MW-02	50	02/09/21 14:15	1.0000E+00

0087

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ^ Indicates estimated SAF value.
** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

21-02080
Ra228
Run 1

Internal Fraction	Sample Desc	Tracer Aliquot (g)	Tracer Total ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	Grav Carrier Added (ml)	Grav Filter Tare (g)	Grav Filter Final (g)	Grav Filter Net (g)	Grav % Rec	Mean % Rec	SAF 1*	SAF 2*
01	LCS	2.2079	890.2	356.0	88.78	2.000	0.0877	0.1533	0.0656	94.66	84.04	1.00	1.00
02	MBL	2.2054	889.2	407.0	101.62	2.000	0.0878	0.1555	0.0677	97.69	99.27	1.00	1.00
03	DUP	2.2104	891.2	396.0	98.65	2.000	0.0858	0.1512	0.0654	94.39	93.11	1.00	1.00
04	DO	2.2012	887.5	419.0	104.81	2.000	0.0869	0.1531	0.0662	95.53	100.13	1.00	1.00
05	TRG	2.1989	886.5	394.0	98.66	2.000	0.0875	0.1557	0.0682	98.41	97.10	1.00	1.00
06	TRG	2.2009	887.3	359.0	89.82	2.000	0.0881	0.1552	0.0671	96.83	86.97	1.00	1.00

8800

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ^ Indicates estimated SAF value.
** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

21-02080
Ra228
Run 1

Internal Fraction	Sample Desc	Rough Prep Date	Rough Prep By	Prep Date	Prep By	Sep t0 Date/Time	Sep t0 By	Sep t1 Date/Time	Sep t1 By
01	LCS			03/03/21 13:14	AYARBER	03/02/21 07:30	AYARBER	03/03/21 13:19	AYARBER
02	MBL			03/03/21 13:14	AYARBER	03/02/21 07:30	AYARBER	03/03/21 13:19	AYARBER
03	DUP			03/03/21 13:14	AYARBER	03/02/21 07:30	AYARBER	03/03/21 13:19	AYARBER
04	DO			03/03/21 13:14	AYARBER	03/02/21 07:30	AYARBER	03/03/21 13:19	AYARBER
05	TRG			03/03/21 13:14	AYARBER	03/02/21 07:30	AYARBER	03/03/21 13:19	AYARBER
06	TRG			03/03/21 13:14	AYARBER	03/02/21 07:30	AYARBER	03/03/21 13:19	AYARBER

6800

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ^ Indicates estimated SAF value.
** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Preliminary Data Report & Analytical Calculations

Work Order: 21-02080-Ra228-1

Client: Pace Gulf Coast
Eberline Services Work Order: 21-02080
Analysis Code: Ra228
Run: 1
0600

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	RA-228	LCS	LCS	pCi/l	9.69E+00	8.44E-01	9.99E-01	8.94E+00	108.35	OK		OK	
02	RA-228	MBL	BLANK	pCi/l	2.76E-01	4.08E-01	8.42E-01					OK	OK
03	RA-228	DUP	MW-1	pCi/l	9.81E-01	5.03E-01	9.73E-01				NA	OK	
04	RA-228	DO	MW-1	pCi/l	1.09E+00	4.61E-01	8.70E-01					OK	
05	RA-228	TRG	MW-3	pCi/l	1.72E+00	4.38E-01	7.31E-01					OK	
06	RA-228	TRG	MW-02	pCi/l	9.41E-01	5.13E-01	9.93E-01					OK	

Client: Pace Gulf Coast
Eberline Services Work Order: 21-02080
Analysis Code: Ra228
Run: 1

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	RA-228	LCS	02/23/21 00:00	1.00E+00	88.78	94.66	84.04	1.00	3/2/2021 7:30	3/3/2021 13:19
02	RA-228	MBL	02/23/21 00:00	1.00E+00	101.62	97.69	99.27	1.00	3/2/2021 7:30	3/3/2021 13:19
03	RA-228	DUP	02/09/21 10:15	1.00E+00	98.65	94.39	93.11	1.00	3/2/2021 7:30	3/3/2021 13:19
04	RA-228	DO	02/09/21 10:15	1.00E+00	104.81	95.53	100.13	1.00	3/2/2021 7:30	3/3/2021 13:19
05	RA-228	TRG	02/09/21 12:15	1.00E+00	98.66	98.41	97.10	1.00	3/2/2021 7:30	3/3/2021 13:19
06	RA-228	TRG	02/09/21 14:15	1.00E+00	89.82	96.83	86.97	1.00	3/2/2021 7:30	3/3/2021 13:19

Client: Pace Gulf Coast
Eberline Services Work Order: 21-02080
Analysis Code: Ra228
Run: 1

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	RA-228	LCS	03/03/21 15:05		LB4110A	F1	120	888	1.333333333	0.4754
02	RA-228	MBL	03/03/21 15:05		LB4110A	F2	120	176	1.266666667	0.4658
03	RA-228	DUP	03/03/21 15:05		LB4110A	F3	120	265	1.533333333	0.4713
04	RA-228	DO	03/03/21 15:05		LB4110A	F4	120	272	1.45	0.4773
05	RA-228	TRG	03/03/21 15:05		LB4110A	G1	120	258	0.916666667	0.4705
06	RA-228	TRG	03/03/21 15:05		LB4110A	G2	120	236	1.366666667	0.4676

Count Room Report
Client: Pace Gulf Coast

21-02080-Ra228-1 (pCi/l) in WA
Tracer ID: Ba-6a

Internal Fraction	Sample Desc	Client ID	Sample Date	Sample Aliquot	Tracer Aliquot (g)	Tracer ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	SAF 1*	SAF 2*
01	LCS	LCS	02/23/21 00:00	1.0000	2.2079	890.1590	356.0000	88.78	1.00	1.00
02	MBL	BLANK	02/23/21 00:00	1.0000	2.2054	889.1511	407.0000	101.62	1.00	1.00
03	DUP	MW-1	02/09/21 10:15	1.0000	2.2104	891.1670	396.0000	98.65	1.00	1.00
04	DO	MW-1	02/09/21 10:15	1.0000	2.2012	887.4578	419.0000	104.81	1.00	1.00
05	TRG	MW-3	02/09/21 12:15	1.0000	2.1989	886.5305	394.0000	98.66	1.00	1.00
06	TRG	MW-02	02/09/21 14:15	1.0000	2.2009	887.3369	359.0000	89.82	1.00	1.00

Spike and Tracer Worksheet

Internal Work Order	Run	Analysis Code	Date	Technician	Technician Initials	Witness Initials
21-02080	1	Ra228	3/3/2021 13:14	AYARBER	AY	

LCS & Matrix Spikes					LCS	MS	LCSD	MSD	LCS		MS		LCSD		MSD	
Isotope	Sol #	Activity dpm/g	Solution Date	Approx Addition	Volume Used (g)	Volume Used (g)	Volume Used (g)	Volume Used (g)	Known pCi	Error Estimate	Added pCi	Error Estimate	Known pCi	Error Estimate	Added pCi	Error Estimate
Ra-228	Ra-12	39.640	3/3/2021	0.500	0.5008				8.94	0.456	0.00	0.000	0.00	0.000	0.00	0.000

Tracers

fraction	Isotope	Sol #	Activity dpm/g	Solution Date	Volume Used (g)	Approx Addition
01	Ba-133	Ba-6a	403.170	3/3/2021	2.2079	2.5100
02	Ba-133	Ba-6a	403.170	3/3/2021	2.2054	2.5100
03	Ba-133	Ba-6a	403.170	3/3/2021	2.2104	2.5100
04	Ba-133	Ba-6a	403.170	3/3/2021	2.2012	2.5100
05	Ba-133	Ba-6a	403.170	3/3/2021	2.1989	2.5100
06	Ba-133	Ba-6a	403.170	3/3/2021	2.2009	2.5100

Balance Printer Tapes

Tracer	LCS

Matrix Spike

0094

Eberline Analytical
Oak Ridge Laboratory

Aliquot Worksheet

Printed: 2/25/2021 11:27

Work Order	Run	Analysis Code	Rpt Units	Lab Deadline	Technician
21-02080	1	Ra228	liters	3/9/2021	JHARVEY

Lab Fraction	Pace Gulf Coast Client ID	Sample Type	Muffle Data Ratio Post/Pre	Dilution Data No of Dils	Dil Factor	Ratio	Aliquot Data Aliquot	Net Equiv	MS Aliquot Data Aliquot	Net Equiv	H-3 Solids Only Water Added (ml)	H3 Dist Aliq
01	LCS	LCS					1.0000E+00	1.0000E+00				
02	BLANK	MBL					1.0000E+00	1.0000E+00				
03	MW-1	DUP					1.0000E+00	1.0000E+00				
04	MW-1	DO					1.0000E+00	1.0000E+00				
05	MW-3	TRG					1.0000E+00	1.0000E+00				
06	MW-02	TRG					1.0000E+00	1.0000E+00				

Comments	

0096

Technician: _____ Date: 2/25/21

Eberline Services - Oak Ridge
Version 1.0 9/1999

Gravimetric Worksheet

Printed: 3/3/2021 3:01 PM

Work Order	Run	Analysis Code	Gravimetric Carrier	Carrier Conc (mg/ml)	Technician
21-02080	1	Ra228	Yttrium	34.6500	AYARBER

TRetec Fraction	Pace Gulf Coast Client ID	Sample Type	Carrier Data Carrier Added (ml)	Filter Data Filter Tare (g)	Filter Final (g)	Filter Net (g)	Gravimetric % Recovery
01	LCS	LCS	2.0000	0.0877	0.1533	**0.0656**	**94.66**
02	BLANK	MBL	2.0000	0.0878	0.1555	**0.0677**	**97.69**
03	DUP	DUP	2.0000	0.0858	0.1512	**0.0654**	**94.39**
04	MW-1	DO	2.0000	0.0869	0.1531	**0.0662**	**95.53**
05	MW-3	TRG	2.0000	0.0875	0.1557	**0.0682**	**98.41**
06	MW-02	TRG	2.0000	0.0881	0.1552	**0.0671**	**96.83**

9600

Technician: _____ Date: 3/3/21

KB 3/3/2021

Detector ID	Sample ID	Alpha	Beta	Count Time	Voltage	TOD
F1	2102080-01	24	888	120	1410	3/3/2021 3:05:50 PM
F2	2102080-02	19	176	120	1410	3/3/2021 3:05:50 PM
F3	2102080-03	17	265	120	1410	3/3/2021 3:05:50 PM
F4	2102080-04	12	272	120	1410	3/3/2021 3:05:50 PM
G1	2102080-05	10	258	120	1410	3/3/2021 3:05:51 PM
G2	2102080-06	15	236	120	1410	3/3/2021 3:05:51 PM

GPC Detector Report
(ALL Backgrounds)

LP
3/3/21

Detector	Alpha/Beta	Calibration Date	Count Date	Bkg CPM	PFW	LCL	Mean	UCL
LB4110A - A1	Alpha	11/2/2019	3/3/2021	1.50E-01	P	1.19E-04	1.48E-01	2.95E-01
LB4110A - A2	Alpha	11/2/2019	3/3/2021	1.83E-01	P	1.07E-02	1.37E-01	2.64E-01
LB4110A - A3	Alpha	11/2/2019	3/3/2021	1.17E-01	P	6.63E-03	1.48E-01	2.88E-01
LB4110A - A4	Alpha	11/2/2019	3/3/2021	3.33E-02	P	7.40E-03	1.48E-01	2.89E-01
LB4110A - B1	Alpha	11/2/2019	3/3/2021	2.00E-01	P	-1.79E-02	1.30E-01	2.78E-01
LB4110A - B2	Alpha	11/2/2019	3/3/2021	1.33E-01	P	4.61E-02	2.01E-01	3.55E-01
LB4110A - B3	Alpha	11/2/2019	3/3/2021	1.33E-01	P	1.32E-02	1.58E-01	3.03E-01
LB4110A - B4	Alpha	11/2/2019	3/3/2021	1.00E-01	P	-1.49E-02	1.09E-01	2.33E-01
LB4110A - C1	Alpha	11/2/2019	3/3/2021	6.67E-02	P	-2.39E-02	9.94E-02	2.23E-01
LB4110A - C2	Alpha	11/2/2019	3/3/2021	8.33E-02	P	-2.41E-02	1.02E-01	2.29E-01
LB4110A - C3	Alpha	11/2/2019	3/3/2021	1.00E-01	P	-2.62E-02	8.28E-02	1.92E-01
LB4110A - C4	Alpha	11/2/2019	3/3/2021	2.83E-01	P	3.27E-02	2.02E-01	3.71E-01
LB4110A - D1	Alpha	11/2/2019	3/3/2021	8.33E-02	P	-2.45E-02	7.50E-02	1.74E-01
LB4110A - D2	Alpha	11/2/2019	3/3/2021	1.17E-01	P	-9.36E-03	1.01E-01	2.11E-01
LB4110A - D3	Alpha	11/2/2019	3/3/2021	1.17E-01	P	-8.48E-03	1.20E-01	2.48E-01
LB4110A - D4	Alpha	11/2/2019	3/3/2021	3.33E-02	P	2.33E-02	1.70E-01	3.17E-01
LB4110A - E1	Alpha	11/2/2017	5/19/2020	1.00E+05	F	-2.35E+04	8.93E+02	2.53E+04
LB4110A - E2	Alpha	11/2/2017	5/19/2020	1.00E+05	F	-2.35E+04	8.93E+02	2.53E+04
LB4110A - E3	Alpha	11/2/2017	5/19/2020	1.00E+05	F	-2.35E+04	8.93E+02	2.53E+04
LB4110A - E4	Alpha	11/2/2017	5/19/2020	1.00E+05	F	-2.35E+04	8.93E+02	2.53E+04
LB4110A - F1	Alpha	11/2/2019	3/3/2021	1.00E-01	P	-2.39E-02	1.14E-01	2.51E-01
LB4110A - F2	Alpha	11/2/2019	3/3/2021	1.33E-01	P	-3.34E-02	9.70E-02	2.27E-01
LB4110A - F3	Alpha	11/2/2019	3/3/2021	8.33E-02	P	-1.89E-02	1.00E-01	2.20E-01
LB4110A - F4	Alpha	11/2/2019	3/3/2021	8.33E-02	P	-3.98E-02	6.63E-02	1.72E-01
LB4110A - G1	Alpha	11/2/2019	3/3/2021	8.33E-02	P	-2.34E-02	8.61E-02	1.96E-01
LB4110A - G2	Alpha	11/2/2019	3/3/2021	1.83E-01	P	-2.09E-02	8.53E-02	1.92E-01
LB4110A - G3	Alpha	11/2/2019	3/3/2021	6.67E-02	P	-1.30E-02	1.23E-01	2.60E-01
LB4110A - G4	Alpha	11/2/2019	3/3/2021	1.50E-01	P	-3.10E-02	9.72E-02	2.25E-01

GPC Detector Report
(ALL Backgrounds)

KP
3/3/21

Detector	Alpha/Beta	Calibration Date	Count Date	Bkg CPM	PFW	LCL	Mean	UCL
LB4110A - A1	Beta	11/2/2019	3/3/2021	1.25E+00	P	-2.25E+00	1.42E+00	5.09E+00
LB4110A - A2	Beta	11/2/2019	3/3/2021	1.25E+00	P	-2.10E+00	1.70E+00	5.50E+00
LB4110A - A3	Beta	11/2/2019	3/3/2021	1.15E+00	P	-2.03E+00	1.50E+00	5.03E+00
LB4110A - A4	Beta	11/2/2019	3/3/2021	1.47E+00	P	-2.17E+00	1.55E+00	5.27E+00
LB4110A - B1	Beta	11/2/2019	3/3/2021	1.67E+00	P	1.04E+00	1.41E+00	1.78E+00
LB4110A - B2	Beta	11/2/2019	3/3/2021	1.25E+00	P	8.16E-01	1.42E+00	2.03E+00
LB4110A - B3	Beta	11/2/2019	3/3/2021	1.12E+00	P	9.25E-01	1.32E+00	1.72E+00
LB4110A - B4	Beta	11/2/2019	3/3/2021	1.42E+00	P	6.37E-01	1.52E+00	2.41E+00
LB4110A - C1	Beta	11/2/2019	3/3/2021	1.10E+00	P	7.95E-01	1.17E+00	1.55E+00
LB4110A - C2	Beta	11/2/2019	3/3/2021	8.83E-01	P	6.58E-01	1.02E+00	1.38E+00
LB4110A - C3	Beta	11/2/2019	3/3/2021	1.28E+00	P	7.81E-01	1.38E+00	1.97E+00
LB4110A - C4	Beta	11/2/2019	3/3/2021	1.42E+00	P	8.65E-01	1.30E+00	1.74E+00
LB4110A - D1	Beta	11/2/2019	3/3/2021	1.42E+00	P	6.75E-01	1.09E+00	1.51E+00
LB4110A - D2	Beta	11/2/2019	3/3/2021	3.00E+00	F	-1.45E+00	2.59E+00	6.63E+00
LB4110A - D3	Beta	11/2/2019	3/3/2021	9.83E-01	P	7.33E-01	1.13E+00	1.53E+00
LB4110A - D4	Beta	11/2/2019	3/3/2021	1.32E+00	P	1.04E+00	1.48E+00	1.91E+00
LB4110A - E1	Beta	11/2/2017	5/19/2020	1.00E+05	F	-2.35E+04	8.94E+02	2.53E+04
LB4110A - E2	Beta	11/2/2017	5/19/2020	1.00E+05	F	-2.35E+04	8.94E+02	2.53E+04
LB4110A - E3	Beta	11/2/2017	5/19/2020	1.00E+05	F	-2.35E+04	8.94E+02	2.53E+04
LB4110A - E4	Beta	11/2/2017	5/19/2020	1.00E+05	F	-2.35E+04	8.94E+02	2.53E+04
LB4110A - F1	Beta	11/2/2019	3/3/2021	1.33E+00	P	4.81E-01	1.27E+00	2.07E+00
LB4110A - F2	Beta	11/2/2019	3/3/2021	1.27E+00	P	-3.12E-01	1.14E+00	2.60E+00
LB4110A - F3	Beta	11/2/2019	3/3/2021	1.53E+00	P	6.41E-02	1.18E+00	2.30E+00
LB4110A - F4	Beta	11/2/2019	3/3/2021	1.45E+00	P	-1.25E+00	1.61E+00	4.46E+00
LB4110A - G1	Beta	11/2/2019	3/3/2021	9.17E-01	P	7.37E-01	1.17E+00	1.60E+00
LB4110A - G2	Beta	11/2/2019	3/3/2021	1.37E+00	P	1.13E+00	1.60E+00	2.06E+00
LB4110A - G3	Beta	11/2/2019	3/3/2021	1.33E+00	P	7.42E-01	1.18E+00	1.61E+00
LB4110A - G4	Beta	11/2/2019	3/3/2021	1.08E+00	P	6.87E-01	1.26E+00	1.83E+00

6600

Eberline Analytical
Oak Ridge Laboratory

GPC Detector Report
(ALL Efficiencies)

Printed: 3/3/2021 7:18 AM

KP 3/3/21

Detector	Alpha/Beta	Calibration Date	Count Date	Eff	PFW	LCL	Mean	UCL
LB4110A - A1	Alpha	11/2/2019	3/3/2021	0.2365	P	0.2253	0.2334	0.2415
LB4110A - A2	Alpha	11/2/2019	3/3/2021	0.2034	P	0.1933	0.2023	0.2114
LB4110A - A3	Alpha	11/2/2019	3/3/2021	0.1998	P	0.1872	0.1970	0.2067
LB4110A - A4	Alpha	11/2/2019	3/3/2021	0.2296	P	0.2150	0.2265	0.2379
LB4110A - B1	Alpha	11/2/2019	3/3/2021	0.2158	P	0.1951	0.2100	0.2248
LB4110A - B2	Alpha	11/2/2019	3/3/2021	0.1964	P	0.1848	0.1982	0.2116
LB4110A - B3	Alpha	11/2/2019	3/3/2021	0.2388	P	0.2188	0.2343	0.2499
LB4110A - B4	Alpha	11/2/2019	3/3/2021	0.2311	P	0.2093	0.2268	0.2444
LB4110A - C1	Alpha	11/2/2019	3/3/2021	0.2005	P	0.1897	0.2001	0.2105
LB4110A - C2	Alpha	11/2/2019	3/3/2021	0.2081	P	0.1910	0.2023	0.2136
LB4110A - C3	Alpha	11/2/2019	3/3/2021	0.2346	P	0.2104	0.2278	0.2452
LB4110A - C4	Alpha	11/2/2019	3/3/2021	0.2181	P	0.1936	0.2127	0.2318
LB4110A - D1	Alpha	11/2/2019	3/3/2021	0.1972	P	0.1869	0.1986	0.2103
LB4110A - D2	Alpha	11/2/2019	3/3/2021	0.2367	P	0.2243	0.2364	0.2484
LB4110A - D3	Alpha	11/2/2019	3/3/2021	0.2417	P	0.2321	0.2428	0.2535
LB4110A - D4	Alpha	11/2/2019	3/3/2021	0.1827	P	0.1759	0.1860	0.1962
LB4110A - E1	Alpha	11/2/2017	5/19/2020	0.2075	P	0.1686	0.2257	0.2828
LB4110A - E2	Alpha	11/2/2017	5/19/2020	0.1778	P	0.1514	0.2049	0.2583
LB4110A - E3	Alpha	11/2/2017	5/19/2020	0.2234	P	0.1549	0.2076	0.2604
LB4110A - E4	Alpha	11/2/2017	5/19/2020	0.2155	P	0.1746	0.2353	0.2961
LB4110A - F1	Alpha	11/2/2019	3/3/2021	0.2164	P	0.2030	0.2131	0.2233
LB4110A - F2	Alpha	11/2/2019	3/3/2021	0.1742	P	0.1698	0.1786	0.1873
LB4110A - F3	Alpha	11/2/2019	3/3/2021	0.2259	P	0.2080	0.2217	0.2354
LB4110A - F4	Alpha	11/2/2019	3/3/2021	0.2221	P	0.2052	0.2158	0.2264
LB4110A - G1	Alpha	11/2/2019	3/3/2021	0.1881	P	0.1741	0.1868	0.1994
LB4110A - G2	Alpha	11/2/2019	3/3/2021	0.1821	P	0.1701	0.1833	0.1964
LB4110A - G3	Alpha	11/2/2019	3/3/2021	0.2160	P	0.2011	0.2151	0.2291
LB4110A - G4	Alpha	11/2/2019	3/3/2021	0.1860	P	0.1586	0.1829	0.2073

KP 3/3/21
out of service

0100

Eberline Analytical
Oak Ridge Laboratory

GPC Detector Report
(ALL Efficiencies)

Printed: 3/3/2021 7:18 AM

KP 3/3/21

Detector	Alpha/Beta	Calibration Date	Count Date	Eff	PFW	LCL	Mean	UCL
LB4110A - A1	Beta	11/2/2019	3/3/2021	0.5700	P	0.5440	0.5646	0.5852
LB4110A - A2	Beta	11/2/2019	3/3/2021	0.4482	P	0.4219	0.4437	0.4654
LB4110A - A3	Beta	11/2/2019	3/3/2021	0.4838	P	0.4554	0.4789	0.5024
LB4110A - A4	Beta	11/2/2019	3/3/2021	0.5574	P	0.5299	0.5530	0.5762
LB4110A - B1	Beta	11/2/2019	3/3/2021	0.5062	P	0.4556	0.4925	0.5293
LB4110A - B2	Beta	11/2/2019	3/3/2021	0.4897	P	0.4591	0.4943	0.5294
LB4110A - B3	Beta	11/2/2019	3/3/2021	0.6081	P	0.5479	0.5858	0.6236
LB4110A - B4	Beta	11/2/2019	3/3/2021	0.5795	P	0.5162	0.5606	0.6049
LB4110A - C1	Beta	11/2/2019	3/3/2021	0.4814	P	0.4578	0.4800	0.5021
LB4110A - C2	Beta	11/2/2019	3/3/2021	0.4904	P	0.4579	0.4833	0.5088
LB4110A - C3	Beta	11/2/2019	3/3/2021	0.6011	P	0.5265	0.5728	0.6190
LB4110A - C4	Beta	11/2/2019	3/3/2021	0.5211	P	0.4733	0.5177	0.5621
LB4110A - D1	Beta	11/2/2019	3/3/2021	0.5798	P	0.5500	0.5793	0.6087
LB4110A - D2	Beta	11/2/2019	3/3/2021	0.6054	P	0.5643	0.5944	0.6245
LB4110A - D3	Beta	11/2/2019	3/3/2021	0.6076	P	0.5780	0.6040	0.6300
LB4110A - D4	Beta	11/2/2019	3/3/2021	0.4862	P	0.4620	0.4845	0.5069
LB4110A - E1	Beta	11/2/2017	5/19/2020	0.5360	P	0.4167	0.5408	0.6649
LB4110A - E2	Beta	11/2/2017	5/19/2020	0.4520	P	0.3728	0.4910	0.6092
LB4110A - E3	Beta	11/2/2017	5/19/2020	0.5775	P	0.3848	0.5001	0.6154
LB4110A - E4	Beta	11/2/2017	5/19/2020	0.5466	P	0.4532	0.5887	0.7241
LB4110A - F1	Beta	11/2/2019	3/3/2021	0.5287	P	0.5158	0.5343	0.5528
LB4110A - F2	Beta	11/2/2019	3/3/2021	0.4370	P	0.4275	0.4477	0.4679
LB4110A - F3	Beta	11/2/2019	3/3/2021	0.5856	P	0.5448	0.5750	0.6052
LB4110A - F4	Beta	11/2/2019	3/3/2021	0.5616	P	0.5264	0.5520	0.5776
LB4110A - G1	Beta	11/2/2019	3/3/2021	0.4470	P	0.4153	0.4445	0.4738
LB4110A - G2	Beta	11/2/2019	3/3/2021	0.4181	P	0.4023	0.4348	0.4674
LB4110A - G3	Beta	11/2/2019	3/3/2021	0.5029	P	0.4870	0.5186	0.5501
LB4110A - G4	Beta	11/2/2019	3/3/2021	0.4342	P	0.3839	0.4396	0.4953

KP 3/3/21 out of service

1010

SECTION X

BARIUM-133 ANALYTICAL TRACER DATA

 UB 3/2/21

Apex-Gamma

Analysis Report for 2102080-01
SPIKE

GAMMA SPECTRUM ANALYSIS

Sample Identification	: 2102080-01
Sample Description	: SPIKE
Sample Type	: RA RECOVERY
Sample Size	: 1.000E+00 units
Facility	: Countroom
Sample Taken On	: 3/2/2021 8:26:03AM
Acquisition Started	: 3/2/2021 8:43:50AM
Procedure	: BAFIL
Operator	: Administrator
Detector Name	: GE1
Geometry	: BAFIL
Live Time	: 900.0 seconds
Real Time	: 900.2 seconds
Dead Time	: 0.02 %
Peak Locate Threshold	: 2.50
Peak Locate Range (in channels)	: 1 - 4096
Peak Area Range (in channels)	: 32 - 4096
Identification Energy Tolerance	: 2.500 keV
Energy Calibration Used Done On	: 10/12/2019
Efficiency Calibration Used Done On	: 10/12/2019
Efficiency Calibration Description	:
Sample Number	: 107970

PEAK ANALYSIS REPORT

Peak Analysis Performed on : 3/2/2021 8:58:53AM
Peak Analysis From Channel : 1
Peak Analysis To Channel : 4096

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)

Analysis Report for 2102080-01

SPIKE

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
M	1	61.17	49 -	69	61.63	1.87E+02	42.77	1.90E+02	2.22
	2	80.33	76 -	86	80.78	7.06E+02	70.73	2.88E+02	2.09
	3	112.83	108 -	121	113.25	2.25E+02	50.26	1.76E+02	3.10
	4	276.64	272 -	284	276.93	5.50E+01	32.98	9.59E+01	2.92
	5	302.42	297 -	308	302.69	1.11E+02	34.81	9.67E+01	1.92
M	6	333.49	330 -	344	333.73	4.70E+01	20.27	4.48E+01	2.96
	7	355.80	350 -	359	356.03	4.50E+02	47.98	7.52E+01	2.50
	8	366.67	362 -	373	366.90	2.46E+01	28.91	8.08E+01	3.51
M	9	383.68	381 -	402	383.89	9.32E+01	20.57	1.78E+01	2.31
m	10	387.04	381 -	402	387.24	1.29E+02	30.55	1.58E+01	2.19
m	11	390.32	381 -	402	390.53	3.59E+01	27.93	1.33E+01	2.73
	12	416.26	408 -	424	416.44	5.15E+01	19.61	1.70E+01	6.63
	13	436.67	431 -	442	436.84	5.79E+01	21.73	3.02E+01	2.00
	14	467.64	464 -	471	467.78	1.31E+01	15.49	2.99E+01	1.79
	15	478.50	476 -	480	478.63	5.67E+00	7.40	6.67E+00	1.00
M	16	511.12	507 -	523	511.23	3.20E+01	11.83	2.53E+00	2.55
m	17	513.97	507 -	523	514.08	1.10E+01	12.17	4.84E+00	2.55
m	18	516.89	507 -	523	517.00	6.21E+00	8.26	5.86E+00	2.32
	19	703.89	700 -	706	703.86	5.50E+00	7.78	7.00E+00	2.99

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet
Errors quoted at 2.000sigma

BACKGROUND SUBTRACT REPORT

Peak Analysis Performed on : 3/2/2021 8:58:53AM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000107928.CNF

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
M	1	61.17	1.87E+02	42.77	2.33E+01	2.34E+00	1.63E+02	4.28E+01
	2	80.33	7.06E+02	70.73			7.06E+02	7.07E+01
	3	112.83	2.25E+02	50.26			2.25E+02	5.03E+01
	4	276.64	5.50E+01	32.98			5.50E+01	3.30E+01
	5	302.42	1.11E+02	34.81			1.11E+02	3.48E+01
M	6	333.49	4.70E+01	20.27			4.70E+01	2.03E+01
	7	355.80	4.50E+02	47.98			4.50E+02	4.80E+01
	8	366.67	2.46E+01	28.91			2.46E+01	2.89E+01
M	9	383.68	9.32E+01	20.57			9.32E+01	2.06E+01
m	10	387.04	1.29E+02	30.55			1.29E+02	3.05E+01

Analysis Report for 2102080-01

SPIKE

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
m	11	390.32	3.59E+01	27.93			3.59E+01	2.79E+01
	12	416.26	5.15E+01	19.61			5.15E+01	1.96E+01
	13	436.67	5.79E+01	21.73			5.79E+01	2.17E+01
	14	467.64	1.31E+01	15.49			1.31E+01	1.55E+01
	15	478.50	5.67E+00	7.40			5.67E+00	7.40E+00
M	16	511.12	3.20E+01	11.83	1.73E+01	1.55E+00	1.47E+01	1.19E+01
m	17	513.97	1.10E+01	12.17			1.10E+01	1.22E+01
m	18	516.89	6.21E+00	8.26			6.21E+00	8.26E+00
	19	703.89	5.50E+00	7.78			5.50E+00	7.78E+00

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet
Errors quoted at 2.000sigma

NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)		Yield(%)	Activity (pCi/units)	Activity Uncertainty
SN-113	0.90	255.12		1.93		
		391.69	*	61.90	2.79E+01	2.19E+01
BA-133	0.99	81.00	*	34.06	3.58E+02	5.03E+01
		302.84	*	18.33	3.12E+02	1.32E+02
		356.01	*	62.05	3.62E+02	5.66E+01
TH-234	0.89	63.29	*	3.80	4.35E+02	1.17E+02
AM-241	0.93	59.54	*	35.90	4.61E+01	1.24E+01

* = Energy line found in the spectrum.
\- = Manually added nuclide.
? = Manually edited nuclide.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 2.500 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000sigma

Analysis Report for 2102080-01

SPIKE

INTERFERENCE CORRECTED REPORT

	Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/units)	Wt mean Activity Uncertainty	Comments
	SN-113	0.908	2.79E+01	2.19E+01	
	BA-133	0.995	3.56E+02	3.61E+01	
?	TH-234	0.892	4.35E+02	1.17E+02	
?	AM-241	0.934	4.61E+01	1.24E+01	

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000sigma

Analysis Report for 2102080-01
SPIKE

UNIDENTIFIED PEAKS

Peak Locate Performed on : 3/2/2021 8:58:53AM
Peak Locate From Channel : 1
Peak Locate To Channel : 4096

	Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
	3	112.83	2.50082E-01	11.17	Tol.	U-237
	4	276.64	6.11489E-02	29.97		
M	6	333.49	5.22032E-02	21.57		
	8	366.67	2.73504E-02	58.73		
M	9	383.68	1.03568E-01	11.04	Sum	
m	10	387.04	1.43007E-01	11.87		
	12	416.26	5.72222E-02	19.04	Sum	
	13	436.67	6.43075E-02	18.77	Sum	
	14	467.64	1.45238E-02	59.26		
	15	478.50	6.29630E-03	65.29		
M	16	511.12	1.63664E-02	40.51		
m	17	513.97	1.22002E-02	55.40		
m	18	516.89	6.90503E-03	66.47		
	19	703.89	6.11111E-03	70.71		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet
Errors quoted at 2.000sigma

NUCLIDE MDA REPORT

Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

Nuclide Name	Energy (keV)	Yield(%)	Line MDA (pCi/units)	Nuclide MDA (pCi/units)	Activity (pCi/units)	Dec. Level (pCi/units)
CA-41	3.00	77.00	8.60E-07	8.60E-07	0.00E+00	0.00E+00
	3.31	12.30	1.01E-05		0.00E+00	0.00E+00

Analysis Report for 2102080-01

SPIKE

	Nuclide Name	Energy (keV)		Yield(%)	Line MDA (pCi/units)	Nuclide MDA (pCi/units)	Activity (pCi/units)	Dec. Level (pCi/units)
	FE-55	5.89		24.50	1.49E-04	1.49E-04	0.00E+00	0.00E+00
	CO-57	122.06		85.51	1.37E+01	1.37E+01	-2.47E+00	6.33E+00
		136.48		10.60	1.41E+02		-9.38E+00	6.58E+01
	NI-59	6.92		29.80	2.91E-04	2.91E-04	0.00E+00	0.00E+00
	MO-93	16.59		52.90	9.33E-03	9.33E-03	0.00E+00	0.00E+00
		18.60		10.00	7.73E-02		0.00E+00	0.00E+00
	NB-93M	16.57		9.43	5.21E-02	5.21E-02	0.00E+00	0.00E+00
	CD-109	88.03		3.72	2.75E+02	2.75E+02	6.06E+00	1.30E+02
+	SN-113	255.12		1.93	7.43E+02	3.42E+01	2.34E+02	3.35E+02
		391.69	*	61.90	3.42E+01		2.79E+01	1.60E+01
	SN-119M	23.87		16.10	1.20E-01	1.01E-01	0.00E+00	0.00E+00
		25.10		22.70	1.01E-01		0.00E+00	0.00E+00
	I-129	29.78		57.00	2.08E+00	2.08E+00	-3.33E-01	1.01E+00
		33.60		13.20	2.24E+01		1.18E+02	1.10E+01
		39.58		7.52	3.30E+01		-8.72E+01	1.59E+01
+	BA-133	81.00	*	34.06	4.03E+01	3.18E+01	3.58E+02	1.95E+01
		302.84	*	18.33	1.36E+02		3.12E+02	6.44E+01
		356.01	*	62.05	3.18E+01		3.62E+02	1.48E+01
	CE-139	165.85		80.35	2.10E+01	2.10E+01	-1.29E+01	9.77E+00
	CE-144	133.54		10.80	1.41E+02	1.41E+02	5.07E+01	6.59E+01
	HG-203	279.19		77.30	2.72E+01	2.72E+01	1.87E+01	1.27E+01
	PB-210	46.50		4.25	6.22E+01	6.22E+01	9.56E+00	2.94E+01
	TH-231	25.64		14.70	1.68E-01	1.68E-01	0.00E+00	0.00E+00
		84.21		6.40	2.17E+02		-5.12E+00	1.04E+02
	PA-234M	9.89		89.00	5.79E-04	5.79E-04	0.00E+00	0.00E+00
		21.72		64.90	2.12E-02		0.00E+00	0.00E+00
		37.93		23.75	1.42E+01		3.42E+01	6.93E+00
+	TH-234	63.29	*	3.80	3.59E+02	3.59E+02	4.35E+02	1.76E+02
	NP-237	29.37		14.00	8.11E+00	8.11E+00	-1.30E+00	3.92E+00
		86.50		12.60	7.77E+01		1.60E+00	3.67E+01
	U-237	97.08		16.30	6.22E+01	4.06E+01	-4.42E+01	2.91E+01
		101.07		26.30	4.06E+01		-1.68E+01	1.90E+01
		114.00		12.30	1.76E+02		3.36E+02	8.48E+01
		208.01		22.00	8.69E+01		3.69E+01	4.04E+01
+	AM-241	59.54	*	35.90	3.80E+01	3.80E+01	4.61E+01	1.86E+01
	AM-243	74.67		66.00	1.19E+01	1.19E+01	4.63E+00	5.64E+00

\+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
\> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

Apex-Gamma

Analysis Report for 2102080-02
BLANK

GAMMA SPECTRUM ANALYSIS

Sample Identification	: 2102080-02
Sample Description	: BLANK
Sample Type	: RA RECOVERY
Sample Size	: 1.000E+00 units
Facility	: Countroom
Sample Taken On	: 3/2/2021 8:26:13AM
Acquisition Started	: 3/2/2021 8:43:56AM
Procedure	: BAFIL
Operator	: Administrator
Detector Name	: GE2
Geometry	: BAFIL
Live Time	: 900.0 seconds
Real Time	: 900.2 seconds
Dead Time	: 0.02 %
Peak Locate Threshold	: 2.50
Peak Locate Range (in channels)	: 1 - 4096
Peak Area Range (in channels)	: 29 - 4096
Identification Energy Tolerance	: 2.500 keV
Energy Calibration Used Done On	: 6/6/2020
Efficiency Calibration Used Done On	: 9/14/2019
Efficiency Calibration Description	:
Sample Number	: 107971

PEAK ANALYSIS REPORT

Peak Analysis Performed on : 3/2/2021 8:59:06AM

Peak Analysis From Channel : 1
Peak Analysis To Channel : 4096

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)

Analysis Report for 2102080-02

BLANK

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
	1	35.03	35 -	42	35.72	3.20E+02	75.05	3.28E+02	2.56
	2	52.42	49 -	57	53.09	8.03E+01	30.61	9.55E+01	2.02
M	3	61.51	58 -	70	62.18	1.19E+02	33.59	1.02E+02	1.86
m	4	65.15	58 -	70	65.81	4.77E+01	32.56	1.42E+02	1.88
	5	80.70	78 -	86	81.34	7.20E+02	62.65	1.58E+02	1.83
	6	111.07	107 -	115	111.68	5.64E+01	40.75	2.21E+02	1.46
	7	206.52	204 -	210	207.03	2.93E+01	22.29	6.75E+01	3.71
M	8	228.65	228 -	234	229.14	1.08E+01	11.68	2.85E+01	1.56
m	9	231.60	228 -	234	232.09	1.76E+01	16.63	4.26E+01	1.56
M	10	275.69	273 -	288	276.13	5.05E+01	18.12	2.19E+01	1.62
m	11	284.57	273 -	288	285.00	8.59E+00	11.15	2.45E+01	1.63
M	12	302.56	297 -	311	302.98	1.62E+02	27.61	2.54E+01	1.53
m	13	306.52	297 -	311	306.94	1.68E+01	17.62	3.27E+01	1.65
	14	334.20	330 -	342	334.58	4.03E+01	26.88	6.93E+01	1.66
m	15	355.73	350 -	361	356.10	4.64E+02	43.41	5.00E+00	1.54
	16	364.17	362 -	368	364.52	8.58E+00	11.54	1.88E+01	1.28
M	17	383.51	380 -	393	383.84	8.05E+01	20.04	1.19E+01	1.74
m	18	386.82	380 -	393	387.16	9.48E+01	23.10	1.68E+01	1.74
m	19	390.77	380 -	393	391.10	1.67E+01	15.80	1.92E+01	1.74
	20	436.77	434 -	440	437.06	4.66E+01	15.64	1.09E+01	1.36
	21	469.49	466 -	474	469.75	1.11E+01	11.52	1.38E+01	1.69
	22	596.46	593 -	601	596.59	9.09E+00	11.17	1.38E+01	1.42
	23	609.15	606 -	612	609.28	9.45E+00	7.50	3.09E+00	1.81
	24	614.72	613 -	617	614.83	6.00E+00	4.90	0.00E+00	1.98
	25	699.25	695 -	702	699.29	6.00E+00	6.93	4.00E+00	1.88
	26	969.21	966 -	971	969.00	7.00E+00	5.29	0.00E+00	1.92

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet
Errors quoted at 2.000sigma

BACKGROUND SUBTRACT REPORT

Peak Analysis Performed on : 3/2/2021 8:59:06AM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000107929.CNF

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
	1	35.03	3.20E+02	75.05			3.20E+02	7.50E+01
	2	52.42	8.03E+01	30.61			8.03E+01	3.06E+01
M	3	61.51	1.19E+02	33.59	8.28E+00	4.23E+00	1.11E+02	3.39E+01

Analysis Report for 2102080-02

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	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
m	4	65.15	4.77E+01	32.56	8.28E+00	4.23E+00	3.94E+01	3.28E+01
	5	80.70	7.20E+02	62.65			7.20E+02	6.26E+01
	6	111.07	5.64E+01	40.75			5.64E+01	4.07E+01
	7	206.52	2.93E+01	22.29			2.93E+01	2.23E+01
M	8	228.65	1.08E+01	11.68			1.08E+01	1.17E+01
m	9	231.60	1.76E+01	16.63			1.76E+01	1.66E+01
M	10	275.69	5.05E+01	18.12			5.05E+01	1.81E+01
m	11	284.57	8.59E+00	11.15			8.59E+00	1.11E+01
M	12	302.56	1.62E+02	27.61			1.62E+02	2.76E+01
m	13	306.52	1.68E+01	17.62			1.68E+01	1.76E+01
	14	334.20	4.03E+01	26.88			4.03E+01	2.69E+01
m	15	355.73	4.64E+02	43.41			4.64E+02	4.34E+01
	16	364.17	8.58E+00	11.54			8.58E+00	1.15E+01
M	17	383.51	8.05E+01	20.04			8.05E+01	2.00E+01
m	18	386.82	9.48E+01	23.10			9.48E+01	2.31E+01
m	19	390.77	1.67E+01	15.80			1.67E+01	1.58E+01
	20	436.77	4.66E+01	15.64			4.66E+01	1.56E+01
	21	469.49	1.11E+01	11.52			1.11E+01	1.15E+01
	22	596.46	9.09E+00	11.17			9.09E+00	1.12E+01
	23	609.15	9.45E+00	7.50	2.81E+00	9.21E-01	6.64E+00	7.56E+00
	24	614.72	6.00E+00	4.90			6.00E+00	4.90E+00
	25	699.25	6.00E+00	6.93			6.00E+00	6.93E+00
	26	969.21	7.00E+00	5.29			7.00E+00	5.29E+00

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet
Errors quoted at 2.000sigma

NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)		Yield(%)	Activity (pCi/units)	Activity Uncertainty
SN-113	0.94	255.12		1.93		
		391.69	*	61.90	1.10E+01	1.05E+01
BA-133	0.99	81.00	*	34.06	4.33E+02	5.75E+01
		302.84	*	18.33	5.77E+02	2.02E+02
		356.01	*	62.05	3.72E+02	5.44E+01
TH-234	0.92	63.29	*	3.80	2.24E+02	6.88E+01

Analysis Report for 2102080-02

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Nuclide Name	Id Confidence	Energy (keV)		Yield(%)	Activity (pCi/units)	Activity Uncertainty
AM-241	0.90	59.54	*	35.90	2.37E+01	7.28E+00

* = Energy line found in the spectrum.
\- = Manually added nuclide.
? = Manually edited nuclide.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 2.500 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000sigma

INTERFERENCE CORRECTED REPORT

	Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/units)	Wt mean Activity Uncertainty	Comments
	SN-113	0.944	1.10E+01	1.05E+01	
	BA-133	0.998	4.07E+02	3.88E+01	
?	TH-234	0.922	2.24E+02	6.88E+01	
?	AM-241	0.905	2.37E+01	7.28E+00	

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000sigma

Analysis Report for 2102080-02
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UNIDENTIFIED PEAKS

Peak Locate Performed on : 3/2/2021 8:59:06AM
Peak Locate From Channel : 1
Peak Locate To Channel : 4096

	Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
	1	35.03	3.55292E-01	11.73	Tol.	I-129
	2	52.42	8.91753E-02	19.07		
m	4	65.15	4.37853E-02	41.66	Tol.	TH-234
	6	111.07	6.26880E-02	36.11		
	7	206.52	3.25044E-02	38.10	Tol.	U-237
M	8	228.65	1.20249E-02	53.98		
m	9	231.60	1.95493E-02	47.25		
M	10	275.69	5.61308E-02	17.93		
m	11	284.57	9.54512E-03	64.88		
m	13	306.52	1.86226E-02	52.57		
	14	334.20	4.48074E-02	33.33		
	16	364.17	9.53704E-03	67.24	Sum	
M	17	383.51	8.94117E-02	12.45	Sum	
m	18	386.82	1.05363E-01	12.18		
	20	436.77	5.17415E-02	16.80	Sum	
	21	469.49	1.23148E-02	51.98	Sum	
	22	596.46	1.01042E-02	61.41		
	23	609.15	7.37814E-03	56.90		
	24	614.72	6.66667E-03	40.82		
	25	699.25	6.66667E-03	57.74		
	26	969.21	7.77778E-03	37.80		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet
Errors quoted at 2.000sigma

NUCLIDE MDA REPORT

Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

Analysis Report for 2102080-02

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	Nuclide Name	Energy (keV)		Yield(%)	Line MDA (pCi/units)	Nuclide MDA (pCi/units)	Activity (pCi/units)	Dec. Level (pCi/units)
	CA-41	3.00		77.00	1.84E-13	1.84E-13	0.00E+00	0.00E+00
		3.31		12.30	4.70E-12		0.00E+00	0.00E+00
	FE-55	5.89		24.50	4.58E-09	4.58E-09	0.00E+00	0.00E+00
	CO-57	122.06		85.51	2.03E+01	2.03E+01	4.59E+00	9.28E+00
		136.48		10.60	1.87E+02		-1.12E+02	8.52E+01
	NI-59	6.92		29.80	2.55E-08	2.55E-08	0.00E+00	0.00E+00
	MO-93	16.59		52.90	9.74E-05	9.74E-05	0.00E+00	0.00E+00
		18.60		10.00	1.34E-03		0.00E+00	0.00E+00
	NB-93M	16.57		9.43	5.41E-04	5.41E-04	0.00E+00	0.00E+00
	CD-109	88.03		3.72	2.27E+02	2.27E+02	-7.58E+01	1.04E+02
+	SN-113	255.12		1.93	9.59E+02	2.16E+01	1.18E+02	4.24E+02
		391.69	*	61.90	2.16E+01		1.10E+01	9.89E+00
	SN-119M	23.87		16.10	5.80E-03	5.80E-03	0.00E+00	0.00E+00
		25.10		22.70	5.92E-03		0.00E+00	0.00E+00
	I-129	29.78		57.00	5.63E-01	5.63E-01	4.91E+00	2.78E-01
		33.60		13.20	4.04E+00		-5.75E-01	1.99E+00
		39.58		7.52	3.97E+00		-7.12E+00	1.82E+00
+	BA-133	81.00	*	34.06	3.36E+01	1.41E+01	4.33E+02	1.60E+01
		302.84	*	18.33	1.55E+02		5.77E+02	7.25E+01
		356.01	*	62.05	1.41E+01		3.72E+02	5.97E+00
	CE-139	165.85		80.35	3.78E+01	3.78E+01	1.46E+01	1.76E+01
	CE-144	133.54		10.80	1.83E+02	1.83E+02	5.98E+00	8.35E+01
	HG-203	279.19		77.30	1.88E+01	1.88E+01	-3.96E+01	8.13E+00
	PB-210	46.50		4.25	1.26E+01	1.26E+01	2.21E+00	5.61E+00
	TH-231	25.64		14.70	1.06E-02	1.06E-02	0.00E+00	0.00E+00
		84.21		6.40	1.48E+02		-1.27E+03	6.89E+01
	PA-234M	9.89		89.00	4.30E-07	4.30E-07	0.00E+00	0.00E+00
		21.72		64.90	7.08E-04		0.00E+00	0.00E+00
		37.93		23.75	1.28E+00		-6.10E+00	6.01E-01
+	TH-234	63.29	*	3.80	1.52E+02	1.52E+02	2.24E+02	7.32E+01
	NP-237	29.37		14.00	2.09E+00	2.09E+00	1.83E+01	1.03E+00
		86.50		12.60	6.36E+01		1.07E+01	2.91E+01
	U-237	97.08		16.30	7.56E+01	5.26E+01	1.06E+01	3.49E+01
		101.07		26.30	5.26E+01		4.41E+00	2.43E+01
		114.00		12.30	1.91E+02		1.20E+02	8.99E+01
		208.01		22.00	1.28E+02		-1.57E+01	5.86E+01
+	AM-241	59.54	*	35.90	1.61E+01	1.61E+01	2.37E+01	7.75E+00
	AM-243	74.67		66.00	8.71E+00	8.71E+00	3.37E+00	4.03E+00

\+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
\> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

VB 3/2/21

Apex-Gamma

Analysis Report for 2102080-03
MW-1

GAMMA SPECTRUM ANALYSIS

Sample Identification	: 2102080-03
Sample Description	: MW-1
Sample Type	: RA RECOVERY
Sample Size	: 1.000E+00 units
Facility	: Countroom
Sample Taken On	: 3/2/2021 8:26:23AM
Acquisition Started	: 3/2/2021 8:44:05AM
Procedure	: BAFIL
Operator	: Administrator
Detector Name	: GE3
Geometry	: BAFIL
Live Time	: 900.0 seconds
Real Time	: 902.0 seconds
Dead Time	: 0.22 %
Peak Locate Threshold	: 2.50
Peak Locate Range (in channels)	: 1 - 4096
Peak Area Range (in channels)	: 10 - 4096
Identification Energy Tolerance	: 2.500 keV
Energy Calibration Used Done On	: 6/6/2020
Efficiency Calibration Used Done On	: 10/19/2019
Efficiency Calibration Description	:
Sample Number	: 107972

PEAK ANALYSIS REPORT

Peak Analysis Performed on : 3/2/2021 8:59:18AM

Peak Analysis From Channel : 1
Peak Analysis To Channel : 4096

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)

Analysis Report for 2102080-03

MW-1

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
M	1	21.15	18 -	39	21.59	8.79E+01	37.26	2.47E+02	2.19
m	2	31.03	18 -	39	31.45	1.95E+03	93.56	1.61E+02	1.97
m	3	35.12	18 -	39	35.54	4.50E+02	80.50	1.14E+02	2.40
	4	53.18	48 -	57	53.58	8.50E+01	39.53	1.74E+02	2.54
M	5	62.06	58 -	74	62.44	1.84E+02	37.85	1.07E+02	2.46
m	6	66.36	58 -	74	66.74	9.65E+01	38.53	1.28E+02	2.46
	7	81.28	76 -	87	81.64	8.28E+02	71.64	2.26E+02	2.17
M	8	112.10	107 -	125	112.43	1.29E+02	34.93	8.25E+01	2.53
m	9	115.93	107 -	125	116.25	4.10E+01	34.99	9.48E+01	2.54
	10	223.17	220 -	226	223.36	2.32E+01	22.75	7.75E+01	1.41
	11	276.85	273 -	282	276.98	4.50E+01	23.73	5.40E+01	2.53
	12	303.22	299 -	306	303.31	1.05E+02	30.59	8.98E+01	2.00
	13	334.92	330 -	341	334.98	4.45E+01	32.31	1.09E+02	2.16
	14	356.61	352 -	362	356.64	4.28E+02	43.67	2.29E+01	2.19
M	15	386.29	381 -	397	386.28	1.76E+02	32.53	3.51E+01	3.39
m	16	391.36	381 -	397	391.35	3.40E+01	26.41	5.77E+00	2.90
	17	437.43	433 -	441	437.36	5.77E+01	16.13	4.60E+00	2.17
	18	468.01	465 -	471	467.90	1.26E+01	8.26	2.79E+00	1.32
	19	474.01	472 -	476	473.90	1.00E+01	6.32	0.00E+00	2.88
	20	501.51	497 -	503	501.37	6.69E+00	6.65	2.63E+00	1.06

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet
Errors quoted at 2.000sigma

BACKGROUND SUBTRACT REPORT

Peak Analysis Performed on : 3/2/2021 8:59:18AM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000107930.CNF

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
M	1	21.15	8.79E+01	37.26			8.79E+01	3.73E+01
m	2	31.03	1.95E+03	93.56			1.95E+03	9.36E+01
m	3	35.12	4.50E+02	80.50			4.50E+02	8.05E+01
	4	53.18	8.50E+01	39.53			8.50E+01	3.95E+01
M	5	62.06	1.84E+02	37.85	1.39E+01	1.83E+00	1.70E+02	3.79E+01
m	6	66.36	9.65E+01	38.53			9.65E+01	3.85E+01
	7	81.28	8.28E+02	71.64			8.28E+02	7.16E+01
M	8	112.10	1.29E+02	34.93			1.29E+02	3.49E+01
m	9	115.93	4.10E+01	34.99			4.10E+01	3.50E+01

Analysis Report for 2102080-03

MW-1

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
	10	223.17	2.32E+01	22.75			2.32E+01	2.27E+01
	11	276.85	4.50E+01	23.73			4.50E+01	2.37E+01
	12	303.22	1.05E+02	30.59			1.05E+02	3.06E+01
	13	334.92	4.45E+01	32.31			4.45E+01	3.23E+01
	14	356.61	4.28E+02	43.67			4.28E+02	4.37E+01
M	15	386.29	1.76E+02	32.53			1.76E+02	3.25E+01
m	16	391.36	3.40E+01	26.41			3.40E+01	2.64E+01
	17	437.43	5.77E+01	16.13			5.77E+01	1.61E+01
	18	468.01	1.26E+01	8.26			1.26E+01	8.26E+00
	19	474.01	1.00E+01	6.32			1.00E+01	6.32E+00
	20	501.51	6.69E+00	6.65			6.69E+00	6.65E+00

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet
Errors quoted at 2.000sigma

NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)		Yield(%)	Activity (pCi/units)	Activity Uncertainty
SN-113	0.95	255.12		1.93		
		391.69	*	61.90	2.87E+01	2.26E+01
I-129	0.86	29.78	*	57.00	2.67E+01	1.29E+00
		33.60	*	13.20	4.38E+01	7.84E+00
		39.58		7.52		
BA-133	0.99	81.00	*	34.06	4.11E+02	5.38E+01
		302.84	*	18.33	3.47E+02	1.42E+02
		356.01	*	62.05	3.86E+02	6.20E+01
HG-203	0.86	279.19	*	77.30	3.59E+01	2.19E+01
TH-234	0.96	63.29	*	3.80	3.83E+02	8.76E+01

Analysis Report for 2102080-03

MW-1

* = Energy line found in the spectrum.
\- = Manually added nuclide.
? = Manually edited nuclide.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 2.500 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000sigma

INTERFERENCE CORRECTED REPORT

	Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/units)	Wt mean Activity Uncertainty	Comments
	SN-113	0.953	2.87E+01	2.26E+01	
	I-129	0.865	2.71E+01	1.27E+00	
	BA-133	0.994	3.96E+02	3.91E+01	
	HG-203	0.869	3.59E+01	2.19E+01	
	TH-234	0.962	3.83E+02	8.76E+01	
X	NP-237	0.742			

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000sigma

Analysis Report for 2102080-03

MW-1

UNIDENTIFIED PEAKS

Peak Locate Performed on : 3/2/2021 8:59:18AM
Peak Locate From Channel : 1
Peak Locate To Channel : 4096

	Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
M	1	21.15	9.77127E-02	21.19	Tol.	PA-234M
	4	53.18	9.44993E-02	23.24		
m	6	66.36	1.07212E-01	19.97	Sum	
M	8	112.10	1.43235E-01	13.55	Sum	
m	9	115.93	4.55848E-02	42.64	Sum	
	10	223.17	2.58244E-02	48.94		
	13	334.92	4.93939E-02	36.34	Sum	
M	15	386.29	1.95789E-01	9.23	Sum	
	17	437.43	6.41111E-02	13.98	Sum	
	18	468.01	1.40079E-02	32.76		
	19	474.01	1.11111E-02	31.62	Sum	
	20	501.51	7.43056E-03	49.74		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet
Errors quoted at 2.000sigma

NUCLIDE MDA REPORT

Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

Nuclide Name	Energy (keV)	Yield(%)	Line MDA (pCi/units)	Nuclide MDA (pCi/units)	Activity (pCi/units)	Dec. Level (pCi/units)
CA-41	3.00	77.00	8.48E-09	8.48E-09	0.00E+00	0.00E+00
	3.31	12.30	1.24E-07		0.00E+00	0.00E+00
FE-55	5.89	24.50	6.04E-06	6.04E-06	0.00E+00	0.00E+00
CO-57	122.06	85.51	1.68E+01	1.68E+01	-4.92E+00	7.83E+00

Analysis Report for 2102080-03

MW-1

	Nuclide Name	Energy (keV)		Yield(%)	Line MDA (pCi/units)	Nuclide MDA (pCi/units)	Activity (pCi/units)	Dec. Level (pCi/units)
	CO-57	136.48		10.60	1.48E+02	1.68E+01	-5.24E+01	6.87E+01
	NI-59	6.92		29.80	1.50E-04	1.50E-04	0.00E+00	6.70E-05
	MO-93	16.59		52.90	3.93E-02	3.93E-02	5.29E-03	1.86E-02
		18.60		10.00	4.70E-01		3.15E-02	2.25E-01
	NB-93M	16.57		9.43	2.19E-01	2.19E-01	2.95E-02	1.04E-01
	CD-109	88.03		3.72	2.21E+02	2.21E+02	-7.07E+01	1.03E+02
+	SN-113	255.12		1.93	9.20E+02	3.16E+01	1.48E+02	4.16E+02
		391.69	*	61.90	3.16E+01		2.87E+01	1.47E+01
	SN-119M	23.87		16.10	1.12E+00	9.72E-01	1.26E-02	5.41E-01
		25.10		22.70	9.72E-01		-2.42E+01	4.67E-01
+	I-129	29.78	*	57.00	1.84E+00	1.84E+00	2.67E+01	9.00E-01
		33.60	*	13.20	1.29E+01		4.38E+01	6.34E+00
		39.58		7.52	1.52E+01		-1.35E+00	7.22E+00
+	BA-133	81.00	*	34.06	3.62E+01	2.33E+01	4.11E+02	1.74E+01
		302.84	*	18.33	1.57E+02		3.47E+02	7.41E+01
		356.01	*	62.05	2.33E+01		3.86E+02	1.04E+01
	CE-139	165.85		80.35	2.68E+01	2.68E+01	-2.10E+00	1.25E+01
	CE-144	133.54		10.80	1.40E+02	1.40E+02	-4.55E+01	6.50E+01
+	HG-203	279.19	*	77.30	2.79E+01	2.79E+01	3.59E+01	1.29E+01
	PB-210	46.50		4.25	3.52E+01	3.52E+01	1.43E+00	1.65E+01
	TH-231	25.64		14.70	1.65E+00	1.65E+00	-4.11E+01	7.95E-01
		84.21		6.40	3.14E+02		1.06E+03	1.53E+02
	PA-234M	9.89		89.00	1.03E-03	1.03E-03	1.01E-03	4.86E-04
		21.72		64.90	1.67E-01		5.87E-02	8.00E-02
		37.93		23.75	7.50E+00		-4.53E-01	3.65E+00
+	TH-234	63.29	*	3.80	2.00E+02	2.00E+02	3.83E+02	9.70E+01
	NP-237	29.37	*	14.00	7.48E+00	7.48E+00	1.09E+02	3.66E+00
		86.50		12.60	6.70E+01		-8.39E+00	3.14E+01
	U-237	97.08		16.30	6.26E+01	3.98E+01	8.27E+00	2.93E+01
		101.07		26.30	3.98E+01		9.16E+00	1.86E+01
		114.00		12.30	1.88E+02		3.57E+02	9.05E+01
		208.01		22.00	1.01E+02		-3.81E+01	4.70E+01
	AM-241	59.54		35.90	1.50E+01	1.50E+01	1.71E+01	7.22E+00
	AM-243	74.67		66.00	9.74E+00	9.74E+00	-3.49E+01	4.59E+00

\+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
\> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

KB 3/2/21

Apex-Gamma

Analysis Report for 2102080-04
MW-1

GAMMA SPECTRUM ANALYSIS

Sample Identification	: 2102080-04
Sample Description	: MW-1
Sample Type	: RA RECOVERY
Sample Size	: 1.000E+00 units
Facility	: Countroom
Sample Taken On	: 3/2/2021 8:26:35AM
Acquisition Started	: 3/2/2021 8:44:11AM
Procedure	: BAFIL
Operator	: Administrator
Detector Name	: GE4
Geometry	: BAFIL
Live Time	: 900.0 seconds
Real Time	: 900.7 seconds
Dead Time	: 0.07 %
Peak Locate Threshold	: 2.50
Peak Locate Range (in channels)	: 1 - 4096
Peak Area Range (in channels)	: 9 - 4096
Identification Energy Tolerance	: 2.500 keV
Energy Calibration Used Done On	: 8/25/2020
Efficiency Calibration Used Done On	: 10/12/2019
Efficiency Calibration Description	:
Sample Number	: 107973

PEAK ANALYSIS REPORT

Peak Analysis Performed on : 3/2/2021 8:59:28AM

Peak Analysis From Channel : 1
Peak Analysis To Channel : 4096

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)

Analysis Report for 2102080-04

MW-1

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
	1	21.12	18 -	24	20.66	7.96E+01	36.12	1.75E+02	3.13
M	2	31.34	25 -	41	30.88	1.88E+03	91.26	1.26E+02	2.45
m	3	35.68	25 -	41	35.22	4.95E+02	66.85	9.73E+01	2.29
	4	52.67	47 -	56	52.20	4.59E+01	39.80	2.00E+02	2.05
	5	61.79	57 -	65	61.32	8.81E+01	56.36	4.30E+02	2.03
	6	66.78	65 -	71	66.31	5.23E+01	39.84	2.23E+02	2.07
	7	81.44	75 -	86	80.96	7.94E+02	68.64	1.92E+02	2.38
	8	101.30	97 -	105	100.82	3.10E+01	30.24	1.22E+02	2.62
M	9	112.45	106 -	120	111.96	1.38E+02	37.26	1.22E+02	2.55
m	10	116.25	106 -	120	115.76	3.59E+01	35.50	1.31E+02	2.70
	11	277.27	273 -	282	276.72	6.92E+01	24.43	4.77E+01	2.81
	12	303.74	299 -	310	303.18	9.34E+01	34.53	1.03E+02	2.60
	13	334.13	327 -	337	333.56	2.05E+01	26.41	8.10E+01	2.54
	14	356.66	349 -	359	356.08	3.37E+02	40.49	4.00E+01	2.85
	15	387.21	381 -	396	386.62	1.82E+02	35.67	4.90E+01	5.11
	16	415.92	411 -	420	415.32	2.33E+01	16.40	2.54E+01	1.82
	17	437.42	432 -	440	436.81	5.61E+01	17.68	1.37E+01	2.97
	18	458.33	455 -	459	457.71	7.00E+00	5.29	0.00E+00	1.32
	19	695.55	690 -	697	694.86	7.00E+00	5.29	0.00E+00	2.70
	20	910.41	906 -	911	909.66	4.83E+00	5.74	2.33E+00	0.94

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet
Errors quoted at 2.000sigma

BACKGROUND SUBTRACT REPORT

Peak Analysis Performed on : 3/2/2021 8:59:28AM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000107931.CNF

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
	1	21.12	7.96E+01	36.12			7.96E+01	3.61E+01
M	2	31.34	1.88E+03	91.26			1.88E+03	9.13E+01
m	3	35.68	4.95E+02	66.85			4.95E+02	6.68E+01
	4	52.67	4.59E+01	39.80			4.59E+01	3.98E+01
	5	61.79	8.81E+01	56.36	1.23E+01	2.13E+00	7.58E+01	5.64E+01
	6	66.78	5.23E+01	39.84			5.23E+01	3.98E+01
	7	81.44	7.94E+02	68.64			7.94E+02	6.86E+01
	8	101.30	3.10E+01	30.24			3.10E+01	3.02E+01
M	9	112.45	1.38E+02	37.26			1.38E+02	3.73E+01

Analysis Report for 2102080-04

MW-1

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
m	10	116.25	3.59E+01	35.50			3.59E+01	3.55E+01
	11	277.27	6.92E+01	24.43			6.92E+01	2.44E+01
	12	303.74	9.34E+01	34.53			9.34E+01	3.45E+01
	13	334.13	2.05E+01	26.41			2.05E+01	2.64E+01
	14	356.66	3.37E+02	40.49			3.37E+02	4.05E+01
	15	387.21	1.82E+02	35.67			1.82E+02	3.57E+01
	16	415.92	2.33E+01	16.40			2.33E+01	1.64E+01
	17	437.42	5.61E+01	17.68			5.61E+01	1.77E+01
	18	458.33	7.00E+00	5.29			7.00E+00	5.29E+00
	19	695.55	7.00E+00	5.29			7.00E+00	5.29E+00
	20	910.41	4.83E+00	5.74			4.83E+00	5.74E+00

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet
Errors quoted at 2.000sigma

NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)		Yield(%)	Activity (pCi/units)	Activity Uncertainty
I-129	0.77	29.78	*	57.00	5.64E+02	5.98E+01
		33.60	*	13.20	6.15E+02	1.00E+02
		39.58		7.52		
BA-133	0.98	81.00	*	34.06	4.14E+02	5.42E+01
		302.84	*	18.33	3.33E+02	1.66E+02
		356.01	*	62.05	4.60E+02	9.06E+01
HG-203	0.91	279.19	*	77.30	5.10E+01	2.35E+01
PA-234M	0.34	9.89		89.00		
		21.72	*	64.90	2.57E+01	1.21E+01
		37.93	*	23.75	3.42E+02	5.57E+01
TH-234	0.94	63.29	*	3.80	3.24E+02	2.43E+02
AM-241	0.87	59.54	*	35.90	3.43E+01	2.57E+01

Analysis Report for 2102080-04

MW-1

* = Energy line found in the spectrum.
\- = Manually added nuclide.
? = Manually edited nuclide.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 2.500 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000sigma

INTERFERENCE CORRECTED REPORT

	Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/units)	Wt mean Activity Uncertainty	Comments
	I-129	0.778	5.65E+02	5.17E+01	
	BA-133	0.989	4.19E+02	4.48E+01	
	HG-203	0.910	5.10E+01	2.35E+01	
	PA-234M	0.345	2.58E+01	1.19E+01	
?	TH-234	0.944	3.24E+02	2.43E+02	
?	AM-241	0.879	3.43E+01	2.57E+01	

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000sigma

Analysis Report for 2102080-04
MW-1

UNIDENTIFIED PEAKS

Peak Locate Performed on : 3/2/2021 8:59:28AM
Peak Locate From Channel : 1
Peak Locate To Channel : 4096

	Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
	4	52.67	5.09513E-02	43.40	Sum	
	6	66.78	5.81233E-02	38.08	Sum	
	8	101.30	3.44444E-02	48.78	Sum	
M	9	112.45	1.53309E-01	13.50	Sum	
m	10	116.25	3.98784E-02	49.45	Sum	
	13	334.13	2.27778E-02	64.43	Sum	
	15	387.21	2.01686E-01	9.82	Sum	
	16	415.92	2.58796E-02	35.21		
	17	437.42	6.23810E-02	15.75	Sum	
	18	458.33	7.77778E-03	37.80		
	19	695.55	7.77778E-03	37.80		
	20	910.41	5.37037E-03	59.43		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet
Errors quoted at 2.000sigma

NUCLIDE MDA REPORT

Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

Nuclide Name	Energy (keV)	Yield(%)	Line MDA (pCi/units)	Nuclide MDA (pCi/units)	Activity (pCi/units)	Dec. Level (pCi/units)
CA-41	3.00	77.00	1.38E+01	1.38E+01	0.00E+00	0.00E+00
	3.31	12.30	6.90E+01		0.00E+00	0.00E+00
FE-55	5.89	24.50	1.10E+01	1.10E+01	0.00E+00	0.00E+00
CO-57	122.06	85.51	1.05E+01	1.05E+01	-4.43E+00	4.87E+00

Analysis Report for 2102080-04

MW-1

	Nuclide Name	Energy (keV)		Yield(%)	Line MDA (pCi/units)	Nuclide MDA (pCi/units)	Activity (pCi/units)	Dec. Level (pCi/units)
	CO-57	136.48		10.60	1.08E+02	1.05E+01	-6.56E-01	5.08E+01
	NI-59	6.92		29.80	4.43E+01	4.43E+01	-2.54E+01	1.87E+01
	MO-93	16.59		52.90	2.99E+01	2.99E+01	1.36E+01	1.43E+01
		18.60		10.00	1.52E+02		4.77E+00	7.29E+01
	NB-93M	16.57		9.43	1.68E+02	1.68E+02	7.64E+01	8.02E+01
	CD-109	88.03		3.72	1.99E+02	1.99E+02	-9.34E+01	9.30E+01
	SN-113	255.12		1.93	8.43E+02	8.12E+01	9.90E+01	3.86E+02
		391.69		61.90	8.12E+01		9.01E+01	3.84E+01
	SN-119M	23.87		16.10	7.24E+01	4.98E+01	-8.07E+01	3.46E+01
		25.10		22.70	4.98E+01		-9.16E+02	2.38E+01
+	I-129	29.78	*	57.00	2.65E+01	2.65E+01	5.64E+02	1.28E+01
		33.60	*	13.20	1.09E+02		6.15E+02	5.27E+01
		39.58		7.52	1.63E+02		1.78E+02	7.88E+01
+	BA-133	81.00	*	34.06	3.51E+01	3.51E+01	4.14E+02	1.68E+01
		302.84	*	18.33	1.77E+02		3.33E+02	8.39E+01
		356.01	*	62.05	4.20E+01		4.60E+02	1.92E+01
	CE-139	165.85		80.35	1.69E+01	1.69E+01	1.92E+00	7.97E+00
	CE-144	133.54		10.80	1.08E+02	1.08E+02	4.23E+01	5.11E+01
+	HG-203	279.19	*	77.30	2.37E+01	2.37E+01	5.10E+01	1.09E+01
	PB-210	46.50		4.25	1.43E+02	1.43E+02	-2.46E+01	6.66E+01
	TH-231	25.64		14.70	7.60E+01	7.60E+01	-1.40E+03	3.63E+01
		84.21		6.40	3.32E+02		1.31E+03	1.62E+02
+	PA-234M	9.89		89.00	2.03E+01	1.76E+01	5.04E-01	9.46E+00
		21.72	*	64.90	1.76E+01		2.57E+01	8.35E+00
		37.93	*	23.75	6.04E+01		3.42E+02	2.93E+01
+	TH-234	63.29	*	3.80	3.89E+02	3.89E+02	3.24E+02	1.89E+02
	NP-237	29.37		14.00	2.58E+02	7.50E+01	2.04E+03	1.27E+02
		86.50		12.60	7.50E+01		-3.06E+00	3.56E+01
	U-237	97.08		16.30	4.98E+01	3.31E+01	-4.81E+00	2.33E+01
		101.07		26.30	3.31E+01		2.23E+01	1.55E+01
		114.00		12.30	1.33E+02		3.03E+02	6.40E+01
		208.01		22.00	7.15E+01		6.61E+00	3.34E+01
+	AM-241	59.54	*	35.90	4.12E+01	4.12E+01	3.43E+01	2.00E+01
	AM-243	74.67		66.00	1.08E+01	1.08E+01	9.22E-01	5.06E+00

\+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
\> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

KB 3/2/21

Analysis Report for 2102080-05

MW-3

GAMMA SPECTRUM ANALYSIS

Sample Identification	: 2102080-05
Sample Description	: MW-3
Sample Type	: RA RECOVERY
Sample Size	: 1.000E+00 units
Facility	: Countroom
Sample Taken On	: 3/2/2021 8:26:49AM
Acquisition Started	: 3/2/2021 8:59:53AM
Procedure	: BAFIL
Operator	: Administrator
Detector Name	: GE3
Geometry	: BAFIL
Live Time	: 900.0 seconds
Real Time	: 902.0 seconds
Dead Time	: 0.22 %
Peak Locate Threshold	: 2.50
Peak Locate Range (in channels)	: 1 - 4096
Peak Area Range (in channels)	: 10 - 4096
Identification Energy Tolerance	: 2.500 keV
Energy Calibration Used Done On	: 6/6/2020
Efficiency Calibration Used Done On	: 10/19/2019
Efficiency Calibration Description	:
Sample Number	: 107974

PEAK ANALYSIS REPORT

Peak Analysis Performed on : 3/2/2021 9:14:58AM

Peak Analysis From Channel : 1

Peak Analysis To Channel : 4096

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)

Analysis Report for 2102080-05

MW-3

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
M	1	20.91	17 -	40	21.34	8.82E+01	35.50	2.12E+02	2.10
m	2	31.04	17 -	40	31.46	2.02E+03	95.96	1.65E+02	1.93
m	3	35.24	17 -	40	35.66	4.70E+02	82.50	1.52E+02	2.24
	4	52.74	50 -	56	53.14	4.84E+01	32.04	1.53E+02	2.02
M	5	61.95	58 -	75	62.34	1.76E+02	42.48	1.78E+02	2.23
m	6	66.23	58 -	75	66.61	1.14E+02	41.24	1.73E+02	2.24
m	7	70.01	58 -	75	70.39	2.47E+01	35.95	1.70E+02	2.24
	8	81.30	77 -	87	81.66	8.37E+02	70.88	2.18E+02	2.03
	9	101.73	99 -	105	102.07	2.55E+01	22.92	7.70E+01	2.99
	10	111.93	106 -	117	112.25	2.00E+02	50.64	2.17E+02	2.09
	11	277.30	274 -	284	277.43	3.32E+01	23.21	5.16E+01	2.63
M	12	303.27	291 -	318	303.36	1.39E+02	25.85	1.60E+01	2.52
m	13	307.48	291 -	318	307.57	2.30E+01	26.70	1.80E+01	3.01
m	14	311.41	291 -	318	311.50	1.25E+01	16.16	1.80E+01	3.02
M	15	334.38	329 -	345	334.43	6.07E+01	19.49	1.24E+01	2.51
m	16	338.38	329 -	345	338.44	1.81E+01	16.12	9.62E+00	2.51
	17	356.57	352 -	360	356.60	3.98E+02	42.44	4.43E+01	2.20
M	18	384.21	380 -	396	384.21	1.10E+02	26.40	1.77E+01	2.31
m	19	387.80	380 -	396	387.79	1.35E+02	31.13	1.29E+01	2.32
	20	416.02	411 -	420	415.98	2.10E+01	20.83	5.00E+01	1.83
	21	437.60	432 -	443	437.53	8.60E+01	20.98	1.20E+01	2.11
	22	468.10	464 -	471	468.00	1.50E+01	13.42	2.01E+01	2.61
	23	475.13	473 -	477	475.02	5.67E+00	7.81	6.67E+00	2.59
	24	527.57	523 -	530	527.39	6.94E+00	7.21	4.11E+00	2.92
	25	611.72	607 -	614	611.44	5.94E+00	6.93	4.13E+00	2.92
	26	649.70	646 -	652	649.38	8.00E+00	5.66	0.00E+00	3.48

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet
Errors quoted at 2.000sigma

BACKGROUND SUBTRACT REPORT

Peak Analysis Performed on : 3/2/2021 9:14:58AM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000107930.CNF

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
M	1	20.91	8.82E+01	35.50			8.82E+01	3.55E+01
m	2	31.04	2.02E+03	95.96			2.02E+03	9.60E+01
m	3	35.24	4.70E+02	82.50			4.70E+02	8.25E+01

Analysis Report for 2102080-05

MW-3

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
	4	52.74	4.84E+01	32.04			4.84E+01	3.20E+01
M	5	61.95	1.76E+02	42.48	1.39E+01	1.83E+00	1.62E+02	4.25E+01
m	6	66.23	1.14E+02	41.24			1.14E+02	4.12E+01
m	7	70.01	2.47E+01	35.95			2.47E+01	3.60E+01
	8	81.30	8.37E+02	70.88			8.37E+02	7.09E+01
	9	101.73	2.55E+01	22.92			2.55E+01	2.29E+01
	10	111.93	2.00E+02	50.64			2.00E+02	5.06E+01
	11	277.30	3.32E+01	23.21			3.32E+01	2.32E+01
M	12	303.27	1.39E+02	25.85			1.39E+02	2.58E+01
m	13	307.48	2.30E+01	26.70			2.30E+01	2.67E+01
m	14	311.41	1.25E+01	16.16			1.25E+01	1.62E+01
M	15	334.38	6.07E+01	19.49			6.07E+01	1.95E+01
m	16	338.38	1.81E+01	16.12			1.81E+01	1.61E+01
	17	356.57	3.98E+02	42.44			3.98E+02	4.24E+01
M	18	384.21	1.10E+02	26.40			1.10E+02	2.64E+01
m	19	387.80	1.35E+02	31.13			1.35E+02	3.11E+01
	20	416.02	2.10E+01	20.83			2.10E+01	2.08E+01
	21	437.60	8.60E+01	20.98			8.60E+01	2.10E+01
	22	468.10	1.50E+01	13.42			1.50E+01	1.34E+01
	23	475.13	5.67E+00	7.81			5.67E+00	7.81E+00
	24	527.57	6.94E+00	7.21			6.94E+00	7.21E+00
	25	611.72	5.94E+00	6.93	1.19E+00	8.64E-01	4.75E+00	6.98E+00
	26	649.70	8.00E+00	5.66			8.00E+00	5.66E+00

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet
Errors quoted at 2.000sigma

NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)		Yield(%)	Activity (pCi/units)	Activity Uncertainty
I-129	0.86	29.78	*	57.00	2.77E+01	1.32E+00
		33.60	*	13.20	4.63E+01	8.14E+00
		39.58		7.52		
BA-133	0.99	81.00	*	34.06	4.16E+02	5.39E+01
		302.84	*	18.33	4.58E+02	1.57E+02
		356.01	*	62.05	3.59E+02	5.87E+01

Analysis Report for 2102080-05

MW-3

Nuclide Name	Id Confidence	Energy (keV)		Yield(%)	Activity (pCi/units)	Activity Uncertainty
HG-203	0.91	279.19	*	77.30	2.65E+01	2.02E+01
TH-234	0.95	63.29	*	3.80	3.63E+02	9.72E+01
AM-241	0.86	59.54	*	35.90	3.85E+01	1.03E+01

* = Energy line found in the spectrum.
\- = Manually added nuclide.
? = Manually edited nuclide.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 2.500 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000sigma

INTERFERENCE CORRECTED REPORT

	Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/units)	Wt mean Activity Uncertainty	Comments
	I-129	0.864	2.82E+01	1.30E+00	
	BA-133	0.994	3.94E+02	3.85E+01	
	HG-203	0.913	2.65E+01	2.02E+01	
?	TH-234	0.955	3.63E+02	9.72E+01	
X	NP-237	0.741			
?	AM-241	0.862	3.85E+01	1.03E+01	

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000sigma

Analysis Report for 2102080-05
MW-3

UNIDENTIFIED PEAKS

Peak Locate Performed on : 3/2/2021 9:14:58AM
Peak Locate From Channel : 1
Peak Locate To Channel : 4096

	Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
M	1	20.91	9.80153E-02	20.12		
	4	52.74	5.38311E-02	33.07		
m	6	66.23	1.27183E-01	18.01	Sum	
m	7	70.01	2.74718E-02	72.70	Sum	
	9	101.73	2.83333E-02	44.95	Tol.	U-237
	10	111.93	2.21757E-01	12.69	Sum	
m	13	307.48	2.55403E-02	58.08	Sum	
m	14	311.41	1.38943E-02	64.60	Sum	
M	15	334.38	6.74736E-02	16.05	Sum	
m	16	338.38	2.01142E-02	44.54	Sum	
M	18	384.21	1.21829E-01	12.04	Sum	
m	19	387.80	1.50295E-01	11.51	Sum	
	20	416.02	2.33333E-02	49.60	Sum	
	21	437.60	9.55556E-02	12.20	Sum	
	22	468.10	1.66222E-02	44.84		
	23	475.13	6.29630E-03	68.91		
	24	527.57	7.71605E-03	51.92		
	25	611.72	5.27827E-03	73.49		
	26	649.70	8.88889E-03	35.36		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet
Errors quoted at 2.000sigma

NUCLIDE MDA REPORT

Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

Analysis Report for 2102080-05

MW-3

	Nuclide Name	Energy (keV)		Yield(%)	Line MDA (pCi/units)	Nuclide MDA (pCi/units)	Activity (pCi/units)	Dec. Level (pCi/units)
	CA-41	3.00		77.00	8.48E-09	8.48E-09	0.00E+00	0.00E+00
		3.31		12.30	1.24E-07		0.00E+00	0.00E+00
	FE-55	5.89		24.50	6.04E-06	6.04E-06	0.00E+00	0.00E+00
	CO-57	122.06		85.51	1.66E+01	1.66E+01	-5.04E+00	7.71E+00
		136.48		10.60	1.53E+02		-3.95E+01	7.11E+01
	NI-59	6.92		29.80	1.41E-04	1.41E-04	-3.23E-05	6.27E-05
	MO-93	16.59		52.90	4.47E-02	4.47E-02	1.05E-02	2.13E-02
		18.60		10.00	5.10E-01		5.30E-01	2.45E-01
	NB-93M	16.57		9.43	2.49E-01	2.49E-01	5.85E-02	1.19E-01
	CD-109	88.03		3.72	2.35E+02	2.35E+02	-1.28E+02	1.10E+02
	SN-113	255.12		1.93	9.33E+02	3.14E+01	-2.96E+01	4.23E+02
		391.69		61.90	3.14E+01		-6.78E+01	1.46E+01
	SN-119M	23.87		16.10	1.06E+00	8.80E-01	-4.16E-01	5.11E-01
		25.10		22.70	8.80E-01		-2.42E+01	4.22E-01
+	I-129	29.78	*	57.00	2.10E+00	2.10E+00	2.77E+01	1.03E+00
		33.60	*	13.20	1.51E+01		4.63E+01	7.42E+00
		39.58		7.52	1.64E+01		3.73E+00	7.81E+00
+	BA-133	81.00	*	34.06	3.48E+01	3.48E+01	4.16E+02	1.67E+01
		302.84	*	18.33	1.64E+02		4.58E+02	7.75E+01
		356.01	*	62.05	3.73E+01		3.59E+02	1.74E+01
	CE-139	165.85		80.35	2.85E+01	2.85E+01	-6.67E+00	1.34E+01
	CE-144	133.54		10.80	1.50E+02	1.50E+02	1.97E+01	7.01E+01
+	HG-203	279.19	*	77.30	2.86E+01	2.86E+01	2.65E+01	1.32E+01
	PB-210	46.50		4.25	3.33E+01	3.33E+01	-1.67E+01	1.55E+01
	TH-231	25.64		14.70	1.50E+00	1.50E+00	-4.11E+01	7.17E-01
		84.21		6.40	3.20E+02		1.04E+03	1.56E+02
	PA-234M	9.89		89.00	1.01E-03	1.01E-03	7.49E-04	4.78E-04
		21.72		64.90	1.69E-01		1.40E-01	8.10E-02
		37.93		23.75	7.69E+00		2.00E+01	3.75E+00
+	TH-234	63.29	*	3.80	2.53E+02	2.53E+02	3.63E+02	1.23E+02
	NP-237	29.37	*	14.00	8.56E+00	8.56E+00	1.13E+02	4.21E+00
		86.50		12.60	7.02E+01		1.08E+01	3.30E+01
	U-237	97.08		16.30	5.79E+01	4.10E+01	-7.68E+00	2.69E+01
		101.07		26.30	4.10E+01		1.13E+01	1.92E+01
		114.00		12.30	2.02E+02		4.70E+02	9.74E+01
		208.01		22.00	9.98E+01		-2.24E+01	4.62E+01
+	AM-241	59.54	*	35.90	2.68E+01	2.68E+01	3.85E+01	1.31E+01
	AM-243	74.67		66.00	9.53E+00	9.53E+00	-3.89E+01	4.48E+00

\+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
\> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

ICB 3/2/21

Apex-Gamma

Analysis Report for 2102080-06
MW-02

GAMMA SPECTRUM ANALYSIS

Sample Identification	: 2102080-06
Sample Description	: MW-02
Sample Type	: RA RECOVERY
Sample Size	: 1.000E+00 units
Facility	: Countroom
Sample Taken On	: 3/2/2021 8:27:03AM
Acquisition Started	: 3/2/2021 8:59:59AM
Procedure	: BAFIL
Operator	: Administrator
Detector Name	: GE4
Geometry	: BAFIL
Live Time	: 900.0 seconds
Real Time	: 900.5 seconds
Dead Time	: 0.05 %
Peak Locate Threshold	: 2.50
Peak Locate Range (in channels)	: 1 - 4096
Peak Area Range (in channels)	: 9 - 4096
Identification Energy Tolerance	: 2.500 keV
Energy Calibration Used Done On	: 8/25/2020
Efficiency Calibration Used Done On	: 10/12/2019
Efficiency Calibration Description	:
Sample Number	: 107975

PEAK ANALYSIS REPORT

Peak Analysis Performed on : 3/2/2021 9:15:12AM

Peak Analysis From Channel : 1
Peak Analysis To Channel : 4096

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)

Analysis Report for 2102080-06

MW-02

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
	1	21.01	18 -	23	20.56	6.73E+01	34.04	1.79E+02	1.77
M	2	31.27	24 -	39	30.81	1.73E+03	88.76	1.60E+02	2.39
m	3	35.50	24 -	39	35.04	3.95E+02	81.79	8.63E+01	2.46
	4	53.42	51 -	56	52.95	4.35E+01	25.94	1.01E+02	2.70
M	5	62.37	57 -	72	61.90	1.51E+02	38.52	1.23E+02	2.50
m	6	66.24	57 -	72	65.77	7.38E+01	37.68	1.03E+02	2.51
	7	81.45	76 -	87	80.98	6.58E+02	66.66	2.22E+02	2.22
	8	93.74	90 -	97	93.26	3.67E+01	23.58	6.87E+01	2.89
M	9	111.98	106 -	119	111.49	1.19E+02	34.41	1.06E+02	2.82
m	10	116.98	106 -	119	116.49	2.98E+01	26.36	1.03E+02	2.37
	11	161.75	157 -	165	161.24	2.55E+01	29.37	1.17E+02	1.46
	12	276.28	271 -	279	275.73	4.01E+01	20.55	3.98E+01	1.62
	13	304.25	297 -	310	303.69	1.30E+02	31.94	5.39E+01	2.89
	14	335.15	328 -	341	334.58	5.23E+01	22.91	3.53E+01	2.48
	15	356.52	350 -	361	355.95	2.80E+02	38.78	4.79E+01	2.07
	16	387.10	379 -	395	386.51	1.74E+02	32.45	3.40E+01	5.47
	17	418.50	411 -	424	417.90	2.05E+01	19.82	3.30E+01	1.36
	18	437.85	431 -	442	437.25	2.81E+01	17.44	2.38E+01	2.04
	19	1017.15	1012 -	1020	1016.38	8.00E+00	5.66	0.00E+00	1.16
	20	1041.50	1037 -	1043	1040.71	7.00E+00	5.29	0.00E+00	1.98

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet
Errors quoted at 2.000sigma

BACKGROUND SUBTRACT REPORT

Peak Analysis Performed on : 3/2/2021 9:15:12AM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000107931.CNF

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
	1	21.01	6.73E+01	34.04			6.73E+01	3.40E+01
M	2	31.27	1.73E+03	88.76			1.73E+03	8.88E+01
m	3	35.50	3.95E+02	81.79			3.95E+02	8.18E+01
	4	53.42	4.35E+01	25.94			4.35E+01	2.59E+01
M	5	62.37	1.51E+02	38.52	1.23E+01	2.13E+00	1.39E+02	3.86E+01
m	6	66.24	7.38E+01	37.68	1.23E+01	2.13E+00	6.15E+01	3.77E+01
	7	81.45	6.58E+02	66.66			6.58E+02	6.67E+01
	8	93.74	3.67E+01	23.58	1.39E+01	2.20E+00	2.28E+01	2.37E+01
M	9	111.98	1.19E+02	34.41	0.00E+00	0.00E+00	1.19E+02	3.44E+01

Analysis Report for 2102080-06

MW-02

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
m	10	116.98	2.98E+01	26.36			2.98E+01	2.64E+01
	11	161.75	2.55E+01	29.37			2.55E+01	2.94E+01
	12	276.28	4.01E+01	20.55			4.01E+01	2.05E+01
	13	304.25	1.30E+02	31.94			1.30E+02	3.19E+01
	14	335.15	5.23E+01	22.91			5.23E+01	2.29E+01
	15	356.52	2.80E+02	38.78			2.80E+02	3.88E+01
	16	387.10	1.74E+02	32.45			1.74E+02	3.24E+01
	17	418.50	2.05E+01	19.82			2.05E+01	1.98E+01
	18	437.85	2.81E+01	17.44			2.81E+01	1.74E+01
	19	1017.15	8.00E+00	5.66			8.00E+00	5.66E+00
	20	1041.50	7.00E+00	5.29			7.00E+00	5.29E+00

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet
Errors quoted at 2.000sigma

NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)		Yield(%)	Activity (pCi/units)	Activity Uncertainty
I-129	0.78	29.78	*	57.00	5.20E+02	5.58E+01
		33.60	*	13.20	4.91E+02	1.11E+02
		39.58		7.52		
BA-133	0.98	81.00	*	34.06	3.43E+02	4.84E+01
		302.84	*	18.33	4.65E+02	1.92E+02
		356.01	*	62.05	3.82E+02	7.97E+01
PA-234M	0.34	9.89		89.00		
		21.72	*	64.90	2.18E+01	1.13E+01
		37.93	*	23.75	2.73E+02	6.18E+01
TH-234	0.97	63.29	*	3.80	5.95E+02	1.74E+02

Analysis Report for 2102080-06

MW-02

* = Energy line found in the spectrum.
\- = Manually added nuclide.
? = Manually edited nuclide.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 2.500 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000sigma

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/units)	Wt mean Activity Uncertainty	Comments
I-129	0.784	5.06E+02	5.01E+01	
BA-133	0.987	3.59E+02	4.05E+01	
PA-234M	0.341	2.09E+01	1.12E+01	
TH-234	0.979	5.95E+02	1.74E+02	

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000sigma

Analysis Report for 2102080-06
MW-02

UNIDENTIFIED PEAKS

Peak Locate Performed on : 3/2/2021 9:15:12AM
Peak Locate From Channel : 1
Peak Locate To Channel : 4096

	Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
	4	53.42	4.83274E-02	29.82	Sum	
m	6	66.24	6.82890E-02	30.71	Sum	
	8	93.74	2.53095E-02	51.98	Sum	
M	9	111.98	1.31723E-01	14.51	Sum	
m	10	116.98	3.30599E-02	44.29	Sum	
	11	161.75	2.83333E-02	57.59	Sum	
	12	276.28	4.45556E-02	25.62		
	14	335.15	5.81429E-02	21.89	Sum	
	16	387.10	1.93333E-01	9.32	Sum	
	17	418.50	2.27928E-02	48.32	Sum	
	18	437.85	3.12222E-02	31.02	Sum	
	19	1017.15	8.88889E-03	35.36		
	20	1041.50	7.77778E-03	37.80		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet
Errors quoted at 2.000sigma

NUCLIDE MDA REPORT

Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

Nuclide Name	Energy (keV)	Yield(%)	Line MDA (pCi/units)	Nuclide MDA (pCi/units)	Activity (pCi/units)	Dec. Level (pCi/units)
CA-41	3.00	77.00	1.38E+01	1.38E+01	0.00E+00	0.00E+00
	3.31	12.30	6.90E+01		0.00E+00	0.00E+00
FE-55	5.89	24.50	1.10E+01	1.10E+01	0.00E+00	0.00E+00

Analysis Report for 2102080-06

MW-02

	Nuclide Name	Energy (keV)		Yield(%)	Line MDA (pCi/units)	Nuclide MDA (pCi/units)	Activity (pCi/units)	Dec. Level (pCi/units)
	CO-57	122.06		85.51	1.11E+01	1.11E+01	8.11E+00	5.21E+00
		136.48		10.60	1.10E+02		3.18E+01	5.19E+01
	NI-59	6.92		29.80	4.79E+01	4.79E+01	-2.42E+01	2.05E+01
	MO-93	16.59		52.90	2.63E+01	2.63E+01	-3.36E+00	1.25E+01
		18.60		10.00	1.49E+02		7.36E+00	7.15E+01
	NB-93M	16.57		9.43	1.48E+02	1.48E+02	-1.89E+01	7.03E+01
	CD-109	88.03		3.72	1.84E+02	1.84E+02	-9.67E+00	8.55E+01
	SN-113	255.12		1.93	7.72E+02	7.32E+01	-5.29E+01	3.51E+02
		391.69		61.90	7.32E+01		1.91E+01	3.44E+01
	SN-119M	23.87		16.10	7.90E+01	5.27E+01	-3.03E+01	3.78E+01
		25.10		22.70	5.27E+01		-8.98E+02	2.52E+01
+	I-129	29.78	*	57.00	2.76E+01	2.76E+01	5.20E+02	1.34E+01
		33.60	*	13.20	1.12E+02		4.91E+02	5.42E+01
		39.58		7.52	1.41E+02		-7.48E+00	6.76E+01
+	BA-133	81.00	*	34.06	3.80E+01	3.80E+01	3.43E+02	1.83E+01
		302.84	*	18.33	1.41E+02		4.65E+02	6.58E+01
		356.01	*	62.05	4.76E+01		3.82E+02	2.20E+01
	CE-139	165.85		80.35	1.77E+01	1.77E+01	1.29E+00	8.34E+00
	CE-144	133.54		10.80	1.07E+02	1.07E+02	7.69E+01	5.03E+01
	HG-203	279.19		77.30	2.75E+01	2.75E+01	3.44E-01	1.27E+01
	PB-210	46.50		4.25	1.60E+02	1.60E+02	8.38E+01	7.51E+01
	TH-231	25.64		14.70	8.04E+01	8.04E+01	-1.37E+03	3.85E+01
		84.21		6.40	3.02E+02		1.07E+03	1.47E+02
+	PA-234M	9.89		89.00	2.11E+01	1.68E+01	1.70E+01	9.89E+00
		21.72	*	64.90	1.68E+01		2.18E+01	7.96E+00
		37.93	*	23.75	6.21E+01		2.73E+02	3.01E+01
+	TH-234	63.29	*	3.80	3.39E+02	3.39E+02	5.95E+02	1.64E+02
	NP-237	29.37		14.00	2.49E+02	6.90E+01	1.82E+03	1.23E+02
		86.50		12.60	6.90E+01		-2.83E+00	3.25E+01
	U-237	97.08		16.30	4.49E+01	2.90E+01	3.85E+00	2.08E+01
		101.07		26.30	2.90E+01		1.33E+01	1.35E+01
		114.00		12.30	1.20E+02		1.98E+02	5.78E+01
		208.01		22.00	7.16E+01		4.22E+00	3.34E+01
	AM-241	59.54		35.90	2.97E+01	2.97E+01	1.60E+01	1.42E+01
	AM-243	74.67		66.00	1.08E+01	1.08E+01	2.49E+00	5.06E+00

\+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
\> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

LELAP CERTIFICATE NUMBER: 01955
DOD-ELAP ACCREDITATION NUMBER: 74960

ANALYTICAL RESULTS

PERFORMED BY

Pace Analytical Gulf Coast
7979 Innovation Park Dr.
Baton Rouge, LA 70820
(225) 769-4900

Report Date 03/02/2021

Report # 221021116

Project 0519829 JLS

Deliver To	***Additional Recipients***
Jonathan Miller ERM 3838 N. Causeway Blvd. Suite 3000 LA 70002	Guy Guinot, ERM

Laboratory Endorsement

Sample analysis was performed in accordance with approved methodologies provided by the Environmental Protection Agency or other recognized agencies. The samples and their corresponding extracts will be maintained for a period of 30 days unless otherwise arranged. Following this retention period the samples will be disposed in accordance with Pace Gulf Coast's Standard Operating Procedures.

Common Abbreviations that may be Utilized in this Report

ND	Indicates the result was Not Detected at the specified reporting limit
NO	Indicates the sample did not ignite when preliminary test performed for EPA Method 1030
DO	Indicates the result was Diluted Out
MI	Indicates the result was subject to Matrix Interference
TNTC	Indicates the result was Too Numerous To Count
SUBC	Indicates the analysis was Sub-Contracted
FLD	Indicates the analysis was performed in the Field
DL	Detection Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
RE	Re-analysis
CF	HPLC or GC Confirmation
00:01	Reported as a time equivalent to 12:00 AM

Reporting Flags that may be Utilized in this Report

J or I	Indicates the result is between the MDL and LOQ
J	DOD flag on analyte in the parent sample for MS/MSD outside acceptance criteria
U	Indicates the compound was analyzed for but not detected
B or V	Indicates the analyte was detected in the associated Method Blank
Q	Indicates a non-compliant QC Result (See Q Flag Application Report)
*****	Indicates a non-compliant or not applicable QC recovery or RPD – see narrative
E	Organics - The result is estimated because it exceeded the instrument calibration range
E	Metals - % diference for the serial dilution is > 10%
L	Reporting Limits adjusted to meet risk-based limit.
P	RPD between primary and confirmation result is greater than 40
DL	Diluted analysis – when appended to Client Sample ID

Sample receipt at Pace Gulf Coast is documented through the attached chain of custody. In accordance with NELAC, this report shall be reproduced only in full and with the written permission of Pace Gulf Coast. The results contained within this report relate only to the samples reported. The documented results are presented within this report.

This report pertains only to the samples listed in the Report Sample Summary and should be retained as a permanent record thereof. The results contained within this report are intended for the use of the client. Any unauthorized use of the information contained in this report is prohibited.

I certify that this data package is in compliance with The NELAC Institute (TNI) Standard 2009 and terms and conditions of the contract and Statement of Work both technically and for completeness, for other than the conditions in the case narrative. Release of the data contained in this hardcopy data package and in the computer readable data submitted has been authorized by the Quality Assurance Manager or his/her designee, as verified by the following signature.

Estimated uncertainty of measurement is available upon request. This report is in compliance with the DOD QSM as specified in the contract if applicable.

Authorized Signature
Pace Gulf Coast Report 221021116

Certifications

Certification	Certification Number
DOD ELAP	74960
Alabama	01955
Arkansas	88-0655
Colorado	01955
Delaware	01955
Florida	E87854
Georgia	01955
Hawaii	01955
Idaho	01955
Illinois	200048
Indiana	01955
Kansas	E-10354
Kentucky	95
Louisiana	01955
Maryland	01955
Massachusetts	01955
Michigan	01955
Mississippi	01955
Missouri	01955
Montana	N/A
Nebraska	01955
New Mexico	01955
North Carolina	618
North Dakota	R-195
Oklahoma	9403
South Carolina	73006001
South Dakota	01955
Tennessee	01955
Texas	T104704178
Vermont	01955
Virginia	460215
Washington	C929
USDA Soil Permit	P330-16-00234

Case Narrative

Client: ERM-Baton Rouge **Report:** 221021116

Pace Analytical Gulf Coast received and analyzed the sample(s) listed
on the Report Sample Summary page of this report. Receipt of the sample(s) is documented
by the attached chain of custody. This applies only to the sample(s) listed in this report.
No sample integrity or quality control exceptions were identified unless noted below.

PROJECT MANAGER COMMENTS

The laboratory lost power on Monday, 02/15/21 due to inclement weather. It was not restored until late Wednesday, 02/17/21. Due to this issue, all TDS samples in this SDG (MW-1, MW-3 and MW-2) were analyzed outside the defined holding time. Per client report the TDS results with a narrative. (Anna Kinchen 02/24/2021 16:38)

MISCELLANEOUS

For Sample 22102111604 (TB-01), a date, time of collection or sample ID discrepancy between a container label and the chain of custody was noted at receipt.

Sample Summary

LAB ID	Client ID	Matrix	Collect Date	Receive Date
22102111601	MW-1	Water	02/09/2021 10:15	02/10/2021 14:15
22102111602	MW-3	Water	02/09/2021 12:15	02/10/2021 14:15
22102111603	MW-2	Water	02/09/2021 14:15	02/10/2021 14:15
22102111604	TB-01	Water	02/09/2021 00:01	02/10/2021 14:15

Sample Results

MW-1	Collect Date	02/09/2021 10:15	LAB ID	22102111601
	Receive Date	02/10/2021 14:15	Matrix	Water

EPA 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/18/2021 22:21	RXJ	704094

CAS#	Parameter	Result	LOQ	Units
71-43-2	Benzene	ND	0.00500	mg/L
100-41-4	Ethylbenzene	ND	0.00500	mg/L
108-88-3	Toluene	ND	0.00500	mg/L
1330-20-7	Xylene (total)	ND	0.015	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	0.05	.05	mg/L	99	78 - 130
1868-53-7	Dibromofluoromethane	0.05	.053	mg/L	107	77 - 127
2037-26-5	Toluene d8	0.05	.052	mg/L	103	76 - 134
17060-07-0	1,2-Dichloroethane-d4	0.05	.05	mg/L	99	71 - 127

MADEP VPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/18/2021 20:03	JAR	704121

CAS#	Parameter	Result	LOQ	Units
GCSV-02-10	Aliphatic >C8-C10	ND	0.020	mg/L
GCSV-02-30	Aliphatic C6-C8	ND	0.030	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
615-59-8	2,5-Dibromotoluene	0.05	.051	mg/L	102	-

MADEP VPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/18/2021 20:03	JAR	704120

CAS#	Parameter	Result	LOQ	Units
GCSV-02-14	Aromatic >C8-C10	ND	0.030	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
615-59-8	2,5-Dibromotoluene	0.05	.043	mg/L	86	-

MADEP EPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/12/2021 20:25	703848	MADEP EPH Revision 1.1 (LA)	1	02/18/2021 01:57	MFS	704061

CAS#	Parameter	Result	LOQ	Units
GCSV-02-11	Aliphatic >C10-C12	ND	0.100	mg/L
GCSV-02-12	Aliphatic >C12-C16	ND	0.100	mg/L
GCSV-02-31	Aliphatic >C16-C35	ND	0.150	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
3386-33-2	1-Chlorooctadecane	0.16	.08	mg/L	50	40 - 140

Sample Results

MW-1

Collect Date	02/09/2021 10:15	**LAB ID**	22102111601
Receive Date	02/10/2021 14:15	**Matrix**	Water

MADEP EPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/12/2021 20:25	703848	MADEP EPH Revision 1.1 (LA)	1	02/18/2021 01:57	MFS	704060

CAS#	Parameter	Result	LOQ	Units
GCSV-05-18	Aromatic >C21-C35	ND	0.100	mg/L
GCSV-02-15	Unadjusted >C10-C12 Aromatics	ND	0.100	mg/L
GCSV-02-16	Unadjusted >C12-C16 Aromatics	ND	0.100	mg/L
GCSV-02-17	Unadjusted >C16-C21 Aromatics	ND	0.100	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.16	.154	mg/L	96	40 - 140
580-13-2	2-Bromonaphthalene	0.16	.174	mg/L	109	40 - 140
321-60-8	2-Fluorobiphenyl	0.16	.171	mg/L	107	40 - 140

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/12/2021 07:45	703863	EPA 3010A	1	02/12/2021 16:15	TJR	703955

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	0.11	0.0010	mg/L
7440-70-2	Calcium	360	0.50	mg/L
7439-89-6	Iron	35.8	0.10	mg/L
7439-96-5	Manganese	1.51	0.0050	mg/L
7440-09-7	Potassium	8.68	0.10	mg/L

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/12/2021 07:45	703863	EPA 3010A	10	02/25/2021 19:02	LWZ	704610

CAS#	Parameter	Result	LOQ	Units
7440-39-3	Barium	1.68	0.010	mg/L
7439-95-4	Magnesium	137	1.00	mg/L
7440-23-5	Sodium	366	1.00	mg/L
7440-24-6	Strontium	2.47	0.010	mg/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/12/2021 09:20	703862	EPA 3005A Dissolved	1	02/18/2021 14:26	TJR	704046

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	0.091	0.0010	mg/L
7439-89-6	Iron	31.4	0.10	mg/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/12/2021 09:20	703862	EPA 3005A Dissolved	10	02/26/2021 12:23	LWZ	704722

CAS#	Parameter	Result	LOQ	Units
7440-39-3	Barium	1.52	0.010	mg/L

Sample Results

MW-1

Collect Date	02/09/2021 10:15	**LAB ID**	22102111601
Receive Date	02/10/2021 14:15	**Matrix**	Water

EPA 6020B Dissolved (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/12/2021 09:20	703862	EPA 3005A Dissolved	10	02/26/2021 12:23	LWZ	704722

CAS#	Parameter	Result	LOQ	Units
7439-96-5	Manganese	1.46	0.050	mg/L
7440-24-6	Strontium	2.29	0.010	mg/L

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	10	02/12/2021 13:29	AJE	703939

CAS#	Parameter	Result	LOQ	Units
24959-67-9	Bromide	ND	2.00	mg/L
14808-79-8	Sulfate	ND	2.00	mg/L

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	200	02/12/2021 13:07	AJE	703939

CAS#	Parameter	Result	LOQ	Units
16887-00-6	Chloride	1190	40.0	mg/L

SM 2320 B-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/11/2021 11:34	RYC	703858

CAS#	Parameter	Result	LOQ	Units
T-005-C	Carbonate Alkalinity	ND	1.0	mg/L CaCO3

SM 2320 B-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/11/2021 11:34	RYC	703858

CAS#	Parameter	Result	LOQ	Units
T-005-B	Bicarbonate Alkalinity	545	1.0	mg/L CaCO3

SM 2540 C-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/23/2021 13:45	CJS	704396

CAS#	Parameter	Result	LOQ	Units
WET-035	Total Dissolved Solids(TDS)	3020	10.0	mg/L

Sample Results

MW-3

Collect Date	02/09/2021 12:15	**LAB ID**	22102111602
Receive Date	02/10/2021 14:15	**Matrix**	Water

EPA 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/18/2021 22:43	RXJ	704094

CAS#	Parameter	Result	LOQ	Units
71-43-2	Benzene	ND	0.00500	mg/L
100-41-4	Ethylbenzene	ND	0.00500	mg/L
108-88-3	Toluene	ND	0.00500	mg/L
1330-20-7	Xylene (total)	ND	0.015	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	0.05	.052	mg/L	104	78 - 130
1868-53-7	Dibromofluoromethane	0.05	.054	mg/L	108	77 - 127
2037-26-5	Toluene d8	0.05	.051	mg/L	101	76 - 134
17060-07-0	1,2-Dichloroethane-d4	0.05	.051	mg/L	102	71 - 127

MADEP VPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/18/2021 20:33	JAR	704121

CAS#	Parameter	Result	LOQ	Units
GCSV-02-10	Aliphatic >C8-C10	ND	0.020	mg/L
GCSV-02-30	Aliphatic C6-C8	ND	0.030	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
615-59-8	2,5-Dibromotoluene	0.05	.052	mg/L	103	-

MADEP VPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/18/2021 20:33	JAR	704120

CAS#	Parameter	Result	LOQ	Units
GCSV-02-14	Aromatic >C8-C10	ND	0.030	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
615-59-8	2,5-Dibromotoluene	0.05	.043	mg/L	86	-

MADEP EPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/12/2021 20:25	703848	MADEP EPH Revision 1.1 (LA)	1	02/18/2021 02:16	MFS	704061

CAS#	Parameter	Result	LOQ	Units
GCSV-02-11	Aliphatic >C10-C12	ND	0.100	mg/L
GCSV-02-12	Aliphatic >C12-C16	ND	0.100	mg/L
GCSV-02-31	Aliphatic >C16-C35	ND	0.150	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
3386-33-2	1-Chlorooctadecane	0.16	.064	mg/L	40	40 - 140

Sample Results

MW-3				
	Collect Date	02/09/2021 12:15	LAB ID	22102111602
	Receive Date	02/10/2021 14:15	Matrix	Water

MADEP EPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/12/2021 20:25	703848	MADEP EPH Revision 1.1 (LA)	1	02/18/2021 02:16	MFS	704060

CAS#	Parameter	Result	LOQ	Units
GCSV-05-18	Aromatic >C21-C35	0.242	0.100	mg/L
GCSV-02-15	Unadjusted >C10-C12 Aromatics	ND	0.100	mg/L
GCSV-02-16	Unadjusted >C12-C16 Aromatics	ND	0.100	mg/L
GCSV-02-17	Unadjusted >C16-C21 Aromatics	ND	0.100	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.16	.159	mg/L	99	40 - 140
580-13-2	2-Bromonaphthalene	0.16	.177	mg/L	111	40 - 140
321-60-8	2-Fluorobiphenyl	0.16	.173	mg/L	108	40 - 140

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/12/2021 07:45	703863	EPA 3010A	1	02/12/2021 16:23	TJR	703955

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	0.095	0.0010	mg/L
7440-70-2	Calcium	317	0.50	mg/L
7439-89-6	Iron	25.3	0.10	mg/L
7439-96-5	Manganese	1.04	0.0050	mg/L
7440-09-7	Potassium	6.70	0.10	mg/L

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/12/2021 07:45	703863	EPA 3010A	10	02/25/2021 19:06	LWZ	704610

CAS#	Parameter	Result	LOQ	Units
7440-39-3	Barium	1.38	0.010	mg/L
7439-95-4	Magnesium	126	1.00	mg/L
7440-23-5	Sodium	235	1.00	mg/L
7440-24-6	Strontium	2.12	0.010	mg/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/12/2021 09:20	703862	EPA 3005A Dissolved	1	02/18/2021 14:29	TJR	704046

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	0.079	0.0010	mg/L
7439-89-6	Iron	22.2	0.10	mg/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/12/2021 09:20	703862	EPA 3005A Dissolved	10	02/26/2021 12:26	LWZ	704722

CAS#	Parameter	Result	LOQ	Units
7440-39-3	Barium	1.20	0.010	mg/L

Sample Results

MW-3				
	Collect Date	02/09/2021 12:15	LAB ID	22102111602
	Receive Date	02/10/2021 14:15	Matrix	Water

EPA 6020B Dissolved (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/12/2021 09:20	703862	EPA 3005A Dissolved	10	02/26/2021 12:26	LWZ	704722

CAS#	Parameter	Result	LOQ	Units
7439-96-5	Manganese	1.05	0.050	mg/L
7440-24-6	Strontium	1.91	0.010	mg/L

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	5	02/12/2021 22:03	AJE	703939

CAS#	Parameter	Result	LOQ	Units
24959-67-9	Bromide	1.00	1.00	mg/L
14808-79-8	Sulfate	1.03	1.00	mg/L

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	200	02/12/2021 13:52	AJE	703939

CAS#	Parameter	Result	LOQ	Units
16887-00-6	Chloride	831	40.0	mg/L

SM 2320 B-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/11/2021 11:34	RYC	703858

CAS#	Parameter	Result	LOQ	Units
T-005-C	Carbonate Alkalinity	ND	1.0	mg/L CaCO3

SM 2320 B-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/11/2021 11:34	RYC	703858

CAS#	Parameter	Result	LOQ	Units
T-005-B	Bicarbonate Alkalinity	554	1.0	mg/L CaCO3

SM 2540 C-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/23/2021 13:45	CJS	704396

CAS#	Parameter	Result	LOQ	Units
WET-035	Total Dissolved Solids(TDS)	2170	10.0	mg/L

Sample Results

MW-2

Collect Date	02/09/2021 14:15	**LAB ID**	22102111603
Receive Date	02/10/2021 14:15	**Matrix**	Water

EPA 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/18/2021 23:05	RXJ	704094

CAS#	Parameter	Result	LOQ	Units
71-43-2	Benzene	ND	0.00500	mg/L
100-41-4	Ethylbenzene	ND	0.00500	mg/L
108-88-3	Toluene	ND	0.00500	mg/L
1330-20-7	Xylene (total)	ND	0.015	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	0.05	.052	mg/L	104	78 - 130
1868-53-7	Dibromofluoromethane	0.05	.053	mg/L	106	77 - 127
2037-26-5	Toluene d8	0.05	.051	mg/L	101	76 - 134
17060-07-0	1,2-Dichloroethane-d4	0.05	.051	mg/L	101	71 - 127

MADEP VPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/18/2021 21:03	JAR	704121

CAS#	Parameter	Result	LOQ	Units
GCSV-02-10	Aliphatic >C8-C10	ND	0.020	mg/L
GCSV-02-30	Aliphatic C6-C8	ND	0.030	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
615-59-8	2,5-Dibromotoluene	0.05	.051	mg/L	103	-

MADEP VPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/18/2021 21:03	JAR	704120

CAS#	Parameter	Result	LOQ	Units
GCSV-02-14	Aromatic >C8-C10	ND	0.030	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
615-59-8	2,5-Dibromotoluene	0.05	.043	mg/L	87	-

MADEP EPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/12/2021 20:25	703848	MADEP EPH Revision 1.1 (LA)	1	02/18/2021 02:35	MFS	704061

CAS#	Parameter	Result	LOQ	Units
GCSV-02-11	Aliphatic >C10-C12	ND	0.100	mg/L
GCSV-02-12	Aliphatic >C12-C16	ND	0.100	mg/L
GCSV-02-31	Aliphatic >C16-C35	ND	0.150	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
3386-33-2	1-Chlorooctadecane	0.16	.074	mg/L	46	40 - 140

Sample Results

MW-2

Collect Date	02/09/2021 14:15	**LAB ID**	22102111603
Receive Date	02/10/2021 14:15	**Matrix**	Water

MADEP EPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/12/2021 20:25	703848	MADEP EPH Revision 1.1 (LA)	1	02/18/2021 02:35	MFS	704060

CAS#	Parameter	Result	LOQ	Units
GCSV-05-18	Aromatic >C21-C35	ND	0.100	mg/L
GCSV-02-15	Unadjusted >C10-C12 Aromatics	ND	0.100	mg/L
GCSV-02-16	Unadjusted >C12-C16 Aromatics	ND	0.100	mg/L
GCSV-02-17	Unadjusted >C16-C21 Aromatics	ND	0.100	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.16	.159	mg/L	99	40 - 140
580-13-2	2-Bromonaphthalene	0.16	.193	mg/L	121	40 - 140
321-60-8	2-Fluorobiphenyl	0.16	.188	mg/L	118	40 - 140

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/12/2021 07:45	703863	EPA 3010A	1	02/12/2021 16:30	TJR	703955

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	0.10	0.0010	mg/L
7440-39-3	Barium	0.71	0.0010	mg/L
7440-70-2	Calcium	148	0.50	mg/L
7439-89-6	Iron	15.5	0.10	mg/L
7439-95-4	Magnesium	53.1	0.10	mg/L
7439-96-5	Manganese	0.64	0.0050	mg/L
7440-09-7	Potassium	5.52	0.10	mg/L
7440-24-6	Strontium	0.98	0.0010	mg/L

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/12/2021 07:45	703863	EPA 3010A	10	02/18/2021 16:00	LWZ	NA

CAS#	Parameter	Result	LOQ	Units
7440-23-5	Sodium	260	1.00	mg/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/12/2021 09:20	703862	EPA 3005A Dissolved	1	02/18/2021 14:33	TJR	704046

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	0.087	0.0010	mg/L
7440-39-3	Barium	0.56	0.0010	mg/L
7439-89-6	Iron	11.3	0.10	mg/L
7439-96-5	Manganese	0.50	0.0050	mg/L
7440-24-6	Strontium	0.83	0.0010	mg/L

Sample Results

MW-2

Collect Date 02/09/2021 14:15 **LAB ID** 22102111603
Receive Date 02/10/2021 14:15 **Matrix** Water

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	2	02/12/2021 22:25	AJE	703939

CAS#	Parameter	Result	LOQ	Units
24959-67-9	Bromide	ND	0.400	mg/L
14808-79-8	Sulfate	0.412	0.400	mg/L

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	100	02/12/2021 14:36	AJE	703939

CAS#	Parameter	Result	LOQ	Units
16887-00-6	Chloride	285	20.0	mg/L

SM 2320 B-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/11/2021 11:34	RYC	703858

CAS#	Parameter	Result	LOQ	Units
T-005-C	Carbonate Alkalinity	ND	1.0	mg/L CaCO3

SM 2320 B-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/11/2021 11:34	RYC	703858

CAS#	Parameter	Result	LOQ	Units
T-005-B	Bicarbonate Alkalinity	676	1.0	mg/L CaCO3

SM 2540 C-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/23/2021 13:45	CJS	704396

CAS#	Parameter	Result	LOQ	Units
WET-035	Total Dissolved Solids(TDS)	1110	10.0	mg/L

TB-01

Collect Date 02/09/2021 00:01 **LAB ID** 22102111604
Receive Date 02/10/2021 14:15 **Matrix** Water

EPA 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/18/2021 15:46	RXJ	704094

CAS#	Parameter	Result	LOQ	Units
71-43-2	Benzene	ND	0.00500	mg/L
100-41-4	Ethylbenzene	ND	0.00500	mg/L
108-88-3	Toluene	ND	0.00500	mg/L

Sample Results

TB-01				
	Collect Date	02/09/2021 00:01	LAB ID	22102111604
	Receive Date	02/10/2021 14:15	Matrix	Water

EPA 8260B (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/18/2021 15:46	RXJ	704094

CAS#	Parameter	Result	LOQ	Units
1330-20-7	Xylene (total)	ND	0.015	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	0.05	.051	mg/L	102	78 - 130
1868-53-7	Dibromofluoromethane	0.05	.052	mg/L	103	77 - 127
2037-26-5	Toluene d8	0.05	.05	mg/L	101	76 - 134
17060-07-0	1,2-Dichloroethane-d4	0.05	.049	mg/L	98	71 - 127

GC/MS Volatiles QC Summary

Analytical Batch 704094	Client ID	MB704094		LCS704094				LCSD704094				
	LAB ID	2145816		2145817				2145818				
	Sample Type	MB		LCS				LCSD				
	Prep Date											
	Analysis Date	02/18/21 15:24		02/18/21 12:51				02/18/21 13:13				
	Matrix	Water		Water				Water				
EPA 8260B		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Benzene	71-43-2	ND	0.00500	0.050	0.050	100	70 - 129	0.050	0.049	97	2	20
Ethylbenzene	100-41-4	ND	0.00500	0.050	0.051	102	74 - 126	0.050	0.050	101	2	30
Toluene	108-88-3	ND	0.00500	0.050	0.050	101	72 - 120	0.050	0.049	99	2	20
Xylene (total)	1330-20-7	ND	0.015	0.150	0.158	105	74 - 127	0.150	0.154	103	3	30
Surrogate												
1,2-Dichloroethane-d4	17060-07-0	.0492	98	.05	.0481	96	71 - 127	.05	.0482	96	NA	NA
4-Bromofluorobenzene	460-00-4	.0513	103	.05	.0531	106	78 - 130	.05	.053	106	NA	NA
Dibromofluoromethane	1868-53-7	.0514	103	.05	.0504	101	77 - 127	.05	.0508	102	NA	NA
Toluene d8	2037-26-5	.0501	100	.05	.0504	101	76 - 134	.05	.05	100	NA	NA

GC Volatiles QC Summary

Analytical Batch	Client ID	MB704120		LCS704120				LCSD704120				
704120	LAB ID	2145936		2145937				2145938				
	Sample Type	MB		LCS				LCSD				
	Prep Date											
	Analysis Date	02/18/21 14:58		02/18/21 12:58				02/18/21 14:00				
	Matrix	Water		Water				Water				
MADEP VPH Revision 1.1 (LA)		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Aromatic >C8-C10	GCSV-02-14	ND	0.030	0.150	0.129	86	60 - 140	0.150	0.163	109	23	30
Surrogate												
2,5-Dibromotoluene	615-59-8	.0451	90	.05	.0356	71	-	.05	.0451	90	NA	NA

Analytical Batch	Client ID	MB704121		LCS704121				LCSD704121				
704121	LAB ID	2145939		2145940				2145941				
	Sample Type	MB		LCS				LCSD				
	Prep Date											
	Analysis Date	02/18/21 14:58		02/18/21 12:58				02/18/21 14:00				
	Matrix	Water		Water				Water				
MADEP VPH Revision 1.1 (LA)		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Aliphatic >C8-C10	GCSV-02-10	ND	0.020	0.100	0.112	112	60 - 140	0.100	0.106	106	6	30
Aliphatic C6-C8	GCSV-02-30	ND	0.030	0.150	0.164	109	60 - 140	0.150	0.164	109	0	30
Surrogate												
2,5-Dibromotoluene	615-59-8	.0523	105	.05	.0518	104	-	.05	.0516	103	NA	NA

GC Semi-Volatiles QC Summary

Analytical Batch	Client ID	MB703848	LCS703848	LCSD703848
704061	LAB ID	2144465	2144466	2144467
Prep Batch	Sample Type	MB	LCS	LCSD
703848	Prep Date	02/12/21 20:25	02/12/21 20:25	02/12/21 20:25
Prep Method	Analysis Date	02/18/21 10:14	02/18/21 10:33	02/18/21 10:52
MADEP EPH Revision 1.1 (LA)	Matrix	Water	Water	Water

MADEP EPH Revision 1.1 (LA)		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Aliphatic >C10-C12	GCSV-02-11	ND	0.100	0.400	0.324	81	30 - 140	0.400	0.282	71	14	40
Aliphatic >C12-C16	GCSV-02-12	ND	0.100	0.400	0.346	87	40 - 140	0.400	0.307	77	12	40
Aliphatic >C16-C35	GCSV-02-31	ND	0.150	1.80	1.70	94	40 - 140	1.80	1.45	81	16	40
Surrogate												
1-Chlorooctadecane	3386-33-2	.0856	54	.16	.0762	48	40 - 140	.16	.108	68	NA	NA

Analytical Batch	Client ID	MB703848	LCS703848	LCSD703848
704060	LAB ID	2144465	2144466	2144467
Prep Batch	Sample Type	MB	LCS	LCSD
703848	Prep Date	02/12/21 20:25	02/12/21 20:25	02/12/21 20:25
Prep Method	Analysis Date	02/17/21 20:53	02/18/21 14:04	02/18/21 14:23
MADEP EPH Revision 1.1 (LA)	Matrix	Water	Water	Water

MADEP EPH Revision 1.1 (LA)		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Aromatic >C21-C35	GCSV-05-18	ND	0.100	2.00	1.65	83	40 - 140	2.00	1.73	87	5	40
Unadjusted >C10-C12 Aromatics	GCSV-02-15	ND	0.100	0.200	0.255	128	30 - 140	0.200	0.247	124	3	40
Unadjusted >C12-C16 Aromatics	GCSV-02-16	ND	0.100	0.800	0.963	120	40 - 140	0.800	0.941	118	2	40
Unadjusted >C16-C21 Aromatics	GCSV-02-17	ND	0.100	0.400	0.451	113	40 - 140	0.400	0.450	113	0	40
Surrogate												
2-Bromonaphthalene	580-13-2	.206	129	.16	.192	120	40 - 140	.16	.187	117	NA	NA
2-Fluorobiphenyl	321-60-8	.204	128	.16	.19	119	40 - 140	.16	.186	116	NA	NA
o-Terphenyl	84-15-1	.182	114	.16	.139	87	40 - 140	.16	.141	88	NA	NA

Inorganics QC Summary

Analytical Batch	Client ID	MB703863	LCS703863
703955	LAB ID	2144572	2144573
Prep Batch	Sample Type	MB	LCS
703863	Prep Date	02/12/21 07:45	02/12/21 07:45
Prep Method	Analysis Date	02/12/21 15:44	02/12/21 15:47
EPA 3010A	Matrix	Water	Water

EPA 6020B		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Arsenic	7440-38-2	ND	0.0010	0.050	0.052	104	80 - 120
Barium	7440-39-3	ND	0.0010	0.050	0.051	102	80 - 120
Calcium	7440-70-2	ND	0.50	25.0	25.4	102	80 - 120
Iron	7439-89-6	ND	0.10	5.00	5.20	104	80 - 120
Magnesium	7439-95-4	ND	0.10	5.00	5.22	104	80 - 120
Manganese	7439-96-5	ND	0.0050	0.050	0.052	104	80 - 120
Potassium	7440-09-7	ND	0.10	5.00	5.05	101	80 - 120
Sodium	7440-23-5	ND	0.10	5.00	5.27	105	80 - 120
Strontium	7440-24-6	ND	0.0010	0.050	0.052	104	80 - 120

Analytical Batch	Client ID	MB703862	LCS703862	LCSD703862
704046	LAB ID	2144569	2144571	2144570
Prep Batch	Sample Type	MB	LCS	LCSD
703862	Prep Date	02/12/21 09:20	02/12/21 09:20	02/12/21 09:20
Prep Method	Analysis Date	02/18/21 14:15	02/18/21 14:22	02/18/21 14:19
EPA 3005A Dissolved	Matrix	Water	Water	Water

EPA 6020B Dissolved		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Arsenic	7440-38-2	ND	0.0010	0.050	0.053	107	80 - 120	0.050	0.053	106	0	20
Barium	7440-39-3	ND	0.0010	0.050	0.051	102	80 - 120	0.050	0.050	99	2	20
Iron	7439-89-6	ND	0.10	5.00	5.36	107	80 - 120	5.00	5.33	107	1	20
Manganese	7439-96-5	ND	0.0050	0.050	0.054	108	80 - 120	0.050	0.054	108	0	20
Strontium	7440-24-6	ND	0.0010	0.050	0.052	105	80 - 120	0.050	0.051	103	2	20

General Chemistry QC Summary

Analytical Batch	Client ID	MB703939		LCS703939				LCSD703939				
703939	LAB ID	2144967		2144968				2145347				
	Sample Type	MB		LCS				LCSD				
	Prep Date											
	Analysis Date	02/12/21 16:50		02/12/21 16:06				02/12/21 20:56				
	Matrix	Water		Water				Water				
EPA 9056A		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Bromide	24959-67-9	ND	0.200	2.50	2.53	101	80 - 120	2.50	2.54	102	0	15
Chloride	16887-00-6	ND	0.200	2.50	2.55	102	80 - 120	2.50	2.53	101	1	15
Sulfate	14808-79-8	ND	0.200	2.50	2.52	101	80 - 120	2.50	2.50	100	1	15

Analytical Batch	Client ID	MB704396	
704396	LAB ID	2147205	
	Sample Type	MB	
	Prep Date		
	Analysis Date	02/23/21 13:45	
	Matrix	Water	
SM 2540 C-2011		Units Result	mg/L LOQ
Total Dissolved Solids(TDS)	WET-035	ND	10.0

Client ID: 4271 - ERM-Baton Rouge
SDG: 221021116
PM: AMK

CHAIN-OF-CUSTODY Analytical Request Document

Pace Analytical

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affi

ALL SH

Company: ERM	Billing Information: SAME
Address: 5400 W Sam Houston Pkwy N. Suite 600 Houston, TX 77041	
Report To: Jonathan Miller	Email To:
Copy To: Dave Angle	Site Collection Info/Address:
Customer Project Name/Number: JLS / 051982 9	State: / County/City: Time Zone Collected: [ ]PT [ ]MT [ ]CT [ ]ET
Phone: 504.815.1764 Email: Jonathan.Miller@erm.com	Site/Facility ID #: Compliance Monitoring? [ ] Yes [ ] No
Collected By (print): Richard Tiahrt	Purchase Order #: Quote #: DW PWS ID #: DW Location Code:
Collected By (signature): Richard Tiahrt	Turnaround Date Required: STD Immediately Packed on Ice: [X] Yes [ ] No
Sample Disposal: [ ] Dispose as appropriate [ ] Return [ ] Archive: [ ] Hold:	Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply) Field Filtered (if applicable): [X] Yes [ ] No Analysis: Diss. Metals

Container Preservat: 3 3 1 1 U U 1

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns
MW-1	GW	G	2/9/21	1015				
MW-3	↓	↓		1215				
MW-2	↓	↓		1415				
TB-01								

Analyses: BTEX; VPH/EPH; Total Metals; Diss Metals; Cl, TDS, Carb/Bicarb Alk; SO4, Br; Ra 226/228 (Sub to Eberline)*

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y N NA
Custody Signatures Present	Y N NA
Collector Signature Present	Y N NA
Bottles Intact	Y N NA
Correct Bottles	Y N NA
Sufficient Volume	Y N NA
Samples Received on Ice	Y N NA
VOA - Headspace Acceptable	Y N NA
USDA Regulated Soils	Y N NA
Samples in Holding Time	Y N NA
Residual Chlorine Present	Y N NA
Cl Strips: _____	
Sample pH Acceptable	Y N NA
pH Strips: _____	
Sulfide Present	Y N NA
Lead Acetate Strips: _____	

LAB USE ONLY:
Lab Sample # / Comments:

* PADS are in a separate WO

AMK 2/11/21

Customer Remarks / Special Conditions / Possible Hazards:
Total Metals: As, Ba, Sr, Fe, Mn, Ca, Na, Mg, K
Diss Metals: As, Ba, Mn, Sr, Fe,

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #: 2536218

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: _____
Cooler 1 Temp Upon Receipt: _____oC
Cooler 1 Therm Corr. Factor: _____oC
Cooler 1 Corrected Temp: _____oC
Comments: 1.3 EBL

Trip Blank Received: Y N NA
HCL MeOH TSP Other

	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature)	2/10/21 1415		2/10/21 @1415
Relinquished by/Company: (Signature)	2/10/21 @1522		2.10.21 1415
Relinquished by/Company: (Signature)			

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Non Conformance(s): YES / NO

Page: _____ of: _____

SAMPLE RECEIVING CHECKLIST

SAMPLE DELIVERY GROUP 221021116	
Client **PM** AMK 4271 - ERM-Baton Rouge	**Transport Method** CUST
Profile Number 286447	**Received By** Jenkins, Mark A.
Line Item(s) 1 - Waters - BTEX	**Receive Date(s)** 02/10/21

CHECKLIST	YES	NO
Samples received with proper thermal preservation?	☑	☐
Radioactivity is <1600 cpm? If no, record cpm value in notes section.	☑	☐
COC relinquished and complete (including sampleIDs, collect times, and sampler)?	☑	☐
All containers received in good condition and within hold time?	☑	☐
All sample labels and containers received match the chain of custody?	☑	☐
Preservative added to any containers?	☐	☑
If received, was headspace for VOC water containers < 6mm?	☑	☐
Samples collected in containers provided by Pace Gulf Coast?	☑	☐

COOLERS

Airbill	Thermometer ID: E34	Temp °C
		1.3

DISCREPANCIES

22102111604 - TB-01:
Sample Discrepancy

LAB PRESERVATIONS

None

NOTES

NO SAMPLE COLLECT TIME LISTED

LELAP CERTIFICATE NUMBER: 01955
DOD-ELAP ACCREDITATION NUMBER: 74960

ANALYTICAL RESULTS

PERFORMED BY

Pace Analytical Gulf Coast
7979 Innovation Park Dr.
Baton Rouge, LA 70820
(225) 769-4900

Report Date 02/22/2021

Report # 221021129

Project 0519829 JLS

Deliver To	***Additional Recipients***
Jonathan Miller ERM 3838 N. Causeway Blvd. Suite 3000 LA 70002	Guy Guinot, ERM

Laboratory Endorsement

Sample analysis was performed in accordance with approved methodologies provided by the Environmental Protection Agency or other recognized agencies. The samples and their corresponding extracts will be maintained for a period of 30 days unless otherwise arranged. Following this retention period the samples will be disposed in accordance with Pace Gulf Coast's Standard Operating Procedures.

Common Abbreviations that may be Utilized in this Report

ND	Indicates the result was Not Detected at the specified reporting limit
NO	Indicates the sample did not ignite when preliminary test performed for EPA Method 1030
DO	Indicates the result was Diluted Out
MI	Indicates the result was subject to Matrix Interference
TNTC	Indicates the result was Too Numerous To Count
SUBC	Indicates the analysis was Sub-Contracted
FLD	Indicates the analysis was performed in the Field
DL	Detection Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
RE	Re-analysis
CF	HPLC or GC Confirmation
00:01	Reported as a time equivalent to 12:00 AM

Reporting Flags that may be Utilized in this Report

J or I	Indicates the result is between the MDL and LOQ
J	DOD flag on analyte in the parent sample for MS/MSD outside acceptance criteria
U	Indicates the compound was analyzed for but not detected
B or V	Indicates the analyte was detected in the associated Method Blank
Q	Indicates a non-compliant QC Result (See Q Flag Application Report)
*****	Indicates a non-compliant or not applicable QC recovery or RPD – see narrative
E	Organics - The result is estimated because it exceeded the instrument calibration range
E	Metals - % diference for the serial dilution is > 10%
L	Reporting Limits adjusted to meet risk-based limit.
P	RPD between primary and confirmation result is greater than 40
DL	Diluted analysis – when appended to Client Sample ID

Sample receipt at Pace Gulf Coast is documented through the attached chain of custody. In accordance with NELAC, this report shall be reproduced only in full and with the written permission of Pace Gulf Coast. The results contained within this report relate only to the samples reported. The documented results are presented within this report.

This report pertains only to the samples listed in the Report Sample Summary and should be retained as a permanent record thereof. The results contained within this report are intended for the use of the client. Any unauthorized use of the information contained in this report is prohibited.

I certify that this data package is in compliance with The NELAC Institute (TNI) Standard 2009 and terms and conditions of the contract and Statement of Work both technically and for completeness, for other than the conditions in the case narrative. Release of the data contained in this hardcopy data package and in the computer readable data submitted has been authorized by the Quality Assurance Manager or his/her designee, as verified by the following signature.

Estimated uncertainty of measurement is available upon request. This report is in compliance with the DOD QSM as specified in the contract if applicable.

Authorized Signature
Pace Gulf Coast Report 221021129

Certifications

Certification	Certification Number
DOD ELAP	74960
Alabama	01955
Arkansas	88-0655
Colorado	01955
Delaware	01955
Florida	E87854
Georgia	01955
Hawaii	01955
Idaho	01955
Illinois	200048
Indiana	01955
Kansas	E-10354
Kentucky	95
Louisiana	01955
Maryland	01955
Massachusetts	01955
Michigan	01955
Mississippi	01955
Missouri	01955
Montana	N/A
Nebraska	01955
New Mexico	01955
North Carolina	618
North Dakota	R-195
Oklahoma	9403
South Carolina	73006001
South Dakota	01955
Tennessee	01955
Texas	T104704178
Vermont	01955
Virginia	460215
Washington	C929
USDA Soil Permit	P330-16-00234

Case Narrative

Client: ERM-Baton Rouge **Report:** 221021129

Pace Analytical Gulf Coast received and analyzed the sample(s) listed
on the Report Sample Summary page of this report. Receipt of the sample(s) is documented
by the attached chain of custody. This applies only to the sample(s) listed in this report.
No sample integrity or quality control exceptions were identified unless noted below.

PROJECT MANAGER COMMENTS

The laboratory lost power on Monday, 02/15/21 due to inclement weather. It was not restored until late Wednesday, 02/17/21. After evaluation of the temperature monitoring system, we discovered a sample storage temperature excursion that occurred prior to analysis of some sample aliquots. For a period of 49 hours, samples were outside the 0-6 degrees Celsius temperature requirement. This affected PAH sample aliquots included in this report. We apologize for any inconvenience caused by this issue and appreciate the opportunity to support your analytical needs. (Anna Kinchen 02/22/2021 10:50)

SEMI-VOLATILES MASS SPECTROMETRY

In the EPA 8270 SIM analysis, the recoveries for the surrogates are below the lower control limits for sample 22102112902 (JLS-2 2-4). This is attributed to the sample matrix so no corrective action was taken.

In the EPA 8270C SIM analysis, samples 22102112904 (JLS-2 6-8) and 22102112903 (JLS-2 4-6) had to be diluted to eliminate interference from non-target background. This is reflected in elevated detection limits. The recoveries for the surrogates are reported as diluted out.

In the EPA 8270C SIM analysis for prep batch 704136, the MS/MSD exhibited RPD failures. All LCS/LCSD recoveries and RPDs are acceptable.

Sample Summary

LAB ID	Client ID	Matrix	Collect Date	Receive Date
22102112901	JLS-2 0-2	Solid	02/08/2021 12:45	02/10/2021 14:15
22102112902	JLS-2 2-4	Solid	02/08/2021 12:55	02/10/2021 14:15
22102112903	JLS-2 4-6	Solid	02/08/2021 13:05	02/10/2021 14:15
22102112904	JLS-2 6-8	Solid	02/08/2021 13:20	02/10/2021 14:15

Sample Results

JLS-2 0-2

Collect Date	02/08/2021 12:45	**LAB ID**	22102112901
Receive Date	02/10/2021 14:15	**Matrix**	Solid

EPA 8270C SIM

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/19/2021 08:15	704136	EPA 3546	1	02/20/2021 13:33	SMH	704244

CAS#	Parameter	Result	LOQ	Units
91-57-6	2-Methylnaphthalene	ND	0.00326	mg/kg
83-32-9	Acenaphthene	0.015	0.00651	mg/kg
208-96-8	Acenaphthylene	ND	0.00651	mg/kg
120-12-7	Anthracene	ND	0.00326	mg/kg
56-55-3	Benzo(a)anthracene	0.00984	0.00651	mg/kg
50-32-8	Benzo(a)pyrene	ND	0.00326	mg/kg
205-99-2	Benzo(b)fluoranthene	ND	0.00651	mg/kg
207-08-9	Benzo(k)fluoranthene	ND	0.00326	mg/kg
218-01-9	Chrysene	0.014	0.00651	mg/kg
53-70-3	Dibenz(a,h)anthracene	ND	0.00651	mg/kg
206-44-0	Fluoranthene	0.042	0.00326	mg/kg
86-73-7	Fluorene	0.012	0.00326	mg/kg
193-39-5	Indeno(1,2,3-cd)pyrene	0.00414	0.00326	mg/kg
91-20-3	Naphthalene	ND	0.00326	mg/kg
85-01-8	Phenanthrene	0.026	0.00326	mg/kg
129-00-0	Pyrene	0.040	0.00326	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
7297-45-2	2-Methylnaphthalene-d10	0.3290	.223	mg/kg	68	47 - 120
93951-69-0	Fluoranthene-d10	0.3290	.191	mg/kg	58	47 - 120

EPA 1312/6020B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/18/2021 07:00	704033	EPA 3010A	1	02/19/2021 17:03	LWZ	704205

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	0.0011	0.0010	mg/L
7440-39-3	Barium	0.067	0.0010	mg/L
7440-43-9	Cadmium	ND	0.0010	mg/L
7440-66-6	Zinc	ND	0.020	mg/L

EPA 9060A *Results Reported on Dry Weight Basis

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/20/2021 14:19	PLH	704256

CAS#	Parameter	Result	LOQ	Units
C-012	Total Organic Carbon	71600	250	mg/kg

Sample Results

JLS-2 2-4

Collect Date	02/08/2021 12:55	**LAB ID**	22102112902
Receive Date	02/10/2021 14:15	**Matrix**	Solid

EPA 8270C SIM

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/19/2021 08:15	704136	EPA 3546	1	02/20/2021 14:28	SMH	704244

CAS#	Parameter	Result	LOQ	Units
91-57-6	2-Methylnaphthalene	ND	0.00324	mg/kg
83-32-9	Acenaphthene	ND	0.00647	mg/kg
208-96-8	Acenaphthylene	ND	0.00647	mg/kg
120-12-7	Anthracene	ND	0.00324	mg/kg
56-55-3	Benzo(a)anthracene	ND	0.00647	mg/kg
50-32-8	Benzo(a)pyrene	ND	0.00324	mg/kg
205-99-2	Benzo(b)fluoranthene	ND	0.00647	mg/kg
207-08-9	Benzo(k)fluoranthene	ND	0.00324	mg/kg
218-01-9	Chrysene	ND	0.00647	mg/kg
53-70-3	Dibenz(a,h)anthracene	ND	0.00647	mg/kg
206-44-0	Fluoranthene	0.018	0.00324	mg/kg
86-73-7	Fluorene	0.00732	0.00324	mg/kg
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.00324	mg/kg
91-20-3	Naphthalene	ND	0.00324	mg/kg
85-01-8	Phenanthrene	0.015	0.00324	mg/kg
129-00-0	Pyrene	0.015	0.00324	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
7297-45-2	2-Methylnaphthalene-d10	0.3270	.052	mg/kg	16*	47 - 120
93951-69-0	Fluoranthene-d10	0.3270	.081	mg/kg	25*	47 - 120

EPA 1312/6020B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/18/2021 07:00	704033	EPA 3010A	1	02/19/2021 17:21	LWZ	704205

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	ND	0.0010	mg/L
7440-39-3	Barium	0.040	0.0010	mg/L
7440-43-9	Cadmium	ND	0.0010	mg/L
7440-66-6	Zinc	ND	0.020	mg/L

EPA 9060A *Results Reported on Dry Weight Basis

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/20/2021 14:31	PLH	704256

CAS#	Parameter	Result	LOQ	Units
C-012	Total Organic Carbon	66000	250	mg/kg

Sample Results

JLS-2 4-6

Collect Date	02/08/2021 13:05	**LAB ID**	22102112903
Receive Date	02/10/2021 14:15	**Matrix**	Solid

EPA 8270C SIM

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/19/2021 08:15	704136	EPA 3546	10	02/20/2021 14:46	SMH	704244

CAS#	Parameter	Result	LOQ	Units
91-57-6	2-Methylnaphthalene	0.700	0.033	mg/kg
83-32-9	Acenaphthene	0.132	0.065	mg/kg
208-96-8	Acenaphthylene	ND	0.065	mg/kg
120-12-7	Anthracene	ND	0.033	mg/kg
56-55-3	Benzo(a)anthracene	ND	0.065	mg/kg
50-32-8	Benzo(a)pyrene	ND	0.033	mg/kg
205-99-2	Benzo(b)fluoranthene	ND	0.065	mg/kg
207-08-9	Benzo(k)fluoranthene	ND	0.033	mg/kg
218-01-9	Chrysene	0.076	0.065	mg/kg
53-70-3	Dibenz(a,h)anthracene	ND	0.065	mg/kg
206-44-0	Fluoranthene	0.252	0.033	mg/kg
86-73-7	Fluorene	0.441	0.033	mg/kg
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.033	mg/kg
91-20-3	Naphthalene	0.177	0.033	mg/kg
85-01-8	Phenanthrene	0.381	0.033	mg/kg
129-00-0	Pyrene	0.148	0.033	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
7297-45-2	2-Methylnaphthalene-d10	0.3290	Diluted Out	mg/kg	0*	47 - 120
93951-69-0	Fluoranthene-d10	0.3290	Diluted Out	mg/kg	0*	47 - 120

MADEP VPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1000	02/19/2021 16:13	JAR	704188

CAS#	Parameter	Result	LOQ	Units
GCSV-02-10	Aliphatic >C8-C10	313	47.6	mg/kg
GCSV-02-30	Aliphatic C6-C8	181	47.6	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
615-59-8	2,5-Dibromotoluene	49.50	51.7	mg/kg	104	60 - 140

MADEP VPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1000	02/19/2021 16:13	JAR	704189

CAS#	Parameter	Result	LOQ	Units
GCSV-02-14	Aromatic >C8-C10	216	47.6	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
615-59-8	2,5-Dibromotoluene	49.50	40.1	mg/kg	81	60 - 140

Sample Results

JLS-2 4-6

Collect Date	02/08/2021 13:05	**LAB ID**	22102112903
Receive Date	02/10/2021 14:15	**Matrix**	Solid

MADEP EPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/13/2021 10:40	703982	MADEP EPH Revision 1.1 (LA)	1	02/18/2021 21:04	MFS	704107

CAS#	Parameter	Result	LOQ	Units
GCSV-02-11	Aliphatic >C10-C12	27.6	6.00	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
3386-33-2	1-Chlorooctadecane	4	1.67	mg/kg	42	40 - 140

MADEP EPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/13/2021 10:40	703982	MADEP EPH Revision 1.1 (LA)	1	02/18/2021 18:12	MFS	704106

CAS#	Parameter	Result	LOQ	Units
GCSV-05-18	Aromatic >C21-C35	41.1	6.00	mg/kg
GCSV-02-15	Unadjusted >C10-C12 Aromatics	ND	6.00	mg/kg
GCSV-02-16	Unadjusted >C12-C16 Aromatics	12.3	6.00	mg/kg
GCSV-02-17	Unadjusted >C16-C21 Aromatics	11.3	6.00	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	4	4	mg/kg	100	40 - 140
580-13-2	2-Bromonaphthalene	4	3.84	mg/kg	96	40 - 140
321-60-8	2-Fluorobiphenyl	4	3.62	mg/kg	91	40 - 140

MADEP EPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/13/2021 10:40	703982	MADEP EPH Revision 1.1 (LA)	5	02/19/2021 17:32	MFS	704194

CAS#	Parameter	Result	LOQ	Units
GCSV-02-12	Aliphatic >C12-C16	88.9	30.0	mg/kg
GCSV-02-31	Aliphatic >C16-C35	149	30.0	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
3386-33-2	1-Chlorooctadecane	4	1.88	mg/kg	47	40 - 140

EPA 1312/6020B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/18/2021 07:00	704033	EPA 3010A	1	02/19/2021 17:24	LWZ	704205

CAS#	Parameter	Result	LOQ	Units
7440-39-3	Barium	0.058	0.0010	mg/L

Sample Results

JLS-2 6-8

Collect Date	02/08/2021 13:20	**LAB ID**	22102112904
Receive Date	02/10/2021 14:15	**Matrix**	Solid

EPA 8270C SIM

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/19/2021 08:15	704136	EPA 3546	10	02/20/2021 15:29	DLB	704244

CAS#	Parameter	Result	LOQ	Units
91-57-6	2-Methylnaphthalene	0.460	0.033	mg/kg
83-32-9	Acenaphthene	0.099	0.066	mg/kg
208-96-8	Acenaphthylene	ND	0.066	mg/kg
120-12-7	Anthracene	ND	0.033	mg/kg
56-55-3	Benzo(a)anthracene	ND	0.066	mg/kg
50-32-8	Benzo(a)pyrene	ND	0.033	mg/kg
205-99-2	Benzo(b)fluoranthene	ND	0.066	mg/kg
207-08-9	Benzo(k)fluoranthene	ND	0.033	mg/kg
218-01-9	Chrysene	ND	0.066	mg/kg
53-70-3	Dibenz(a,h)anthracene	ND	0.066	mg/kg
206-44-0	Fluoranthene	0.233	0.033	mg/kg
86-73-7	Fluorene	0.212	0.033	mg/kg
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.033	mg/kg
91-20-3	Naphthalene	0.163	0.033	mg/kg
85-01-8	Phenanthrene	0.345	0.033	mg/kg
129-00-0	Pyrene	0.136	0.033	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
7297-45-2	2-Methylnaphthalene-d10	0.3330	Diluted Out	mg/kg	0*	47 - 120
93951-69-0	Fluoranthene-d10	0.3330	Diluted Out	mg/kg	0*	47 - 120

MADEP VPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1000	02/19/2021 18:25	JAR	704188

CAS#	Parameter	Result	LOQ	Units
GCSV-02-10	Aliphatic >C8-C10	243	50.2	mg/kg
GCSV-02-30	Aliphatic C6-C8	ND	50.2	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
615-59-8	2,5-Dibromotoluene	49.70	53.8	mg/kg	108	60 - 140

MADEP VPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1000	02/19/2021 18:25	JAR	704189

CAS#	Parameter	Result	LOQ	Units
GCSV-02-14	Aromatic >C8-C10	134	50.2	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
615-59-8	2,5-Dibromotoluene	49.70	41.9	mg/kg	84	60 - 140

Sample Results

JLS-2 6-8

Collect Date	02/08/2021 13:20	**LAB ID**	22102112904
Receive Date	02/10/2021 14:15	**Matrix**	Solid

MADEP EPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/13/2021 10:40	703982	MADEP EPH Revision 1.1 (LA)	1	02/18/2021 21:23	MFS	704107

CAS#	Parameter	Result	LOQ	Units
GCSV-02-11	Aliphatic >C10-C12	11.7	6.00	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
3386-33-2	1-Chlorooctadecane	4	2.49	mg/kg	62	40 - 140

MADEP EPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/13/2021 10:40	703982	MADEP EPH Revision 1.1 (LA)	1	02/18/2021 18:31	MFS	704106

CAS#	Parameter	Result	LOQ	Units
GCSV-05-18	Aromatic >C21-C35	29.9	6.00	mg/kg
GCSV-02-15	Unadjusted >C10-C12 Aromatics	ND	6.00	mg/kg
GCSV-02-16	Unadjusted >C12-C16 Aromatics	12.6	6.00	mg/kg
GCSV-02-17	Unadjusted >C16-C21 Aromatics	9.86	6.00	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	4	3.73	mg/kg	93	40 - 140
580-13-2	2-Bromonaphthalene	4	5.5	mg/kg	138	40 - 140
321-60-8	2-Fluorobiphenyl	4	5.56	mg/kg	139	40 - 140

MADEP EPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/13/2021 10:40	703982	MADEP EPH Revision 1.1 (LA)	5	02/19/2021 17:51	MFS	704194

CAS#	Parameter	Result	LOQ	Units
GCSV-02-12	Aliphatic >C12-C16	48.9	30.0	mg/kg
GCSV-02-31	Aliphatic >C16-C35	90.8	30.0	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
3386-33-2	1-Chlorooctadecane	4	1.68	mg/kg	42	40 - 140

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/12/2021 09:00	703920	EPA 3050B	10	02/18/2021 14:50	TJR	704046

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	10.5	0.40	mg/kg

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/12/2021 09:00	703920	EPA 3050B	100	02/19/2021 14:05	LWZ	704205

CAS#	Parameter	Result	LOQ	Units
7440-39-3	Barium	2040	4.00	mg/kg

GC/MS Semi-Volatiles QC Summary

Analytical Batch	Client ID	MB704136		LCS704136				LCSD704136				
704244	LAB ID	2146015		2146016				2146017				
Prep Batch	Sample Type	MB		LCS				LCSD				
704136	Prep Date	02/19/21 08:15		02/19/21 08:15				02/19/21 08:15				
Prep Method	Analysis Date	02/20/21 12:37		02/20/21 12:56				02/20/21 13:14				
EPA 3546	Matrix	Solid		Solid				Solid				
EPA 8270C SIM		Units Result	mg/kg LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
2-Methylnaphthalene	91-57-6	ND	0.00328	0.333	0.247	74	39 - 114	0.333	0.264	79	7	20
Acenaphthene	83-32-9	ND	0.00656	0.333	0.274	82	44 - 111	0.333	0.291	87	6	20
Acenaphthylene	208-96-8	ND	0.00656	0.333	0.287	86	39 - 116	0.333	0.305	92	6	20
Anthracene	120-12-7	ND	0.00328	0.333	0.266	80	50 - 114	0.333	0.286	86	7	20
Benzo(a)anthracene	56-55-3	ND	0.00656	0.333	0.301	90	54 - 122	0.333	0.311	93	3	20
Benzo(a)pyrene	50-32-8	ND	0.00328	0.333	0.309	93	50 - 125	0.333	0.320	96	3	20
Benzo(b)fluoranthene	205-99-2	ND	0.00656	0.333	0.304	91	53 - 128	0.333	0.317	95	4	20
Benzo(k)fluoranthene	207-08-9	ND	0.00328	0.333	0.325	98	56 - 123	0.333	0.333	100	2	20
Chrysene	218-01-9	ND	0.00656	0.333	0.310	93	57 - 118	0.333	0.316	95	2	20
Dibenz(a,h)anthracene	53-70-3	ND	0.00656	0.333	0.322	97	50 - 129	0.333	0.333	100	3	20
Fluoranthene	206-44-0	ND	0.00328	0.333	0.296	89	55 - 119	0.333	0.304	91	3	20
Fluorene	86-73-7	ND	0.00328	0.333	0.278	83	47 - 114	0.333	0.295	89	6	20
Indeno(1,2,3-cd)pyrene	193-39-5	ND	0.00328	0.333	0.327	98	49 - 130	0.333	0.338	101	3	20
Naphthalene	91-20-3	ND	0.00328	0.333	0.246	74	38 - 111	0.333	0.260	78	6	20
Phenanthrene	85-01-8	ND	0.00328	0.333	0.280	84	49 - 113	0.333	0.293	88	5	20
Pyrene	129-00-0	ND	0.00328	0.333	0.298	89	55 - 117	0.333	0.308	92	3	20
Surrogate												
2-Methylnaphthalene-d10	7297-45-2	.234	71	.333	.229	69	47 - 120	.333	.241	72	NA	NA
Fluoranthene-d10	93951-69-0	.258	78	.333	.251	75	47 - 120	.333	.256	77	NA	NA

Analytical Batch	Client ID	JLS-2 0-2		2144553MS				2144553MSD				
704244	LAB ID	22102112901		2146018				2146019				
Prep Batch	Sample Type	SAMPLE		MS				MSD				
704136	Prep Date	02/19/2021 08:15		02/19/21 08:15				02/19/21 08:15				
Prep Method	Analysis Date	02/20/2021 13:33		02/20/21 13:51				02/20/21 14:10				
EPA 3546	Matrix	Solid		Solid				Solid				
EPA 8270C SIM		Units Result	mg/kg LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
2-Methylnaphthalene	91-57-6	0.00	0.00326	0.327	0.230	70	39 - 114	0.333	0.264	79	14	20
Acenaphthene	83-32-9	0.015	0.00651	0.327	0.264	76	44 - 111	0.333	0.302	86	13	20
Acenaphthylene	208-96-8	0.00	0.00651	0.327	0.267	82	39 - 116	0.333	0.310	93	15	20
Anthracene	120-12-7	0.00	0.00326	0.327	0.234	72	50 - 114	0.333	0.270	81	14	20
Benzo(a)anthracene	56-55-3	0.00984	0.00651	0.327	0.254	75	54 - 122	0.333	0.306	89	19	20
Benzo(a)pyrene	50-32-8	0.00	0.00326	0.327	0.259	79	50 - 125	0.333	0.312	94	19	20
Benzo(b)fluoranthene	205-99-2	0.00	0.00651	0.327	0.261	80	53 - 128	0.333	0.334	100	25*	20
Benzo(k)fluoranthene	207-08-9	0.00	0.00326	0.327	0.262	80	56 - 123	0.333	0.321	96	20	20
Chrysene	218-01-9	0.014	0.00651	0.327	0.257	74	57 - 118	0.333	0.322	92	22*	20
Dibenz(a,h)anthracene	53-70-3	0.00	0.00651	0.327	0.235	72	50 - 129	0.333	0.268	80	13	20
Fluoranthene	206-44-0	0.042	0.00326	0.327	0.282	73	55 - 119	0.333	0.323	84	14	20
Fluorene	86-73-7	0.012	0.00326	0.327	0.261	76	47 - 114	0.333	0.305	88	16	20
Indeno(1,2,3-cd)pyrene	193-39-5	0.00414	0.00326	0.327	0.244	73	49 - 130	0.333	0.278	82	13	20
Naphthalene	91-20-3	0.00207	0.00326	0.327	0.229	69	38 - 111	0.333	0.262	78	13	20
Phenanthrene	85-01-8	0.026	0.00326	0.327	0.264	73	49 - 113	0.333	0.314	86	17	20
Pyrene	129-00-0	0.040	0.00326	0.327	0.293	78	55 - 117	0.333	0.365	98	22*	20
Surrogate												
2-Methylnaphthalene-d10	7297-45-2	.223	68	.327	.213	65	47 - 120	.333	.247	74	NA	NA
Fluoranthene-d10	93951-69-0	.191	58	.327	.209	64	47 - 120	.333	.224	67	NA	NA

GC Volatiles QC Summary

Analytical Batch	Client ID	MB704188		LCS704188				LCSD704188				
704188	LAB ID	2146218		2146219				2146220				
	Sample Type	MB		LCS				LCSD				
	Prep Date											
	Analysis Date	02/19/21 13:57		02/19/21 05:27				02/19/21 19:01				
	Matrix	Solid		Solid				Solid				
MADEP VPH Revision 1.1 (LA)		Units Result	mg/kg LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Aliphatic >C8-C10	GCSV-02-10	ND	1.50	5.00	5.24	105	60 - 140	4.00	4.58	115	13	30
Aliphatic C6-C8	GCSV-02-30	ND	1.50	7.50	8.31	111	60 - 140	6.00	8.20	137	1	30
Surrogate												
2,5-Dibromotoluene	615-59-8	2.56	102	2.5	2.71	108	60 - 140	2.5	2.55	102	NA	NA

Analytical Batch	Client ID	MB704189		LCS704189				LCSD704189				
704189	LAB ID	2146221		2146222				2146223				
	Sample Type	MB		LCS				LCSD				
	Prep Date											
	Analysis Date	02/19/21 13:57		02/19/21 05:27				02/19/21 19:01				
	Matrix	Solid		Solid				Solid				
MADEP VPH Revision 1.1 (LA)		Units Result	mg/kg LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Aromatic >C8-C10	GCSV-02-14	ND	1.50	7.50	8.10	108	60 - 140	7.50	7.68	102	5	30
Surrogate												
2,5-Dibromotoluene	615-59-8	2.09	84	2.5	2.23	89	60 - 140	2.5	2.15	86	NA	NA

GC Semi-Volatiles QC Summary

Analytical Batch	Client ID	MB703982	LCS703982	LCSD703982
704061	LAB ID	2145254	2145255	2145256
Prep Batch	Sample Type	MB	LCS	LCSD
703982	Prep Date	02/13/21 10:40	02/13/21 10:40	02/13/21 10:40
Prep Method	Analysis Date	02/18/21 11:11	02/18/21 17:34	02/18/21 15:20
MADEP EPH Revision 1.1 (LA)	Matrix	Solid	Solid	Solid

MADEP EPH Revision 1.1 (LA)		Units Result	mg/kg LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Aliphatic >C10-C12	GCSV-02-11	ND	6.00	10.0	5.86	59	30 - 140	10.0	6.21	62	6	25
Aliphatic >C12-C16	GCSV-02-12	ND	6.00	10.0	6.69	67	40 - 140	10.0	6.95	70	4	25
Aliphatic >C16-C35	GCSV-02-31	ND	6.00	45.0	38.0	84	40 - 140	45.0	39.2	87	3	25
Surrogate												
1-Chlorooctadecane	3386-33-2	1.61	40	4	1.84	46	40 - 140	4	2.11	53	NA	NA

Analytical Batch	Client ID	MB703982	LCS703982	LCSD703982
704060	LAB ID	2145254	2145255	2145256
Prep Batch	Sample Type	MB	LCS	LCSD
703982	Prep Date	02/13/21 10:40	02/13/21 10:40	02/13/21 10:40
Prep Method	Analysis Date	02/18/21 11:11	02/18/21 15:20	02/18/21 17:34
MADEP EPH Revision 1.1 (LA)	Matrix	Solid	Solid	Solid

MADEP EPH Revision 1.1 (LA)		Units Result	mg/kg LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Aromatic >C21-C35	GCSV-05-18	ND	6.00	50.0	42.9	86	40 - 140	50.0	44.5	89	4	25
Unadjusted >C10-C12 Aromatics	GCSV-02-15	ND	6.00	5.00	4.09	82	30 - 140	5.00	5.11	102	22	25
Unadjusted >C12-C16 Aromatics	GCSV-02-16	ND	6.00	20.0	16.7	84	40 - 140	20.0	20.7	104	21	25
Unadjusted >C16-C21 Aromatics	GCSV-02-17	ND	6.00	10.0	9.09	91	40 - 140	10.0	10.8	108	17	25
Surrogate												
2-Bromonaphthalene	580-13-2	3.75	94	4	4.01	100	40 - 140	4	4.79	120	NA	NA
2-Fluorobiphenyl	321-60-8	3.64	91	4	4.05	101	40 - 140	4	4.83	121	NA	NA
o-Terphenyl	84-15-1	3.38	85	4	3.11	78	40 - 140	4	3.69	92	NA	NA

Inorganics QC Summary

Analytical Batch	Client ID	MB704033	LCS704033
704205	LAB ID	2145537	2145539
Prep Batch	Sample Type	MB	LCS
704033	Prep Date	02/18/21 07:00	02/18/21 07:00
Prep Method	Analysis Date	02/19/21 15:25	02/19/21 15:28
EPA 3010A	Matrix	Water	Water

EPA 1312/6020B		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Arsenic	7440-38-2	ND	0.0010	0.050	0.049	99	80 - 120
Barium	7440-39-3	ND	0.0010	0.050	0.050	99	80 - 120
Cadmium	7440-43-9	ND	0.0010	0.050	0.050	99	80 - 120
Zinc	7440-66-6	ND	0.020	1.00	0.99	99	80 - 120

Analytical Batch	Client ID	JLS-2 0-2	2144553MS	2144553MSD
704205	LAB ID	22102112901	2145622	2145623
Prep Batch	Sample Type	SAMPLE	MS	MSD
704033	Prep Date	02/18/2021 07:00	02/18/21 07:00	02/18/21 07:00
Prep Method	Analysis Date	02/19/2021 17:03	02/19/21 17:07	02/19/21 17:10
EPA 3010A	Matrix	Solid	Solid	Solid

EPA 1312/6020B		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Arsenic	7440-38-2	0.0011	0.0010	0.050	0.054	105	80 - 120	0.050	0.053	104	2	20
Barium	7440-39-3	0.067	0.0010	0.050	0.12	105	80 - 120	0.050	0.12	115	0	20
Cadmium	7440-43-9	0.0	0.0010	0.050	0.051	102	80 - 120	0.050	0.052	104	2	20
Zinc	7440-66-6	0.012	0.020	1.00	1.06	104	80 - 120	1.00	1.06	104	0	20

Analytical Batch	Client ID	MB703920	LCS703920	LCSD703920
704046	LAB ID	2144899	2144901	2144900
Prep Batch	Sample Type	MB	LCS	LCSD
703920	Prep Date	02/12/21 09:00	02/12/21 09:00	02/12/21 09:00
Prep Method	Analysis Date	02/18/21 14:40	02/18/21 14:47	02/18/21 14:43
EPA 3050B	Matrix	Solid	Solid	Solid

EPA 6020B		Units Result	mg/kg LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Arsenic	7440-38-2	ND	0.040	2.00	2.32	116	80 - 120	2.00	2.15	107	8	20
Barium	7440-39-3	0.091	0.040	2.00	2.34	117	80 - 120	2.00	2.13	106	9	20

General Chemistry QC Summary

Analytical Batch 704256	Client ID	MB704256		LCS704256			
	LAB ID	2146656		2146657			
	Sample Type	MB		LCS			
	Prep Date						
	Analysis Date	02/20/21 13:58		02/20/21 14:06			
	Matrix	Solid		Solid			
EPA 9060A		Units Result	mg/kg LOQ	Spike Added	Result	%R	Control Limits%R
Total Organic Carbon	C-012	ND	250	2000	2040	102	69 - 128

Analytical Batch 704256	Client ID	JLS-2 2-4		2144554DUP		
	LAB ID	22102112902		2146658		
	Sample Type	SAMPLE		DUP		
	Prep Date	NA				
	Analysis Date	02/20/2021 14:31		02/20/21 14:44		
	Matrix	Solid		Solid		
EPA 9060A		Units Result	mg/kg LOQ	Result	RPD	RPD Limit
Total Organic Carbon	C-012	66000	250	66400	1	25

Client ID: 4271 - ERM-Baton Rouge
SDG: 221021129
PM: AMK

CHAIN-OF-CUSTODY Analytical Request Document

Pace Analytical

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix W

ALL SHA

Company: ERM	Billing Information: SAME
Address: 840 W Sam Houston Pkwy N Suite 600 Houston, TX 77024	
Report To: Jonathan Miller	Email To:
Copy To: Dave Angle	Site Collection Info/Address:
Customer Project Name/Number: JLS 0519829	State: / County/City: Time Zone Collected: [ ]PT [ ]MT [ ]CT [ ]ET
Phone: 504.840.1764 Email: Jonathan.Miller@erm.com	Site/Facility ID #: Compliance Monitoring? [ ] Yes [ ] No
Collected By (print): R. Charles Trahan	Purchase Order #: Quote #: DW PWS ID #: DW Location Code:
Collected By (signature):	Turnaround Date Required: STD Immediately Packed on Ice: [X] Yes [ ] No
Sample Disposal: [ ] Dispose as appropriate [ ] Return [ ] Archive: [ ] Hold:	Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply) Field Filtered (if applicable): [X] Yes [ ] No Analysis: Diss, Metals

Container Preservative

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	SPLP Pb	SPLP Cr	SPLP As	SPLP Ba (2nd)	TCLP	PAHs	EPA/VPH	Total Ba, As	Lab Sample # / Comments
JLS-2 0-2'	SL	G	2/8/21	1245				6	X	X	X	X	X	X			1
JLS-2 2-4'	SL	G	2/8/21	1255				6	X	X	X	X	X	X			2
JLS-2 4-6'	SL	G	2/8/21	1305				5	X					X	X		3
JLS-2 6-8'	SL	G	2/8/21	1320				5						X	X	X	4

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y N NA
Custody Signatures Present	Y N NA
Collector Signature Present	Y N NA
Bottles Intact	Y N NA
Correct Bottles	Y N NA
Sufficient Volume	Y N NA
Samples Received on Ice	Y N NA
VOA – Headspace Acceptable	Y N NA
USDA Regulated Soils	Y N NA
Samples in Holding Time	Y N NA
Residual Chlorine Present	Y N NA
Cl Strips: _____	
Sample pH Acceptable	Y N NA
pH Strips: _____	
Sulfide Present	Y N NA
Lead Acetate Strips: _____	

LAB USE ONLY:
Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #: 2498140

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: _____
Cooler 1 Temp Upon Receipt: _____oC
Cooler 1 Therm Corr. Factor: _____oC
Cooler 1 Corrected Temp: _____oC
Comments: 0.7 E34

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
	2/10/21 1415		2/10/21 @ 1415
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
	2/10/21 @ 1522	Laurent Heller	2.10.21 1415
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: _____ of: _____

SAMPLE RECEIVING CHECKLIST

SAMPLE DELIVERY GROUP 221021129	
Client **PM** AMK 4271 - ERM-Baton Rouge	**Transport Method** CUST
Profile Number 286447	**Received By** Jenkins, Mark A.
Line Item(s) 2 - Solid	**Receive Date(s)** 02/10/21

CHECKLIST	YES	NO
Samples received with proper thermal preservation?	☑	☐
Radioactivity is <1600 cpm? If no, record cpm value in notes section.	☑	☐
COC relinquished and complete (including sampleIDs, collect times, and sampler)?	☑	☐
All containers received in good condition and within hold time?	☑	☐
All sample labels and containers received match the chain of custody?	☑	☐
Preservative added to any containers?	☐	☑
If received, was headspace for VOC water containers < 6mm?	☑	☐
Samples collected in containers provided by Pace Gulf Coast?	☑	☐

COOLERS

Airbill	Thermometer ID: E34	Temp °C
		0.7

DISCREPANCIES

None

LAB PRESERVATIONS

None

NOTES

LELAP CERTIFICATE NUMBER: 01955
DOD-ELAP ACCREDITATION NUMBER: 74960

ANALYTICAL RESULTS

PERFORMED BY

Pace Analytical Gulf Coast
7979 Innovation Park Dr.
Baton Rouge, LA 70820
(225) 769-4900

Report Date 03/01/2021

Report # 221022685

Project 0519829 JLS

Deliver To	***Additional Recipients***
Jonathan Miller ERM 3838 N. Causeway Blvd. Suite 3000 LA 70002	Guy Guinot, ERM

Laboratory Endorsement

Sample analysis was performed in accordance with approved methodologies provided by the Environmental Protection Agency or other recognized agencies. The samples and their corresponding extracts will be maintained for a period of 30 days unless otherwise arranged. Following this retention period the samples will be disposed in accordance with Pace Gulf Coast's Standard Operating Procedures.

Common Abbreviations that may be Utilized in this Report

ND	Indicates the result was Not Detected at the specified reporting limit
NO	Indicates the sample did not ignite when preliminary test performed for EPA Method 1030
DO	Indicates the result was Diluted Out
MI	Indicates the result was subject to Matrix Interference
TNTC	Indicates the result was Too Numerous To Count
SUBC	Indicates the analysis was Sub-Contracted
FLD	Indicates the analysis was performed in the Field
DL	Detection Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
RE	Re-analysis
CF	HPLC or GC Confirmation
00:01	Reported as a time equivalent to 12:00 AM

Reporting Flags that may be Utilized in this Report

J or I	Indicates the result is between the MDL and LOQ
J	DOD flag on analyte in the parent sample for MS/MSD outside acceptance criteria
U	Indicates the compound was analyzed for but not detected
B or V	Indicates the analyte was detected in the associated Method Blank
Q	Indicates a non-compliant QC Result (See Q Flag Application Report)
*****	Indicates a non-compliant or not applicable QC recovery or RPD – see narrative
E	Organics - The result is estimated because it exceeded the instrument calibration range
E	Metals - % diference for the serial dilution is > 10%
L	Reporting Limits adjusted to meet risk-based limit.
P	RPD between primary and confirmation result is greater than 40
DL	Diluted analysis – when appended to Client Sample ID

Sample receipt at Pace Gulf Coast is documented through the attached chain of custody. In accordance with NELAC, this report shall be reproduced only in full and with the written permission of Pace Gulf Coast. The results contained within this report relate only to the samples reported. The documented results are presented within this report.

This report pertains only to the samples listed in the Report Sample Summary and should be retained as a permanent record thereof. The results contained within this report are intended for the use of the client. Any unauthorized use of the information contained in this report is prohibited.

I certify that this data package is in compliance with The NELAC Institute (TNI) Standard 2009 and terms and conditions of the contract and Statement of Work both technically and for completeness, for other than the conditions in the case narrative. Release of the data contained in this hardcopy data package and in the computer readable data submitted has been authorized by the Quality Assurance Manager or his/her designee, as verified by the following signature.

Estimated uncertainty of measurement is available upon request. This report is in compliance with the DOD QSM as specified in the contract if applicable.

Authorized Signature
Pace Gulf Coast Report 221022685

Certifications

Certification	Certification Number
DOD ELAP	74960
Alabama	01955
Arkansas	88-0655
Colorado	01955
Delaware	01955
Florida	E87854
Georgia	01955
Hawaii	01955
Idaho	01955
Illinois	200048
Indiana	01955
Kansas	E-10354
Kentucky	95
Louisiana	01955
Maryland	01955
Massachusetts	01955
Michigan	01955
Mississippi	01955
Missouri	01955
Montana	N/A
Nebraska	01955
New Mexico	01955
North Carolina	618
North Dakota	R-195
Oklahoma	9403
South Carolina	73006001
South Dakota	01955
Tennessee	01955
Texas	T104704178
Vermont	01955
Virginia	460215
Washington	C929
USDA Soil Permit	P330-16-00234

Case Narrative

Client: ERM-Baton Rouge **Report:** 221022685

Pace Analytical Gulf Coast received and analyzed the sample(s) listed on the Report Sample Summary page of this report. Receipt of the sample(s) is documented by the attached chain of custody. This applies only to the sample(s) listed in this report. No sample integrity or quality control exceptions were identified unless noted below.

No anomalies were found for the analyzed sample(s).

Sample Summary

LAB ID	Client ID	Matrix	Collect Date	Receive Date
22102268501	SW-1 (UPSTREAM)	Water	02/25/2021 09:45	02/25/2021 16:52
22102268502	SW-1 (UPSTREAM) MS	Water	02/25/2021 09:45	02/25/2021 16:52
22102268503	SW-1 (UPSTREAM) MSD	Water	02/25/2021 09:45	02/25/2021 16:52
22102268504	SW-2 (SITE ENTRANCE)	Water	02/25/2021 09:55	02/25/2021 16:52
22102268505	SW-3 (SITE CANAL)	Water	02/25/2021 10:05	02/25/2021 16:52
22102268506	SW-4 (SITE)	Water	02/25/2021 10:15	02/25/2021 16:52
22102268507	SW-5 (DOWNSTREAM)	Water	02/25/2021 10:25	02/25/2021 16:52
22102268508	DUP-1	Water	02/25/2021 00:01	02/25/2021 16:52

Sample Results

SW-1 (UPSTREAM)

Collect Date	02/25/2021 09:45	**LAB ID**	22102268501
Receive Date	02/25/2021 16:52	**Matrix**	Water

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	10	03/01/2021 10:39	AJE	704799

CAS#	Parameter	Result	LOQ	Units
16887-00-6	Chloride	26.7	2.00	mg/L

SM 2510 B-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	03/01/2021 11:15	AJE	704838

CAS#	Parameter	Result	LOQ	Units
C-011	Specific Conductance	259	10	umhos/cm

SW-1 (UPSTREAM) MS

Collect Date	02/25/2021 09:45	**LAB ID**	22102268502
Receive Date	02/25/2021 16:52	**Matrix**	Water

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	10	03/01/2021 11:02	AJE	704799

CAS#	Parameter	Result	LOQ	Units
16887-00-6	Chloride	52.4	2.00	mg/L

SW-1 (UPSTREAM) MSD

Collect Date	02/25/2021 09:45	**LAB ID**	22102268503
Receive Date	02/25/2021 16:52	**Matrix**	Water

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	10	03/01/2021 11:24	AJE	704799

CAS#	Parameter	Result	LOQ	Units
16887-00-6	Chloride	52.4	2.00	mg/L

SW-2 (SITE ENTRANCE)

Collect Date	02/25/2021 09:55	**LAB ID**	22102268504
Receive Date	02/25/2021 16:52	**Matrix**	Water

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	10	03/01/2021 11:46	AJE	704799

CAS#	Parameter	Result	LOQ	Units
16887-00-6	Chloride	26.8	2.00	mg/L

Sample Results

SW-2 (SITE ENTRANCE)

Collect Date 02/25/2021 09:55 **LAB ID** 22102268504
Receive Date 02/25/2021 16:52 **Matrix** Water

SM 2510 B-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	03/01/2021 11:15	AJE	704838

CAS#	Parameter	Result	LOQ	Units
C-011	Specific Conductance	259	10	umhos/cm

SW-3 (SITE CANAL)

Collect Date 02/25/2021 10:05 **LAB ID** 22102268505
Receive Date 02/25/2021 16:52 **Matrix** Water

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	10	03/01/2021 12:09	AJE	704799

CAS#	Parameter	Result	LOQ	Units
16887-00-6	Chloride	27.2	2.00	mg/L

SM 2510 B-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	03/01/2021 11:15	AJE	704838

CAS#	Parameter	Result	LOQ	Units
C-011	Specific Conductance	271	10	umhos/cm

SW-4 (SITE)

Collect Date 02/25/2021 10:15 **LAB ID** 22102268506
Receive Date 02/25/2021 16:52 **Matrix** Water

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	10	03/01/2021 12:29	AJE	704799

CAS#	Parameter	Result	LOQ	Units
16887-00-6	Chloride	26.7	2.00	mg/L

SM 2510 B-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	03/01/2021 11:15	AJE	704838

CAS#	Parameter	Result	LOQ	Units
C-011	Specific Conductance	270	10	umhos/cm

Sample Results

SW-5 (DOWNSTREAM)

Collect Date	02/25/2021 10:25	**LAB ID**	22102268507
Receive Date	02/25/2021 16:52	**Matrix**	Water

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	10	03/01/2021 12:49	AJE	704799

CAS#	Parameter	Result	LOQ	Units
16887-00-6	Chloride	26.3	2.00	mg/L

SM 2510 B-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	03/01/2021 11:15	AJE	704838

CAS#	Parameter	Result	LOQ	Units
C-011	Specific Conductance	266	10	umhos/cm

DUP-1

Collect Date	02/25/2021 00:01	**LAB ID**	22102268508
Receive Date	02/25/2021 16:52	**Matrix**	Water

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	10	03/01/2021 13:10	AJE	704799

CAS#	Parameter	Result	LOQ	Units
16887-00-6	Chloride	27.0	2.00	mg/L

SM 2510 B-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	03/01/2021 11:15	AJE	704838

CAS#	Parameter	Result	LOQ	Units
C-011	Specific Conductance	261	10	umhos/cm

General Chemistry QC Summary

Analytical Batch	Client ID	MB704799		LCS704799			
704799	LAB ID	2149932		2149933			
	Sample Type	MB		LCS			
	Prep Date						
	Analysis Date	03/01/21 14:31		03/01/21 14:11			
	Matrix	Water		Water			
EPA 9056A		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Chloride	16887-00-6	ND	0.200	2.50	2.59	104	80 - 120

Analytical Batch	Client ID	SW-1 (UPSTREAM)		SW-1 (UPSTREAM) MS				SW-1 (UPSTREAM) MSD				
704799	LAB ID	22102268501		22102268502				22102268503				
	Sample Type	SAMPLE		MS				MSD				
	Prep Date	NA										
	Analysis Date	03/01/2021 10:39		03/01/21 11:02				03/01/21 11:24				
	Matrix	Water		Water				Water				
EPA 9056A		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Chloride	16887-00-6	26.7	2.00	25.0	52.4	102	80 - 120	25.0	52.4	102	0	15

Analytical Batch	Client ID	SW-1 (UPSTREAM)		2149361DUP		
704838	LAB ID	22102268501		2150096		
	Sample Type	SAMPLE		DUP		
	Prep Date	NA				
	Analysis Date	03/01/2021 11:15		03/01/21 11:15		
	Matrix	Water		Water		
SM 2510 B-2011		Units Result	umhos/cm LOQ	Result	RPD	RPD Limit
Specific Conductance	C-011	259	10	261	1	10

CHAIN-OF-CUSTODY Analytical Request Document

Pace Analytical

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Work

Client ID: 4271 - ERM-Baton Rouge
SDG: 221022685
PM: AMK

ALL SHAD

Company: ERM	Billing Information:
Address: 3838 N. Causeway Blvd, Ste 300, Metairie, LA	
Report To: Jonathan Miller	Email To: Jonathan.Miller@erm.com
Copy To:	Site Collection Info/Address: Bayou Pigeon
Customer Project Name/Number: 0519829	State: LA County/City: Iberia Parish Time Zone Collected: [ ]PT [ ]MT [X]CT [ ]ET
Phone: 504.810.1764 Email: Jonathan.Miller@ERM.com	Site/Facility ID #:
Collected By (print): Guy Guinet	Purchase Order #: Quote #:
Collected By (signature):	Turnaround Date Required: 2-day
Sample Disposal: [X] Dispose as appropriate [ ] Return [ ] Archive: [ ] Hold:	Rush: [ ] Same Day [ ] Next Day [X] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply)
	Compliance Monitoring? [ ] Yes [ ] No
	DW PWS ID #: DW Location Code:
	Immediately Packed on Ice: [X] Yes [ ] No
	Field Filtered (if applicable): [ ] Yes [X] No Analysis:

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	Analyses: Chlorides	Analyses: Specific Conductance / SM 2510B
SW-1(Upstream)	Water	G	2/25/21	0945				3	X	X
SW-2(Site Entrance)	"	"	"	0955				1	X	X
SW-3(Site Canal)	"	"	"	1005				1	X	X
SW-4(Site)	"	"	"	1015				1	X	X
SW-5(Downstream)	"	"	"	1025				1	X	X
DUP-1	"	"	—	—				1	X	X

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y N NA
Custody Signatures Present	Y N NA
Collector Signature Present	Y N NA
Bottles Intact	Y N NA
Correct Bottles	Y N NA
Sufficient Volume	Y N NA
Samples Received on Ice	Y N NA
VOA - Headspace Acceptable	Y N NA
USDA Regulated Soils	Y N NA
Samples in Holding Time	Y N NA
Residual Chlorine Present	Y N NA
Cl Strips:	
Sample pH Acceptable	Y N NA
pH Strips:	
Sulfide Present	Y N NA
Lead Acetate Strips:	

LAB USE ONLY:
Lab Sample # / Comments:

2 3 1
4 2
5 3
6 4
7 5
8

Customer Remarks / Special Conditions / Possible Hazards: MS/MSD collected @ SW-1

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #: 2605072

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: T54
Cooler 1 Temp Upon Receipt: 3.9 oC
Cooler 1 Therm Corr. Factor: oC
Cooler 1 Corrected Temp: oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
ERM	2/25/21-1652	PACE	2/25/21 1652
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: 1 of: 1

SAMPLE RECEIVING CHECKLIST

SAMPLE DELIVERY GROUP 221022685	
Client **PM** AMK 4271 - ERM-Baton Rouge	**Transport Method** CUSTOMER
Profile Number 286447	**Received By** McCune, Dodie N.
Line Item(s) 1 - Waters - BTEX	**Receive Date(s)** 02/25/21

CHECKLIST	YES	NO
Samples received with proper thermal preservation?	☑	☐
Radioactivity is <1600 cpm? If no, record cpm value in notes section.	☑	☐
COC relinquished and complete (including sampleIDs, collect times, and sampler)?	☑	☐
All containers received in good condition and within hold time?	☑	☐
All sample labels and containers received match the chain of custody?	☑	☐
Preservative added to any containers?	☐	☑
If received, was headspace for VOC water containers < 6mm?	☑	☐
Samples collected in containers provided by Pace Gulf Coast?	☑	☐

COOLERS

Airbill	Thermometer ID: E34	Temp °C
		3.9

DISCREPANCIES

None

LAB PRESERVATIONS

None

NOTES

Revision 1.6

LELAP CERTIFICATE NUMBER: 01955
DOD-ELAP ACCREDITATION NUMBER: 74960

ANALYTICAL RESULTS

PERFORMED BY

Pace Analytical Gulf Coast
7979 Innovation Park Dr.
Baton Rouge, LA 70820
(225) 769-4900

Report Date 03/08/2021

Report # 221022687

Project 0519829 JLS

Deliver To	***Additional Recipients***
Jonathan Miller ERM 3838 N. Causeway Blvd. Suite 3000 Metairie, LA 70002	Guy Guinot, ERM

Laboratory Endorsement

Sample analysis was performed in accordance with approved methodologies provided by the Environmental Protection Agency or other recognized agencies. The samples and their corresponding extracts will be maintained for a period of 30 days unless otherwise arranged. Following this retention period the samples will be disposed in accordance with Pace Gulf Coast's Standard Operating Procedures.

Common Abbreviations that may be Utilized in this Report

ND	Indicates the result was Not Detected at the specified reporting limit
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DO	Indicates the result was Diluted Out
MI	Indicates the result was subject to Matrix Interference
TNTC	Indicates the result was Too Numerous To Count
SUBC	Indicates the analysis was Sub-Contracted
FLD	Indicates the analysis was performed in the Field
DL	Detection Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
RE	Re-analysis
CF	HPLC or GC Confirmation
00:01	Reported as a time equivalent to 12:00 AM

Reporting Flags that may be Utilized in this Report

J or I	Indicates the result is between the MDL and LOQ
J	DOD flag on analyte in the parent sample for MS/MSD outside acceptance criteria
U	Indicates the compound was analyzed for but not detected
B or V	Indicates the analyte was detected in the associated Method Blank
Q	Indicates a non-compliant QC Result (See Q Flag Application Report)
*****	Indicates a non-compliant or not applicable QC recovery or RPD – see narrative
E	Organics - The result is estimated because it exceeded the instrument calibration range
E	Metals - % diference for the serial dilution is > 10%
L	Reporting Limits adjusted to meet risk-based limit.
P	RPD between primary and confirmation result is greater than 40
DL	Diluted analysis – when appended to Client Sample ID

Sample receipt at Pace Gulf Coast is documented through the attached chain of custody. In accordance with NELAC, this report shall be reproduced only in full and with the written permission of Pace Gulf Coast. The results contained within this report relate only to the samples reported. The documented results are presented within this report.

This report pertains only to the samples listed in the Report Sample Summary and should be retained as a permanent record thereof. The results contained within this report are intended for the use of the client. Any unauthorized use of the information contained in this report is prohibited.

I certify that this data package is in compliance with The NELAC Institute (TNI) Standard 2009 and terms and conditions of the contract and Statement of Work both technically and for completeness, for other than the conditions in the case narrative. Release of the data contained in this hardcopy data package and in the computer readable data submitted has been authorized by the Quality Assurance Manager or his/her designee, as verified by the following signature.

Estimated uncertainty of measurement is available upon request. This report is in compliance with the DOD QSM as specified in the contract if applicable.

Authorized Signature
Pace Gulf Coast Report 221022687

Certifications

Certification	Certification Number
DOD ELAP	74960
Alabama	01955
Arkansas	88-0655
Colorado	01955
Delaware	01955
Florida	E87854
Georgia	01955
Hawaii	01955
Idaho	01955
Illinois	200048
Indiana	01955
Kansas	E-10354
Kentucky	95
Louisiana	01955
Maryland	01955
Massachusetts	01955
Michigan	01955
Mississippi	01955
Missouri	01955
Montana	N/A
Nebraska	01955
New Mexico	01955
North Carolina	618
North Dakota	R-195
Oklahoma	9403
South Carolina	73006001
South Dakota	01955
Tennessee	01955
Texas	T104704178
Vermont	01955
Virginia	460215
Washington	C929
USDA Soil Permit	P330-16-00234

Case Narrative

Client: ERM-Baton Rouge **Report:** 221022687

Pace Analytical Gulf Coast received and analyzed the sample(s) listed
on the Report Sample Summary page of this report. Receipt of the sample(s) is documented
by the attached chain of custody. This applies only to the sample(s) listed in this report.
No sample integrity or quality control exceptions were identified unless noted below.

SEMI-VOLATILES MASS SPECTROMETRY

In the EPA 8270C SIM analysis for prep batch 704928, the MS/MSD exhibited RPD failures. All LCS/LCSD recoveries and RPDs are acceptable.

Sample Summary

LAB ID	Client ID	Matrix	Collect Date	Receive Date
22102268701	JLS-2 (0-5)	Solid	02/25/2021 12:30	02/25/2021 16:52
22102268702	JLS-2 (5-11)	Solid	02/25/2021 11:50	02/25/2021 16:52

Sample Results

JLS-2 (0-5)

Collect Date	02/25/2021 12:30	**LAB ID**	22102268701
Receive Date	02/25/2021 16:52	**Matrix**	Solid

EPA 8270C SIM

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
03/03/2021 08:00	704928	EPA 3546	1	03/04/2021 11:26	DLB	705147

CAS#	Parameter	Result	LOQ	Units
91-57-6	2-Methylnaphthalene	0.014	0.00330	mg/kg
83-32-9	Acenaphthene	ND	0.00660	mg/kg
208-96-8	Acenaphthylene	ND	0.00660	mg/kg
120-12-7	Anthracene	ND	0.00330	mg/kg
56-55-3	Benzo(a)anthracene	ND	0.00660	mg/kg
50-32-8	Benzo(a)pyrene	ND	0.00330	mg/kg
205-99-2	Benzo(b)fluoranthene	ND	0.00660	mg/kg
207-08-9	Benzo(k)fluoranthene	ND	0.00330	mg/kg
218-01-9	Chrysene	ND	0.00660	mg/kg
53-70-3	Dibenz(a,h)anthracene	ND	0.00660	mg/kg
206-44-0	Fluoranthene	0.00922	0.00330	mg/kg
86-73-7	Fluorene	0.014	0.00330	mg/kg
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.00330	mg/kg
91-20-3	Naphthalene	ND	0.00330	mg/kg
85-01-8	Phenanthrene	0.013	0.00330	mg/kg
129-00-0	Pyrene	0.00645	0.00330	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
7297-45-2	2-Methylnaphthalene-d10	0.3330	.223	mg/kg	67	47 - 120
93951-69-0	Fluoranthene-d10	0.3330	.23	mg/kg	69	47 - 120

SM 2540 G-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	03/03/2021 12:00	CJS	705077

CAS#	Parameter	Result	LOQ	Units
WET-037	Total Moisture	74.2	0.010	%

JLS-2 (5-11)

Collect Date	02/25/2021 11:50	**LAB ID**	22102268702
Receive Date	02/25/2021 16:52	**Matrix**	Solid

EPA 8270C SIM

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
03/03/2021 08:00	704928	EPA 3546	1	03/04/2021 12:21	DLB	705147

CAS#	Parameter	Result	LOQ	Units
91-57-6	2-Methylnaphthalene	ND	0.00326	mg/kg
83-32-9	Acenaphthene	ND	0.00651	mg/kg
208-96-8	Acenaphthylene	ND	0.00651	mg/kg
120-12-7	Anthracene	ND	0.00326	mg/kg
56-55-3	Benzo(a)anthracene	ND	0.00651	mg/kg
50-32-8	Benzo(a)pyrene	ND	0.00326	mg/kg
205-99-2	Benzo(b)fluoranthene	ND	0.00651	mg/kg
207-08-9	Benzo(k)fluoranthene	ND	0.00326	mg/kg
218-01-9	Chrysene	ND	0.00651	mg/kg
53-70-3	Dibenz(a,h)anthracene	ND	0.00651	mg/kg
206-44-0	Fluoranthene	0.00457	0.00326	mg/kg
86-73-7	Fluorene	ND	0.00326	mg/kg

Sample Results

JLS-2 (5-11)

Collect Date	02/25/2021 11:50	**LAB ID**	22102268702
Receive Date	02/25/2021 16:52	**Matrix**	Solid

EPA 8270C SIM (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
03/03/2021 08:00	704928	EPA 3546	1	03/04/2021 12:21	DLB	705147

CAS#	Parameter	Result	LOQ	Units
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.00326	mg/kg
91-20-3	Naphthalene	ND	0.00326	mg/kg
85-01-8	Phenanthrene	0.00436	0.00326	mg/kg
129-00-0	Pyrene	0.00397	0.00326	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
7297-45-2	2-Methylnaphthalene-d10	0.3290	.21	mg/kg	64	47 - 120
93951-69-0	Fluoranthene-d10	0.3290	.204	mg/kg	62	47 - 120

MADEP VPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1000	03/05/2021 16:35	JAR	704988

CAS#	Parameter	Result	LOQ	Units
GCSV-02-10	Aliphatic >C8-C10	69.3	46.3	mg/kg
GCSV-02-30	Aliphatic C6-C8	ND	46.3	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
615-59-8	2,5-Dibromotoluene	43.60	49.8	mg/kg	114	60 - 140

MADEP VPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1000	03/05/2021 16:35	JAR	704987

CAS#	Parameter	Result	LOQ	Units
GCSV-02-14	Aromatic >C8-C10	ND	46.3	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
615-59-8	2,5-Dibromotoluene	43.60	31.8	mg/kg	73	60 - 140

MADEP EPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
03/03/2021 08:20	705027	MADEP EPH Revision 1.1 (LA)	1	03/04/2021 16:24	MFS	705196

CAS#	Parameter	Result	LOQ	Units
GCSV-02-11	Aliphatic >C10-C12	ND	5.88	mg/kg
GCSV-02-12	Aliphatic >C12-C16	ND	5.88	mg/kg
GCSV-02-31	Aliphatic >C16-C35	ND	5.88	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
3386-33-2	1-Chlorooctadecane	3.92	3.14	mg/kg	80	40 - 140

Sample Results

JLS-2 (5-11)

Collect Date	02/25/2021 11:50	**LAB ID**	22102268702
Receive Date	02/25/2021 16:52	**Matrix**	Solid

MADEP EPH Revision 1.1 (LA)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
03/03/2021 08:20	705027	MADEP EPH Revision 1.1 (LA)	1	03/04/2021 16:24	MFS	705195

CAS#	Parameter	Result	LOQ	Units
GCSV-05-18	Aromatic >C21-C35	ND	5.88	mg/kg
GCSV-02-15	Unadjusted >C10-C12 Aromatics	ND	5.88	mg/kg
GCSV-02-16	Unadjusted >C12-C16 Aromatics	ND	5.88	mg/kg
GCSV-02-17	Unadjusted >C16-C21 Aromatics	ND	5.88	mg/kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	3.92	3.55	mg/kg	91	40 - 140
580-13-2	2-Bromonaphthalene	3.92	1.99	mg/kg	51	40 - 140
321-60-8	2-Fluorobiphenyl	3.92	3.91	mg/kg	100	40 - 140

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
03/02/2021 08:00	704792	EPA 3050B	10	03/02/2021 19:44	LWZ	704970

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	5.48	0.38	mg/kg

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
03/02/2021 08:00	704792	EPA 3050B	100	03/03/2021 12:32	LWZ	705084

CAS#	Parameter	Result	LOQ	Units
7440-39-3	Barium	749	3.82	mg/kg

SM 2540 G-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	03/03/2021 12:00	CJS	705077

CAS#	Parameter	Result	LOQ	Units
WET-037	Total Moisture	73.1	0.010	%

GC/MS Semi-Volatiles QC Summary

Analytical Batch	Client ID	MB704928	LCS704928	LCSD704928
705147	LAB ID	2150474	2150475	2150476
Prep Batch	Sample Type	MB	LCS	LCSD
704928	Prep Date	03/03/21 08:00	03/03/21 08:00	03/03/21 08:00
Prep Method	Analysis Date	03/04/21 10:30	03/04/21 10:48	03/04/21 11:07
EPA 3546	Matrix	Solid	Solid	Solid

EPA 8270C SIM		Units Result	mg/kg LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
2-Methylnaphthalene	91-57-6	ND	0.00321	0.333	0.241	72	39 - 114	0.327	0.212	65	13	20
Acenaphthene	83-32-9	ND	0.00643	0.333	0.271	81	44 - 111	0.327	0.239	73	13	20
Acenaphthylene	208-96-8	ND	0.00643	0.333	0.271	81	39 - 116	0.327	0.239	73	13	20
Anthracene	120-12-7	ND	0.00321	0.333	0.236	71	50 - 114	0.327	0.211	65	11	20
Benzo(a)anthracene	56-55-3	ND	0.00643	0.333	0.294	88	54 - 122	0.327	0.254	78	15	20
Benzo(a)pyrene	50-32-8	ND	0.00321	0.333	0.289	87	50 - 125	0.327	0.251	77	14	20
Benzo(b)fluoranthene	205-99-2	ND	0.00643	0.333	0.295	89	53 - 128	0.327	0.254	78	15	20
Benzo(k)fluoranthene	207-08-9	ND	0.00321	0.333	0.306	92	56 - 123	0.327	0.268	82	13	20
Chrysene	218-01-9	ND	0.00643	0.333	0.296	89	57 - 118	0.327	0.258	79	14	20
Dibenz(a,h)anthracene	53-70-3	ND	0.00643	0.333	0.306	92	50 - 129	0.327	0.264	81	15	20
Fluoranthene	206-44-0	ND	0.00321	0.333	0.262	79	55 - 119	0.327	0.232	71	12	20
Fluorene	86-73-7	ND	0.00321	0.333	0.266	80	47 - 114	0.327	0.234	72	13	20
Indeno(1,2,3-cd)pyrene	193-39-5	ND	0.00321	0.333	0.313	94	49 - 130	0.327	0.270	83	15	20
Naphthalene	91-20-3	ND	0.00321	0.333	0.254	76	38 - 111	0.327	0.227	69	11	20
Phenanthrene	85-01-8	ND	0.00321	0.333	0.253	76	49 - 113	0.327	0.225	69	12	20
Pyrene	129-00-0	ND	0.00321	0.333	0.286	86	55 - 117	0.327	0.246	75	15	20
Surrogate												
2-Methylnaphthalene-d10	7297-45-2	.22	68	.333	.227	68	47 - 120	.327	.195	60	NA	NA
Fluoranthene-d10	93951-69-0	.223	69	.333	.23	69	47 - 120	.327	.195	60	NA	NA

Analytical Batch	Client ID	JLS-2 (0-5)	2149375MS	2149375MSD
705147	LAB ID	22102268701	2150477	2150478
Prep Batch	Sample Type	SAMPLE	MS	MSD
704928	Prep Date	03/03/2021 08:00	03/03/21 08:00	03/03/21 08:00
Prep Method	Analysis Date	03/04/2021 11:26	03/04/21 11:44	03/04/21 12:02
EPA 3546	Matrix	Solid	Solid	Solid

EPA 8270C SIM		Units Result	mg/kg LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
2-Methylnaphthalene	91-57-6	0.014	0.00330	0.323	0.245	71	39 - 114	0.327	0.276	80	12	20
Acenaphthene	83-32-9	0.00418	0.00660	0.323	0.257	78	44 - 111	0.327	0.338	102	27*	20
Acenaphthylene	208-96-8	0.00	0.00660	0.323	0.256	79	39 - 116	0.327	0.320	98	22*	20
Anthracene	120-12-7	0.00	0.00330	0.323	0.225	70	50 - 114	0.327	0.249	76	10	20
Benzo(a)anthracene	56-55-3	0.00248	0.00660	0.323	0.271	83	54 - 122	0.327	0.314	95	15	20
Benzo(a)pyrene	50-32-8	0.00	0.00330	0.323	0.271	84	50 - 125	0.327	0.318	97	16	20
Benzo(b)fluoranthene	205-99-2	0.00	0.00660	0.323	0.266	82	53 - 128	0.327	0.326	100	20	20
Benzo(k)fluoranthene	207-08-9	0.00	0.00330	0.323	0.285	88	56 - 123	0.327	0.328	100	14	20
Chrysene	218-01-9	0.00292	0.00660	0.323	0.269	82	57 - 118	0.327	0.315	95	16	20
Dibenz(a,h)anthracene	53-70-3	0.00	0.00660	0.323	0.282	87	50 - 129	0.327	0.324	99	14	20
Fluoranthene	206-44-0	0.00922	0.00330	0.323	0.272	81	55 - 119	0.327	0.338	101	22*	20
Fluorene	86-73-7	0.014	0.00330	0.323	0.262	77	47 - 114	0.327	0.358	105	31*	20
Indeno(1,2,3-cd)pyrene	193-39-5	0.00	0.00330	0.323	0.287	89	49 - 130	0.327	0.331	101	14	20
Naphthalene	91-20-3	0.00297	0.00330	0.323	0.232	71	38 - 111	0.327	0.257	78	10	20
Phenanthrene	85-01-8	0.013	0.00330	0.323	0.284	84	49 - 113	0.327	0.306	90	7	20
Pyrene	129-00-0	0.00645	0.00330	0.323	0.277	84	55 - 117	0.327	0.325	97	16	20
Surrogate												
2-Methylnaphthalene-d10	7297-45-2	.223	67	.323	.18	56	47 - 120	.327	.18	55	NA	NA
Fluoranthene-d10	93951-69-0	.23	69	.323	.219	68	47 - 120	.327	.253	77	NA	NA

GC Volatiles QC Summary

Analytical Batch	Client ID	MB704987		LCS704987				LCSD704987				
704987	LAB ID	2150753		2150754				2150755				
	Sample Type	MB		LCS				LCSD				
	Prep Date											
	Analysis Date	03/05/21 15:35		03/05/21 13:47				03/05/21 14:24				
	Matrix	Solid		Solid				Solid				
MADEP VPH Revision 1.1 (LA)		Units Result	mg/kg LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Aromatic >C8-C10	GCSV-02-14	ND	1.50	7.50	6.49	87	60 - 140	7.50	6.58	88	1	30
Surrogate												
2,5-Dibromotoluene	615-59-8	1.84	74	2.5	1.86	74	60 - 140	2.5	1.84	74	NA	NA

Analytical Batch	Client ID	MB704988		LCS704988				LCSD704988				
704988	LAB ID	2150756		2150757				2150758				
	Sample Type	MB		LCS				LCSD				
	Prep Date											
	Analysis Date	03/05/21 15:35		03/05/21 13:47				03/05/21 14:24				
	Matrix	Solid		Solid				Solid				
MADEP VPH Revision 1.1 (LA)		Units Result	mg/kg LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Aliphatic >C8-C10	GCSV-02-10	ND	1.50	5.00	4.16	83	60 - 140	5.00	5.60	112	30	30
Aliphatic C6-C8	GCSV-02-30	ND	1.50	7.50	7.97	106	60 - 140	7.50	8.08	108	1	30
Surrogate												
2,5-Dibromotoluene	615-59-8	2.56	102	2.5	2.6	104	60 - 140	2.5	2.58	103	NA	NA

GC Semi-Volatiles QC Summary

Analytical Batch	Client ID	MB705027	LCS705027	LCSD705027
705196	LAB ID	2151034	2151035	2151036
Prep Batch	Sample Type	MB	LCS	LCSD
705027	Prep Date	03/03/21 08:20	03/03/21 08:20	03/03/21 08:20
Prep Method	Analysis Date	03/04/21 15:25	03/04/21 15:45	03/04/21 16:05
MADEP EPH Revision 1.1 (LA)	Matrix	Solid	Solid	Solid

MADEP EPH Revision 1.1 (LA)		Units Result	mg/kg LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Aliphatic >C10-C12	GCSV-02-11	ND	5.94	9.52	5.86	62	30 - 140	9.90	6.40	65	9	25
Aliphatic >C12-C16	GCSV-02-12	ND	5.94	9.52	6.60	69	40 - 140	9.90	7.12	72	8	25
Aliphatic >C16-C35	GCSV-02-31	ND	5.94	42.9	32.0	75	40 - 140	44.6	32.5	73	2	25
Surrogate												
1-Chlorooctadecane	3386-33-2	3.26	82	3.81	2.59	68	40 - 140	3.96	2.67	67	NA	NA

Analytical Batch	Client ID	MB705027	LCS705027	LCSD705027
705195	LAB ID	2151034	2151035	2151036
Prep Batch	Sample Type	MB	LCS	LCSD
705027	Prep Date	03/03/21 08:20	03/03/21 08:20	03/03/21 08:20
Prep Method	Analysis Date	03/04/21 17:23	03/04/21 15:45	03/05/21 12:01
MADEP EPH Revision 1.1 (LA)	Matrix	Solid	Solid	Solid

MADEP EPH Revision 1.1 (LA)		Units Result	mg/kg LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Aromatic >C21-C35	GCSV-05-18	ND	5.94	47.6	39.9	84	40 - 140	49.5	50.2	101	23	25
Unadjusted >C10-C12 Aromatics	GCSV-02-15	ND	5.94	4.76	3.17	67	30 - 140	4.95	3.74	76	16	25
Unadjusted >C12-C16 Aromatics	GCSV-02-16	ND	5.94	19.0	17.4	91	40 - 140	19.8	20.6	104	17	25
Unadjusted >C16-C21 Aromatics	GCSV-02-17	ND	5.94	9.52	9.77	103	40 - 140	9.90	11.8	119	19	25
Surrogate												
2-Bromonaphthalene	580-13-2	1.92	48	3.81	1.71	45	40 - 140	3.96	1.83	46	NA	NA
2-Fluorobiphenyl	321-60-8	4.52	114	3.81	4.34	114	40 - 140	3.96	5.08	128	NA	NA
o-Terphenyl	84-15-1	4.3	109	3.81	3.86	101	40 - 140	3.96	4.68	118	NA	NA

Inorganics QC Summary

Analytical Batch	Client ID	MB704792		LCS704792				LCSD704792				
704970	LAB ID	2149916		2149918				2149917				
Prep Batch	Sample Type	MB		LCS				LCSD				
704792	Prep Date	03/02/21 08:00		03/02/21 08:00				03/02/21 08:00				
Prep Method	Analysis Date	03/02/21 19:33		03/02/21 19:40				03/02/21 19:37				
EPA 3050B	Matrix	Solid		Solid				Solid				
EPA 6020B		Units Result	mg/kg LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Arsenic	7440-38-2	ND	0.040	2.00	2.17	108	80 - 120	2.00	2.06	103	5	20
Barium	7440-39-3	ND	0.040	2.00	2.20	110	80 - 120	2.00	2.06	103	7	20

General Chemistry QC Summary

Analytical Batch		Client ID	JLS-2 (0-5)		2149375DUP		
705077		LAB ID	22102268701		2151219		
		Sample Type	SAMPLE		DUP		
		Prep Date	NA				
		Analysis Date	03/03/2021 12:00		03/03/21 12:00		
		Matrix	Solid		Solid		
SM 2540 G-2011		Units Result	% LOQ		Result	RPD	RPD Limit
Total Moisture	WET-037	74.2	0.010		74.0	0	25

CHAIN-OF-CUSTODY Analytical Request Document

Pace Analytical

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Work

Client ID: 4271 – ERM-Baton Rouge
SDG: 221022687
PM: AMK

ALL SHAL

Container Preservative T: U U 3 U U

** Preservative Types: (1) nitric acid, (2) sul
(6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

Company: ERM	Billing Information:
Address: 3535 N. Causeway Blvd, Metairie, Louisiana	
Report To: Jonathan Miller	Email To: Jonathan.Miller@erm.com
Copy To:	Site Collection Info/Address: Bayou Pigeon
Customer Project Name/Number: 0519829	State: LA / County/City: Iberia Parish Time Zone Collected: [ ]PT [ ]MT [X]CT [ ]ET
Phone: 504-910-1764 Email: Jonathan.Miller@erm.com	Site/Facility ID #: Compliance Monitoring? [ ] Yes [ ] No
Collected By (print): Gulf Guinet	Purchase Order #: Quote #: DW PWS ID #: DW Location Code:
Collected By (signature):	Turnaround Date Required: 2 day Immediately Packed on Ice: [X] Yes [ ] No
Sample Disposal: [X] Dispose as appropriate [ ] Return [ ] Archive: _____ [ ] Hold: _____	Rush: [ ] Same Day [ ] Next Day [X] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply) Field Filtered (if applicable): [ ] Yes [X] No Analysis: _____

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	Arsenic (As)	Barium (Ba)	VPH	EPH	PAHs *					
SLS-2(0-5)	SO	Comp	2/25/21	1230				6	X	X	X	X	X					
SLS-2(5-11)	SO	Comp	2/25/21	1150				6	X	X	X	X	X					

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y	N	NA
Custody Signatures Present	Y	N	NA
Collector Signature Present	Y	N	NA
Bottles Intact	Y	N	NA
Correct Bottles	Y	N	NA
Sufficient Volume	Y	N	NA
Samples Received on Ice	Y	N	NA
VOA - Headspace Acceptable	Y	N	NA
USDA Regulated Soils	Y	N	NA
Samples in Holding Time	Y	N	NA
Residual Chlorine Present	Y	N	NA
Cl Strips: _____			
Sample pH Acceptable	Y	N	NA
pH Strips: _____			
Sulfide Present	Y	N	NA
Lead Acetate Strips: _____			

LAB USE ONLY:
Lab Sample # / Comments:

1
2

* Resp. PAHs only for sample SLS-2(0-5') per Client AMK 2/26/21

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #: 2605073

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: E34
Cooler 1 Temp Upon Receipt: 3.9 oC
Cooler 1 Therm Corr. Factor: _____ oC
Cooler 1 Corrected Temp: _____ oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
ERM	2/25/21-1652	PACE	2/25/21 1652
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: _____ of: _____

SAMPLE RECEIVING CHECKLIST

SAMPLE DELIVERY GROUP 221022687	
Client **PM** AMK 4271 - ERM-Baton Rouge	**Transport Method** CUSTOMER
Profile Number 286447	**Received By** McCune, Dodie N.
Line Item(s) 2 - Solid	**Receive Date(s)** 02/25/21

CHECKLIST	YES	NO
Samples received with proper thermal preservation?	☑	☐
Radioactivity is <1600 cpm? If no, record cpm value in notes section.	☑	☐
COC relinquished and complete (including sampleIDs, collect times, and sampler)?	☑	☐
All containers received in good condition and within hold time?	☑	☐
All sample labels and containers received match the chain of custody?	☑	☐
Preservative added to any containers?	☐	☑
If received, was headspace for VOC water containers < 6mm?	☑	☐
Samples collected in containers provided by Pace Gulf Coast?	☑	☐

COOLERS

Airbill	Thermometer ID: E34	Temp °C
		3.9

DISCREPANCIES

None

LAB PRESERVATIONS

None

NOTES

Revision 1.6

LELAP CERTIFICATE NUMBER: 01955
DOD-ELAP ACCREDITATION NUMBER: 74960

ANALYTICAL RESULTS

PERFORMED BY

Pace Analytical Gulf Coast
7979 Innovation Park Dr.
Baton Rouge, LA 70820
(225) 769-4900

Report Date 03/11/2021

Report # 221030356

Project 0519829 JLS

Deliver To	***Additional Recipients***
Jonathan Miller ERM 3838 N. Causeway Blvd. Suite 3000 Metairie, LA 70002	Guy Guinot, ERM

Laboratory Endorsement

Sample analysis was performed in accordance with approved methodologies provided by the Environmental Protection Agency or other recognized agencies. The samples and their corresponding extracts will be maintained for a period of 30 days unless otherwise arranged. Following this retention period the samples will be disposed in accordance with Pace Gulf Coast's Standard Operating Procedures.

Common Abbreviations that may be Utilized in this Report

ND	Indicates the result was Not Detected at the specified reporting limit
NO	Indicates the sample did not ignite when preliminary test performed for EPA Method 1030
DO	Indicates the result was Diluted Out
MI	Indicates the result was subject to Matrix Interference
TNTC	Indicates the result was Too Numerous To Count
SUBC	Indicates the analysis was Sub-Contracted
FLD	Indicates the analysis was performed in the Field
DL	Detection Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
RE	Re-analysis
CF	HPLC or GC Confirmation
00:01	Reported as a time equivalent to 12:00 AM

Reporting Flags that may be Utilized in this Report

J or I	Indicates the result is between the MDL and LOQ
J	DOD flag on analyte in the parent sample for MS/MSD outside acceptance criteria
U	Indicates the compound was analyzed for but not detected
B or V	Indicates the analyte was detected in the associated Method Blank
Q	Indicates a non-compliant QC Result (See Q Flag Application Report)
*****	Indicates a non-compliant or not applicable QC recovery or RPD – see narrative
E	Organics - The result is estimated because it exceeded the instrument calibration range
E	Metals - % diference for the serial dilution is > 10%
L	Reporting Limits adjusted to meet risk-based limit.
P	RPD between primary and confirmation result is greater than 40
DL	Diluted analysis – when appended to Client Sample ID

Sample receipt at Pace Gulf Coast is documented through the attached chain of custody. In accordance with NELAC, this report shall be reproduced only in full and with the written permission of Pace Gulf Coast. The results contained within this report relate only to the samples reported. The documented results are presented within this report.

This report pertains only to the samples listed in the Report Sample Summary and should be retained as a permanent record thereof. The results contained within this report are intended for the use of the client. Any unauthorized use of the information contained in this report is prohibited.

I certify that this data package is in compliance with The NELAC Institute (TNI) Standard 2009 and terms and conditions of the contract and Statement of Work both technically and for completeness, for other than the conditions in the case narrative. Release of the data contained in this hardcopy data package and in the computer readable data submitted has been authorized by the Quality Assurance Manager or his/her designee, as verified by the following signature.

Estimated uncertainty of measurement is available upon request. This report is in compliance with the DOD QSM as specified in the contract if applicable.

Authorized Signature
Pace Gulf Coast Report 221030356

Certifications

Certification	Certification Number
DOD ELAP	74960
Alabama	01955
Arkansas	88-0655
Colorado	01955
Delaware	01955
Florida	E87854
Georgia	01955
Hawaii	01955
Idaho	01955
Illinois	200048
Indiana	01955
Kansas	E-10354
Kentucky	95
Louisiana	01955
Maryland	01955
Massachusetts	01955
Michigan	01955
Mississippi	01955
Missouri	01955
Montana	N/A
Nebraska	01955
New Mexico	01955
North Carolina	618
North Dakota	R-195
Oklahoma	9403
South Carolina	73006001
South Dakota	01955
Tennessee	01955
Texas	T104704178
Vermont	01955
Virginia	460215
Washington	C929
USDA Soil Permit	P330-16-00234

Case Narrative

Client: ERM-Baton Rouge **Report:** 221030356

Pace Analytical Gulf Coast received and analyzed the sample(s) listed
on the Report Sample Summary page of this report. Receipt of the sample(s) is documented
by the attached chain of custody. This applies only to the sample(s) listed in this report.
No sample integrity or quality control exceptions were identified unless noted below.

METALS

In the EPA 1312/6020B analysis for prep batch 705255, the MS recovery is outside the control limits for Barium. The LCS recovery is within control limits. This indicates the analysis is in control and the sample is affected by matrix interference. A post-digestion spike was performed on the QC sample for this batch.

Sample Summary

LAB ID	Client ID	Matrix	Collect Date	Receive Date
22103035601	JLS-2 6-8	Solid	02/08/2021 13:20	02/10/2021 14:15
22103035602	JLS-2 0-2'	Solid	02/08/2021 12:45	02/10/2021 14:15
22103035603	JLS-2 2-4'	Solid	02/08/2021 12:55	02/10/2021 14:15
22103035604	JLS-2 4-6'	Solid	02/08/2021 13:05	02/10/2021 14:15

Sample Results

JLS-2 6-8					
	Collect Date	02/08/2021 13:20	LAB ID	22103035601
	Receive Date	02/10/2021 14:15	Matrix	Solid

EPA 1312/6020B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
03/08/2021 06:30	705255	EPA 3010A	1	03/08/2021 21:14	LWZ	705420

CAS#	Parameter	Result	LOQ	Units
7440-39-3	Barium	0.099	0.0010	mg/L

SM 2540 G-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	03/05/2021 15:15	CJS	705310

CAS#	Parameter	Result	LOQ	Units
WET-037	Total Moisture	58.0	0.010	%

JLS-2 0-2'				
	Collect Date	02/08/2021 12:45	LAB ID	22103035602
	Receive Date	02/10/2021 14:15	Matrix	Solid

SM 2540 G-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	03/05/2021 15:15	CJS	705310

CAS#	Parameter	Result	LOQ	Units
WET-037	Total Moisture	72.5	0.010	%

JLS-2 2-4'				
	Collect Date	02/08/2021 12:55	LAB ID	22103035603
	Receive Date	02/10/2021 14:15	Matrix	Solid

SM 2540 G-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	03/05/2021 15:15	CJS	705310

CAS#	Parameter	Result	LOQ	Units
WET-037	Total Moisture	72.8	0.010	%

JLS-2 4-6'				
	Collect Date	02/08/2021 13:05	LAB ID	22103035604
	Receive Date	02/10/2021 14:15	Matrix	Solid

SM 2540 G-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	03/05/2021 15:15	CJS	705310

CAS#	Parameter	Result	LOQ	Units
WET-037	Total Moisture	54.8	0.010	%

Inorganics QC Summary

Analytical Batch	Client ID	MB705255
705420	LAB ID	2152265
Prep Batch	Sample Type	MB
705255	Prep Date	03/08/21 06:30
Prep Method	Analysis Date	03/08/21 20:08
EPA 3010A	Matrix	Water

EPA 1312/6020B		Units Result	mg/L LOQ
Barium	7440-39-3	ND	0.0010

Analytical Batch	Client ID	LCS705255
705420	LAB ID	2152266
Prep Batch	Sample Type	LCS
705255	Prep Date	03/08/21 06:30
Prep Method	Analysis Date	03/08/21 20:11
EPA 3010A	Matrix	Water

EPA 1312/6020B		Spike Added	Result	%R	Control Limits%R
Barium	7440-39-3	0.050	0.052	103	80 - 120

Analytical Batch	Client ID	JLS-2 6-8	2151190MS
705420	LAB ID	22103035601	2152315
Prep Batch	Sample Type	SAMPLE	MS
705255	Prep Date	03/08/2021 06:30	03/08/21 06:30
Prep Method	Analysis Date	03/08/2021 21:14	03/08/21 21:18
EPA 3010A	Matrix	Water	Water

EPA 1312/6020B		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Barium	7440-39-3	0.099	0.0010	0.050	0.16	130*	80 - 120

Client ID: 4271 - ERM-Baton Rouge
SDG: 221030356
PM: AMK

CHAIN-OF-CUSTODY Analytical Request Document

Pace Analytical

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affi

ALL S

Container Preserva

Company: ERM

Billing Information: SAME

Address: 845 Wisconsin Houston Pkwy N Suite 600 Houston, TX 77024

Report To: Jonathan Miller

Email To:

Copy To: Dave Angle

Site Collection Info/Address:

Customer Project Name/Number: JLS 0519829

State: / County/City: Time Zone Collected: [ ]PT [ ]MT [ ]CT [ ]ET

Phone: 504.810.1764
Email: Jonathan.Miller@erm.com

Site/Facility ID #:

Compliance Monitoring? [ ] Yes [ ] No

Collected By (print): Richarles Truhan

Purchase Order #:
Quote #:

DW PWS ID #:
DW Location Code:

Collected By (signature):

Turnaround Date Required: STD

Immediately Packed on Ice: [ ] Yes [ ] No

Sample Disposal:
[ ] Dispose as appropriate [ ] Return
[ ] Archive: _____
[ ] Hold: _____

Rush:
[ ] Same Day [ ] Next Day
[ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day
(Expedite Charges Apply)

Field Filtered (if applicable): [X] Yes [ ] No

Analysis: Diss, Metals

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns
JLS-2 0-2'	SL	G	2/8/21	1245				6
JLS-2 2-4'	SL	G	2/8/21	1255				6
JLS-2 4-6'	SL	G	2/8/21	1305				5
JLS-2 6-8*	SL	G	2/8/21	1320				5

Analyses

SPLP Ba	SPLP As	SPLP Zn	TOC	PAHs	EPA VPH	Total BaAs	Total Moisture	Hold
X	X	X	X	X			X	
X	X	X	X	X			X	
X				X	X		X	
*				X	X	X	X	

3/4/21

Lab Profile/Line:

2	1
3	2
4	3
1	4

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y N NA
Custody Signatures Present	Y N NA
Collector Signature Present	Y N NA
Bottles Intact	Y N NA
Correct Bottles	Y N NA
Sufficient Volume	Y N NA
Samples Received on Ice	Y N NA
VOA - Headspace Acceptable	Y N NA
USDA Regulated Soils	Y N NA
Samples in Holding Time	Y N NA
Residual Chlorine Present	Y N NA
Cl Strips:	
Sample pH Acceptable	Y N NA
pH Strips:	
Sulfide Present	Y N NA
Lead Acetate Strips:	

LAB USE ONLY:
Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards:
* Client Added SPLP Ba to Sample JLS-2 (4-8) on 3/3/21 MMC

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #: 2498140

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: _____
Cooler 1 Temp Upon Receipt: _____oC
Cooler 1 Therm Corr. Factor: _____oC
Cooler 1 Corrected Temp: _____oC
Comments: 0.7 E34

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
	2/10/21 1415		2/10/21 @ 1415
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
	2/10/21 @ 1522		2.10.21 1415
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: _____ of: _____

SAMPLE RECEIVING CHECKLIST

SAMPLE DELIVERY GROUP 221030356	
Client **PM** AMK 4271 - ERM-Baton Rouge	**Transport Method** CUSTOMER
Profile Number 286447	**Received By** Kinchen, Anna M. McCune, Dodie N.
Line Item(s) 2 - Solid	**Receive Date(s)** 02/10/21

CHECKLIST	YES	NO
Samples received with proper thermal preservation?	☑	☐
Radioactivity is <1600 cpm? If no, record cpm value in notes section.	☑	☐
COC relinquished and complete (including sampleIDs, collect times, and sampler)?	☑	☐
All containers received in good condition and within hold time?	☑	☐
All sample labels and containers received match the chain of custody?	☑	☐
Preservative added to any containers?	☐	☑
If received, was headspace for VOC water containers < 6mm?	☑	☐
Samples collected in containers provided by Pace Gulf Coast?	☑	☐

COOLERS

Airbill	Thermometer ID: E34	Temp °C
		0.7

DISCREPANCIES

None

LAB PRESERVATIONS

None

NOTES

Element Materials Technology Lafayette
2417 W. Pinhook Road
Lafayette, LA 70508-3344
TEL: (337) 235-0483 FAX: (337) 233-6540
Website: www.element.com

February 19, 2021

Jonathan Miller
Environmental Resources Management
CityCentre Four
840 W. Sam Houston Pkwy North, Suite 600
Houston, TX 77024
TEL:
FAX

RE: JLS/0519829

Order No.: 21020524

Dear Jonathan Miller:

Element Materials Technology Lafayette received 1 sample(s) on 2/10/2021 for the analyses presented in the following report.

In accordance with your instructions Element Lafayette conducted the analysis shown on the following pages on samples submitted by your company. The results related only to the items tested. Unless otherwise noted, all analyses were conducted using EPA approved methodologies and all test results meet all requirements of TNI. All relevant sampling information is on the attached Chain-of-Custody form.

Where applicable, all soil data, except for 29-B, are on a wet-weight basis unless otherwise indicated in the units field as –dry.

LELAP Certification No.: 01997. TCEQ Certification No.: T104704261. LDHH Certification No.: LA023. ISDH Certification No.: C-LA-01. NDELCP Certification No.: R-226. A scope of accredited parameters is available upon request. A "#" by the test method or analyte indicates this parameter is outside the scope of accreditation.

Estimated uncertainty is available upon request. This report shall not be reproduced except in full, without the written approval of the laboratory.

If you have any questions regarding these test results, please feel free to call.

Cristina Thibeaux
Customer Service Supervisor
2417 W. Pinhook Road
Lafayette, LA 70508-3344

Element Materials Technology Lafayette
2417 W. Pinhook Road
Lafayette, LA 70508-3344
TEL: (337) 235-0483 FAX: (337) 233-6540
Website: www.element.com

Case Narrative

WO#: **21020524**
Date: **2/19/2021**

CLIENT: Environmental Resources Management
Project: JLS/0519829

Unless specified by the client, a duplicate or MS/MSD, wherever applicable, is randomly selected and analyzed from each analytical batch provided sample volume is sufficient. The sample chosen for duplicate or MS/MSD may or may not be a sample submitted in this workorder. A method blank and/or a lab control sample (LCS)/lab control sample duplicate (LCSD), wherever applicable, are processed as a quality control check for each analytical batch. When the matrix QC data is not available due to insufficient sample volume or when the results indicate possible matrix effect, the validity of the batch is determined by the method blank and LCS/LCSD.

The results of the laboratory internal quality control data are provided in the QC Summary Report section of the report for your review. Laboratory-related QC exceptions that may impact the validity of data are discussed in the case narrative. Sample-related QC exceptions are flagged either in the results page(s) or in the QC report page(s). End users should consider QC exceptions when evaluating sample data against data quality objectives.

Any other exceptions associated with this report will be footnoted in the results page(s) or the QC summary page(s).

Element Materials Technology Lafayette
2417 W. Pinhook Road
Lafayette, LA 70508-3344
TEL: (337) 235-0483 FAX: (337) 233-6540
Website: www.element.com

Analytical Report

(consolidated)

WO#: **21020524**

Date Reported: **2/19/2021**

CLIENT: Environmental Resources Management **Collection Date:** 2/4/2021 9:00:00 AM

Project: JLS/0519829

Lab ID: 21020524-001 **Matrix:** SOIL

Client Sample ID JLS-2 44'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ELECTRICAL CONDUCTIVITY @ SATURATION				**LDNR 29-B**		Analyst: **JMI**
Electrical Conductivity	2.27	0.10		mmhos/cm	1	2/19/2021 3:20:00 PM

Qualifiers:				
	*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
	M	Matrix Interference	ND	Not Detected at the Reporting Limit
	RL	Reporting Limit	SDL	Sample detection limit
	U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode

Element Materials Technology Lafayette
2417 W. Pinhook Road
Lafayette, LA 70508-3344
TEL: (337) 235-0483 FAX: (337) 233-6540
Website: www.element.com

QC SUMMARY REPORT

WO#: **21020524**

19-Feb-21

Client: Environmental Resources Management
Project: JLS/0519829 **BatchID:** **R97398**

Sample ID	**MB-R97398**	SampType:	**MBLK**	TestCode:	**EC_S**	Units:	**mmhos/cm**	Prep Date:		RunNo:	**97398**
Client ID:	**PBS**	Batch ID:	**R97398**	TestNo:	**LDNR 29-B**			Analysis Date:	**2/19/2021**	SeqNo:	**2375218**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Electrical Conductivity	< 0.10	0.10									

Sample ID	**LCS1-R97398**	SampType:	**LCS1**	TestCode:	**EC_S**	Units:	**mmhos/cm**	Prep Date:		RunNo:	**97398**
Client ID:	**ZZZZZZ**	Batch ID:	**R97398**	TestNo:	**LDNR 29-B**			Analysis Date:	**2/19/2021**	SeqNo:	**2375219**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Electrical Conductivity	0.42	0.10	0.46	0	92.6	90	110				

Sample ID	**LCS2-R97398**	SampType:	**LCS2**	TestCode:	**EC_S**	Units:	**mmhos/cm**	Prep Date:		RunNo:	**97398**
Client ID:	**ZZZZZZ**	Batch ID:	**R97398**	TestNo:	**LDNR 29-B**			Analysis Date:	**2/19/2021**	SeqNo:	**2375220**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Electrical Conductivity	57.6	0.10	53.00	0	109	90	110				

Sample ID	**21020521-002ADUP**	SampType:	**DUP**	TestCode:	**EC_S**	Units:	**mmhos/cm**	Prep Date:		RunNo:	**97398**
Client ID:	**ZZZZZZ**	Batch ID:	**R97398**	TestNo:	**LDNR 29-B**			Analysis Date:	**2/19/2021**	SeqNo:	**2375224**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Electrical Conductivity	8.97	0.10						8.93	0.45	20	*

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode		

Element Materials Technology Lafayette
2417 W. Pinhook Road
Lafayette, LA 70508-3344
TEL: (337) 235-0483 FAX: (337) 233-6540
Website: www.element.com

Sample Log-In Check List

Client Name: **ERM_HOUSTON** Work Order Number: **21020524** RcptNo: **1**

Logged by:	**Tammy Thibodeaux**	**2/10/2021 4:30:00 PM**	Tammy L Thibodeaux
Completed By:	**Tammy Thibodeaux**	**2/10/2021 4:33:56 PM**	Tammy L Thibodeaux
Reviewed By:	**Caitlin Duplantis**	**2/18/2021 12:00:14 PM**	Caitlin Duplantis

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☐	No ☑	Not Present ☐
2.	How was the sample delivered?	Client		

Log In

3.	Coolers are present?	Yes ☑	No ☐	NA ☐
4.	Shipping container/cooler in good condition?	Yes ☑	No ☐	
	Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☑
	No. Seal Date:	Signed By:		
5.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
6.	Were all samples received at a temperature of >0° C to 6.0°C	Yes ☐	No ☑	NA ☐
		Not required		
7.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
8.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
9.	Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
10.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
11.	Is the headspace in the VOA vials less than 1/4 inch or 6 mm?	Yes ☐	No ☐	No VOA Vials ☑
12.	Were any sample containers received broken?	Yes ☐	No ☑	
13.	Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
14.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
15.	Is it clear what analyses were requested?	Yes ☑	No ☐	
16.	Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

Special Handling (if applicable)

17.	Was client notified of all discrepancies with this order?	Yes ☐	No ☐	NA ☑

Person Notified: Date

By Whom: Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding:

Client Instructions:

18. Additional remarks:

No sampler's signature by client.

Cooler Information

Cooler No	Temp ºC	Condition	Seal Intact	Seal No	Seal Date	Signed By

element™

Chain of Custody

Laboratory Number: 20T 2102054

Page 1 of 1

Client Information:	Billing Information:	PO Number:	Project Name/Number:
Company Name: ERM	SAME		JLS/0519629
Contact Name: Jonathan Miller		Quote Number:	Sampler's Signature
Address: 840 W. Sam Houston Pkwy N. Suite 600		Required QC Level	
City, State Zip: Houston, TX 77024			
Phone Number: 504.810.1764 Ext:	Ext:	Bill Monthly ☐Yes ☐No	Shipping Method: UPS / FedEx / NOW DHL / Element / Hand / Mail
Fax Number:			
E-mail Address: Jonathan.Miller@erm.com			

Matrix Code

DW = Drinking Water
WW = Waste Water
GW = Ground Water
AQ = Aqueous
OT = Other
SL = Sludge SOL = Solid
O = Oil SO = Soil
F = Food SW = Swab
NG = Natural Gas
NGL = Natural Gas Liquid
PW = Produced Water
CF = Completion Fluid

Which Regulations Apply:
☐RCRA ☐Drinking Water
☐POTW ☐Distribution
☐NPDES ☐Special
☐USDA/FDA ☐State
☐RECAP/RISC ☐Other

Turn Time
☐Standard
RUSH
☐1 Day
☐2 Day
☐Other
(Rush turn times will incur a surcharge and must be pre-approved by lab.)

Sample ID/Description	Collection Information: Date	Time	Grab / Composite	Matrix	Container: Quantity	Container: Type P=Plastic, G=Glass, V=Vial	Pres.: HCl, HNO_3, H_2SO_4, NaOH, $Na_2S_2O_3$	Requested Tests: EC	Comments
JLS-2 4/4'	2/4/21	0900	G	SO	1	P	None	X	

	Relinquished by	Date/Time	Received by	Date/Time
1	[signature]	2/10/21 1630	[signature]	2/10/21 1630
2				
3				

Field Notes:

Received at lab on ice?
☐Yes ☒No Temp:

All samples submitted to Element Materials Technology for analysis are accepted on a custodial basis only. Ownership of the material remains with the client submitting the samples. Element Materials Technology reserves the right to return unused sample portions.

8800 North US 31
Columbus, IN
47201 USA
P 812-375-0531
F 812-375-0731

328 Ley Road, Suite 100
Fort Wayne, IN
46825 USA
P 260-471-7000
F 260-471-7777

909 Executive Dr
Warsaw, IN
46580 USA
P 574-267-3305
F 574-269-6569

3371 Cleveland Road, Suite 100A
South Bend, IN
46628 USA
P 574-277-0707
F 574-273-5699

2417 W. Pinhook Rd
Lafayette, LA
70508 USA
P 337-235-0483
F 337-233-6540