NELAP CERTIFICATE NUMBER: 01955
DOD ELAP CERTIFICATE NUMBER: L14-243

ANALYTICAL RESULTS

PERFORMED BY

GCAL, LLC
7979 Innovation Park Dr.
Baton Rouge, LA 70820

Report Date 02/12/2016

GCAL Report 216021016

Project 07-47 East White Lake

Deliver To	***Additional Recipients***
Dave Angle Michael Pisani and Associates 13313 Southwest Freeway Suite 221 Sugar Land, TX 77478 281-242-5700	Jonathan Miller, Michael Pisani & Associates Lance Cooper, Michael Pisani & Associates

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 GCAL'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
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
DL	Diluted analysis – when appended to Client Sample ID
LOD	Limit of Detection
LOQ	Limit of Quantitation
RE	Re-analysis
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	The result is estimated because it exceeded the instrument calibration range
E	Metals - % diference for the serial dilution is > 10%
P	**RPD between primary and confirmation result is greater than 40**

Sample receipt at GCAL 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 GCAL. 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.

Certifications

10/02/2015

Certification	Certification Number
DOD ELAP	L14-243
Alabama	01955
Arkansas	12-060-0
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
USDA Soil Permit	P330-10-00117

Sample Summary

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21602101601	BC-3	Water	02/09/2016 11:15	02/10/2016 10:10

Sample Results

BC-3	**Collect Date**	02/09/2016 11:15	**GCAL ID**	21602101601
	Receive Date	02/10/2016 10:10	**Matrix**	Water

EPA 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/10/2016 15:27	CLS	579016

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	.049	ug/L	98	78 - 130
1868-53-7	Dibromofluoromethane	0.05	.047	ug/L	94	77 - 127
2037-26-5	Toluene d8	0.05	.05	ug/L	101	76 - 134
17060-07-0	1,2-Dichloroethane-d4	0.05	.054	ug/L	107	71 - 127

EPA 8015C GRO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/10/2016 15:20	BMR	579045

CAS#	Parameter	Result	LOQ	Units
8006-61-9	Gasoline Range Organics	ND	0.100	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
106-39-8	Bromochlorobenzene	0.03	.017	ug/L	56	49 - 136

MADEP VPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/10/2016 13:11	JAR	578812

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

Sample Results

BC-3	**Collect Date**	02/09/2016 11:15	**GCAL ID**	21602101601
	Receive Date	02/10/2016 10:10	**Matrix**	Water

MADEP VPH Revision 1.1 (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/10/2016 13:11	JAR	578812

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
GCV-00-7	2,5-Dibromotoluene (PID)	0.05	.05	ug/L	101	70 - 130
GCV-00-8	2,5-Dibromotoluene (FID)	0.05	.053	ug/L	107	70 - 130

MADEP EPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/11/2016 07:00	579070	MADEP EPH Revision 1.1	1	02/12/2016 14:23	ARW	579286

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	0.04	.031	ug/L	78	40 - 140

MADEP EPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/11/2016 07:00	579070	MADEP EPH Revision 1.1	1	02/12/2016 14:23	ARW	579284

CAS#	Parameter	Result	LOQ	Units
GCSV-02-15	Aromatic >C10-C12	ND	0.100	mg/L
GCSV-02-16	Aromatic >C12-C16	ND	0.100	mg/L
GCSV-02-17	Aromatic >C16-C21	ND	0.150	mg/L
GCSV-05-18	Aromatic >C21-C35	ND	0.100	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.04	.036	ug/L	89	40 - 140
580-13-2	2-Bromonaphthalene	0.04	.036	ug/L	91	40 - 140
321-60-8	2-Fluorobiphenyl	0.04	.037	ug/L	92	40 - 140

Sample Results

BC-3	**Collect Date**	02/09/2016 11:15	**GCAL ID**	21602101601
	Receive Date	02/10/2016 10:10	**Matrix**	Water

EPA 6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/10/2016 14:00	579037	EPA 3010A	10	02/11/2016 12:44	JEL2	579122

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	0.011	0.0025	mg/L
7440-39-3	Barium	3.53	0.010	mg/L
7440-43-9	Cadmium	ND	0.010	mg/L
7440-70-2	Calcium	352	5.00	mg/L
7440-47-3	Chromium	ND	0.010	mg/L
7439-89-6	Iron	1.22	1.00	mg/L
7439-92-1	Lead	ND	0.010	mg/L
7439-96-5	Manganese	0.30	0.050	mg/L
7440-09-7	Potassium	8.82	1.00	mg/L
7440-66-6	Zinc	ND	0.20	mg/L

EPA 6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/10/2016 14:00	579037	EPA 3010A	200	02/11/2016 12:39	JEL2	579122

CAS#	Parameter	Result	LOQ	Units
7439-95-4	Magnesium	135	20.0	mg/L
7440-23-5	Sodium	1650	20.0	mg/L
7440-24-6	Strontium	4.61	0.20	mg/L

EPA 6020A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/10/2016 12:45	578935	EPA 3005A Dissolved	10	02/11/2016 12:07	JEL2	579122

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	0.0097	0.0025	mg/L
7440-39-3	Barium	3.32	0.010	mg/L
7440-43-9	Cadmium	ND	0.010	mg/L
7440-47-3	Chromium	ND	0.010	mg/L
7439-89-6	Iron	ND	1.00	mg/L
7439-92-1	Lead	ND	0.010	mg/L
7439-96-5	Manganese	0.27	0.050	mg/L
7440-66-6	Zinc	ND	0.20	mg/L

Sample Results

BC-3

Collect Date	02/09/2016 11:15	**GCAL ID**	21602101601
Receive Date	02/10/2016 10:10	**Matrix**	Water

EPA 6020A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/10/2016 12:45	578935	EPA 3005A Dissolved	100	02/11/2016 11:46	JEL2	579122

CAS#	Parameter	Result	LOQ	Units
7440-24-6	Strontium	3.60	0.10	mg/L

EPA 7470A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/10/2016 14:00	579038	EPA 7470A	1	02/11/2016 13:49	JEL2	579107

CAS#	Parameter	Result	LOQ	Units
7439-97-6	Mercury	ND	0.00020	mg/L

EPA 7470A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/10/2016 14:00	579038	EPA 7470A Dissolved	1	02/11/2016 13:51	JEL2	579107

CAS#	Parameter	Result	LOQ	Units
7439-97-6	Mercury	ND	0.00020	mg/L

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	20	02/11/2016 00:53	RXJ	578978

CAS#	Parameter	Result	LOQ	Units
24959-67-9	Bromide	ND	4.00	mg/L
14808-79-8	Sulfate	57.6	4.00	mg/L

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	2000	02/11/2016 01:10	RXJ	578978

CAS#	Parameter	Result	LOQ	Units
16887-00-6	Chloride	2850	400	mg/L

Sample Results

BC-3	**Collect Date**	02/09/2016 11:15	**GCAL ID**	21602101601
	Receive Date	02/10/2016 10:10	**Matrix**	Water

SM 2320 B-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/10/2016 15:37	JEM	579060

CAS#	Parameter	Result	LOQ	Units
T-005-B	Bicarbonate Alkalinity	251	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	02/10/2016 15:37	JEM	579060

CAS#	Parameter	Result	LOQ	Units
T-005-C	Carbonate Alkalinity	ND	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	02/10/2016 17:06	AJE	579063

CAS#	Parameter	Result	LOQ	Units
WET-035	Total Dissolved Solids(TDS)	4860	10.0	mg/L

GC/MS Volatiles QC Summary

Analytical Batch 579016	Client ID	MB579016		LCS579016				LCSD579016				
	GCAL ID	1538917		1538918				1538919				
	Sample Type	MB		LCS				LCSD				
	Prep Date	NA		NA				NA				
	Analysis Date	02/10/2016 12:00		02/10/2016 09:40				02/10/2016 10:03				
	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	0.047	94	70 - 129	0.050	0.047	94	0	20
Ethylbenzene	100-41-4	ND	0.00500	0.050	0.047	94	74 - 126	0.050	0.047	94	0	30
Toluene	108-88-3	ND	0.00500	0.050	0.047	93	72 - 120	0.050	0.047	94	0	20
Xylene (total)	1330-20-7	ND	0.015	0.150	0.139	93	74 - 127	0.150	0.140	93	1	30
Surrogate												
1,2-Dichloroethane-d4	17060-07-0	.0522	104	.05	.0545	109	71 - 127	.05	.0537	107	NA	NA
4-Bromofluorobenzene	460-00-4	.0459	92	.05	.0489	98	78 - 130	.05	.05	100	NA	NA
Dibromofluoromethane	1868-53-7	.0483	97	.05	.0499	100	77 - 127	.05	.0502	100	NA	NA
Toluene d8	2037-26-5	.0513	103	.05	.0466	93	76 - 134	.05	.0478	96	NA	NA

GC Volatiles QC Summary

Analytical Batch 579045	Client ID	MB579045		LCS579045				LCSD579045				
	GCAL ID	1539087		1539088				1539089				
	Sample Type	MB		LCS				LCSD				
	Prep Date	NA		NA				NA				
	Analysis Date	02/10/2016 10:43		02/10/2016 10:03				02/10/2016 10:23				
	Matrix	Water		Water				Water				
EPA 8015C GRO		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Gasoline Range Organics	8006-61-9	ND	0.100	0.500	0.472	94	70 - 128	0.500	0.468	94	1	25
Surrogate												
Bromochlorobenzene	106-39-8	.0162	54	.03	.0243	81	49 - 136	.03	.0231	77	NA	NA

Analytical Batch 578812	Client ID	MB578812		LCS578812				LCSD578812				
	GCAL ID	1538125		1538126				1538127				
	Sample Type	MB		LCS				LCSD				
	Prep Date	NA		NA				NA				
	Analysis Date	02/08/2016 12:14		02/08/2016 10:47				02/08/2016 11:20				
	Matrix	Water		Water				Water				
MADEP VPH Revision 1.1		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	0.096	96	60 - 140	0.100	0.102	102	6	30
Aliphatic C6-C8	GCSV-02-30	ND	0.030	0.150	0.167	111	60 - 140	0.150	0.149	99	11	30
Aromatic >C8-C10	GCSV-02-14	ND	0.030	0.150	0.149	99	60 - 140	0.150	0.140	93	6	30
Surrogate												
2,5-Dibromotoluene (FID)	GCV-00-8	.0561	112	.05	.059	118	70 - 130	.05	.0575	115	NA	NA
2,5-Dibromotoluene (PID)	GCV-00-7	.0488	98	.05	.0552	110	70 - 130	.05	.0501	100	NA	NA

Inorganics QC Summary

Analytical Batch	Client ID	MB579038		LCS579038			
579107	GCAL ID	1539035		1539036			
Prep Batch	Sample Type	MB		LCS			
579038	Prep Date	02/10/2016 14:00		02/10/2016 14:00			
Prep Method	Analysis Date	02/11/2016 13:45		02/11/2016 13:47			
EPA 7470A	Matrix	Water		Water			
EPA 7470A		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Mercury	7439-97-6	ND	0.00020	0.0050	0.0049	98	80 - 120

Analytical Batch	Client ID	FMS0208Y066S		1538389MS				1538389MSD				
579107	GCAL ID	21602090501		1539056				1539057				
Prep Batch	Sample Type	SAMPLE		MS				MSD				
579038	Prep Date	02/10/2016 14:00		02/10/2016 14:00				02/10/2016 14:00				
Prep Method	Analysis Date	02/11/2016 13:57		02/11/2016 13:59				02/11/2016 14:01				
EPA 7470A	Matrix	Solid		Solid				Solid				
EPA 7470A		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Mercury	7439-97-6	0.0	0.00020	0.0050	0.0049	99	80 - 120	0.0050	0.0041	82	18	20

Analytical Batch	Client ID	MB579038		LCS579038			
579107	GCAL ID	1539035		1539036			
Prep Batch	Sample Type	MB		LCS			
579038	Prep Date	02/10/2016 14:00		02/10/2016 14:00			
Prep Method	Analysis Date	02/11/2016 13:45		02/11/2016 13:47			
EPA 7470A	Matrix	Water		Water			
EPA 7470A Dissolved		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Mercury	7439-97-6	ND	0.00020	0.0050	0.0049	98	80 - 120

Analytical Batch	Client ID	FMS0208Y066S		1538389MS				1538389MSD				
579107	GCAL ID	21602090501		1539056				1539057				
Prep Batch	Sample Type	SAMPLE		MS				MSD				
579038	Prep Date	02/10/2016 14:00		02/10/2016 14:00				02/10/2016 14:00				
Prep Method	Analysis Date	02/11/2016 13:57		02/11/2016 13:59				02/11/2016 14:01				
EPA 7470A	Matrix	Solid		Solid				Solid				
EPA 7470A Dissolved		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Mercury	7439-97-6	0.0	0.00020	0.0050	0.0049	99	80 - 120	0.0050	0.0041	82	18	20

Analytical Batch	Client ID	MB579037		LCS579037			
579122	GCAL ID	1539030		1539031			
Prep Batch	Sample Type	MB		LCS			
579037	Prep Date	02/10/2016 14:00		02/10/2016 14:00			
Prep Method	Analysis Date	02/11/2016 12:28		02/11/2016 12:34			
EPA 3010A	Matrix	Water		Water			
EPA 6020A		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Arsenic	7440-38-2	ND	0.00025	0.050	0.050	100	80 - 120
Barium	7440-39-3	ND	0.0010	0.050	0.050	100	80 - 120
Cadmium	7440-43-9	ND	0.0010	0.050	0.049	99	80 - 120
Calcium	7440-70-2	ND	0.50	25.0	24.8	99	80 - 120
Chromium	7440-47-3	ND	0.0010	0.050	0.051	101	80 - 120
Iron	7439-89-6	ND	0.10	5.00	5.09	102	80 - 120
Lead	7439-92-1	ND	0.0010	0.050	0.050	100	80 - 120
Magnesium	7439-95-4	ND	0.10	5.00	5.13	103	80 - 120
Manganese	7439-96-5	ND	0.0050	0.050	0.048	97	80 - 120
Potassium	7440-09-7	ND	0.10	5.00	5.01	100	80 - 120
Sodium	7440-23-5	ND	0.10	5.00	5.24	105	80 - 120
Strontium	7440-24-6	ND	0.0010	0.050	0.052	103	80 - 120
Zinc	7440-66-6	ND	0.020	1.00	1.00	100	80 - 120

Inorganics QC Summary

Analytical Batch	Client ID	MB578935	LCS578935
579122	GCAL ID	1538590	1538591
Prep Batch	Sample Type	MB	LCS
578935	Prep Date	02/10/2016 12:45	02/10/2016 12:45
Prep Method	Analysis Date	02/11/2016 11:36	02/11/2016 11:41
EPA 3005A Dissolved	Matrix	Water	Water

EPA 6020A Dissolved		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Arsenic	7440-38-2	ND	0.00025	0.050	0.049	98	80 - 120
Barium	7440-39-3	ND	0.0010	0.050	0.049	99	80 - 120
Cadmium	7440-43-9	ND	0.0010	0.050	0.049	98	80 - 120
Chromium	7440-47-3	ND	0.0010	0.050	0.049	98	80 - 120
Iron	7439-89-6	ND	0.10	5.00	4.98	100	80 - 120
Lead	7439-92-1	ND	0.0010	0.050	0.048	97	80 - 120
Manganese	7439-96-5	ND	0.0050	0.050	0.050	99	80 - 120
Strontium	7440-24-6	ND	0.0010	0.050	0.049	98	80 - 120
Zinc	7440-66-6	ND	0.020	1.00	0.99	99	80 - 120

Analytical Batch	Client ID	BC-3	1538950MS	1538950MSD
579122	GCAL ID	21602101601	1538993	1538994
Prep Batch	Sample Type	SAMPLE	MS	MSD
578935	Prep Date	02/10/2016 12:45	02/10/2016 12:45	02/10/2016 12:45
Prep Method	Analysis Date	02/11/2016 12:07	02/11/2016 12:13	02/11/2016 12:18
EPA 3005A Dissolved	Matrix	Water	Water	Water

EPA 6020A Dissolved		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Arsenic	7440-38-2	0.0097	0.0025	0.050	0.058	97	80 - 120	0.050	0.058	96	0	20
Barium	7440-39-3	3.32	0.010	0.050	3.36	81	80 - 120	0.050	3.31	-26*	1	20
Cadmium	7440-43-9	0.0	0.010	0.050	0.049	99	80 - 120	0.050	0.047	93	4	20
Chromium	7440-47-3	0.0	0.010	0.050	0.052	104	80 - 120	0.050	0.047	94	10	20
Iron	7439-89-6	0.88	1.00	5.00	5.67	96	80 - 120	5.00	5.72	97	1	20
Lead	7439-92-1	0.0	0.010	0.050	0.048	96	80 - 120	0.050	0.047	94	2	20
Manganese	7439-96-5	0.27	0.050	0.050	0.31	94	80 - 120	0.050	0.31	93	0	20
Zinc	7440-66-6	0.0	0.20	1.00	1.03	103	80 - 120	1.00	0.98	98	5	20

Analytical Batch	Client ID	BC-3	1538950MS	1538950MSD
579122	GCAL ID	21602101601	1538993	1538994
Prep Batch	Sample Type	SAMPLE	MS	MSD
578935	Prep Date	02/10/2016 12:45	02/10/2016 12:45	02/10/2016 12:45
Prep Method	Analysis Date	02/11/2016 11:46	02/11/2016 11:51	02/11/2016 11:57
EPA 3005A Dissolved	Matrix	Water	Water	Water

EPA 6020A Dissolved		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Strontium	7440-24-6	3.60	0.10	0.050	3.59	-8*	80 - 120	0.050	3.68	168*	2	20

General Chemistry QC Summary

Analytical Batch 579060	Client ID	BC-3	1538950DUP
	GCAL ID	21602101601	1539254
	Sample Type	SAMPLE	DUP
	Prep Date	NA	NA
	Analysis Date	02/10/2016 15:37	02/10/2016 15:37
	Matrix	Water	Water

SM 2320 B-2011		Units Result	mg/L CaCO3 LOQ	Result	RPD	RPD Limit
Bicarbonate Alkalinity	T-005-B	251	1.0	263	5	11

Analytical Batch 578978	Client ID	MB578978	LCS578978
	GCAL ID	1538781	1538782
	Sample Type	MB	LCS
	Prep Date	NA	NA
	Analysis Date	02/10/2016 15:46	02/10/2016 15:29
	Matrix	Water	Water

EPA 9056A		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Bromide	24959-67-9	ND	0.200	2.50	2.29	92	80 - 120
Chloride	16887-00-6	ND	0.200	2.50	2.32	93	80 - 120
Sulfate	14808-79-8	ND	0.200	2.50	2.41	96	80 - 120

Analytical Batch 579063	Client ID	MB579063	LCS579063
	GCAL ID	1539274	1539275
	Sample Type	MB	LCS
	Prep Date	NA	NA
	Analysis Date	02/10/2016 17:06	02/10/2016 17:06
	Matrix	Water	Water

SM 2540 C-2011		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Total Dissolved Solids(TDS)	WET-035	ND	10.0	1000	988	99	80 - 120

Analytical Batch 579063	Client ID	BC-3	1538950DUP
	GCAL ID	21602101601	1539276
	Sample Type	SAMPLE	DUP
	Prep Date	NA	NA
	Analysis Date	02/10/2016 17:06	02/10/2016 17:06
	Matrix	Water	Water

SM 2540 C-2011		Units Result	mg/L LOQ	Result	RPD	RPD Limit
Total Dissolved Solids(TDS)	WET-035	4860	10.0	4850	0	5.4

GCAL ANALYTICAL LABORATORIES, LLC

7979 Innovation Park Dr., Baton Rouge, LA 70820-7402
Phone: 225.769.4900 • Fax: 225.767.5717 • www.gcal.com

CHAIN OF CUSTODY RECORD

Client ID: 4271 - Michael Pisani & Associates
SDG: 216021016
PM: RKW

Report to:	Bill to:
Client: Michael Pisani & Associates	Client:
Address: 1100 Poydras St #30 Energy Ctr New Orleans, LA 70163	Address:
Contact: Don Aguk	Contact:
Phone: 281-242-5700	Phone:
E-mail: jshugart@mpisani.com	E-mail:

P.O. Number: 07-47
Project Name/Number: E. White Lake
Sampled By: Jody Shugart

GCAL use only:
Custody Seal used ☐ yes ☐ no intact ☐ yes ☐ no
Temperature °C 1.3°C E26
B2cpm

☐ Dissolved Analysis Requested
☐ Field filtered
☐ Lab filtered

Matrix[1]	Date	Time (2400)	Comp	Grab	Sample Description	No Containers	EPH/VPH Mass Method	metals (total)	metals (diss. field filtered)	anions/cations *	BTEX 8260 oz/10/16	TPH DRO, GRO, DRO	Alkilinity	Bicarbonate/Carbonate	Chloride, Bromide, Sulfate	TDS	Preservative
W	2/9/16	11:15		x	BC-3	10	X	X	X	X	X	X	X	X	X	X	

Sodium Potassium
Magnesium Calcium
Arsenic Barium
Cadmium Chromium
Iron Manganese Lead
Strontium Zinc Mercury

Air Bill No:

Turn Around Time (Business Days): ~~X~~ 24h* ~~X~~ 48h* ☐ 3 days* ☐ 1 week* ☐ Standard (Per Contract/Quote)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
	2/9/16	14:00		2/9/16	1400
	2/10/16	0930		2/10/16	0930
	2/10/16	1010		2-10-16	1010

Note: ~~*see most recent E. White Lake lab reports for parameter list~~ 29B Metals with Strontium

By submitting these samples, you agree to GCAL's terms and conditions contained in our most recent schedule of services.

Matrix[1]: 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 PM.

WHITE: CLIENT FINAL REPORT - CANARY: CLIENT

GCAL ANALYTICAL LABORATORIES, LLC

SAMPLE RECEIVING CHECKLIST

216021016

SAMPLE DELIVERY GROUP 216021016

Client PM RKW 4271 - Michael Pisani & Associates	**Transport Method** COURIER
Profile Number 174115	**Received By** Lofton, Katie E.
Line Item(s) 3 - Surface Water	**Receive Date(s)** 02/10/16

CHECKLIST	YES	NO	NA
Samples received with proper thermal and chemical preservation?	☑	☐	☐
Radioactivity is <1600 cmp? If no, record cmp value in notes section.	☑	☐	☐
Custody seals present and intact?	☐	☑	☐
COC relinquished and complete (including sample IDs, collection dates and times, and sampler name)?	☑	☐	☐
Short holds or RUSH samples received?	☑	☐	☐
All containers received in good condition and within hold time?	☐	☑	☐
All sample labels and containers received match the chain of custody?	☑	☐	☐
Preservation checked at receipt? Exceptions: VOC, Coliform, TOC, Oil and Grease, DOC	☑	☐	☐
Preservative added to any containers?	☐	☑	☐
VOC water containers received with headspace < 6mm?	☑	☐	☐
Received filtered sample volume for dissolved analysis?	☑	☐	☐
Trip blank present in all coolers containing VOC waters?	☐	☑	☐
Samples collected in containers provided by GCAL?	☑	☐	☐

COOLERS

Airbill	Thermometer ID: E26	Temp(°C)
		1.3

DISCREPANCIES

None

LAB PRESERVATIONS

None

NOTES Did not receive containers for DRO/ORO analysis.

Revision 1.4

Page 1 of 1

GCAL
ANALYTICAL LABORATORIES, LLC

NELAP CERTIFICATE NUMBER: 01955
DOD ELAP CERTIFICATE NUMBER: L14-243

ANALYTICAL RESULTS

PERFORMED BY

GCAL, LLC
7979 Innovation Park Dr.
Baton Rouge, LA 70820

Report Date 02/12/2016

GCAL Report 216020523

Project 07-47 East White Lake

Deliver To	***Additional Recipients***
Dave Angle Michael Pisani and Associates 13313 Southwest Freeway Suite 221 Sugar Land, TX 77478 281-242-5700	Jonathan Miller, Michael Pisani & Associates Lance Cooper, Michael Pisani & Associates

PJLA Testing DoD ELAP

ISO 17025

NELAP ACCREDITED TNI LABORATORY

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 GCAL'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
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
DL	Diluted analysis – when appended to Client Sample ID
LOD	Limit of Detection
LOQ	Limit of Quantitation
RE	Re-analysis
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	The result is estimated because it exceeded the instrument calibration range
E	Metals - % diference for the serial dilution is > 10%
P	**RPD between primary and confirmation result is greater than 40**

Sample receipt at GCAL 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 GCAL. 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
GCAL Report 216020523

Certifications

10/02/2015

Certification	Certification Number
DOD ELAP	L14-243
Alabama	01955
Arkansas	12-060-0
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
USDA Soil Permit	P330-10-00117

Case Narrative

Client: Michael Pisani & Associates **Report:** 216020523

Gulf Coast Analytical Laboratories 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.

VOLATILES GAS CHROMATOGRAPHY

In the MADEP VPH Revision 1.1 analysis, sample 21602052303 (BC-2) had to be diluted to bracket the concentration of target analyte(s) within the calibration range of the instrument.

METALS

In the EPA 6020A analysis, samples 21602052301 (MC-2), 21602052302 (TBA-2), 21602052303 (BC-2) and 21602052304 (BC-4) had to be diluted in order to bracket the concentration within the calibration range of the instrument.

In the EPA 6020A Dissolved analysis, samples 21602052301 (MC-2), 21602052302 (TBA-2), 21602052303 (BC-2) and 21602052304 (BC-4) had to be diluted in order to bracket the concentration within the calibration range of the instrument.

In the EPA 6020A analysis, a chemical or physical interference necessitated a dilution for samples 21602052301 (MC-2), 21602052302 (TBA-2) and 21602052304 (BC-4). This is reflected in the elevated reporting limits.

In the EPA 6020A Dissolved analysis, a chemical or physical interference necessitated a dilution for samples 21602052301 (MC-2), 21602052302 (TBA-2) and 21602052304 (BC-4). This is reflected in the elevated reporting limits.

In the EPA 6020A analysis, sample 21602052303 (BC-2) was analyzed at a dilution. The reporting limits are at or below the RECAP screening standards at this dilution.

In the EPA 6020A Dissolved analysis, sample 21602052303 (BC-2) was analyzed at a dilution. The reporting limits are at or below the RECAP screening standards at this dilution.

In the EPA 6020A Dissolved analysis for prep batch 578760, the MS and/or MSD recovery is outside the control limits for Manganese. The LCS recovery is within the control limits. This indicates the analysis is in control and the sample is affected by matrix interference. The MS/MSD recoveries and RPD are not applicable for Strontium and Barium because the sample concentration is greater than four times the spike concentration.

The dissolved concentration for some analyetes is slightly greater than the total concentration of these analytes in several samples. This is attributed to separate aliquots of sample.

CONVENTIONALS

In the EPA 9056A analysis, samples 21602052301 (MC-2), 21602052302 (TBA-2), 21602052303 (BC-2) and 21602052304 (BC-4) had to be diluted in order to bracket the concentration within the calibration range of the instrument.

In the SM 2540 C-2011 analysis, sample 21602052303 (BC-2) had to be diluted prior to filtration in order not to exceed the maximum residue allowed by the method.

Sample Summary

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21602052301	MC-2	Water	02/01/2016 14:45	02/05/2016 10:39
21602052302	TBA-2	Water	02/02/2016 09:30	02/05/2016 10:39
21602052303	BC-2	Water	02/03/2016 16:00	02/05/2016 10:39
21602052304	BC-4	Water	02/04/2016 14:45	02/05/2016 10:39

Sample Results

MC-2	**Collect Date**	02/01/2016 14:45	**GCAL ID**	21602052301
	Receive Date	02/05/2016 10:39	**Matrix**	Water

EPA 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/06/2016 17:48	CJR	578693

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	.049	ug/L	99	78 - 130
1868-53-7	Dibromofluoromethane	0.05	.052	ug/L	103	77 - 127
2037-26-5	Toluene d8	0.05	.053	ug/L	106	76 - 134
17060-07-0	1,2-Dichloroethane-d4	0.05	.05	ug/L	101	71 - 127

EPA 8015C GRO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/08/2016 13:00	JAR	578785

CAS#	Parameter	Result	LOQ	Units
8006-61-9	Gasoline Range Organics	ND	0.100	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
106-39-8	Bromochlorobenzene	0.03	.017	ug/L	55	49 - 136

MADEP VPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/08/2016 12:58	JAR	578812

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

Sample Results

MC-2

Collect Date	02/01/2016 14:45	**GCAL ID**	21602052301
Receive Date	02/05/2016 10:39	**Matrix**	Water

MADEP VPH Revision 1.1 (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/08/2016 12:58	JAR	578812

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
GCV-00-7	2,5-Dibromotoluene (PID)	0.05	.047	ug/L	94	70 - 130
GCV-00-8	2,5-Dibromotoluene (FID)	0.05	.053	ug/L	105	70 - 130

EPA 8015C DRO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 15:35	578658	EPA 3510C	1	02/08/2016 11:39	MEF2	578843

CAS#	Parameter	Result	LOQ	Units
GCSV-00-4	Diesel Range Organics	ND	0.125	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.05	.03	ug/L	60	56 - 125

EPA 8015C ORO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 15:35	578659	EPA 3510C	1	02/08/2016 11:39	MEF2	578844

CAS#	Parameter	Result	LOQ	Units
GCSV-00-44	Oil Range Organics	ND	0.125	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.05	.032	ug/L	64	56 - 125

MADEP EPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/08/2016 22:00	578662	MADEP EPH Revision 1.1	1	02/10/2016 18:14	ARW	579180

CAS#	Parameter	Result	LOQ	Units
GCSV-02-11	Aliphatic >C10-C12	ND	0.100	mg/L

Sample Results

MC-2

Collect Date	02/01/2016 14:45	**GCAL ID**	21602052301
Receive Date	02/05/2016 10:39	**Matrix**	Water

MADEP EPH Revision 1.1 (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/08/2016 22:00	578662	MADEP EPH Revision 1.1 (Continued)	1	02/10/2016 18:14	ARW	579180

CAS#	Parameter	Result	LOQ	Units
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	0.04	.025	ug/L	62	40 - 140

MADEP EPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/08/2016 22:00	578662	MADEP EPH Revision 1.1	1	02/11/2016 12:59	ARW	579170

CAS#	Parameter	Result	LOQ	Units
GCSV-02-15	Aromatic >C10-C12	ND	0.100	mg/L
GCSV-02-16	Aromatic >C12-C16	ND	0.100	mg/L
GCSV-02-17	Aromatic >C16-C21	ND	0.150	mg/L
GCSV-05-18	Aromatic >C21-C35	ND	0.100	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.04	.028	ug/L	69	40 - 140
580-13-2	2-Bromonaphthalene	0.04	.038	ug/L	95	40 - 140
321-60-8	2-Fluorobiphenyl	0.04	.039	ug/L	97	40 - 140

EPA 6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 09:20	578741	EPA 3010A	10	02/08/2016 19:56	JEL2	578889

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	0.010	0.0025	mg/L
7440-39-3	Barium	1.35	0.010	mg/L
7440-43-9	Cadmium	ND	0.010	mg/L
7440-70-2	Calcium	152	5.00	mg/L
7440-47-3	Chromium	0.021	0.010	mg/L
7439-89-6	Iron	16.6	1.00	mg/L
7439-92-1	Lead	0.013	0.010	mg/L
7439-95-4	Magnesium	46.3	1.00	mg/L
7439-96-5	Manganese	0.51	0.050	mg/L
7440-09-7	Potassium	7.82	1.00	mg/L

Sample Results

MC-2

Collect Date	02/01/2016 14:45	**GCAL ID**	21602052301
Receive Date	02/05/2016 10:39	**Matrix**	Water

EPA 6020A (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 09:20	578741	EPA 3010A	10	02/08/2016 19:56	JEL2	578889

CAS#	Parameter	Result	LOQ	Units
7440-66-6	Zinc	ND	0.20	mg/L

EPA 6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 09:20	578741	EPA 3010A	100	02/08/2016 19:53	JEL2	578889

CAS#	Parameter	Result	LOQ	Units
7440-23-5	Sodium	785	10.0	mg/L
7440-24-6	Strontium	1.26	0.10	mg/L

EPA 6020A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 13:55	578760	EPA 3005A Dissolved	10	02/09/2016 09:26	JEL2	578926

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	0.0060	0.0025	mg/L
7440-39-3	Barium	1.07	0.010	mg/L
7440-43-9	Cadmium	ND	0.010	mg/L
7440-47-3	Chromium	ND	0.010	mg/L
7439-89-6	Iron	ND	1.00	mg/L
7439-92-1	Lead	ND	0.010	mg/L
7439-96-5	Manganese	0.16	0.050	mg/L
7440-66-6	Zinc	ND	0.20	mg/L

EPA 6020A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 13:55	578760	EPA 3005A Dissolved	100	02/09/2016 09:12	JEL2	578926

CAS#	Parameter	Result	LOQ	Units
7440-24-6	Strontium	1.11	0.10	mg/L

Sample Results

MC-2

Collect Date	02/01/2016 14:45	**GCAL ID**	21602052301
Receive Date	02/05/2016 10:39	**Matrix**	Water

EPA 7470A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 10:45	578744	EPA 7470A	1	02/08/2016 16:52	LWZ	578805

CAS#	Parameter	Result	LOQ	Units
7439-97-6	Mercury	ND	0.00020	mg/L

EPA 7470A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 10:45	578744	EPA 7470A Dissolved	1	02/08/2016 16:55	LWZ	578805

CAS#	Parameter	Result	LOQ	Units
7439-97-6	Mercury	ND	0.00020	mg/L

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	5	02/08/2016 17:59	SMR	578848

CAS#	Parameter	Result	LOQ	Units
24959-67-9	Bromide	1.84	1.00	mg/L
14808-79-8	Sulfate	30.0	1.00	mg/L

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	500	02/08/2016 18:34	SMR	578848

CAS#	Parameter	Result	LOQ	Units
16887-00-6	Chloride	1220	100	mg/L

SM 2320 B-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/09/2016 18:53	JEM	578982

CAS#	Parameter	Result	LOQ	Units
T-005-B	Bicarbonate Alkalinity	320	1.0	mg/L CaCO3

Sample Results

MC-2

Collect Date	02/01/2016 14:45	**GCAL ID**	21602052301
Receive Date	02/05/2016 10:39	**Matrix**	Water

SM 2320 B-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/09/2016 18:53	JEM	578982

CAS#	Parameter	Result	LOQ	Units
T-005-C	Carbonate Alkalinity	ND	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	02/05/2016 14:30	WRW	578637

CAS#	Parameter	Result	LOQ	Units
WET-035	Total Dissolved Solids(TDS)	2270	10.0	mg/L

TBA-2

Collect Date	02/02/2016 09:30	**GCAL ID**	21602052302
Receive Date	02/05/2016 10:39	**Matrix**	Water

EPA 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/06/2016 18:09	CJR	578693

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	ug/L	99	78 - 130
1868-53-7	Dibromofluoromethane	0.05	.052	ug/L	105	77 - 127
2037-26-5	Toluene d8	0.05	.053	ug/L	107	76 - 134
17060-07-0	1,2-Dichloroethane-d4	0.05	.051	ug/L	101	71 - 127

Sample Results

TBA-2

Collect Date	02/02/2016 09:30	**GCAL ID**	21602052302
Receive Date	02/05/2016 10:39	**Matrix**	Water

EPA 8015C GRO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/08/2016 13:19	JAR	578785

CAS#	Parameter	Result	LOQ	Units
8006-61-9	Gasoline Range Organics	ND	0.100	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
106-39-8	Bromochlorobenzene	0.03	.02	ug/L	67	49 - 136

MADEP VPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/08/2016 13:23	JAR	578812

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
GCSV-02-14	Aromatic >C8-C10	ND	0.030	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
GCV-00-7	2,5-Dibromotoluene (PID)	0.05	.048	ug/L	96	70 - 130
GCV-00-8	2,5-Dibromotoluene (FID)	0.05	.055	ug/L	109	70 - 130

EPA 8015C DRO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 15:35	578658	EPA 3510C	1	02/08/2016 12:47	MEF2	578843

CAS#	Parameter	Result	LOQ	Units
GCSV-00-4	Diesel Range Organics	ND	0.125	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.05	.038	ug/L	76	56 - 125

Sample Results

TBA-2	**Collect Date**	02/02/2016 09:30	**GCAL ID**	21602052302
	Receive Date	02/05/2016 10:39	**Matrix**	Water

EPA 8015C ORO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 15:35	578659	EPA 3510C	1	02/08/2016 12:47	MEF2	578844

CAS#	Parameter	Result	LOQ	Units
GCSV-00-44	Oil Range Organics	ND	0.125	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.05	.041	ug/L	81	56 - 125

MADEP EPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/08/2016 22:00	578662	MADEP EPH Revision 1.1	1	02/10/2016 18:34	ARW	579180

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	0.04	.038	ug/L	95	40 - 140

MADEP EPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/08/2016 22:00	578662	MADEP EPH Revision 1.1	1	02/11/2016 13:19	ARW	579170

CAS#	Parameter	Result	LOQ	Units
GCSV-02-15	Aromatic >C10-C12	ND	0.100	mg/L
GCSV-02-16	Aromatic >C12-C16	ND	0.100	mg/L
GCSV-02-17	Aromatic >C16-C21	ND	0.150	mg/L
GCSV-05-18	Aromatic >C21-C35	ND	0.100	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.04	.032	ug/L	80	40 - 140
580-13-2	2-Bromonaphthalene	0.04	.035	ug/L	88	40 - 140
321-60-8	2-Fluorobiphenyl	0.04	.036	ug/L	90	40 - 140

Sample Results

TBA-2	**Collect Date**	02/02/2016 09:30	**GCAL ID**	21602052302
	Receive Date	02/05/2016 10:39	**Matrix**	Water

EPA 6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 09:20	578741	EPA 3010A	20	02/08/2016 20:06	JEL2	578889

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	ND	0.0050	mg/L
7440-39-3	Barium	2.66	0.020	mg/L
7440-43-9	Cadmium	ND	0.020	mg/L
7440-70-2	Calcium	270	10.0	mg/L
7440-47-3	Chromium	ND	0.020	mg/L
7439-89-6	Iron	9.20	2.00	mg/L
7439-92-1	Lead	ND	0.020	mg/L
7439-95-4	Magnesium	84.2	2.00	mg/L
7439-96-5	Manganese	0.56	0.10	mg/L
7440-09-7	Potassium	10.5	2.00	mg/L
7440-66-6	Zinc	ND	0.40	mg/L

EPA 6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 09:20	578741	EPA 3010A	500	02/08/2016 20:03	JEL2	578889

CAS#	Parameter	Result	LOQ	Units
7440-23-5	Sodium	1560	50.0	mg/L
7440-24-6	Strontium	3.45	0.50	mg/L

EPA 6020A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 13:55	578760	EPA 3005A Dissolved	20	02/09/2016 09:53	JEL2	578926

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	ND	0.0050	mg/L
7440-39-3	Barium	2.56	0.020	mg/L
7440-43-9	Cadmium	ND	0.020	mg/L
7440-47-3	Chromium	ND	0.020	mg/L
7439-89-6	Iron	3.43	2.00	mg/L
7439-92-1	Lead	ND	0.020	mg/L
7439-96-5	Manganese	0.47	0.10	mg/L
7440-66-6	Zinc	ND	0.40	mg/L

Sample Results

TBA-2

Collect Date	02/02/2016 09:30	**GCAL ID**	21602052302
Receive Date	02/05/2016 10:39	**Matrix**	Water

EPA 6020A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 13:55	578760	EPA 3005A Dissolved	500	02/09/2016 09:49	JEL2	578926

CAS#	Parameter	Result	LOQ	Units
7440-24-6	Strontium	3.67	0.50	mg/L

EPA 7470A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 10:45	578744	EPA 7470A	1	02/08/2016 17:01	LWZ	578805

CAS#	Parameter	Result	LOQ	Units
7439-97-6	Mercury	ND	0.00020	mg/L

EPA 7470A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 10:45	578744	EPA 7470A Dissolved	1	02/08/2016 17:03	LWZ	578805

CAS#	Parameter	Result	LOQ	Units
7439-97-6	Mercury	ND	0.00020	mg/L

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	5	02/08/2016 18:52	SMR	578848

CAS#	Parameter	Result	LOQ	Units
24959-67-9	Bromide	3.87	1.00	mg/L
14808-79-8	Sulfate	3.42	1.00	mg/L

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1000	02/09/2016 11:51	SMR	578848

CAS#	Parameter	Result	LOQ	Units
16887-00-6	Chloride	3060	200	mg/L

Sample Results

TBA-2

Collect Date	02/02/2016 09:30	**GCAL ID**	21602052302
Receive Date	02/05/2016 10:39	**Matrix**	Water

SM 2320 B-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/09/2016 18:53	JEM	578982

CAS#	Parameter	Result	LOQ	Units
T-005-B	Bicarbonate Alkalinity	429	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	02/09/2016 18:53	JEM	578982

CAS#	Parameter	Result	LOQ	Units
T-005-C	Carbonate Alkalinity	ND	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	02/05/2016 14:30	WRW	578637

CAS#	Parameter	Result	LOQ	Units
WET-035	Total Dissolved Solids(TDS)	4840	10.0	mg/L

BC-2

Collect Date	02/03/2016 16:00	**GCAL ID**	21602052303
Receive Date	02/05/2016 10:39	**Matrix**	Water

EPA 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/07/2016 02:51	CJR	578722

CAS#	Parameter	Result	LOQ	Units
71-43-2	Benzene	0.200E	0.00500	mg/L
100-41-4	Ethylbenzene	0.00932	0.00500	mg/L
108-88-3	Toluene	ND	0.00500	mg/L

Sample Results

BC-2

Collect Date	02/03/2016 16:00	**GCAL ID**	21602052303
Receive Date	02/05/2016 10:39	**Matrix**	Water

EPA 8260B (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/07/2016 02:51	CJR	578722

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	.054	ug/L	107	78 - 130
1868-53-7	Dibromofluoromethane	0.05	.049	ug/L	98	77 - 127
2037-26-5	Toluene d8	0.05	.053	ug/L	106	76 - 134
17060-07-0	1,2-Dichloroethane-d4	0.05	.049	ug/L	98	71 - 127

EPA 8015C GRO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/08/2016 13:39	JAR	578785

CAS#	Parameter	Result	LOQ	Units
8006-61-9	Gasoline Range Organics	0.425	0.100	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
106-39-8	Bromochlorobenzene	0.03	.025	ug/L	84	49 - 136

MADEP VPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	5	02/08/2016 13:51	JAR	578812

CAS#	Parameter	Result	LOQ	Units
GCSV-02-10	Aliphatic >C8-C10	0.141	0.100	mg/L
GCSV-02-30	Aliphatic C6-C8	0.636	0.150	mg/L
GCSV-02-14	Aromatic >C8-C10	0.405	0.150	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
GCV-00-7	2,5-Dibromotoluene (PID)	0.25	.247	ug/L	99	70 - 130
GCV-00-8	2,5-Dibromotoluene (FID)	0.25	.285	ug/L	114	70 - 130

Sample Results

BC-2

Collect Date	02/03/2016 16:00	**GCAL ID**	21602052303
Receive Date	02/05/2016 10:39	**Matrix**	Water

EPA 8015C DRO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 15:35	578658	EPA 3510C	1	02/08/2016 12:59	MEF2	578843

CAS#	Parameter	Result	LOQ	Units
GCSV-00-4	Diesel Range Organics	0.340	0.125	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.05	.038	ug/L	76	56 - 125

EPA 8015C ORO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 15:35	578659	EPA 3510C	1	02/08/2016 12:59	MEF2	578844

CAS#	Parameter	Result	LOQ	Units
GCSV-00-44	Oil Range Organics	ND	0.125	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.05	.041	ug/L	82	56 - 125

MADEP EPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/08/2016 22:00	578662	MADEP EPH Revision 1.1	1	02/10/2016 18:53	ARW	579180

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	0.04	.032	ug/L	81	40 - 140

MADEP EPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/08/2016 22:00	578662	MADEP EPH Revision 1.1	1	02/11/2016 13:38	ARW	579170

CAS#	Parameter	Result	LOQ	Units
GCSV-02-15	Aromatic >C10-C12	ND	0.100	mg/L

Sample Results

BC-2

Collect Date	02/03/2016 16:00	**GCAL ID**	21602052303
Receive Date	02/05/2016 10:39	**Matrix**	Water

MADEP EPH Revision 1.1 (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/08/2016 22:00	578662	MADEP EPH Revision 1.1 (Continued)	1	02/11/2016 13:38	ARW	579170

CAS#	Parameter	Result	LOQ	Units
GCSV-02-16	Aromatic >C12-C16	ND	0.100	mg/L
GCSV-02-17	Aromatic >C16-C21	ND	0.150	mg/L
GCSV-05-18	Aromatic >C21-C35	ND	0.100	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.04	.023	ug/L	57	40 - 140
580-13-2	2-Bromonaphthalene	0.04	.024	ug/L	61	40 - 140
321-60-8	2-Fluorobiphenyl	0.04	.025	ug/L	63	40 - 140

EPA 6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 09:20	578741	EPA 3010A	50	02/08/2016 20:16	JEL2	578889

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	ND	0.013	mg/L
7440-39-3	Barium	22.5	0.050	mg/L
7440-43-9	Cadmium	ND	0.050	mg/L
7440-70-2	Calcium	1430	25.0	mg/L
7440-47-3	Chromium	ND	0.050	mg/L
7439-89-6	Iron	17.3	5.00	mg/L
7439-92-1	Lead	ND	0.050	mg/L
7439-95-4	Magnesium	384	5.00	mg/L
7439-96-5	Manganese	1.62	0.25	mg/L
7440-09-7	Potassium	41.5	5.00	mg/L
7440-66-6	Zinc	ND	1.00	mg/L

EPA 6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 09:20	578741	EPA 3010A	2000	02/08/2016 20:13	JEL2	578889

CAS#	Parameter	Result	LOQ	Units
7440-23-5	Sodium	8720	200	mg/L
7440-24-6	Strontium	29.6	2.00	mg/L

Sample Results

BC-2

Collect Date	02/03/2016 16:00	**GCAL ID**	21602052303
Receive Date	02/05/2016 10:39	**Matrix**	Water

EPA 6020A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 13:55	578760	EPA 3005A Dissolved	50	02/09/2016 10:03	JEL2	578926

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	ND	0.013	mg/L
7440-39-3	Barium	21.0	0.050	mg/L
7440-43-9	Cadmium	ND	0.050	mg/L
7440-47-3	Chromium	ND	0.050	mg/L
7439-89-6	Iron	13.5	5.00	mg/L
7439-92-1	Lead	ND	0.050	mg/L
7439-96-5	Manganese	1.50	0.25	mg/L
7440-66-6	Zinc	ND	1.00	mg/L

EPA 6020A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 13:55	578760	EPA 3005A Dissolved	2000	02/09/2016 10:00	JEL2	578926

CAS#	Parameter	Result	LOQ	Units
7440-24-6	Strontium	31.3	2.00	mg/L

EPA 7470A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 10:45	578744	EPA 7470A	1	02/08/2016 17:05	LWZ	578805

CAS#	Parameter	Result	LOQ	Units
7439-97-6	Mercury	ND	0.00020	mg/L

EPA 7470A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 10:45	578744	EPA 7470A Dissolved	1	02/08/2016 17:07	LWZ	578805

CAS#	Parameter	Result	LOQ	Units
7439-97-6	Mercury	ND	0.00020	mg/L

Sample Results

BC-2

Collect Date	02/03/2016 16:00	**GCAL ID**	21602052303
Receive Date	02/05/2016 10:39	**Matrix**	Water

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	2	02/08/2016 19:26	SMR	578848

CAS#	Parameter	Result	LOQ	Units
14808-79-8	Sulfate	5.11	0.400	mg/L

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	100	02/08/2016 19:44	SMR	578848

CAS#	Parameter	Result	LOQ	Units
24959-67-9	Bromide	20.3	20.0	mg/L

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	10000	02/09/2016 12:09	SMR	578848

CAS#	Parameter	Result	LOQ	Units
16887-00-6	Chloride	16600	2000	mg/L

SM 2320 B-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/09/2016 18:53	JEM	578982

CAS#	Parameter	Result	LOQ	Units
T-005-B	Bicarbonate Alkalinity	319	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	02/09/2016 18:53	JEM	578982

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

Sample Results

BC-2

Collect Date	02/03/2016 16:00	**GCAL ID**	21602052303
Receive Date	02/05/2016 10:39	**Matrix**	Water

SM 2540 C-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	10	02/05/2016 14:30	WRW	578637

CAS#	Parameter	Result	LOQ	Units
WET-035	Total Dissolved Solids(TDS)	22200	100	mg/L

BC-4

Collect Date	02/04/2016 14:45	**GCAL ID**	21602052304
Receive Date	02/05/2016 10:39	**Matrix**	Water

EPA 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/07/2016 19:27	JCK	578767

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	.048	ug/L	95	78 - 130
1868-53-7	Dibromofluoromethane	0.05	.048	ug/L	96	77 - 127
2037-26-5	Toluene d8	0.05	.052	ug/L	103	76 - 134
17060-07-0	1,2-Dichloroethane-d4	0.05	.05	ug/L	99	71 - 127

EPA 8015C GRO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/08/2016 13:59	JAR	578785

CAS#	Parameter	Result	LOQ	Units
8006-61-9	Gasoline Range Organics	ND	0.100	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
106-39-8	Bromochlorobenzene	0.03	.018	ug/L	59	49 - 136

Sample Results

BC-4	**Collect Date**	02/04/2016 14:45	**GCAL ID**	21602052304
	Receive Date	02/05/2016 10:39	**Matrix**	Water

MADEP VPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/08/2016 14:18	JAR	578812

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
GCSV-02-14	Aromatic >C8-C10	ND	0.030	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
GCV-00-7	2,5-Dibromotoluene (PID)	0.05	.05	ug/L	99	70 - 130
GCV-00-8	2,5-Dibromotoluene (FID)	0.05	.054	ug/L	109	70 - 130

EPA 8015C DRO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 15:35	578658	EPA 3510C	1	02/08/2016 12:24	MEF2	578843

CAS#	Parameter	Result	LOQ	Units
GCSV-00-4	Diesel Range Organics	ND	0.125	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.05	.039	ug/L	77	56 - 125

EPA 8015C ORO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 15:35	578659	EPA 3510C	1	02/08/2016 12:24	MEF2	578844

CAS#	Parameter	Result	LOQ	Units
GCSV-00-44	Oil Range Organics	ND	0.125	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.05	.041	ug/L	83	56 - 125

Sample Results

BC-4

Collect Date	02/04/2016 14:45	**GCAL ID**	21602052304
Receive Date	02/05/2016 10:39	**Matrix**	Water

MADEP EPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/08/2016 22:00	578662	MADEP EPH Revision 1.1	1	02/10/2016 19:13	ARW	579180

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	0.04	.034	ug/L	85	40 - 140

MADEP EPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/08/2016 22:00	578662	MADEP EPH Revision 1.1	1	02/11/2016 16:35	ARW	579170

CAS#	Parameter	Result	LOQ	Units
GCSV-02-15	Aromatic >C10-C12	ND	0.100	mg/L
GCSV-02-16	Aromatic >C12-C16	ND	0.100	mg/L
GCSV-02-17	Aromatic >C16-C21	ND	0.150	mg/L
GCSV-05-18	Aromatic >C21-C35	ND	0.100	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.04	.026	ug/L	66	40 - 140
580-13-2	2-Bromonaphthalene	0.04	.031	ug/L	79	40 - 140
321-60-8	2-Fluorobiphenyl	0.04	.032	ug/L	79	40 - 140

EPA 6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 09:20	578741	EPA 3010A	20	02/08/2016 20:27	JEL2	578889

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	ND	0.0050	mg/L
7440-39-3	Barium	4.97	0.020	mg/L
7440-43-9	Cadmium	ND	0.020	mg/L
7440-70-2	Calcium	477	10.0	mg/L
7440-47-3	Chromium	ND	0.020	mg/L
7439-89-6	Iron	9.43	2.00	mg/L
7439-92-1	Lead	ND	0.020	mg/L
7439-95-4	Magnesium	170	2.00	mg/L
7439-96-5	Manganese	1.08	0.10	mg/L
7440-09-7	Potassium	7.94	2.00	mg/L

Sample Results

BC-4

Collect Date	02/04/2016 14:45	**GCAL ID**	21602052304
Receive Date	02/05/2016 10:39	**Matrix**	Water

EPA 6020A (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 09:20	578741	EPA 3010A	20	02/08/2016 20:27	JEL2	578889

CAS#	Parameter	Result	LOQ	Units
7440-66-6	Zinc	ND	0.40	mg/L

EPA 6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 09:20	578741	EPA 3010A	500	02/08/2016 20:23	JEL2	578889

CAS#	Parameter	Result	LOQ	Units
7440-23-5	Sodium	1650	50.0	mg/L
7440-24-6	Strontium	4.37	0.50	mg/L

EPA 6020A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 13:55	578760	EPA 3005A Dissolved	20	02/09/2016 10:13	JEL2	578926

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	ND	0.0050	mg/L
7440-39-3	Barium	4.71	0.020	mg/L
7440-43-9	Cadmium	ND	0.020	mg/L
7440-47-3	Chromium	ND	0.020	mg/L
7439-89-6	Iron	8.71	2.00	mg/L
7439-92-1	Lead	ND	0.020	mg/L
7439-96-5	Manganese	1.06	0.10	mg/L
7440-66-6	Zinc	ND	0.40	mg/L

EPA 6020A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 13:55	578760	EPA 3005A Dissolved	500	02/09/2016 10:10	JEL2	578926

CAS#	Parameter	Result	LOQ	Units
7440-24-6	Strontium	4.59	0.50	mg/L

Sample Results

BC-4

Collect Date	02/04/2016 14:45	**GCAL ID**	21602052304
Receive Date	02/05/2016 10:39	**Matrix**	Water

EPA 7470A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 10:45	578744	EPA 7470A	1	02/08/2016 17:09	LWZ	578805

CAS#	Parameter	Result	LOQ	Units
7439-97-6	Mercury	ND	0.00020	mg/L

EPA 7470A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
02/07/2016 10:45	578744	EPA 7470A Dissolved	1	02/08/2016 17:11	LWZ	578805

CAS#	Parameter	Result	LOQ	Units
7439-97-6	Mercury	ND	0.00020	mg/L

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	2	02/08/2016 20:01	SMR	578848

CAS#	Parameter	Result	LOQ	Units
24959-67-9	Bromide	4.39	0.400	mg/L
14808-79-8	Sulfate	7.36	0.400	mg/L

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	2000	02/09/2016 12:26	SMR	578848

CAS#	Parameter	Result	LOQ	Units
16887-00-6	Chloride	3690	400	mg/L

SM 2320 B-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/09/2016 18:53	JEM	578982

CAS#	Parameter	Result	LOQ	Units
T-005-B	Bicarbonate Alkalinity	361	1.0	mg/L CaCO3

Sample Results

BC-4

Collect Date	02/04/2016 14:45	**GCAL ID**	21602052304
Receive Date	02/05/2016 10:39	**Matrix**	Water

SM 2320 B-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	02/09/2016 18:53	JEM	578982

CAS#	Parameter	Result	LOQ	Units
T-005-C	Carbonate Alkalinity	ND	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	02/05/2016 14:30	WRW	578637

CAS#	Parameter	Result	LOQ	Units
WET-035	Total Dissolved Solids(TDS)	5920	10.0	mg/L

GC/MS Volatiles QC Summary

Analytical Batch	Client ID	MB578693		LCS578693				LCSD578693				
578693	GCAL ID	1537716		1537717				1537718				
	Sample Type	MB		LCS				LCSD				
	Prep Date	NA		NA				NA				
	Analysis Date	02/06/2016 12:28		02/06/2016 10:10				02/06/2016 10:31				
	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	0.059	117	70 - 129	0.050	0.056	111	5	20
Ethylbenzene	100-41-4	ND	0.00500	0.050	0.058	115	74 - 126	0.050	0.055	109	5	30
Toluene	108-88-3	ND	0.00500	0.050	0.050	100	72 - 120	0.050	0.049	97	2	20
Xylene (total)	1330-20-7	ND	0.015	0.150	0.152	101	74 - 127	0.150	0.146	97	4	30
Surrogate												
1,2-Dichloroethane-d4	17060-07-0	.0496	99	.05	.0483	97	71 - 127	.05	.0483	97	NA	NA
4-Bromofluorobenzene	460-00-4	.0482	96	.05	.0501	100	78 - 130	.05	.0509	102	NA	NA
Dibromofluoromethane	1868-53-7	.0513	103	.05	.0499	100	77 - 127	.05	.0481	96	NA	NA
Toluene d8	2037-26-5	.0517	103	.05	.0485	97	76 - 134	.05	.0486	97	NA	NA

Analytical Batch	Client ID	MB578722		LCS578722				LCSD578722				
578722	GCAL ID	1537779		1537780				1537781				
	Sample Type	MB		LCS				LCSD				
	Prep Date	NA		NA				NA				
	Analysis Date	02/06/2016 21:56		02/06/2016 19:50				02/06/2016 20:11				
	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	0.057	115	70 - 129	0.050	0.056	111	2	20
Ethylbenzene	100-41-4	ND	0.00500	0.050	0.057	115	74 - 126	0.050	0.056	112	2	30
Toluene	108-88-3	ND	0.00500	0.050	0.050	100	72 - 120	0.050	0.049	98	2	20
Xylene (total)	1330-20-7	ND	0.015	0.150	0.152	101	74 - 127	0.150	0.147	98	3	30
Surrogate												
1,2-Dichloroethane-d4	17060-07-0	.0496	99	.05	.0482	96	71 - 127	.05	.048	96	NA	NA
4-Bromofluorobenzene	460-00-4	.0489	98	.05	.051	102	78 - 130	.05	.0513	103	NA	NA
Dibromofluoromethane	1868-53-7	.0512	102	.05	.0486	97	77 - 127	.05	.0484	97	NA	NA
Toluene d8	2037-26-5	.0526	105	.05	.0483	97	76 - 134	.05	.0491	98	NA	NA

Analytical Batch	Client ID	NESB-4B		NESB-4B MS				NESB-4B MSD				
578722	GCAL ID	21602041201		21602041202				21602041203				
	Sample Type	SAMPLE		MS				MSD				
	Prep Date	NA		NA				NA				
	Analysis Date	02/06/2016 22:17		02/06/2016 22:38				02/06/2016 22:59				
	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	0.00	0.00500	0.050	0.059	119	70 - 129	0.050	0.058	116	2	20
Ethylbenzene	100-41-4	0.00	0.00500	0.050	0.057	115	74 - 126	0.050	0.057	114	0	30
Toluene	108-88-3	0.00	0.00500	0.050	0.050	100	72 - 120	0.050	0.050	99	0	20
Surrogate												
1,2-Dichloroethane-d4	17060-07-0			.05	.0482	96	71 - 127	.05	.048	96	NA	NA
4-Bromofluorobenzene	460-00-4			.05	.0501	100	78 - 130	.05	.0509	102	NA	NA
Dibromofluoromethane	1868-53-7			.05	.0486	97	77 - 127	.05	.0492	98	NA	NA
Toluene d8	2037-26-5			.05	.0482	96	76 - 134	.05	.048	96	NA	NA

GC/MS Volatiles QC Summary

Analytical Batch 578767	Client ID	MB578767		LCS578767				LCSD578767				
	GCAL ID	1537903		1537904				1537905				
	Sample Type	MB		LCS				LCSD				
	Prep Date	NA		NA				NA				
	Analysis Date	02/07/2016 16:43		02/07/2016 13:53				02/07/2016 14:17				
	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	98	2	20
Ethylbenzene	100-41-4	ND	0.00500	0.050	0.051	102	74 - 126	0.050	0.050	100	2	30
Toluene	108-88-3	ND	0.00500	0.050	0.050	100	72 - 120	0.050	0.050	99	0	20
Xylene (total)	1330-20-7	ND	0.015	0.150	0.154	103	74 - 127	0.150	0.150	100	3	30
Surrogate												
1,2-Dichloroethane-d4	17060-07-0	.0509	102	.05	.0544	109	71 - 127	.05	.0541	108	NA	NA
4-Bromofluorobenzene	460-00-4	.0465	93	.05	.0499	100	78 - 130	.05	.0505	101	NA	NA
Dibromofluoromethane	1868-53-7	.0481	96	.05	.049	98	77 - 127	.05	.0493	99	NA	NA
Toluene d8	2037-26-5	.0516	103	.05	.0474	95	76 - 134	.05	.0481	96	NA	NA

GC Volatiles QC Summary

Analytical Batch 578785	Client ID	MB578785		LCS578785				LCSD578785				
	GCAL ID	1537927		1537928				1537929				
	Sample Type	MB		LCS				LCSD				
	Prep Date	NA		NA				NA				
	Analysis Date	02/08/2016 12:42		02/08/2016 12:02				02/08/2016 12:22				
	Matrix	Water		Water				Water				
EPA 8015C GRO		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Gasoline Range Organics	8006-61-9	ND	0.100	0.500	0.486	97	70 - 128	0.500	0.495	99	2	25
Surrogate												
Bromochlorobenzene	106-39-8	.02	67	.03	.0268	89	49 - 136	.03	.0287	96	NA	NA

Analytical Batch 578812	Client ID	MB578812		LCS578812				LCSD578812				
	GCAL ID	1538125		1538126				1538127				
	Sample Type	MB		LCS				LCSD				
	Prep Date	NA		NA				NA				
	Analysis Date	02/08/2016 12:14		02/08/2016 10:47				02/08/2016 11:20				
	Matrix	Water		Water				Water				
MADEP VPH Revision 1.1		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	0.096	96	60 - 140	0.100	0.102	102	6	30
Aliphatic C6-C8	GCSV-02-30	ND	0.030	0.150	0.167	111	60 - 140	0.150	0.149	99	11	30
Aromatic >C8-C10	GCSV-02-14	ND	0.030	0.150	0.149	99	60 - 140	0.150	0.140	93	6	30
Surrogate												
2,5-Dibromotoluene (FID)	GCV-00-8	.0561	112	.05	.059	118	70 - 130	.05	.0575	115	NA	NA
2,5-Dibromotoluene (PID)	GCV-00-7	.0488	98	.05	.0552	110	70 - 130	.05	.0501	100	NA	NA

GC Semi-Volatiles QC Summary

Analytical Batch	Client ID	MB578658		LCS578658				LCSD578658				
578843	GCAL ID	1537464		1537465				1537466				
Prep Batch	Sample Type	MB		LCS				LCSD				
578658	Prep Date	02/07/2016 15:35		02/07/2016 15:35				02/07/2016 15:35				
Prep Method	Analysis Date	02/08/2016 10:04		02/08/2016 10:27				02/08/2016 10:39				
EPA 3510C	Matrix	Water		Water				Water				
EPA 8015C DRO		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Diesel Range Organics	GCSV-00-4	ND	0.125	1.00	0.856	86	47 - 120	1.00	0.845	84	1	30
Surrogate												
o-Terphenyl	84-15-1	.0395	79	.05	.0429	86	56 - 125	.05	.0421	84	NA	NA

Analytical Batch	Client ID	MB578659		LCS578659				LCSD578659				
578844	GCAL ID	1537467		1537468				1537469				
Prep Batch	Sample Type	MB		LCS				LCSD				
578659	Prep Date	02/07/2016 15:35		02/07/2016 15:35				02/07/2016 15:35				
Prep Method	Analysis Date	02/08/2016 10:04		02/08/2016 10:56				02/08/2016 11:11				
EPA 3510C	Matrix	Water		Water				Water				
EPA 8015C ORO		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Oil Range Organics	GCSV-00-44	ND	0.125	2.00	1.40	70	41 - 113	2.00	1.64	82	16	40
Surrogate												
o-Terphenyl	84-15-1	.0425	85	.05	.0408	82	56 - 125	.05	.0422	84	NA	NA

Analytical Batch	Client ID	MB578662		LCS578662				LCSD578662				
579180	GCAL ID	1537476		1537477				1537478				
Prep Batch	Sample Type	MB		LCS				LCSD				
578662	Prep Date	02/08/2016 22:00		02/08/2016 22:00				02/08/2016 22:00				
Prep Method	Analysis Date	02/10/2016 17:16		02/10/2016 17:36				02/10/2016 17:55				
MADEP EPH Revision 1.1	Matrix	Water		Water				Water				
MADEP EPH Revision 1.1		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	0.100	0.103	103	30 - 140	0.100	0.081	81	24	25
Aliphatic >C12-C16	GCSV-02-12	ND	0.100	0.100	0.103	103	40 - 140	0.100	0.100	100	3	25
Aliphatic >C16-C35	GCSV-02-31	ND	0.150	0.450	0.543	121	40 - 140	0.450	0.528	117	3	25
Surrogate												
1-Chlorooctadecane	3386-33-2	.0305	76	.04	.0375	94	40 - 140	.04	.0418	105	NA	NA

Analytical Batch	Client ID	MB578662		LCS578662				LCSD578662				
579170	GCAL ID	1537476		1537477				1537478				
Prep Batch	Sample Type	MB		LCS				LCSD				
578662	Prep Date	02/08/2016 22:00		02/08/2016 22:00				02/08/2016 22:00				
Prep Method	Analysis Date	02/11/2016 12:01		02/11/2016 12:21				02/11/2016 12:40				
MADEP EPH Revision 1.1	Matrix	Water		Water				Water				
MADEP EPH Revision 1.1		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Aromatic >C10-C12	GCSV-02-15	ND	0.100	0.050	0.042	85	30 - 140	0.050	0.041	82	2	25
Aromatic >C12-C16	GCSV-02-16	ND	0.100	0.200	0.166	83	40 - 140	0.200	0.161	81	3	25
Aromatic >C16-C21	GCSV-02-17	ND	0.150	0.100	0.087	87	40 - 140	0.100	0.084	84	4	25
Aromatic >C21-C35	GCSV-05-18	ND	0.100	0.500	0.386	77	40 - 140	0.500	0.376	75	3	25
Surrogate												
2-Bromonaphthalene	580-13-2	.0302	76	.04	.0391	98	40 - 140	.04	.0375	94	NA	NA
2-Fluorobiphenyl	321-60-8	.0315	79	.04	.04	100	40 - 140	.04	.0385	96	NA	NA
o-Terphenyl	84-15-1	.0299	75	.04	.0386	97	40 - 140	.04	.0366	92	NA	NA

Inorganics QC Summary

Analytical Batch	Client ID	MB578744		LCS578744			
578805	GCAL ID	1537845		1537846			
Prep Batch	Sample Type	MB		LCS			
578744	Prep Date	02/07/2016 10:45		02/07/2016 10:45			
Prep Method	Analysis Date	02/08/2016 16:23		02/08/2016 16:25			
EPA 7470A	Matrix	Water		Water			
EPA 7470A		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Mercury	7439-97-6	ND	0.00020	0.0050	0.0050	100	80 - 120

Analytical Batch	Client ID	LION DECON WATER DRUM #..		1536528MSD				
578805	GCAL ID	21602041001		1537848				
Prep Batch	Sample Type	SAMPLE		MSD				
578744	Prep Date	02/07/2016 10:45		02/07/2016 10:45				
Prep Method	Analysis Date	02/08/2016 16:28		02/08/2016 16:36				
EPA 7470A	Matrix	Water		Water				
EPA 7470A		Units Result	mg/L LOQ	Spike Added	Result	%R	RPD	RPD Limit
Mercury	7439-97-6	0.0052	0.00020	0.0050	0.0052	104	6	20

Analytical Batch	Client ID	BOILER C DRUM		1537344MS			
578805	GCAL ID	21602052402		1537849			
Prep Batch	Sample Type	SAMPLE		MS			
578744	Prep Date	02/07/2016 10:45		02/07/2016 10:45			
Prep Method	Analysis Date	02/08/2016 16:48		02/08/2016 16:50			
EPA 7470A	Matrix	Water		Water			
EPA 7470A		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Mercury	7439-97-6	0.0	0.00020	0.0050	0.0051	103	80 - 120

Analytical Batch	Client ID	MB578744		LCS578744			
578805	GCAL ID	1537845		1537846			
Prep Batch	Sample Type	MB		LCS			
578744	Prep Date	02/07/2016 10:45		02/07/2016 10:45			
Prep Method	Analysis Date	02/08/2016 16:23		02/08/2016 16:25			
EPA 7470A	Matrix	Water		Water			
EPA 7470A Dissolved		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Mercury	7439-97-6	ND	0.00020	0.0050	0.0050	100	80 - 120

Analytical Batch	Client ID	LION DECON WATER DRUM #..		1536528MSD				
578805	GCAL ID	21602041001		1537848				
Prep Batch	Sample Type	SAMPLE		MSD				
578744	Prep Date	02/07/2016 10:45		02/07/2016 10:45				
Prep Method	Analysis Date	02/08/2016 16:28		02/08/2016 16:36				
EPA 7470A	Matrix	Water		Water				
EPA 7470A Dissolved		Units Result	mg/L LOQ	Spike Added	Result	%R	RPD	RPD Limit
Mercury	7439-97-6	0.0052	0.00020	0.0050	0.0052	104	6	20

Analytical Batch	Client ID	BOILER C DRUM		1537344MS			
578805	GCAL ID	21602052402		1537849			
Prep Batch	Sample Type	SAMPLE		MS			
578744	Prep Date	02/07/2016 10:45		02/07/2016 10:45			
Prep Method	Analysis Date	02/08/2016 16:48		02/08/2016 16:50			
EPA 7470A	Matrix	Water		Water			
EPA 7470A Dissolved		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Mercury	7439-97-6	0.0	0.00020	0.0050	0.0051	103	80 - 120

Inorganics QC Summary

Analytical Batch	Client ID	MB578741		LCS578741			
578926	GCAL ID	1537834		1537835			
Prep Batch	Sample Type	MB		LCS			
578741	Prep Date	02/07/2016 09:20		02/07/2016 09:20			
Prep Method	Analysis Date	02/09/2016 08:58		02/09/2016 09:02			
EPA 3010A	Matrix	Water		Water			
EPA 6020A		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Arsenic	7440-38-2	ND	0.00025	0.050	0.052	104	80 - 120
Barium	7440-39-3	ND	0.0010	0.050	0.052	104	80 - 120
Cadmium	7440-43-9	ND	0.0010	0.050	0.053	106	80 - 120
Calcium	7440-70-2	ND	0.50	25.0	26.7	107	80 - 120
Chromium	7440-47-3	ND	0.0010	0.050	0.054	107	80 - 120
Iron	7439-89-6	ND	0.10	5.00	5.41	108	80 - 120
Lead	7439-92-1	ND	0.0010	0.050	0.053	106	80 - 120
Magnesium	7439-95-4	ND	0.10	5.00	5.56	111	80 - 120
Manganese	7439-96-5	ND	0.0050	0.050	0.054	107	80 - 120
Potassium	7440-09-7	ND	0.10	5.00	5.40	108	80 - 120
Sodium	7440-23-5	ND	0.10	5.00	5.41	108	80 - 120
Strontium	7440-24-6	ND	0.0010	0.050	0.054	108	80 - 120
Zinc	7440-66-6	ND	0.020	1.00	1.05	105	80 - 120

Analytical Batch	Client ID	LION DECON WATER DRUM #..		1536528MS				1536528MSD				
579222	GCAL ID	21602041001		1537836				1537837				
Prep Batch	Sample Type	SAMPLE		MS				MSD				
578741	Prep Date	02/07/2016 09:20		02/07/2016 09:20				02/07/2016 09:20				
Prep Method	Analysis Date	02/11/2016 17:39		02/11/2016 17:42				02/11/2016 17:45				
EPA 3010A	Matrix	Water		Water				Water				
EPA 6020A		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Arsenic	7440-38-2	0.0071	0.025	0.50	0.50	98	80 - 120	0.50	0.51	101	2	20
Barium	7440-39-3	0.055	0.10	0.50	0.56	102	80 - 120	0.50	0.58	104	4	20
Cadmium	7440-43-9	0.00037	0.10	0.50	0.53	105	80 - 120	0.50	0.53	105	0	20
Chromium	7440-47-3	0.0045	0.10	0.50	0.50	99	80 - 120	0.50	0.50	99	0	20
Lead	7439-92-1	0.0022	0.10	0.50	0.52	103	80 - 120	0.50	0.52	103	0	20

Analytical Batch	Client ID	MB578760		LCS578760			
578926	GCAL ID	1537885		1537886			
Prep Batch	Sample Type	MB		LCS			
578760	Prep Date	02/07/2016 13:55		02/07/2016 13:55			
Prep Method	Analysis Date	02/09/2016 09:05		02/09/2016 09:09			
EPA 3005A Dissolved	Matrix	Water		Water			
EPA 6020A Dissolved		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Arsenic	7440-38-2	ND	0.00025	0.050	0.047	93	80 - 120
Barium	7440-39-3	ND	0.0010	0.050	0.046	92	80 - 120
Cadmium	7440-43-9	ND	0.0010	0.050	0.048	96	80 - 120
Chromium	7440-47-3	ND	0.0010	0.050	0.046	93	80 - 120
Iron	7439-89-6	ND	0.10	5.00	4.66	93	80 - 120
Lead	7439-92-1	ND	0.0010	0.050	0.049	97	80 - 120
Manganese	7439-96-5	ND	0.0050	0.050	0.047	95	80 - 120
Strontium	7440-24-6	ND	0.0010	0.050	0.047	95	80 - 120
Zinc	7440-66-6	ND	0.020	1.00	0.96	96	80 - 120

Inorganics QC Summary

Analytical Batch	Client ID	MC-2		1537339MS				1537339MSD				
578926	GCAL ID	21602052301		1537887				1537888				
Prep Batch	Sample Type	SAMPLE		MS				MSD				
578760	Prep Date	02/07/2016 13:55		02/07/2016 13:55				02/07/2016 13:55				
Prep Method	Analysis Date	02/09/2016 09:26		02/09/2016 09:29				02/09/2016 09:36				
EPA 3005A Dissolved	Matrix	Water		Water				Water				
EPA 6020A Dissolved		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Arsenic	7440-38-2	0.0060	0.0025	0.050	0.060	107	80 - 120	0.050	0.056	99	7	20
Barium	7440-39-3	1.07	0.010	0.050	1.11	69*	80 - 120	0.050	1.08	15*	3	20
Cadmium	7440-43-9	0.0	0.010	0.050	0.055	109	80 - 120	0.050	0.052	104	6	20
Chromium	7440-47-3	0.0	0.010	0.050	0.051	103	80 - 120	0.050	0.050	101	2	20
Iron	7439-89-6	0.32	1.00	5.00	5.57	105	80 - 120	5.00	5.30	100	5	20
Lead	7439-92-1	0.0	0.010	0.050	0.053	105	80 - 120	0.050	0.051	102	4	20
Manganese	7439-96-5	0.16	0.050	0.050	0.21	82	80 - 120	0.050	0.20	78*	5	20
Zinc	7440-66-6	0.0	0.20	1.00	1.07	107	80 - 120	1.00	1.03	103	4	20

Analytical Batch	Client ID	MC-2		1537339MS				1537339MSD				
578926	GCAL ID	21602052301		1537887				1537888				
Prep Batch	Sample Type	SAMPLE		MS				MSD				
578760	Prep Date	02/07/2016 13:55		02/07/2016 13:55				02/07/2016 13:55				
Prep Method	Analysis Date	02/09/2016 09:12		02/09/2016 09:15				02/09/2016 09:19				
EPA 3005A Dissolved	Matrix	Water		Water				Water				
EPA 6020A Dissolved		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Strontium	7440-24-6	1.11	0.10	0.050	1.17	125*	80 - 120	0.050	1.19	170*	2	20

General Chemistry QC Summary

Analytical Batch 578848	Client ID	MB578848		LCS578848			
	GCAL ID	1538220		1538221			
	Sample Type	MB		LCS			
	Prep Date	NA		NA			
	Analysis Date	02/08/2016 17:42		02/08/2016 16:54			
	Matrix	Water		Water			
EPA 9056A		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Bromide	24959-67-9	ND	0.200	2.50	2.50	100	80 - 120
Chloride	16887-00-6	ND	0.200	2.50	2.32	93	80 - 120
Sulfate	14808-79-8	ND	0.200	2.50	2.47	99	80 - 120

Analytical Batch 578848	Client ID	MW-19		1535831MS				1535831MSD				
	GCAL ID	21602027103		1538268				1538269				
	Sample Type	SAMPLE		MS				MSD				
	Prep Date	NA		NA				NA				
	Analysis Date	02/09/2016 02:42		02/09/2016 02:59				02/09/2016 03:16				
	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	95.5	20.0	250	356	104	80 - 120	250	352	103	1	15

Analytical Batch 578848	Client ID	OXY #2		1534424MS				1534424MSD				
	GCAL ID	21601290201		1538266				1538267				
	Sample Type	SAMPLE		MS				MSD				
	Prep Date	NA		NA				NA				
	Analysis Date	02/08/2016 22:55		02/08/2016 23:13				02/08/2016 23:30				
	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	3010	1000	12500	15500	100	80 - 120	12500	15500	100	0	15

Analytical Batch 578637	Client ID	MB578637		LCS578637			
	GCAL ID	1537355		1537356			
	Sample Type	MB		LCS			
	Prep Date	NA		NA			
	Analysis Date	02/05/2016 14:30		02/05/2016 14:30			
	Matrix	Water		Water			
SM 2540 C-2011		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Total Dissolved Solids(TDS)	WET-035	ND	10.0	1000	978	98	80 - 120

Analytical Batch 578637	Client ID	TG-18		1536276DUP		
	GCAL ID	21602033801		1537357		
	Sample Type	SAMPLE		DUP		
	Prep Date	NA		NA		
	Analysis Date	02/05/2016 14:30		02/05/2016 14:30		
	Matrix	Water		Water		
SM 2540 C-2011		Units Result	mg/L LOQ	Result	RPD	RPD Limit
Total Dissolved Solids(TDS)	WET-035	2470	10.0	2480	0	5.4

GCAL ANALYTICAL LABORATORIES, LLC

7979 Innovation Park Dr., Baton Rouge, LA 70820-7402
Phone: 225.769.4900 • Fax: 225.767.5717 • www.gcal.com

CHAIN OF CUSTODY RECORD

Client ID: 4271 - Michael Pisani & Associates
SDG: 216020523
PM: RKW

Report to:
Client: Michael Pisani & Associates
Address: 1100 Poydras Suite 1430 New Orleans, LA
Contact: Lance Cooper
Phone: 504. 582. 2476
E-mail: lcooper@mpisani.com

Bill to:
Client: SAME
Address:
Contact:
Phone:
E-mail:

P.O. Number

Project Name/Number: East White Lake / 07-47

Sampled By: R. Charles Trahan

Analytical Requests & Method

GCAL use only:
Custody Seal used ☐ yes ☐ no
intact ☐ yes ☐ no
Temperature °C 0.7°C, 1.5°C E26
23cpm
30cpm

☑ Dissolved Analysis Requested
☑ Field filtered
☐ Lab filtered

Matrix[1]	Date	Time (2400)	Comp	Grab	Sample Description	No Containers	BTEX HCl	VPH (Mass. Method) HCl	EPH (Mass. Method) HCl	TPH - DRO/ORO/GRO none	Total Metals HNO3	Diss. Metals HNO3	Alkalinity - Bicarb none	Cl, Br, SO4, TDS none	Preservative
W	2/1/16	1445		X	MC-2	14	X	X	X	X	X	X	X	X	1
↓	2/2/16	0930		↓	TBA-2	↓	X	X	X	X	X	X	X	X	2
↓	2/3/16	1600		↓	BC-2	↓	X	X	X	X	X	X	X	X	3
↓	2/4/16	1445		↓	BC-4	↓	X	X	X	X	X	X	X	X	4

Air Bill No:

* Turn Around Time (Business Days): ☐ 24h* ☐ 48h* ☐ 3 days* ☐ 1 week* ☐ Standard (Per Contract/Quote) Call Lance Cooper for Turn Around Time

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
[signature]	2/4/16	1800	[signature]	2-4-16	1800
[signature]	2/4/16	2000	[signature]	2/4/16	2000
[signature]	2/5/16	0945	[signature]	2/5/16	0945
[signature]	2/5/16	1039	[signature]	2-5-16	1039

Note: ~~Total Metal~~: As, Ba, Cd, Cr, Fe, Mn, Pb, Sr, Zn, Hg, Na, Ca, Mg, K
Diss Metal: As, Ba, Cd, Cr, Fe, Mn, Pb, Sr, Zn, Hg

By submitting these samples, you agree to GCAL's terms and conditions contained in our most recent schedule of services.

Matrix[1]: 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 PM.

WHITE: CLIENT FINAL REPORT - CANARY: CLIENT

GCAL ANALYTICAL LABORATORIES, LLC

SAMPLE RECEIVING CHECKLIST

216020523

SAMPLE DELIVERY GROUP 216020523	
Client PM RKW 4271 - Michael Pisani & Associates	**Transport Method** COURIER
Profile Number 174115	**Received By** Lofton, Katie E.
Line Item(s) 3 - Surface Water	**Receive Date(s)** 02/05/16

CHECKLIST	YES	NO	NA
Were all samples received using proper thermal preservation?	☑	☐	☐
When used, were all custody seals intact?	☐	☐	☑
Were all samples received in proper containers?	☑	☐	☐
Were all samples received using proper chemical preservation?	☑	☐	☐
Was preservative added to any container at the lab?	☐	☑	☐
Were all containers received in good condition?	☑	☐	☐
Were all VOC water samples received without head space?	☑	☐	☐
Do all sample labels match the Chain of Custody?	☑	☐	☐
Did the Chain of Custody list the sampling technician?	☑	☐	☐
Was the COC maintained i.e. all signatures, dates and time of receipt included?	☑	☐	☐

COOLERS

Airbill	Thermometer ID: E26	Temp(°C)
		0.7
		1.5

DISCREPANCIES

None

LAB PRESERVATIONS

None

NOTES

Revision 1.4

Page 1 of 1

NELAP CERTIFICATE NUMBER: 01955
DOD ELAP CERTIFICATE NUMBER: L14-243

ANALYTICAL RESULTS

PERFORMED BY

GCAL, LLC
7979 Innovation Park Dr.
Baton Rouge, LA 70820

Report Date 01/06/2016

GCAL Report 215122915

Project 07-47 East White Lake

Deliver To	***Additional Recipients***
Dave Angle Michael Pisani and Associates 13313 Southwest Freeway Suite 221 Sugar Land, TX 77478 281-242-5700	Jonathan Miller, Michael Pisani & Associates Lance Cooper, Michael Pisani & Associates

PJLA Testing DoD ELAP

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 GCAL'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
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
DL	Diluted analysis – when appended to Client Sample ID
LOD	Limit of Detection
LOQ	Limit of Quantitation
RE	Re-analysis
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	The result is estimated because it exceeded the instrument calibration range
E	Metals - % diference for the serial dilution is > 10%

Sample receipt at GCAL 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 GCAL. 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
GCAL Report 215122915

Certifications

10/02/2015

Certification	Certification Number
DOD ELAP	L14-243
Alabama	01955
Arizona	AZ0718
Arkansas	12-060-0
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
USDA Soil Permit	P330-10-00117

Case Narrative

Client: Michael Pisani & Associates **Report:** 215122915

Gulf Coast Analytical Laboratories 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 analysis for prep batch 575719, the LCS/LCSD recoveries are 0% for Benzidine. This is a poor performing analyte is that is unstable in the spiking solution. The LCS/LCSD RPD is above the control limit for 3,3-Dichlorobenzene.

METALS

In the EPA 6020A analysis, sample 21512291502 (BC-1) had to be diluted in order to bracket the concentration of target analytes within the calibration range of the instrument and to eliminate a chemical or physical interference. The reporting limits are at or below the RECAP screening standards at this dilution.

In the EPA 6020A analysis for prep batch 575791, The MS/MSD recoveries and RPD are not applicable for Barium and Strontium because the sample concentration is greater than four times the spike concentration.

CONVENTIONALS

In the EPA 9056A analysis, sample 21512291502 (BC-1) had to be diluted in order to bracket the concentration of a target analyte within the calibration range of the instrument and to eliminate background interference.

MISCELLANEOUS

N-nitrosodiphenylamine decomposes in the GC inlet and cannot be separated from Diphenylamine. The laboratory uses N-nitrosodiphenylamine as the calibration and QC standard.

Sample Summary

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21512291501	BC-1	Water	12/28/2015 16:40	12/29/2015 08:15
21512291502	BC-1	Water	12/28/2015 16:40	12/29/2015 08:15

Sample Results

BC-1	**Collect Date**	12/28/2015 16:40	**GCAL ID**	21512291501
	Receive Date	12/29/2015 08:15	**Matrix**	Water

EPA 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/29/2015 08:30	575719	EPA 3510C	1	12/30/2015 16:09	JMC2	575876

CAS#	Parameter	Result	LOQ	Units
120-82-1	1,2,4-Trichlorobenzene	ND	0.010	mg/L
95-50-1	1,2-Dichlorobenzene	ND	0.010	mg/L
122-66-7	1,2Diphenylhydrazine/Azobenzen	ND	0.010	mg/L
541-73-1	1,3-Dichlorobenzene	ND	0.010	mg/L
106-46-7	1,4-Dichlorobenzene	ND	0.010	mg/L
88-06-2	2,4,6-Trichlorophenol	ND	0.010	mg/L
120-83-2	2,4-Dichlorophenol	ND	0.010	mg/L
105-67-9	2,4-Dimethylphenol	ND	0.010	mg/L
51-28-5	2,4-Dinitrophenol	ND	0.010	mg/L
121-14-2	2,4-Dinitrotoluene	ND	0.010	mg/L
606-20-2	2,6-Dinitrotoluene	ND	0.010	mg/L
91-58-7	2-Chloronaphthalene	ND	0.010	mg/L
95-57-8	2-Chlorophenol	ND	0.010	mg/L
91-57-6	2-Methylnaphthalene	ND	0.010	mg/L
88-75-5	2-Nitrophenol	ND	0.010	mg/L
91-94-1	3,3'-Dichlorobenzidine	ND	0.010	mg/L
534-52-1	4,6-Dinitro-2-methylphenol	ND	0.010	mg/L
101-55-3	4-Bromophenyl phenyl ether	ND	0.010	mg/L
59-50-7	4-Chloro-3-methylphenol	ND	0.010	mg/L
7005-72-3	4-Chlorophenyl phenyl ether	ND	0.010	mg/L
100-02-7	4-Nitrophenol	ND	0.010	mg/L
83-32-9	Acenaphthene	ND	0.010	mg/L
208-96-8	Acenaphthylene	ND	0.010	mg/L
120-12-7	Anthracene	ND	0.010	mg/L
92-87-5	Benzidine	ND	0.050	mg/L
56-55-3	Benzo(a)anthracene	ND	0.010	mg/L
50-32-8	Benzo(a)pyrene	ND	0.010	mg/L
205-99-2	Benzo(b)fluoranthene	ND	0.010	mg/L
191-24-2	Benzo(g,h,i)perylene	ND	0.010	mg/L
207-08-9	Benzo(k)fluoranthene	ND	0.010	mg/L
111-91-1	Bis(2-Chloroethoxy)methane	ND	0.010	mg/L
111-44-4	Bis(2-Chloroethyl)ether	ND	0.010	mg/L
108-60-1	Bis(2-Chloroisopropyl)ether	ND	0.010	mg/L
117-81-7	Bis(2-Ethylhexyl)phthalate	ND	0.010	mg/L
85-68-7	Butyl benzyl phthalate	ND	0.010	mg/L
218-01-9	Chrysene	ND	0.010	mg/L
53-70-3	Dibenz(a,h)anthracene	ND	0.010	mg/L
84-66-2	Diethyl phthalate	ND	0.010	mg/L
131-11-3	Dimethyl phthalate	ND	0.010	mg/L
84-74-2	Di-n-butyl phthalate	ND	0.010	mg/L
117-84-0	Di-n-octyl phthalate	ND	0.010	mg/L
206-44-0	Fluoranthene	ND	0.010	mg/L
86-73-7	Fluorene	ND	0.010	mg/L
118-74-1	Hexachlorobenzene	ND	0.010	mg/L
87-68-3	Hexachlorobutadiene	ND	0.010	mg/L
77-47-4	Hexachlorocyclopentadiene	ND	0.010	mg/L
67-72-1	Hexachloroethane	ND	0.010	mg/L
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.010	mg/L

Sample Results

BC-1

Collect Date	12/28/2015 16:40	**GCAL ID**	21512291501
Receive Date	12/29/2015 08:15	**Matrix**	Water

EPA 8270C (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/29/2015 08:30	575719	EPA 3510C	1	12/30/2015 16:09	JMC2	575876

CAS#	Parameter	Result	LOQ	Units
78-59-1	Isophorone	ND	0.010	mg/L
91-20-3	Naphthalene	ND	0.010	mg/L
98-95-3	Nitrobenzene	ND	0.010	mg/L
62-75-9	n-Nitrosodimethylamine	ND	0.010	mg/L
621-64-7	n-Nitrosodi-n-propylamine	ND	0.010	mg/L
86-30-6	n-Nitrosodiphenylamine	ND	0.010	mg/L
87-86-5	Pentachlorophenol	ND	0.010	mg/L
85-01-8	Phenanthrene	ND	0.010	mg/L
108-95-2	Phenol	ND	0.010	mg/L
129-00-0	Pyrene	ND	0.010	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	0.05	.042	ug/L	84	44 - 120
321-60-8	2-Fluorobiphenyl	0.05	.041	ug/L	81	44 - 119
1718-51-0	Terphenyl-d14	0.05	.046	ug/L	91	50 - 134
4165-62-2	Phenol-d5	0.10	.034	ug/L	34	10 - 120
367-12-4	2-Fluorophenol	0.10	.048	ug/L	48	19 - 119
118-79-6	2,4,6-Tribromophenol	0.10	.075	ug/L	75	43 - 140

EPA 8015C GRO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/29/2015 15:32	BMR	575746

CAS#	Parameter	Result	LOQ	Units
8006-61-9	Gasoline Range Organics	ND	0.100	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
106-39-8	Bromochlorobenzene	0.03	.022	ug/L	72	49 - 136

Sample Results

BC-1

Collect Date	12/28/2015 16:40	**GCAL ID**	21512291501
Receive Date	12/29/2015 08:15	**Matrix**	Water

EPA 8015C DRO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/29/2015 13:00	575750	EPA 3510C	1	12/29/2015 19:11	ARW	575845

CAS#	Parameter	Result	LOQ	Units
GCSV-00-4	Diesel Range Organics	ND	0.125	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.05	.042	ug/L	84	56 - 125

EPA 8015C ORO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/29/2015 19:11	575822	EPA 3510C	1	01/05/2016 10:04	ARW	576202

CAS#	Parameter	Result	LOQ	Units
GCSV-00-44	Oil Range Organics	ND	0.125	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.05	.044	ug/L	87	56 - 125

BC-1

Collect Date	12/28/2015 16:40	**GCAL ID**	21512291502
Receive Date	12/29/2015 08:15	**Matrix**	Water

EPA 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/30/2015 15:45	CJR	575867

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	.049	ug/L	98	78 - 130
1868-53-7	Dibromofluoromethane	0.05	.051	ug/L	103	77 - 127
2037-26-5	Toluene d8	0.05	.054	ug/L	107	76 - 134
17060-07-0	1,2-Dichloroethane-d4	0.05	.051	ug/L	102	71 - 127

Sample Results

BC-1	**Collect Date**	12/28/2015 16:40	**GCAL ID**	21512291502
	Receive Date	12/29/2015 08:15	**Matrix**	Water

MADEP VPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/31/2015 19:25	JAR	575997

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
GCSV-02-14	Aromatic >C8-C10	ND	0.030	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
GCV-00-7	2,5-Dibromotoluene (PID)	0.05	.046	ug/L	92	70 - 130
GCV-00-8	2,5-Dibromotoluene (FID)	0.05	.05	ug/L	99	70 - 130

MADEP EPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/29/2015 12:25	575541	MADEP EPH Revision 1.1	1	01/03/2016 11:02	SDD	576098

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	0.04	.026	ug/L	65	40 - 140

MADEP EPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/29/2015 12:25	575541	MADEP EPH Revision 1.1	1	01/03/2016 11:02	SDD	576099

CAS#	Parameter	Result	LOQ	Units
GCSV-02-15	Aromatic >C10-C12	ND	0.100	mg/L
GCSV-02-16	Aromatic >C12-C16	ND	0.100	mg/L
GCSV-02-17	Aromatic >C16-C21	ND	0.150	mg/L
GCSV-05-18	Aromatic >C21-C35	ND	0.100	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.04	.027	ug/L	68	40 - 140
580-13-2	2-Bromonaphthalene	0.04	.034	ug/L	86	40 - 140
321-60-8	2-Fluorobiphenyl	0.04	.034	ug/L	86	40 - 140

Sample Results

BC-1

Collect Date	12/28/2015 16:40	**GCAL ID**	21512291502
Receive Date	12/29/2015 08:15	**Matrix**	Water

EPA 6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/29/2015 10:40	575734	EPA 3010A	5	12/31/2015 13:43	LWZ	575937

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	ND	0.0050	mg/L
7440-39-3	Barium	0.87	0.0050	mg/L
7440-43-9	Cadmium	ND	0.0050	mg/L
7440-70-2	Calcium	88.9	2.50	mg/L
7440-47-3	Chromium	ND	0.0050	mg/L
7439-89-6	Iron	0.99	0.50	mg/L
7439-92-1	Lead	ND	0.0050	mg/L
7439-95-4	Magnesium	31.4	0.50	mg/L
7439-96-5	Manganese	0.14	0.025	mg/L
7440-09-7	Potassium	3.84	0.50	mg/L
7440-66-6	Zinc	ND	0.10	mg/L

EPA 6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/29/2015 10:40	575734	EPA 3010A	100	12/31/2015 12:21	LWZ	575937

CAS#	Parameter	Result	LOQ	Units
7440-23-5	Sodium	160	10.0	mg/L
7440-24-6	Strontium	0.84	0.10	mg/L

EPA 6020A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/29/2015 16:15	575791	EPA 3005A Dissolved	5	12/31/2015 13:50	LWZ	575937

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	ND	0.0050	mg/L
7440-39-3	Barium	0.80	0.0050	mg/L
7440-43-9	Cadmium	ND	0.0050	mg/L
7440-47-3	Chromium	ND	0.0050	mg/L
7439-89-6	Iron	0.89	0.50	mg/L
7439-92-1	Lead	ND	0.0050	mg/L
7439-96-5	Manganese	0.11	0.025	mg/L
7440-66-6	Zinc	ND	0.10	mg/L

Sample Results

BC-1

Collect Date	12/28/2015 16:40	**GCAL ID**	21512291502
Receive Date	12/29/2015 08:15	**Matrix**	Water

EPA 6020A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/29/2015 16:15	575791	EPA 3005A Dissolved	100	12/31/2015 12:32	LWZ	575937

CAS#	Parameter	Result	LOQ	Units
7440-24-6	Strontium	0.79	0.10	mg/L

EPA 7470A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/29/2015 15:00	575735	EPA 7470A	1	12/31/2015 14:02	LWZ	575973

CAS#	Parameter	Result	LOQ	Units
7439-97-6	Mercury	ND	0.00020	mg/L

EPA 7470A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/29/2015 15:00	575735	EPA 7470A Dissolved	1	12/31/2015 14:04	LWZ	575973

CAS#	Parameter	Result	LOQ	Units
7439-97-6	Mercury	ND	0.00020	mg/L

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	2	01/02/2016 16:02	SMR	576030

CAS#	Parameter	Result	LOQ	Units
24959-67-9	Bromide	0.406	0.400	mg/L
14808-79-8	Sulfate	1.84	0.400	mg/L

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	100	01/02/2016 16:20	SMR	576030

CAS#	Parameter	Result	LOQ	Units
16887-00-6	Chloride	165	20.0	mg/L

Sample Results

BC-1

Collect Date	12/28/2015 16:40	**GCAL ID**	21512291502
Receive Date	12/29/2015 08:15	**Matrix**	Water

SM 2320 B-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/30/2015 11:46	JEM	575868

CAS#	Parameter	Result	LOQ	Units
T-005-B	Bicarbonate Alkalinity	343	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	12/30/2015 11:46	JEM	575868

CAS#	Parameter	Result	LOQ	Units
T-005-C	Carbonate Alkalinity	ND	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	12/30/2015 12:31	WRW	575865

CAS#	Parameter	Result	LOQ	Units
WET-035	Total Dissolved Solids(TDS)	643	10.0	mg/L

GC/MS Volatiles QC Summary

Analytical Batch 575867	Client ID	MB575867		LCS575867				LCSD575867				
	GCAL ID	1524907		1524908				1524909				
	Sample Type	MB		LCS				LCSD				
	Prep Date	NA		NA				NA				
	Analysis Date	12/30/2015 12:13		12/30/2015 10:34				12/30/2015 10:55				
	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	0.053	106	70 - 129	0.050	0.051	101	4	20
Ethylbenzene	100-41-4	ND	0.00500	0.050	0.053	105	74 - 126	0.050	0.052	103	2	30
Toluene	108-88-3	ND	0.00500	0.050	0.051	101	72 - 120	0.050	0.049	98	4	20
Xylene (total)	1330-20-7	ND	0.015	0.150	0.163	109	74 - 127	0.150	0.158	105	3	30
Surrogate												
1,2-Dichloroethane-d4	17060-07-0	.0506	101	.05	.0502	100	71 - 127	.05	.0505	101		NA
4-Bromofluorobenzene	460-00-4	.0501	100	.05	.0493	99	78 - 130	.05	.0507	101		NA
Dibromofluoromethane	1868-53-7	.0507	101	.05	.0501	100	77 - 127	.05	.0488	98		NA
Toluene d8	2037-26-5	.0544	109	.05	.0496	99	76 - 134	.05	.051	102		NA

GC/MS Semi-Volatiles QC Summary

Analytical Batch	Client ID	MB575719		LCS575719				LCSD575719				
575876	GCAL ID	1524320		1524321				1524322				
Prep Batch	Sample Type	MB		LCS				LCSD				
575719	Prep Date	12/29/2015 08:30		12/29/2015 08:30				12/29/2015 08:30				
Prep Method	Analysis Date	12/30/2015 15:20		12/30/2015 15:37				12/30/2015 15:53				
EPA 3510C	Matrix	Water		Water				Water				
EPA 8270C		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
1,2,4-Trichlorobenzene	120-82-1	ND	0.010	0.050	0.042	84	29 - 116	0.050	0.042	84	0	30
1,2-Dichlorobenzene	95-50-1	ND	0.010	0.050	0.040	81	32 - 111	0.050	0.041	82	2	30
1,2Diphenylhydrazine/Azobenzen	122-66-7	ND	0.010	0.050	0.044	88	49 - 122	0.050	0.043	85	2	30
1,3-Dichlorobenzene	541-73-1	ND	0.010	0.050	0.039	79	28 - 110	0.050	0.039	78	0	30
1,4-Dichlorobenzene	106-46-7	ND	0.010	0.050	0.039	78	29 - 112	0.050	0.040	80	3	30
2,4,6-Trichlorophenol	88-06-2	ND	0.010	0.050	0.041	83	50 - 125	0.050	0.044	88	7	30
2,4-Dichlorophenol	120-83-2	ND	0.010	0.050	0.040	81	47 - 121	0.050	0.041	82	2	30
2,4-Dimethylphenol	105-67-9	ND	0.010	0.050	0.021	41	31 - 124	0.050	0.023	46	9	30
2,4-Dinitrophenol	51-28-5	ND	0.010	0.050	0.037	74	23 - 143	0.050	0.044	88	17	30
2,4-Dinitrotoluene	121-14-2	ND	0.010	0.050	0.042	85	57 - 128	0.050	0.048	96	13	30
2,6-Dinitrotoluene	606-20-2	ND	0.010	0.050	0.045	91	57 - 124	0.050	0.050	100	11	30
2-Chloronaphthalene	91-58-7	ND	0.010	0.050	0.044	87	40 - 116	0.050	0.045	90	2	30
2-Chlorophenol	95-57-8	ND	0.010	0.050	0.037	74	38 - 117	0.050	0.037	75	0	30
2-Methylnaphthalene	91-57-6	ND	0.010	0.050	0.043	86	40 - 121	0.050	0.045	89	5	30
2-Nitrophenol	88-75-5	ND	0.010	0.050	0.043	87	47 - 123	0.050	0.043	86	0	30
3,3'-Dichlorobenzidine	91-94-1	ND	0.010	0.050	0.040	79	27 - 129	0.050	0.055	110	32*	30
4,6-Dinitro-2-methylphenol	534-52-1	ND	0.010	0.050	0.044	88	44 - 137	0.050	0.045	90	2	30
4-Bromophenyl phenyl ether	101-55-3	ND	0.010	0.050	0.045	89	55 - 124	0.050	0.044	88	2	30
4-Chloro-3-methylphenol	59-50-7	ND	0.010	0.050	0.039	79	52 - 119	0.050	0.042	83	7	30
4-Chlorophenyl phenyl ether	7005-72-3	ND	0.010	0.050	0.041	83	53 - 121	0.050	0.045	89	9	30
4-Nitrophenol	100-02-7	ND	0.010	0.050	0.017	34	10 - 120	0.050	0.022	44	26	30
Acenaphthene	83-32-9	ND	0.010	0.050	0.042	85	47 - 122	0.050	0.045	90	7	30
Acenaphthylene	208-96-8	ND	0.010	0.050	0.043	86	41 - 130	0.050	0.046	92	7	30
Anthracene	120-12-7	ND	0.010	0.050	0.044	89	57 - 123	0.050	0.045	90	2	30
Benzidine	92-87-5	ND	0.050	0.050	0.00	0*	10 - 120	0.050	0.00	0*	0	30
Benzo(a)anthracene	56-55-3	ND	0.010	0.050	0.043	85	58 - 125	0.050	0.045	90	5	30
Benzo(a)pyrene	50-32-8	ND	0.010	0.050	0.043	85	54 - 128	0.050	0.045	90	5	30
Benzo(b)fluoranthene	205-99-2	ND	0.010	0.050	0.040	79	53 - 131	0.050	0.043	86	7	30
Benzo(g,h,i)perylene	191-24-2	ND	0.010	0.050	0.044	87	50 - 134	0.050	0.037	74	17	30
Benzo(k)fluoranthene	207-08-9	ND	0.010	0.050	0.042	84	57 - 129	0.050	0.046	91	9	30
Bis(2-Chloroethoxy)methane	111-91-1	ND	0.010	0.050	0.042	85	48 - 120	0.050	0.043	86	2	30
Bis(2-Chloroethyl)ether	111-44-4	ND	0.010	0.050	0.043	85	43 - 118	0.050	0.042	85	2	30
Bis(2-Chloroisopropyl)ether	108-60-1	ND	0.010	0.050	0.043	86	37 - 130	0.050	0.042	84	2	30
Bis(2-Ethylhexyl)phthalate	117-81-7	ND	0.010	0.050	0.043	85	55 - 135	0.050	0.047	94	9	30
Butyl benzyl phthalate	85-68-7	ND	0.010	0.050	0.043	87	53 - 134	0.050	0.044	88	2	30
Chrysene	218-01-9	ND	0.010	0.050	0.042	83	59 - 123	0.050	0.046	91	9	30
Dibenz(a,h)anthracene	53-70-3	ND	0.010	0.050	0.043	87	51 - 134	0.050	0.040	80	7	30
Diethyl phthalate	84-66-2	ND	0.010	0.050	0.043	85	56 - 125	0.050	0.046	91	7	30
Dimethyl phthalate	131-11-3	ND	0.010	0.050	0.043	87	45 - 127	0.050	0.046	91	7	30
Di-n-butyl phthalate	84-74-2	ND	0.010	0.050	0.043	86	59 - 127	0.050	0.048	96	11	30
Di-n-octyl phthalate	117-84-0	ND	0.010	0.050	0.043	85	51 - 140	0.050	0.055	109	24	30
Fluoranthene	206-44-0	ND	0.010	0.050	0.042	85	57 - 128	0.050	0.051	102	19	30
Fluorene	86-73-7	ND	0.010	0.050	0.042	85	52 - 124	0.050	0.046	92	9	30
Hexachlorobenzene	118-74-1	ND	0.010	0.050	0.043	87	53 - 125	0.050	0.043	86	0	30
Hexachlorobutadiene	87-68-3	ND	0.010	0.050	0.042	83	22 - 124	0.050	0.040	81	5	30
Hexachlorocyclopentadiene	77-47-4	ND	0.010	0.050	0.034	69	16 - 120	0.050	0.035	70	3	30
Hexachloroethane	67-72-1	ND	0.010	0.050	0.038	75	21 - 115	0.050	0.037	74	3	30
Indeno(1,2,3-cd)pyrene	193-39-5	ND	0.010	0.050	0.044	87	52 - 134	0.050	0.044	89	0	30
Isophorone	78-59-1	ND	0.010	0.050	0.043	86	42 - 124	0.050	0.043	86	0	30
Naphthalene	91-20-3	ND	0.010	0.050	0.041	82	40 - 121	0.050	0.041	83	0	30
Nitrobenzene	98-95-3	ND	0.010	0.050	0.043	87	45 - 121	0.050	0.043	86	0	30
n-Nitrosodimethylamine	62-75-9	ND	0.010	0.050	0.028	55	12 - 120	0.050	0.028	56	0	30
n-Nitrosodi-n-propylamine	621-64-7	ND	0.010	0.050	0.042	84	49 - 119	0.050	0.043	86	2	30
n-Nitrosodiphenylamine	86-30-6	ND	0.010	0.050	0.046	92	51 - 123	0.050	0.045	90	2	30
Pentachlorophenol	87-86-5	ND	0.010	0.050	0.038	75	35 - 138	0.050	0.041	82	8	30
Phenanthrene	85-01-8	ND	0.010	0.050	0.044	87	59 - 120	0.050	0.044	89	0	30
Phenol	108-95-2	ND	0.010	0.050	0.020	40	16 - 120	0.050	0.021	41	5	30
Pyrene	129-00-0	ND	0.010	0.050	0.046	91	57 - 126	0.050	0.038	77	19	30

GC/MS Semi-Volatiles QC Summary

Analytical Batch	Client ID	MB575719	LCS575719	LCSD575719
575876	GCAL ID	1524320	1524321	1524322
Prep Batch	Sample Type	MB	LCS	LCSD
575719	Prep Date	12/29/2015 08:30	12/29/2015 08:30	12/29/2015 08:30
Prep Method	Analysis Date	12/30/2015 15:20	12/30/2015 15:37	12/30/2015 15:53
EPA 3510C	Matrix	Water	Water	Water

EPA 8270C		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Surrogate												
2,4,6-Tribromophenol	118-79-6	.0813	81	.1	.0728	73	43 - 140	.1	.0843	84		NA
2-Fluorobiphenyl	321-60-8	.0403	81	.05	.038	76	44 - 119	.05	.0421	84		NA
2-Fluorophenol	367-12-4	.05	50	.1	.0482	48	19 - 119	.1	.05	50		NA
Nitrobenzene-d5	4165-60-0	.042	84	.05	.0381	76	44 - 120	.05	.0411	82		NA
Phenol-d5	4165-62-2	.0358	36	.1	.0337	34	10 - 120	.1	.0363	36		NA
Terphenyl-d14	1718-51-0	.0483	97	.05	.0424	85	50 - 134	.05	.0398	80		NA

GC Volatiles QC Summary

Analytical Batch 575746	Client ID	MB575746		LCS575746				LCSD575746				
	GCAL ID	1524406		1524407				1524408				
	Sample Type	MB		LCS				LCSD				
	Prep Date	NA		NA				NA				
	Analysis Date	12/29/2015 11:33		12/29/2015 11:07				12/29/2015 11:20				
	Matrix	Water		Water				Water				
EPA 8015C GRO		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Gasoline Range Organics	8006-61-9	ND	0.100	0.500	0.502	100	70 - 128	0.500	0.513	103	2	25
Surrogate												
Bromochlorobenzene	106-39-8	.0221	74	.03	.0236	79	49 - 136	.03	.0261	87		NA

Analytical Batch 575997	Client ID	MB575997		LCS575997				LCSD575997				
	GCAL ID	1525308		1525309				1525310				
	Sample Type	MB		LCS				LCSD				
	Prep Date	NA		NA				NA				
	Analysis Date	12/31/2015 18:58		12/31/2015 17:06				12/31/2015 17:47				
	Matrix	Water		Water				Water				
MADEP VPH Revision 1.1		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	0.086	86	60 - 140	0.100	0.116	116	30	30
Aliphatic C6-C8	GCSV-02-30	ND	0.030	0.150	0.132	88	60 - 140	0.150	0.163	109	21	30
Aromatic >C8-C10	GCSV-02-14	ND	0.030	0.150	0.132	88	60 - 140	0.150	0.150	100	13	30
Surrogate												
2,5-Dibromotoluene (FID)	GCV-00-8	.0547	109	.05	.0564	113	70 - 130	.05	.053	106		NA
2,5-Dibromotoluene (PID)	GCV-00-7	.049	98	.05	.0462	92	70 - 130	.05	.0496	99		NA

GC Semi-Volatiles QC Summary

Analytical Batch	Client ID	MB575750		LCS575750				LCSD575750				
575845	GCAL ID	1524416		1524417				1524418				
Prep Batch	Sample Type	MB		LCS				LCSD				
575750	Prep Date	12/29/2015 13:00		12/29/2015 13:00				12/29/2015 13:00				
Prep Method	Analysis Date	12/29/2015 18:24		12/29/2015 18:41				12/29/2015 18:56				
EPA 3510C	Matrix	Water		Water				Water				
EPA 8015C DRO		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Diesel Range Organics	GCSV-00-4	ND	0.125	1.00	0.803	80	47 - 120	1.00	0.878	88	9	30
Surrogate												
o-Terphenyl	84-15-1	.0392	78	.05	.0426	85	56 - 125	.05	.0441	88		NA

Analytical Batch	Client ID	MB575822		LCS575822				LCSD575822				
575910	GCAL ID	1524758		1524759				1524760				
Prep Batch	Sample Type	MB		LCS				LCSD				
575822	Prep Date	12/30/2015 10:00		12/30/2015 10:00				12/30/2015 10:00				
Prep Method	Analysis Date	12/30/2015 13:58		12/30/2015 14:42				12/30/2015 14:57				
EPA 3510C	Matrix	Water		Water				Water				
EPA 8015C ORO		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Oil Range Organics	GCSV-00-44	ND	0.125	2.00	1.68	84	41 - 113	2.00	1.81	91	7	40
Surrogate												
o-Terphenyl	84-15-1	.0433	87	.05	.0396	79	56 - 125	.05	.04	80		NA

Analytical Batch	Client ID	MB575541		LCS575541				LCSD575541				
576098	GCAL ID	1523752		1523753				1523754				
Prep Batch	Sample Type	MB		LCS				LCSD				
575541	Prep Date	12/29/2015 07:00		12/29/2015 07:00				12/29/2015 07:00				
Prep Method	Analysis Date	01/03/2016 08:43		01/03/2016 09:03				01/03/2016 09:22				
MADEP EPH Revision 1.1	Matrix	Water		Water				Water				
MADEP EPH Revision 1.1		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	0.100	0.062	62	30 - 140	0.100	0.059	59	5	25
Aliphatic >C12-C16	GCSV-02-12	ND	0.100	0.100	0.053	53	40 - 140	0.100	0.058	58	9	25
Aliphatic >C16-C35	GCSV-02-31	ND	0.150	0.450	0.292	65	40 - 140	0.450	0.359	80	21	25
Surrogate												
1-Chlorooctadecane	3386-33-2	.0353	88	.04	.0246	62	40 - 140	.04	.0203	51		NA

Analytical Batch	Client ID	MB575541		LCS575541				LCSD575541				
576099	GCAL ID	1523752		1523753				1523754				
Prep Batch	Sample Type	MB		LCS				LCSD				
575541	Prep Date	12/29/2015 07:00		12/29/2015 07:00				12/29/2015 07:00				
Prep Method	Analysis Date	01/03/2016 09:03		01/03/2016 09:22				01/03/2016 09:41				
MADEP EPH Revision 1.1	Matrix	Water		Water				Water				
MADEP EPH Revision 1.1		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Aromatic >C10-C12	GCSV-02-15	ND	0.100	0.050	0.036	71	30 - 140	0.050	0.030	60	18	25
Aromatic >C12-C16	GCSV-02-16	ND	0.100	0.200	0.133	67	40 - 140	0.200	0.119	60	11	25
Aromatic >C16-C21	GCSV-02-17	ND	0.150	0.100	0.070	70	40 - 140	0.100	0.064	64	9	25
Aromatic >C21-C35	GCSV-05-18	ND	0.100	0.500	0.279	56	40 - 140	0.500	0.272	54	3	25
Surrogate												
2-Bromonaphthalene	580-13-2	.0322	81	.04	.0346	87	40 - 140	.04	.0333	83		NA
2-Fluorobiphenyl	321-60-8	.0332	83	.04	.0363	91	40 - 140	.04	.0326	82		NA
o-Terphenyl	84-15-1	.0237	59	.04	.0263	66	40 - 140	.04	.0233	58		NA

Inorganics QC Summary

Analytical Batch	Client ID	MB575735		LCS575735			
575973	GCAL ID	1524364		1524365			
Prep Batch	Sample Type	MB		LCS			
575735	Prep Date	12/29/2015 15:00		12/29/2015 15:00			
Prep Method	Analysis Date	12/31/2015 13:22		12/31/2015 13:24			
EPA 7470A	Matrix	Water		Water			
EPA 7470A		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Mercury	7439-97-6	ND	0.00020	0.0050	0.0051	102	80 - 120

Analytical Batch	Client ID	MB575734		LCS575734			
575848	GCAL ID	1524362		1524363			
Prep Batch	Sample Type	MB		LCS			
575734	Prep Date	12/29/2015 10:40		12/29/2015 10:40			
Prep Method	Analysis Date	12/30/2015 00:34		12/30/2015 00:37			
EPA 3010A	Matrix	Water		Water			
EPA 6020A		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Arsenic	7440-38-2	ND	0.0010	0.050	0.047	94	80 - 120
Barium	7440-39-3	ND	0.0010	0.050	0.049	99	80 - 120
Cadmium	7440-43-9	ND	0.0010	0.050	0.048	97	80 - 120
Calcium	7440-70-2	ND	0.50	25.0	26.0	104	80 - 120
Chromium	7440-47-3	ND	0.0010	0.050	0.051	101	80 - 120
Iron	7439-89-6	ND	0.10	5.00	5.08	102	80 - 120
Lead	7439-92-1	ND	0.0010	0.050	0.049	98	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	0.051	103	80 - 120
Potassium	7440-09-7	ND	0.10	5.00	4.96	99	80 - 120
Sodium	7440-23-5	ND	0.10	5.00	5.23	105	80 - 120
Strontium	7440-24-6	ND	0.0010	0.050	0.054	108	80 - 120
Zinc	7440-66-6	ND	0.020	1.00	0.95	95	80 - 120

Analytical Batch	Client ID	RB30490ML		1524040MS			
576141	GCAL ID	21512280201		1524389			
Prep Batch	Sample Type	SAMPLE		MS			
575734	Prep Date	12/29/2015 10:40		12/29/2015 10:40			
Prep Method	Analysis Date	01/04/2016 21:55		01/04/2016 22:01			
EPA 3010A	Matrix	Solid		Solid			
EPA 6020A		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Arsenic	7440-38-2	0.0022	0.10	0.50	0.51	102	80 - 120
Barium	7440-39-3	1.60	0.10	0.50	2.11	102	80 - 120
Cadmium	7440-43-9	0.0011	0.10	0.50	0.49	97	80 - 120
Chromium	7440-47-3	0.0	0.10	0.50	0.46	93	80 - 120
Lead	7439-92-1	0.0056	0.10	0.50	0.49	98	80 - 120

Analytical Batch	Client ID	MB575791		LCS575791			
575937	GCAL ID	1524659		1524660			
Prep Batch	Sample Type	MB		LCS			
575791	Prep Date	12/29/2015 16:15		12/29/2015 16:15			
Prep Method	Analysis Date	12/31/2015 12:25		12/31/2015 12:28			
EPA 3005A Dissolved	Matrix	Water		Water			
EPA 6020A Dissolved		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Arsenic	7440-38-2	ND	0.0010	0.050	0.046	92	80 - 120
Barium	7440-39-3	ND	0.0010	0.050	0.045	91	80 - 120
Cadmium	7440-43-9	ND	0.0010	0.050	0.047	94	80 - 120
Chromium	7440-47-3	ND	0.0010	0.050	0.045	90	80 - 120
Iron	7439-89-6	ND	0.10	5.00	4.57	91	80 - 120
Lead	7439-92-1	ND	0.0010	0.050	0.046	93	80 - 120
Manganese	7439-96-5	ND	0.0050	0.050	0.047	93	80 - 120
Strontium	7440-24-6	ND	0.0010	0.050	0.045	90	80 - 120
Zinc	7440-66-6	ND	0.020	1.00	0.92	92	80 - 120

Inorganics QC Summary

Analytical Batch	Client ID	BC-1		1524388MS				1524388MSD				
575937	GCAL ID	21512291502		1524661				1524662				
Prep Batch	Sample Type	SAMPLE		MS				MSD				
575791	Prep Date	12/29/2015 16:15		12/29/2015 16:15				12/29/2015 16:15				
Prep Method	Analysis Date	12/31/2015 13:50		12/31/2015 13:57				12/31/2015 14:04				
EPA 3005A Dissolved	Matrix	Water		Water				Water				
EPA 6020A Dissolved		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Arsenic	7440-38-2	0.0	0.0050	0.050	0.050	99	80 - 120	0.050	0.051	102	2	20
Barium	7440-39-3	0.801	0.0050	0.050	0.81	12*	80 - 120	0.050	0.84	80	4	20
Cadmium	7440-43-9	0.0	0.0050	0.050	0.049	98	80 - 120	0.050	0.051	102	4	20
Chromium	7440-47-3	0.0	0.0050	0.050	0.048	96	80 - 120	0.050	0.050	99	4	20
Iron	7439-89-6	0.89	0.50	5.00	5.66	95	80 - 120	5.00	5.80	98	2	20
Lead	7439-92-1	0.0	0.0050	0.050	0.048	96	80 - 120	0.050	0.050	99	4	20
Manganese	7439-96-5	0.112	0.025	0.050	0.16	87	80 - 120	0.050	0.16	94	0	20
Zinc	7440-66-6	0.0	0.10	1.00	0.98	98	80 - 120	1.00	1.01	101	3	20

Analytical Batch	Client ID	BC-1		1524388MS				1524388MSD				
575937	GCAL ID	21512291502		1524661				1524662				
Prep Batch	Sample Type	SAMPLE		MS				MSD				
575791	Prep Date	12/29/2015 16:15		12/29/2015 16:15				12/29/2015 16:15				
Prep Method	Analysis Date	12/31/2015 12:32		12/31/2015 12:35				12/31/2015 12:38				
EPA 3005A Dissolved	Matrix	Water		Water				Water				
EPA 6020A Dissolved		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Strontium	7440-24-6	0.79	0.10	0.050	0.83	80	80 - 120	0.050	0.86	136*	4	20

General Chemistry QC Summary

Analytical Batch 576030	Client ID	MB576030		LCS576030			
	GCAL ID	1525382		1525383			
	Sample Type	MB		LCS			
	Prep Date	NA		NA			
	Analysis Date	01/02/2016 12:16		01/02/2016 11:59			
	Matrix	Water		Water			
EPA 9056A		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Bromide	24959-67-9	ND	0.200	2.50	2.39	96	80 - 120
Chloride	16887-00-6	ND	0.200	2.50	2.29	92	80 - 120
Sulfate	14808-79-8	ND	0.200	2.50	2.48	99	80 - 120

Analytical Batch 576030	Client ID	OF 002		1522669MS				1522669MSD				
	GCAL ID	21512221301		1525405				1525406				
	Sample Type	SAMPLE		MS				MSD				
	Prep Date	NA		NA				NA				
	Analysis Date	01/02/2016 16:37		01/02/2016 16:55				01/02/2016 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	0.000	2.00	25.0	24.1	96	80 - 120	25.0	24.2	97	0	15
Sulfate	14808-79-8	12.6	2.00	25.0	36.5	96	80 - 120	25.0	36.3	95	1	15

Analytical Batch 575865	Client ID	MB575865		LCS575865			
	GCAL ID	1524903		1524904			
	Sample Type	MB		LCS			
	Prep Date	NA		NA			
	Analysis Date	12/30/2015 12:31		12/30/2015 12:31			
	Matrix	Water		Water			
SM 2540 C-2011		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Total Dissolved Solids(TDS)	WET-035	ND	10.0	1000	954	95	80 - 120

Analytical Batch 575865	Client ID	BC-1		1524388DUP		
	GCAL ID	21512291502		1524905		
	Sample Type	SAMPLE		DUP		
	Prep Date	NA		NA		
	Analysis Date	12/30/2015 12:31		12/30/2015 12:31		
	Matrix	Water		Water		
SM 2540 C-2011		Units Result	mg/L LOQ	Result	RPD	RPD Limit
Total Dissolved Solids(TDS)	WET-035	643	10.0	640	0	5.4

GCAL ANALYTICAL LABORATORIES, LLC

7979 Innovation Park Dr., Baton Rouge, LA 70820-7402
Phone: 225.769.4900 • Fax: 225.767.5717 • www.gcal.com

CHAIN OF CUSTODY RECORD

Client ID: 4271 - Michael Pisani & Associates
SDG: 215122915
PM: RKW

Report to:
Client: Michael Pisani & Assoc.
Address: 1100 Poydras Suite 1430 New Orleans, LA
Contact: Lance Cooper
Phone: 504-582-2476
E-mail: lcooper@mpisani.com

Bill to:
Client: Same
Address:
Contact:
Phone:
E-mail:

P.O. Number: 07-47
Project Name/Number: EWL-GW Sampling (Oversight)
Sampled By: Thomas Killen

GCAL use only:
Custody Seal
used ☐ yes ☐ no
intact ☐ yes ☐ no
Temperature °C 0.9E24

☐ Dissolved Analysis Requested
☐ Field filtered
☐ Lab filtered

Matrix[1]	Date	Time (2400)	Comp	Grab	Sample Description	No Containers	Analytical Requests & Method: Semivolatile Organics 8270 (None)	TPH-DRO, ORO, GRO (None)	Total & Dissolved Metals (HNO3)	Bromide, TDS, Chloride (None)	Sulfate, Alkalinity, Carb, Bicarb (None)	Calcium, Magnesium, Potassium, Sodium (None)	TPH Fractions (CVPH/EPH) (HCl)	BTEX (HCl)				Preservative
W	12-29-15	1640		X	BC-1	16	X	X	X	X	X	X	X	X				1, 2

Air Bill No:

Turn Around Time (Business Days): ☒ 24h* ☐ 48h* ☐ 3 days* ☐ 1 week* ☒ Standard (Per Contract/Quote)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
[signature]	12-29-15	0815	[signature]	12-29-15	8:15
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Note: Rush on: TPH - DRO, ORO, GRO & Semivolatile Org (8270)

By submitting these samples, you agree to GCAL's terms and conditions contained in our most recent schedule of services.

Matrix[1]: 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 PM.

WHITE: CLIENT FINAL REPORT - CANARY: CLIENT

GCAL ANALYTICAL LABORATORIES, LLC

SAMPLE RECEIVING CHECKLIST

215122915

SAMPLE DELIVERY GROUP 215122915	
Client PM RKW *4271 - Michael Pisani & Associates*	**Transport Method**
Profile Number 174115	**Received By** Lofton, Katie E. McCune, Dodie N.
Line Item(s) 3 - Surface Water	**Receive Date(s)** 12/29/15

CHECKLIST	YES	NO	NA
Were all samples received using proper thermal preservation?	☑	☐	☐
When used, were all custody seals intact?	☐	☐	☑
Were all samples received in proper containers?	☑	☐	☐
Were all samples received using proper chemical preservation?	☑	☐	☐
Was preservative added to any container at the lab?	☐	☑	☐
Were all containers received in good condition?	☑	☐	☐
Were all VOC water samples received without head space?	☑	☐	☐
Do all sample labels match the Chain of Custody?	☑	☐	☐
Did the Chain of Custody list the sampling technician?	☑	☐	☐
Was the COC maintained i.e. all signatures, dates and time of receipt included?	☑	☐	☐

COOLERS

Airbill	Thermometer ID: E24	Temp(°C)
		0.9

DISCREPANCIES

None

LAB PRESERVATIONS

None

NOTES

Revision 1.4

Page 1 of 1

NELAP CERTIFICATE NUMBER: 01955
DOD ELAP CERTIFICATE NUMBER: L14-243

ANALYTICAL RESULTS

PERFORMED BY

GCAL, LLC
7979 Innovation Park Dr.
Baton Rouge, LA 70820

Report Date 01/07/2016

GCAL Report 215122360

Project 07-47 East White Lake

Deliver To	***Additional Recipients***
Dave Angle Michael Pisani and Associates 13313 Southwest Freeway Suite 221 Sugar Land, TX 77478 281-242-5700	Jonathan Miller, Michael Pisani & Associates Lance Cooper, Michael Pisani & Associates

PJLA Testing DoD ELAP

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 GCAL'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
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
DL	Diluted analysis – when appended to Client Sample ID
LOD	Limit of Detection
LOQ	Limit of Quantitation
RE	Re-analysis
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	The result is estimated because it exceeded the instrument calibration range
E	Metals - % diference for the serial dilution is > 10%

Sample receipt at GCAL 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 GCAL. 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
GCAL Report 215122360

Certifications

10/02/2015

Certification	Certification Number
DOD ELAP	L14-243
Alabama	01955
Arizona	AZ0718
Arkansas	12-060-0
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
USDA Soil Permit	P330-10-00117

Case Narrative

Client: Michael Pisani & Associates **Report:** 215122360

Gulf Coast Analytical Laboratories 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 6020A Total and Dissolved analyses, sample 21512236001 (TBA-1D) was analyzed at a dilution due to chemical or physical interference and to bracket the concentration within the calibration range of the instrument. This is reflected in the elevated reporting limits.

In the EPA 7470A analysis for prep batch 575473, the MS and/or MSD recovery is outside the control limits for Mercury. The LCS recovery is within the control limits. This indicates the analysis is in control and the sample is affected by matrix interference.

CONVENTIONALS

In the EPA 9056A analysis, sample 21512236001 (TBA-1D) had to be diluted in order to bracket the concentration within the calibration range of the instrument and to eliminate a chemical or physical interference. This is reflected in the elevated reporting limits.

Sample Summary

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21512236001	TBA-1D	Water	12/22/2015 10:45	12/23/2015 16:05

Sample Results

TBA-1D	**Collect Date**	12/22/2015 10:45	**GCAL ID**	21512236001
	Receive Date	12/23/2015 16:05	**Matrix**	Water

EPA 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/31/2015 11:23	CLS	575935

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	.041	ug/L	82	78 - 130
1868-53-7	Dibromofluoromethane	0.05	.048	ug/L	96	77 - 127
2037-26-5	Toluene d8	0.05	.05	ug/L	101	76 - 134
17060-07-0	1,2-Dichloroethane-d4	0.05	.053	ug/L	106	71 - 127

EPA 8015C GRO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/29/2015 15:45	BMR	575746

CAS#	Parameter	Result	LOQ	Units
8006-61-9	Gasoline Range Organics	ND	0.100	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
106-39-8	Bromochlorobenzene	0.03	.022	ug/L	73	49 - 136

MADEP VPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/29/2015 12:25	JAR	575663

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

Sample Results

TBA-1D

Collect Date	12/22/2015 10:45	**GCAL ID**	21512236001
Receive Date	12/23/2015 16:05	**Matrix**	Water

MADEP VPH Revision 1.1 (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/29/2015 12:25	JAR	575663

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
GCV-00-7	2,5-Dibromotoluene (PID)	0.05	.046	ug/L	91	70 - 130
GCV-00-8	2,5-Dibromotoluene (FID)	0.05	.052	ug/L	104	70 - 130

EPA 8015C DRO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/28/2015 09:00	575542	EPA 3510C	1	12/28/2015 15:00	SDD	575721

CAS#	Parameter	Result	LOQ	Units
GCSV-00-4	Diesel Range Organics	ND	0.125	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.05	.033	ug/L	66	56 - 125

EPA 8015C ORO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/28/2015 09:00	575543	EPA 3510C	1	12/28/2015 15:00	SDD	575722

CAS#	Parameter	Result	LOQ	Units
GCSV-00-44	Oil Range Organics	ND	0.125	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.05	.036	ug/L	71	56 - 125

MADEP EPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/29/2015 07:00	575541	MADEP EPH Revision 1.1	1	01/03/2016 10:43	SDD	576098

CAS#	Parameter	Result	LOQ	Units
GCSV-02-11	Aliphatic >C10-C12	ND	0.100	mg/L

Sample Results

TBA-1D

Collect Date	12/22/2015 10:45	**GCAL ID**	21512236001
Receive Date	12/23/2015 16:05	**Matrix**	Water

MADEP EPH Revision 1.1 (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/29/2015 07:00	575541	MADEP EPH Revision 1.1 (Continued)	1	01/03/2016 10:43	SDD	576098

CAS#	Parameter	Result	LOQ	Units
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	0.04	.031	ug/L	78	40 - 140

MADEP EPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/29/2015 07:00	575541	MADEP EPH Revision 1.1	1	01/03/2016 10:43	SDD	576099

CAS#	Parameter	Result	LOQ	Units
GCSV-02-15	Aromatic >C10-C12	ND	0.100	mg/L
GCSV-02-16	Aromatic >C12-C16	ND	0.100	mg/L
GCSV-02-17	Aromatic >C16-C21	ND	0.150	mg/L
GCSV-05-18	Aromatic >C21-C35	ND	0.100	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.04	.028	ug/L	71	40 - 140
580-13-2	2-Bromonaphthalene	0.04	.039	ug/L	98	40 - 140
321-60-8	2-Fluorobiphenyl	0.04	.038	ug/L	95	40 - 140

EPA 6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/24/2015 12:25	575472	EPA 3010A	5	12/31/2015 13:37	LWZ	575937

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	ND	0.0050	mg/L
7440-39-3	Barium	1.19	0.0050	mg/L
7440-43-9	Cadmium	ND	0.0050	mg/L
7440-70-2	Calcium	144	2.50	mg/L
7440-47-3	Chromium	ND	0.0050	mg/L
7439-89-6	Iron	1.76	0.50	mg/L
7439-95-4	Magnesium	48.6	0.50	mg/L
7439-96-5	Manganese	0.26	0.025	mg/L
7440-09-7	Potassium	4.26	0.50	mg/L
7440-66-6	Zinc	ND	0.10	mg/L

Sample Results

TBA-1D

Collect Date	12/22/2015 10:45	**GCAL ID**	21512236001
Receive Date	12/23/2015 16:05	**Matrix**	Water

EPA 6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/24/2015 12:25	575472	EPA 3010A	100	12/31/2015 12:11	LWZ	575937

CAS#	Parameter	Result	LOQ	Units
7440-23-5	Sodium	505	10.0	mg/L
7440-24-6	Strontium	1.23	0.10	mg/L

EPA 6020A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/24/2015 14:00	575504	EPA 3005A Dissolved	5	12/31/2015 13:30	LWZ	575937

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	ND	0.0050	mg/L
7440-39-3	Barium	1.12	0.0050	mg/L
7440-43-9	Cadmium	ND	0.0050	mg/L
7440-47-3	Chromium	ND	0.0050	mg/L
7439-89-6	Iron	1.67	0.50	mg/L
7439-96-5	Manganese	0.25	0.025	mg/L
7440-66-6	Zinc	ND	0.10	mg/L

EPA 6020A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/24/2015 14:00	575504	EPA 3005A Dissolved	100	12/31/2015 12:01	LWZ	575937

CAS#	Parameter	Result	LOQ	Units
7440-24-6	Strontium	1.19	0.10	mg/L

EPA 7470A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/24/2015 14:50	575473	EPA 7470A	1	12/29/2015 11:42	LWZ	575737

CAS#	Parameter	Result	LOQ	Units
7439-97-6	Mercury	ND	0.00020	mg/L

Sample Results

TBA-1D

Collect Date	12/22/2015 10:45	**GCAL ID**	21512236001
Receive Date	12/23/2015 16:05	**Matrix**	Water

EPA 7470A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/24/2015 14:50	575473	EPA 7470A Dissolved	1	12/29/2015 11:44	LWZ	575737

CAS#	Parameter	Result	LOQ	Units
7439-97-6	Mercury	ND	0.00020	mg/L

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	5	12/31/2015 12:47	RXJ	575904

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

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	500	12/31/2015 13:05	RXJ	575904

CAS#	Parameter	Result	LOQ	Units
16887-00-6	Chloride	876	100	mg/L

SM 2320 B-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/30/2015 11:46	JEM	575868

CAS#	Parameter	Result	LOQ	Units
T-005-B	Bicarbonate Alkalinity	363	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	12/30/2015 11:46	JEM	575868

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

Sample Results

TBA-1D	**Collect Date**	12/22/2015 10:45	**GCAL ID**	21512236001
	Receive Date	12/23/2015 16:05	**Matrix**	Water

SM 2540 C-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/24/2015 11:47	WRW	575488

CAS#	Parameter	Result	LOQ	Units
WET-035	Total Dissolved Solids(TDS)	1600	10.0	mg/L

GC/MS Volatiles QC Summary

Analytical Batch	Client ID	MB575935		LCS575935				LCSD575935				
575935	GCAL ID	1525103		1525104				1525105				
	Sample Type	MB		LCS				LCSD				
	Prep Date	NA		NA				NA				
	Analysis Date	12/31/2015 10:52		12/31/2015 09:30				12/31/2015 09:49				
	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	0.056	111	70 - 129	0.050	0.055	111	2	20
Ethylbenzene	100-41-4	ND	0.00500	0.050	0.052	104	74 - 126	0.050	0.051	102	2	30
Toluene	108-88-3	ND	0.00500	0.050	0.051	103	72 - 120	0.050	0.050	100	2	20
Xylene (total)	1330-20-7	ND	0.015	0.150	0.157	105	74 - 127	0.150	0.153	102	3	30
Surrogate												
1,2-Dichloroethane-d4	17060-07-0	.0538	108	.05	.0542	108	71 - 127	.05	.0545	109		NA
4-Bromofluorobenzene	460-00-4	.0406	81	.05	.044	88	78 - 130	.05	.0423	85		NA
Dibromofluoromethane	1868-53-7	.0483	97	.05	.0494	99	77 - 127	.05	.0497	99		NA
Toluene d8	2037-26-5	.0504	101	.05	.0472	94	76 - 134	.05	.0468	94		NA

Analytical Batch	Client ID	RB30490ML		1524040MS			
575935	GCAL ID	21512280201		1525164			
	Sample Type	SAMPLE		MS			
	Prep Date	NA		NA			
	Analysis Date	12/31/2015 12:32		12/31/2015 14:28			
	Matrix	Solid		Solid			
EPA 8260B		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Benzene	71-43-2	0.00	0.200	2.00	2.24	112	73 - 128
Surrogate							
1,2-Dichloroethane-d4	17060-07-0	2.11	106	2	2.09	105	62 - 125
4-Bromofluorobenzene	460-00-4	1.66	83	2	1.79	90	62 - 127
Dibromofluoromethane	1868-53-7	1.97	99	2	1.99	100	65 - 130
Toluene d8	2037-26-5	1.99	100	2	1.93	97	71 - 132

Analytical Batch	Client ID	151222-1B		1524058MS				1524058MSD				
575935	GCAL ID	21512261704		1525161				1525162				
	Sample Type	SAMPLE		MS				MSD				
	Prep Date	NA		NA				NA				
	Analysis Date	12/31/2015 12:13		12/31/2015 13:11				12/31/2015 13:30				
	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	0.00	0.200	2.00	2.32	116	70 - 129	2.00	2.23	112	4	20
Ethylbenzene	100-41-4	0.00	0.200	2.00	2.15	108	74 - 126	2.00	2.12	106	1	30
Toluene	108-88-3	0.00	0.200	2.00	2.15	108	72 - 120	2.00	2.07	104	4	20
Xylene (total)	1330-20-7	0.00	0.600	6.00	6.55	109	74 - 127	6.00	6.29	105	4	30
Surrogate												
1,2-Dichloroethane-d4	17060-07-0	2.08	104	2	2.2	110	71 - 127	2	2.19	110		NA
4-Bromofluorobenzene	460-00-4	1.67	84	2	1.81	91	78 - 130	2	1.73	87		NA
Dibromofluoromethane	1868-53-7	1.95	98	2	1.99	100	77 - 127	2	1.95	98		NA
Toluene d8	2037-26-5	1.99	100	2	1.94	97	76 - 134	2	1.9	95		NA

Analytical Batch	Client ID	LL-13391		1524111MS			
575935	GCAL ID	21512281101		1525165			
	Sample Type	SAMPLE		MS			
	Prep Date	NA		NA			
	Analysis Date	12/31/2015 12:51		12/31/2015 14:48			
	Matrix	Solid		Solid			
EPA 8260B		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Benzene	71-43-2	0.00	0.200	2.00	2.24	112	73 - 128
Surrogate							
1,2-Dichloroethane-d4	17060-07-0	2.12	106	2	2.11	106	62 - 125
4-Bromofluorobenzene	460-00-4	1.7	85	2	1.8	90	62 - 127

GC/MS Volatiles QC Summary

Analytical Batch	Client ID	LL-13391		1524111MS			
575935	GCAL ID	21512281101		1525165			
	Sample Type	SAMPLE		MS			
	Prep Date	NA		NA			
	Analysis Date	12/31/2015 12:51		12/31/2015 14:48			
	Matrix	Solid		Solid			
EPA 8260B		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Dibromofluoromethane	1868-53-7	1.96	98	2	2.01	101	65 - 130
Toluene d8	2037-26-5	2.05	103	2	1.95	98	71 - 132

GC Volatiles QC Summary

Analytical Batch 575746	Client ID	MB575746		LCS575746				LCSD575746				
	GCAL ID	1524406		1524407				1524408				
	Sample Type	MB		LCS				LCSD				
	Prep Date	NA		NA				NA				
	Analysis Date	12/29/2015 11:33		12/29/2015 11:07				12/29/2015 11:20				
	Matrix	Water		Water				Water				
EPA 8015C GRO		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Gasoline Range Organics	8006-61-9	ND	0.100	0.500	0.502	100	70 - 128	0.500	0.513	103	2	25
Surrogate												
Bromochlorobenzene	106-39-8	.0221	74	.03	.0236	79	49 - 136	.03	.0261	87		NA

Analytical Batch 575663	Client ID	MB575663		LCS575663				LCSD575663				
	GCAL ID	1524088		1524089				1524090				
	Sample Type	MB		LCS				LCSD				
	Prep Date	NA		NA				NA				
	Analysis Date	12/28/2015 14:24		12/28/2015 21:24				12/28/2015 13:30				
	Matrix	Water		Water				Water				
MADEP VPH Revision 1.1		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	0.111	111	60 - 140	0.100	0.100	100	10	30
Aliphatic C6-C8	GCSV-02-30	ND	0.030	0.150	0.168	112	60 - 140	0.150	0.142	95	17	30
Aromatic >C8-C10	GCSV-02-14	ND	0.030	0.150	0.143	95	60 - 140	0.150	0.143	95	0	30
Surrogate												
2,5-Dibromotoluene (FID)	GCV-00-8	.054	108	.05	.0592	118	70 - 130	.05	.0538	108		NA
2,5-Dibromotoluene (PID)	GCV-00-7	.0483	97	.05	.057	114	70 - 130	.05	.048	96		NA

GC Semi-Volatiles QC Summary

Analytical Batch	Client ID	MB575542		LCS575542				LCSD575542				
575721	GCAL ID	1523755		1523756				1523757				
Prep Batch	Sample Type	MB		LCS				LCSD				
575542	Prep Date	12/28/2015 09:00		12/28/2015 09:00				12/28/2015 09:00				
Prep Method	Analysis Date	12/28/2015 13:44		12/28/2015 14:01				12/28/2015 14:16				
EPA 3510C	Matrix	Water		Water				Water				
EPA 8015C DRO		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Diesel Range Organics	GCSV-00-4	ND	0.125	1.00	0.765	76	47 - 120	1.00	0.910	91	17	30
Surrogate												
o-Terphenyl	84-15-1	.0416	83	.05	.0417	83	56 - 125	.05	.0442	88		NA

Analytical Batch	Client ID	MB575543		LCS575543				LCSD575543				
575722	GCAL ID	1523758		1523759				1523760				
Prep Batch	Sample Type	MB		LCS				LCSD				
575543	Prep Date	12/28/2015 09:00		12/28/2015 09:00				12/28/2015 09:00				
Prep Method	Analysis Date	12/28/2015 13:44		12/28/2015 14:31				12/28/2015 14:43				
EPA 3510C	Matrix	Water		Water				Water				
EPA 8015C ORO		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Oil Range Organics	GCSV-00-44	ND	0.125	2.00	1.82	91	41 - 113	2.00	1.92	96	5	40
Surrogate												
o-Terphenyl	84-15-1	.0448	90	.05	.0426	85	56 - 125	.05	.0455	91		NA

Analytical Batch	Client ID	MB575541		LCS575541				LCSD575541				
576098	GCAL ID	1523752		1523753				1523754				
Prep Batch	Sample Type	MB		LCS				LCSD				
575541	Prep Date	12/29/2015 07:00		12/29/2015 07:00				12/29/2015 07:00				
Prep Method	Analysis Date	01/03/2016 08:43		01/03/2016 09:03				01/03/2016 09:22				
MADEP EPH Revision 1.1	Matrix	Water		Water				Water				
MADEP EPH Revision 1.1		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	0.100	0.062	62	30 - 140	0.100	0.059	59	5	25
Aliphatic >C12-C16	GCSV-02-12	ND	0.100	0.100	0.053	53	40 - 140	0.100	0.058	58	9	25
Aliphatic >C16-C35	GCSV-02-31	ND	0.150	0.450	0.292	65	40 - 140	0.450	0.359	80	21	25
Surrogate												
1-Chlorooctadecane	3386-33-2	.0353	88	.04	.0246	62	40 - 140	.04	.0203	51		NA

Analytical Batch	Client ID	MB575541		LCS575541				LCSD575541				
576099	GCAL ID	1523752		1523753				1523754				
Prep Batch	Sample Type	MB		LCS				LCSD				
575541	Prep Date	12/29/2015 07:00		12/29/2015 07:00				12/29/2015 07:00				
Prep Method	Analysis Date	01/03/2016 09:03		01/03/2016 09:22				01/03/2016 09:41				
MADEP EPH Revision 1.1	Matrix	Water		Water				Water				
MADEP EPH Revision 1.1		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Aromatic >C10-C12	GCSV-02-15	ND	0.100	0.050	0.036	71	30 - 140	0.050	0.030	60	18	25
Aromatic >C12-C16	GCSV-02-16	ND	0.100	0.200	0.133	67	40 - 140	0.200	0.119	60	11	25
Aromatic >C16-C21	GCSV-02-17	ND	0.150	0.100	0.070	70	40 - 140	0.100	0.064	64	9	25
Aromatic >C21-C35	GCSV-05-18	ND	0.100	0.500	0.279	56	40 - 140	0.500	0.272	54	3	25
Surrogate												
2-Bromonaphthalene	580-13-2	.0322	81	.04	.0346	87	40 - 140	.04	.0333	83		NA
2-Fluorobiphenyl	321-60-8	.0332	83	.04	.0363	91	40 - 140	.04	.0326	82		NA
o-Terphenyl	84-15-1	.0237	59	.04	.0263	66	40 - 140	.04	.0233	58		NA

Inorganics QC Summary

Analytical Batch	Client ID	MB575473		LCS575473			
575931	GCAL ID	1523539		1523540			
Prep Batch	Sample Type	MB		LCS			
575473	Prep Date	12/24/2015 14:50		12/24/2015 14:50			
Prep Method	Analysis Date	12/31/2015 12:40		12/31/2015 12:42			
EPA 7470A	Matrix	Water		Water			
EPA 7470A		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Mercury	7439-97-6	ND	0.00020	0.0050	0.0047	94	80 - 120

Analytical Batch	Client ID	VB29363		1523276MS				1523276MSD				
575737	GCAL ID	21512233601		1523644				1523645				
Prep Batch	Sample Type	SAMPLE		MS				MSD				
575473	Prep Date	12/24/2015 14:50		12/24/2015 14:50				12/24/2015 14:50				
Prep Method	Analysis Date	12/29/2015 11:46		12/29/2015 11:49				12/29/2015 11:51				
EPA 7470A	Matrix	Solid		Solid				Solid				
EPA 7470A		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Mercury	7439-97-6	0.0	0.00020	0.0050	0.0036	72*	80 - 120	0.0050	0.0041	81	13	20

Analytical Batch	Client ID	MB575472	
575669	GCAL ID	1523537	
Prep Batch	Sample Type	MB	
575472	Prep Date	12/24/2015 12:25	
Prep Method	Analysis Date	12/28/2015 15:55	
EPA 3010A	Matrix	Water	
EPA 6020A		Units Result	mg/L LOQ
Arsenic	7440-38-2	ND	0.0010
Barium	7440-39-3	ND	0.0010
Cadmium	7440-43-9	ND	0.0010
Calcium	7440-70-2	ND	0.50
Chromium	7440-47-3	ND	0.0010
Iron	7439-89-6	ND	0.10
Magnesium	7439-95-4	ND	0.10
Manganese	7439-96-5	ND	0.0050
Potassium	7440-09-7	ND	0.10
Sodium	7440-23-5	0.14	0.10
Strontium	7440-24-6	ND	0.0010
Zinc	7440-66-6	ND	0.020

Analytical Batch	Client ID	LCS575472			
575669	GCAL ID	1523538			
Prep Batch	Sample Type	LCS			
575472	Prep Date	12/24/2015 12:25			
Prep Method	Analysis Date	12/28/2015 15:59			
EPA 3010A	Matrix	Water			
EPA 6020A		Spike Added	Result	%R	Control Limits%R
Arsenic	7440-38-2	0.050	0.044	88	80 - 120
Barium	7440-39-3	0.050	0.046	93	80 - 120
Cadmium	7440-43-9	0.050	0.046	92	80 - 120
Calcium	7440-70-2	25.0	24.1	96	80 - 120
Chromium	7440-47-3	0.050	0.048	95	80 - 120
Iron	7439-89-6	5.00	4.73	95	80 - 120
Magnesium	7439-95-4	5.00	5.02	100	80 - 120
Manganese	7439-96-5	0.050	0.048	95	80 - 120
Potassium	7440-09-7	5.00	4.63	93	80 - 120
Sodium	7440-23-5	5.00	5.06	101	80 - 120
Strontium	7440-24-6	0.050	0.048	96	80 - 120
Zinc	7440-66-6	1.00	0.88	88	80 - 120

Inorganics QC Summary

Analytical Batch	Client ID	BFF-LAYDOWN YARD		1523082MS			
576141	GCAL ID	21512230301		1523638			
Prep Batch	Sample Type	SAMPLE		MS			
575472	Prep Date	12/24/2015 12:25		12/24/2015 12:25			
Prep Method	Analysis Date	01/04/2016 12:23		01/04/2016 12:29			
EPA 3010A	Matrix	Solid		Solid			
EPA 6020A		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Arsenic	7440-38-2	0.0031	0.15	0.74	0.80	107	80 - 120
Barium	7440-39-3	2.00	0.15	0.74	2.78	105	80 - 120
Cadmium	7440-43-9	0.0026	0.15	0.74	0.80	107	80 - 120
Chromium	7440-47-3	0.0079	0.15	0.74	0.79	105	80 - 120

Analytical Batch	Client ID	VB29363		1523276MS				1523276MSD				
576140	GCAL ID	21512233601		1523639				1523640				
Prep Batch	Sample Type	SAMPLE		MS				MSD				
575472	Prep Date	12/24/2015 12:25		12/24/2015 12:25				12/24/2015 12:25				
Prep Method	Analysis Date	01/04/2016 23:52		01/04/2016 23:55				01/04/2016 23:59				
EPA 3010A	Matrix	Water		Water				Water				
EPA 6020A		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Arsenic	7440-38-2	0.0	0.10	0.50	0.49	99	80 - 120	0.50	0.47	94	4	20
Barium	7440-39-3	0.293	0.10	0.50	0.78	98	80 - 120	0.50	0.75	92	4	20
Cadmium	7440-43-9	0.00042	0.10	0.50	0.51	101	80 - 120	0.50	0.50	99	2	20
Chromium	7440-47-3	0.00918	0.10	0.50	0.49	97	80 - 120	0.50	0.48	94	2	20

Analytical Batch	Client ID	MB575504		LCS575504			
575782	GCAL ID	1523677		1523678			
Prep Batch	Sample Type	MB		LCS			
575504	Prep Date	12/24/2015 14:00		12/24/2015 14:00			
Prep Method	Analysis Date	12/29/2015 19:48		12/29/2015 19:54			
EPA 3005A Dissolved	Matrix	Water		Water			
EPA 6020A Dissolved		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Arsenic	7440-38-2	ND	0.0010	0.050	0.046	93	80 - 120
Barium	7440-39-3	ND	0.0010	0.050	0.048	96	80 - 120
Cadmium	7440-43-9	ND	0.0010	0.050	0.047	93	80 - 120
Chromium	7440-47-3	ND	0.0010	0.050	0.046	93	80 - 120
Iron	7439-89-6	ND	0.10	5.00	4.67	93	80 - 120
Manganese	7439-96-5	ND	0.0050	0.050	0.047	93	80 - 120
Strontium	7440-24-6	ND	0.0010	0.050	0.049	97	80 - 120
Zinc	7440-66-6	ND	0.020	1.00	0.94	94	80 - 120

General Chemistry QC Summary

Analytical Batch 575904	Client ID	MB575904		LCS575904				LCSD575904				
	GCAL ID	1525023		1525024				1525355				
	Sample Type	MB		LCS				LCSD				
	Prep Date	NA		NA				NA				
	Analysis Date	12/30/2015 20:39		12/30/2015 20:22				12/31/2015 17:29				
	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	2.33	93	80 - 120	2.50	2.27	91	3	15
Chloride	16887-00-6	ND	0.200	2.50	2.46	98	80 - 120	2.50	2.43	97	1	15
Sulfate	14808-79-8	ND	0.200	2.50	2.28	91	80 - 120	2.50	2.50	100	9	15

Analytical Batch 575904	Client ID	SRA-13MW-01D1-121515		SRA-13MW-01D1-121515 MS				SRA-13MW-01D1-121515 MS..				
	GCAL ID	21512191201		21512191202				21512191203				
	Sample Type	SAMPLE		MS				MSD				
	Prep Date	NA		NA				NA				
	Analysis Date	12/31/2015 14:51		12/31/2015 15:08				12/31/2015 15:26				
	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	74.5	20.0	250	310	94	80 - 120	250	311	95	0	15

Analytical Batch 575488	Client ID	MB575488		LCS575488			
	GCAL ID	1523630		1523631			
	Sample Type	MB		LCS			
	Prep Date	NA		NA			
	Analysis Date	12/24/2015 11:47		12/24/2015 11:47			
	Matrix	Water		Water			
SM 2540 C-2011		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Total Dissolved Solids(TDS)	WET-035	ND	10.0	1000	896	90	80 - 120

Analytical Batch 575488	Client ID	TBA-1D		1523331DUP		
	GCAL ID	21512236001		1523632		
	Sample Type	SAMPLE		DUP		
	Prep Date	NA		NA		
	Analysis Date	12/24/2015 11:47		12/24/2015 11:47		
	Matrix	Water		Water		
SM 2540 C-2011		Units Result	mg/L LOQ	Result	RPD	RPD Limit
Total Dissolved Solids(TDS)	WET-035	1600	10.0	1590	1	5.4

GCAL ANALYTICAL LABORATORIES, LLC

7979 Innovation Park Dr., Baton Rouge, LA 70820-7402
Phone: 225.769.4900 • Fax: 225.767.5717 • www.gcal.com

CHAIN OF CUSTODY RECORD

Client ID: 4271 - Michael Pisani & Associates
SDG: 215122360
PM: RKW

Report to:	Bill to:
Client: Michael Pisani + Assoc	Client:
Address: 1100 Poydras St. Suite 1430 New Orleans, LA 70163	Address: Same
Contact: Lance Cooper	Contact:
Phone: 504-582-2476	Phone:
E-mail: lcooper@mpisani.com	E-mail:

P.O. Number:

Project Name/Number: EWL GW Sampling 07-47

Sampled By: Dan McGregor

Analytical Requests & Method: Total Metals; Dissolved Metals; Bromide/TDS/Chlorides; Sodium/Calcium/Magnesium/K; Sulfate/Alkalinity/Ca/Bicarb; TPH Fractions (EPH/PH); BTEX; TPH(D,G,O) 8015

GCAL use only:
Custody Seal used ☐ yes ☐ no
intact ☐ yes ☐ no
Temperature °C 4.1 E-24

☑ Dissolved Analysis Requested
☑ Field filtered
☐ Lab filtered

Matrix[1]	Date	Time (2400)	Comp	Grab	Sample Description	No Containers	Preservative
W	12/22/15	1045		X	TBA-1D	14	-1

Air Bill No:

Turn Around Time (Business Days): ☐ 24h* ☐ 48h* ☐ 3 days* ☐ 1 week* ☑ Standard (Per Contract/Quote)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
	12/23/15	1605		12/23	1605
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Note: See Randy Whittington
Metals = (As, Ba, Cd, Cr, Fe, Mn, Fe, Sr, Zn, Hg)

By submitting these samples, you agree to GCAL's terms and conditions contained in our most recent schedule of services.

Matrix[1]: 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 PM.

WHITE: CLIENT FINAL REPORT - CANARY: CLIENT

GCAL ANALYTICAL LABORATORIES, LLC

SAMPLE RECEIVING CHECKLIST

* 2 1 5 1 2 2 3 6 0 *

SAMPLE DELIVERY GROUP 215122360	
Client PM RKW 4271 - Michael Pisani & Associates	**Transport Method** COURIER
Profile Number 174115	**Received By** Lofton, Katie E.
Line Item(s) 3 - Surface Water	**Receive Date(s)** 12/23/15

CHECKLIST	YES	NO	NA
Were all samples received using proper thermal preservation?	☑	☐	☐
When used, were all custody seals intact?	☐	☐	☑
Were all samples received in proper containers?	☑	☐	☐
Were all samples received using proper chemical preservation?	☑	☐	☐
Was preservative added to any container at the lab?	☐	☑	☐
Were all containers received in good condition?	☑	☐	☐
Were all VOC water samples received without head space?	☑	☐	☐
Do all sample labels match the Chain of Custody?	☑	☐	☐
Did the Chain of Custody list the sampling technician?	☑	☐	☐
Was the COC maintained i.e. all signatures, dates and time of receipt included?	☑	☐	☐

COOLERS

Airbill	Thermometer ID: E24	Temp(°C)
		4.1

DISCREPANCIES

None

LAB PRESERVATIONS

None

NOTES

Revision 1.4

Page 1 of 1

NELAP CERTIFICATE NUMBER: 01955
DOD ELAP CERTIFICATE NUMBER: L14-243

ANALYTICAL RESULTS

PERFORMED BY

GCAL, LLC
7979 Innovation Park Dr.
Baton Rouge, LA 70820

Report Date 12/24/2015

GCAL Report 215121919

Project 07-47 East Whitelake

Deliver To	***Additional Recipients***
Dave Angle Michael Pisani and Associates 13313 Southwest Freeway Suite 221 Sugar Land, TX 77478 281-242-5700	Jonathan Miller, Michael Pisani & Associates Lance Cooper, Michael Pisani & Associates

PJLA Testing DoD ELAP

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 GCAL'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
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
DL	Diluted analysis – when appended to Client Sample ID
LOD	Limit of Detection
LOQ	Limit of Quantitation
RE	Re-analysis
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	The result is estimated because it exceeded the instrument calibration range
E	Metals - % diference for the serial dilution is > 10%

Sample receipt at GCAL 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 GCAL. 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 standard 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
GCAL Report 215121919

Certifications

10/02/2015

Certification	Certification Number
DOD ELAP	L14-243
Alabama	01955
Arizona	AZ0718
Arkansas	12-060-0
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
USDA Soil Permit	P330-10-00117

Case Narrative

Client: Michael Pisani & Associates **Report:** 215121919

Gulf Coast Analytical Laboratories 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 analysis for prep batch 575048, the LCS/LCSD exhibited recoveries above the established control limits for Benzidine. However, Benzidine was not detected in the associated samples, therefore the data is reportable. The LCS/LCSD RPD is above the control limit for Benzidine.

SEMI-VOLATILES GAS CHROMATOGRAPHY

In the MADEP EPH Revision 1.1 analysis, the recovery for the surrogate, 2-Fluorobiphenyl is above the upper control limit for 21512191903. No target compounds were detected in the sample; therefore the data is reportable.

METALS

In the EPA 6020A analysis, sample 21512191901 (TBB-1D) was analyzed at a dilution. The reporting limits are at or below the RECAP screening standards at this dilution.

In the EPA 6020A Dissolved analysis, sample 21512191903 (TBB-3S) was analyzed at a dilution. The reporting limits are at or below the RECAP screening standards at this dilution.

In the EPA 6020A analysis, samples 21512191901 (TBB-1D), 21512191903 (TBB-3S) and 21512191902 (TBB-1S) had to be diluted in order to bracket the concentration within the calibration range of the instrument.

In the EPA 6020A Dissolved analysis, samples 21512191901 (TBB-1D), 21512191902 (TBB-1S) and 21512191903 (TBB-3S) had to be diluted in order to bracket the concentration within the calibration range of the instrument.

In the EPA 6020A analysis, a chemical or physical interference necessitated a dilution for sample 21512191902 (TBB-1S). This is reflected in the elevated reporting limits.

In the EPA 6020A Dissolved analysis, a chemical or physical interference necessitated a dilution for sample 21512191902 (TBB-1S). This is reflected in the elevated reporting limits.

In the EPA 6020A analysis, sample 21512191903 (TBB-3S) was analyzed at a dilution. The reporting limits are at or below the RECAP screening standards at this dilution.

In the EPA 6020A Dissolved analysis, sample 21512191901 (TBB-1D) was analyzed at a dilution. The reporting limits are at or below the RECAP screening standards at this dilution.

In the EPA 6020A Dissolved analysis for prep batch 575106, the MS and/or MSD recovery is outside the control limits for Iron. The LCS recovery is within the control limits. This indicates the analysis is in control and the sample is affected by matrix interference. The MS/MSD recoveries and RPD are not applicable for Strontium because the sample concentration is greater than four times the spike concentration.

CONVENTIONALS

In the EPA 9056A analysis, samples 21512191901 (TBB-1D), 21512191903 (TBB-3S) and 21512191902 (TBB-1S) had to be diluted in order to bracket the concentration within the calibration range of the instrument.

MISCELLANEOUS

Sample 21512191901 (TBB-1D) was received outside of the prescribed temperature range. However, the sample was received packaged on ice. It is apparent that the sample temperature had not equilibrated prior to receipt at the laboratory. No further action was taken.

N-nitrosodiphenylamine decomposes in the GC inlet and cannot be separated from Diphenylamine. The laboratory uses N-nitrosodiphenylamine as the calibration and QC standard.

Sample Summary

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21512191901	TBB-1D	Water	12/17/2015 13:45	12/18/2015 16:10
21512191902	TBB-1S	Water	12/17/2015 15:45	12/18/2015 16:10
21512191903	TBB-3S	Water	12/18/2015 09:30	12/18/2015 16:10

Sample Results

TBB-1D	**Collect Date**	12/17/2015 13:45	**GCAL ID**	21512191901
	Receive Date	12/18/2015 16:10	**Matrix**	Water

EPA 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/24/2015 11:45	MMM	575466

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	ug/L	99	78 - 130
1868-53-7	Dibromofluoromethane	0.05	.052	ug/L	105	77 - 127
2037-26-5	Toluene d8	0.05	.052	ug/L	104	76 - 134
17060-07-0	1,2-Dichloroethane-d4	0.05	.052	ug/L	105	71 - 127

EPA 8015C GRO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/22/2015 13:35	JAR	575141

CAS#	Parameter	Result	LOQ	Units
8006-61-9	Gasoline Range Organics	ND	0.100	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
106-39-8	Bromochlorobenzene	0.03	.023	ug/L	77	49 - 136

MADEP VPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/22/2015 18:46	JAR	575224

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

Sample Results

TBB-1D

Collect Date	12/17/2015 13:45	**GCAL ID**	21512191901
Receive Date	12/18/2015 16:10	**Matrix**	Water

MADEP VPH Revision 1.1 (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/22/2015 18:46	JAR	575224

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
GCV-00-7	2,5-Dibromotoluene (PID)	0.05	.047	ug/L	94	70 - 130
GCV-00-8	2,5-Dibromotoluene (FID)	0.05	.051	ug/L	103	70 - 130

EPA 8015C DRO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 11:00	575053	EPA 3510C	1	12/21/2015 13:37	ARW	575182

CAS#	Parameter	Result	LOQ	Units
GCSV-00-4	Diesel Range Organics	ND	0.125	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.05	.038	ug/L	75	56 - 125

EPA 8015C ORO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 11:00	575054	EPA 3510C	1	12/21/2015 13:37	ARW	575183

CAS#	Parameter	Result	LOQ	Units
GCSV-00-44	Oil Range Organics	0.186	0.125	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.05	.041	ug/L	81	56 - 125

MADEP EPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 09:00	575052	MADEP EPH Revision 1.1	1	12/21/2015 23:02	DLB	575270

CAS#	Parameter	Result	LOQ	Units
GCSV-02-11	Aliphatic >C10-C12	ND	0.100	mg/L

Sample Results

TBB-1D

Collect Date	12/17/2015 13:45	**GCAL ID**	21512191901
Receive Date	12/18/2015 16:10	**Matrix**	Water

MADEP EPH Revision 1.1 (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 09:00	575052	MADEP EPH Revision 1.1 (Continued)	1	12/21/2015 23:02	DLB	575270

CAS#	Parameter	Result	LOQ	Units
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	0.04	.026	ug/L	66	40 - 140

MADEP EPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 09:00	575052	MADEP EPH Revision 1.1	1	12/21/2015 14:40	DLB	575269

CAS#	Parameter	Result	LOQ	Units
GCSV-02-15	Aromatic >C10-C12	ND	0.100	mg/L
GCSV-02-16	Aromatic >C12-C16	ND	0.100	mg/L
GCSV-02-17	Aromatic >C16-C21	ND	0.150	mg/L
GCSV-05-18	Aromatic >C21-C35	ND	0.100	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.04	.032	ug/L	80	40 - 140
580-13-2	2-Bromonaphthalene	0.04	.051	ug/L	128	40 - 140
321-60-8	2-Fluorobiphenyl	0.04	.052	ug/L	131	40 - 140

EPA 6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 09:20	575075	EPA 3010A	5	12/23/2015 13:51	LWZ	575411

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	0.020	0.0050	mg/L
7440-39-3	Barium	1.66	0.0050	mg/L
7440-43-9	Cadmium	ND	0.0050	mg/L
7440-70-2	Calcium	136	2.50	mg/L
7440-47-3	Chromium	0.051	0.0050	mg/L
7439-92-1	Lead	0.082	0.0050	mg/L
7439-96-5	Manganese	1.65	0.025	mg/L
7440-09-7	Potassium	11.9	0.50	mg/L
7440-66-6	Zinc	0.19	0.10	mg/L

Sample Results

TBB-1D

Collect Date	12/17/2015 13:45	**GCAL ID**	21512191901
Receive Date	12/18/2015 16:10	**Matrix**	Water

EPA 6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 09:20	575075	EPA 3010A	100	12/23/2015 12:53	LWZ	575411

CAS#	Parameter	Result	LOQ	Units
7439-89-6	Iron	60.5	10.0	mg/L
7439-95-4	Magnesium	74.1	10.0	mg/L
7440-23-5	Sodium	765	10.0	mg/L
7440-24-6	Strontium	1.66	0.10	mg/L

EPA 6020A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 17:15	575106	EPA 3005A Dissolved	5	12/23/2015 14:52	LWZ	575411

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	ND	0.0050	mg/L
7440-39-3	Barium	0.89	0.0050	mg/L
7440-43-9	Cadmium	ND	0.0050	mg/L
7440-47-3	Chromium	ND	0.0050	mg/L
7439-89-6	Iron	3.05	0.50	mg/L
7439-92-1	Lead	0.0095	0.0050	mg/L
7439-96-5	Manganese	0.55	0.025	mg/L
7440-66-6	Zinc	ND	0.10	mg/L

EPA 6020A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 17:15	575106	EPA 3005A Dissolved	100	12/23/2015 14:38	LWZ	575411

CAS#	Parameter	Result	LOQ	Units
7440-24-6	Strontium	1.16	0.10	mg/L

EPA 7470A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 09:55	575077	EPA 7470A	1	12/21/2015 14:56	LWZ	575159

CAS#	Parameter	Result	LOQ	Units
7439-97-6	Mercury	ND	0.00020	mg/L

Sample Results

TBB-1D

Collect Date	12/17/2015 13:45	**GCAL ID**	21512191901
Receive Date	12/18/2015 16:10	**Matrix**	Water

EPA 7470A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 09:55	575077	EPA 7470A Dissolved	1	12/21/2015 14:58	LWZ	575159

CAS#	Parameter	Result	LOQ	Units
7439-97-6	Mercury	ND	0.00020	mg/L

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	5	12/23/2015 12:09	DMT	575384

CAS#	Parameter	Result	LOQ	Units
24959-67-9	Bromide	1.65	1.00	mg/L

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	500	12/23/2015 12:26	DMT	575384

CAS#	Parameter	Result	LOQ	Units
16887-00-6	Chloride	1220	100	mg/L
14808-79-8	Sulfate	102	100	mg/L

SM 2320 B-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/23/2015 10:24	DMT	575395

CAS#	Parameter	Result	LOQ	Units
T-005-B	Bicarbonate Alkalinity	330	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	12/23/2015 10:24	DMT	575395

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

Sample Results

TBB-1D

Collect Date	12/17/2015 13:45	**GCAL ID**	21512191901
Receive Date	12/18/2015 16:10	**Matrix**	Water

SM 2540 C-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/23/2015 10:58	WRW	575389

CAS#	Parameter	Result	LOQ	Units
WET-035	Total Dissolved Solids(TDS)	2030	10.0	mg/L

TBB-1S

Collect Date	12/17/2015 15:45	**GCAL ID**	21512191902
Receive Date	12/18/2015 16:10	**Matrix**	Water

EPA 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/24/2015 12:06	MMM	575466

CAS#	Parameter	Result	LOQ	Units
71-43-2	Benzene	0.00707	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	.051	ug/L	101	78 - 130
1868-53-7	Dibromofluoromethane	0.05	.052	ug/L	103	77 - 127
2037-26-5	Toluene d8	0.05	.053	ug/L	105	76 - 134
17060-07-0	1,2-Dichloroethane-d4	0.05	.053	ug/L	106	71 - 127

EPA 8015C GRO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/22/2015 13:54	JAR	575141

CAS#	Parameter	Result	LOQ	Units
8006-61-9	Gasoline Range Organics	ND	0.100	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
106-39-8	Bromochlorobenzene	0.03	.024	ug/L	80	49 - 136

Sample Results

TBB-1S	**Collect Date**	12/17/2015 15:45	**GCAL ID**	21512191902
	Receive Date	12/18/2015 16:10	**Matrix**	Water

MADEP VPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/22/2015 19:12	JAR	575224

CAS#	Parameter	Result	LOQ	Units
GCSV-02-10	Aliphatic >C8-C10	ND	0.020	mg/L
GCSV-02-30	Aliphatic C6-C8	0.044	0.030	mg/L
GCSV-02-14	Aromatic >C8-C10	ND	0.030	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
GCV-00-7	2,5-Dibromotoluene (PID)	0.05	.047	ug/L	94	70 - 130
GCV-00-8	2,5-Dibromotoluene (FID)	0.05	.055	ug/L	110	70 - 130

EPA 8015C DRO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 11:00	575053	EPA 3510C	1	12/21/2015 13:51	ARW	575182

CAS#	Parameter	Result	LOQ	Units
GCSV-00-4	Diesel Range Organics	0.157	0.125	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.05	.043	ug/L	86	56 - 125

EPA 8015C ORO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 11:00	575054	EPA 3510C	1	12/21/2015 13:51	ARW	575183

CAS#	Parameter	Result	LOQ	Units
GCSV-00-44	Oil Range Organics	0.214	0.125	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.05	.046	ug/L	92	56 - 125

Sample Results

TBB-1S

Collect Date	12/17/2015 15:45	**GCAL ID**	21512191902
Receive Date	12/18/2015 16:10	**Matrix**	Water

MADEP EPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 09:00	575052	MADEP EPH Revision 1.1	1	12/21/2015 23:21	DLB	575270

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	0.04	.019	ug/L	49	40 - 140

MADEP EPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 09:00	575052	MADEP EPH Revision 1.1	1	12/21/2015 14:59	DLB	575269

CAS#	Parameter	Result	LOQ	Units
GCSV-02-15	Aromatic >C10-C12	ND	0.100	mg/L
GCSV-02-16	Aromatic >C12-C16	ND	0.100	mg/L
GCSV-02-17	Aromatic >C16-C21	ND	0.150	mg/L
GCSV-05-18	Aromatic >C21-C35	ND	0.100	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.04	.036	ug/L	91	40 - 140
580-13-2	2-Bromonaphthalene	0.04	.049	ug/L	123	40 - 140
321-60-8	2-Fluorobiphenyl	0.04	.05	ug/L	125	40 - 140

EPA 6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 09:20	575075	EPA 3010A	50	12/23/2015 14:01	LWZ	575411

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	ND	0.050	mg/L
7440-39-3	Barium	17.5	0.050	mg/L
7440-43-9	Cadmium	ND	0.050	mg/L
7440-70-2	Calcium	1780	25.0	mg/L
7440-47-3	Chromium	ND	0.050	mg/L
7439-89-6	Iron	57.9	5.00	mg/L
7439-92-1	Lead	ND	0.050	mg/L
7439-96-5	Manganese	13.1	0.25	mg/L
7440-09-7	Potassium	15.8	5.00	mg/L

Sample Results

TBB-1S	**Collect Date**	12/17/2015 15:45	**GCAL ID**	21512191902
	Receive Date	12/18/2015 16:10	**Matrix**	Water

EPA 6020A (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 09:20	575075	EPA 3010A	50	12/23/2015 14:01	LWZ	575411

CAS#	Parameter	Result	LOQ	Units
7440-66-6	Zinc	ND	1.00	mg/L

EPA 6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 09:20	575075	EPA 3010A	1000	12/23/2015 13:58	LWZ	575411

CAS#	Parameter	Result	LOQ	Units
7439-95-4	Magnesium	1050	100	mg/L
7440-23-5	Sodium	5680	100	mg/L
7440-24-6	Strontium	25.8	1.00	mg/L

EPA 6020A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 17:15	575106	EPA 3005A Dissolved	50	12/23/2015 15:33	LWZ	575411

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	ND	0.050	mg/L
7440-39-3	Barium	15.7	0.050	mg/L
7440-43-9	Cadmium	ND	0.050	mg/L
7440-47-3	Chromium	ND	0.050	mg/L
7439-89-6	Iron	52.2	5.00	mg/L
7439-92-1	Lead	ND	0.050	mg/L
7439-96-5	Manganese	11.4	0.25	mg/L
7440-66-6	Zinc	ND	1.00	mg/L

EPA 6020A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 17:15	575106	EPA 3005A Dissolved	1000	12/23/2015 15:29	LWZ	575411

CAS#	Parameter	Result	LOQ	Units
7440-24-6	Strontium	23.7	1.00	mg/L

Sample Results

TBB-1S

Collect Date	12/17/2015 15:45	**GCAL ID**	21512191902
Receive Date	12/18/2015 16:10	**Matrix**	Water

EPA 7470A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 09:55	575077	EPA 7470A	1	12/21/2015 15:00	LWZ	575159

CAS#	Parameter	Result	LOQ	Units
7439-97-6	Mercury	ND	0.00020	mg/L

EPA 7470A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 09:55	575077	EPA 7470A Dissolved	1	12/21/2015 15:02	LWZ	575159

CAS#	Parameter	Result	LOQ	Units
7439-97-6	Mercury	ND	0.00020	mg/L

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	50	12/23/2015 12:44	DMT	575384

CAS#	Parameter	Result	LOQ	Units
24959-67-9	Bromide	23.9	10.0	mg/L
14808-79-8	Sulfate	ND	10.0	mg/L

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	5000	12/23/2015 14:28	DMT	575384

CAS#	Parameter	Result	LOQ	Units
16887-00-6	Chloride	16900	1000	mg/L

SM 2320 B-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/23/2015 10:24	DMT	575395

CAS#	Parameter	Result	LOQ	Units
T-005-B	Bicarbonate Alkalinity	316	1.0	mg/L CaCO3

Sample Results

TBB-1S

Collect Date	12/17/2015 15:45	**GCAL ID**	21512191902
Receive Date	12/18/2015 16:10	**Matrix**	Water

SM 2320 B-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/23/2015 10:24	DMT	575395

CAS#	Parameter	Result	LOQ	Units
T-005-C	Carbonate Alkalinity	ND	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	12/23/2015 10:58	WRW	575389

CAS#	Parameter	Result	LOQ	Units
WET-035	Total Dissolved Solids(TDS)	33100	10.0	mg/L

TBB-3S

Collect Date	12/18/2015 09:30	**GCAL ID**	21512191903
Receive Date	12/18/2015 16:10	**Matrix**	Water

EPA 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/24/2015 12:28	MMM	575466

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	.051	ug/L	102	78 - 130
1868-53-7	Dibromofluoromethane	0.05	.052	ug/L	105	77 - 127
2037-26-5	Toluene d8	0.05	.052	ug/L	104	76 - 134
17060-07-0	1,2-Dichloroethane-d4	0.05	.052	ug/L	104	71 - 127

EPA 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/21/2015 13:30	575048	EPA 3510C	1	12/21/2015 23:59	JMC2	575284

CAS#	Parameter	Result	LOQ	Units
120-82-1	1,2,4-Trichlorobenzene	ND	0.010	mg/L

Sample Results

TBB-3S	**Collect Date**	12/18/2015 09:30	**GCAL ID**	21512191903
	Receive Date	12/18/2015 16:10	**Matrix**	Water

EPA 8270C (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/21/2015 13:30	575048	EPA 3510C	1	12/21/2015 23:59	JMC2	575284

CAS#	Parameter	Result	LOQ	Units
95-50-1	1,2-Dichlorobenzene	ND	0.010	mg/L
122-66-7	1,2Diphenylhydrazine/Azobenzen	ND	0.010	mg/L
541-73-1	1,3-Dichlorobenzene	ND	0.010	mg/L
106-46-7	1,4-Dichlorobenzene	ND	0.010	mg/L
88-06-2	2,4,6-Trichlorophenol	ND	0.010	mg/L
120-83-2	2,4-Dichlorophenol	ND	0.010	mg/L
105-67-9	2,4-Dimethylphenol	ND	0.010	mg/L
51-28-5	2,4-Dinitrophenol	ND	0.010	mg/L
121-14-2	2,4-Dinitrotoluene	ND	0.010	mg/L
606-20-2	2,6-Dinitrotoluene	ND	0.010	mg/L
91-58-7	2-Chloronaphthalene	ND	0.010	mg/L
95-57-8	2-Chlorophenol	ND	0.010	mg/L
91-57-6	2-Methylnaphthalene	ND	0.010	mg/L
88-75-5	2-Nitrophenol	ND	0.010	mg/L
91-94-1	3,3'-Dichlorobenzidine	ND	0.010	mg/L
534-52-1	4,6-Dinitro-2-methylphenol	ND	0.010	mg/L
101-55-3	4-Bromophenyl phenyl ether	ND	0.010	mg/L
59-50-7	4-Chloro-3-methylphenol	ND	0.010	mg/L
7005-72-3	4-Chlorophenyl phenyl ether	ND	0.010	mg/L
100-02-7	4-Nitrophenol	ND	0.010	mg/L
83-32-9	Acenaphthene	ND	0.010	mg/L
208-96-8	Acenaphthylene	ND	0.010	mg/L
120-12-7	Anthracene	ND	0.010	mg/L
92-87-5	Benzidine	ND	0.050	mg/L
56-55-3	Benzo(a)anthracene	ND	0.010	mg/L
50-32-8	Benzo(a)pyrene	ND	0.010	mg/L
205-99-2	Benzo(b)fluoranthene	ND	0.010	mg/L
191-24-2	Benzo(g,h,i)perylene	ND	0.010	mg/L
207-08-9	Benzo(k)fluoranthene	ND	0.010	mg/L
111-91-1	Bis(2-Chloroethoxy)methane	ND	0.010	mg/L
111-44-4	Bis(2-Chloroethyl)ether	ND	0.010	mg/L
108-60-1	Bis(2-Chloroisopropyl)ether	ND	0.010	mg/L
117-81-7	Bis(2-Ethylhexyl)phthalate	ND	0.010	mg/L
85-68-7	Butyl benzyl phthalate	ND	0.010	mg/L
218-01-9	Chrysene	ND	0.010	mg/L
53-70-3	Dibenz(a,h)anthracene	ND	0.010	mg/L
84-66-2	Diethyl phthalate	ND	0.010	mg/L
131-11-3	Dimethyl phthalate	ND	0.010	mg/L
84-74-2	Di-n-butyl phthalate	ND	0.010	mg/L
117-84-0	Di-n-octyl phthalate	ND	0.010	mg/L
206-44-0	Fluoranthene	ND	0.010	mg/L
86-73-7	Fluorene	ND	0.010	mg/L
118-74-1	Hexachlorobenzene	ND	0.010	mg/L
87-68-3	Hexachlorobutadiene	ND	0.010	mg/L
77-47-4	Hexachlorocyclopentadiene	ND	0.010	mg/L
67-72-1	Hexachloroethane	ND	0.010	mg/L
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.010	mg/L
78-59-1	Isophorone	ND	0.010	mg/L

Sample Results

TBB-3S

Collect Date	12/18/2015 09:30	**GCAL ID**	21512191903
Receive Date	12/18/2015 16:10	**Matrix**	Water

EPA 8270C (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/21/2015 13:30	575048	EPA 3510C	1	12/21/2015 23:59	JMC2	575284

CAS#	Parameter	Result	LOQ	Units
91-20-3	Naphthalene	ND	0.010	mg/L
98-95-3	Nitrobenzene	ND	0.010	mg/L
62-75-9	n-Nitrosodimethylamine	ND	0.010	mg/L
621-64-7	n-Nitrosodi-n-propylamine	ND	0.010	mg/L
86-30-6	n-Nitrosodiphenylamine	ND	0.010	mg/L
87-86-5	Pentachlorophenol	ND	0.010	mg/L
85-01-8	Phenanthrene	ND	0.010	mg/L
108-95-2	Phenol	ND	0.010	mg/L
129-00-0	Pyrene	ND	0.010	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	0.05	.036	ug/L	71	44 - 120
321-60-8	2-Fluorobiphenyl	0.05	.032	ug/L	64	44 - 119
1718-51-0	Terphenyl-d14	0.05	.049	ug/L	98	50 - 134
4165-62-2	Phenol-d5	0.10	.033	ug/L	33	10 - 120
367-12-4	2-Fluorophenol	0.10	.045	ug/L	45	19 - 119
118-79-6	2,4,6-Tribromophenol	0.10	.067	ug/L	67	43 - 140

EPA 8015C GRO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/22/2015 14:07	JAR	575141

CAS#	Parameter	Result	LOQ	Units
8006-61-9	Gasoline Range Organics	ND	0.100	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
106-39-8	Bromochlorobenzene	0.03	.022	ug/L	74	49 - 136

Sample Results

TBB-3S	**Collect Date**	12/18/2015 09:30	**GCAL ID**	21512191903
	Receive Date	12/18/2015 16:10	**Matrix**	Water

MADEP VPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/22/2015 19:40	JAR	575224

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
GCSV-02-14	Aromatic >C8-C10	ND	0.030	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
GCV-00-7	2,5-Dibromotoluene (PID)	0.05	.047	ug/L	94	70 - 130
GCV-00-8	2,5-Dibromotoluene (FID)	0.05	.055	ug/L	109	70 - 130

EPA 8015C DRO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 11:00	575053	EPA 3510C	1	12/21/2015 14:03	ARW	575182

CAS#	Parameter	Result	LOQ	Units
GCSV-00-4	Diesel Range Organics	0.157	0.125	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.05	.047	ug/L	93	56 - 125

EPA 8015C ORO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 11:00	575054	EPA 3510C	1	12/21/2015 14:03	ARW	575183

CAS#	Parameter	Result	LOQ	Units
GCSV-00-44	Oil Range Organics	ND	0.125	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.05	.05	ug/L	100	56 - 125

Sample Results

TBB-3S	**Collect Date**	12/18/2015 09:30	**GCAL ID**	21512191903
	Receive Date	12/18/2015 16:10	**Matrix**	Water

MADEP EPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 09:00	575052	MADEP EPH Revision 1.1	1	12/21/2015 23:41	DLB	575270

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	0.04	.025	ug/L	63	40 - 140

MADEP EPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 09:00	575052	MADEP EPH Revision 1.1	1	12/21/2015 15:18	DLB	575269

CAS#	Parameter	Result	LOQ	Units
GCSV-02-15	Aromatic >C10-C12	ND	0.100	mg/L
GCSV-02-16	Aromatic >C12-C16	ND	0.100	mg/L
GCSV-02-17	Aromatic >C16-C21	ND	0.150	mg/L
GCSV-05-18	Aromatic >C21-C35	ND	0.100	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.04	.033	ug/L	82	40 - 140
580-13-2	2-Bromonaphthalene	0.04	.056	ug/L	139	40 - 140
321-60-8	2-Fluorobiphenyl	0.04	.057	ug/L	142*	40 - 140

EPA 6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 09:20	575075	EPA 3010A	5	12/23/2015 14:08	LWZ	575411

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	0.0087	0.0050	mg/L
7440-39-3	Barium	0.67	0.0050	mg/L
7440-43-9	Cadmium	ND	0.0050	mg/L
7440-70-2	Calcium	137	2.50	mg/L
7440-47-3	Chromium	ND	0.0050	mg/L
7439-89-6	Iron	5.61	0.50	mg/L
7439-92-1	Lead	ND	0.0050	mg/L
7439-95-4	Magnesium	45.3	0.50	mg/L
7439-96-5	Manganese	0.37	0.025	mg/L
7440-09-7	Potassium	3.74	0.50	mg/L

Sample Results

TBB-3S	**Collect Date**	12/18/2015 09:30	**GCAL ID**	21512191903
	Receive Date	12/18/2015 16:10	**Matrix**	Water

EPA 6020A (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 09:20	575075	EPA 3010A	5	12/23/2015 14:08	LWZ	575411

CAS#	Parameter	Result	LOQ	Units
7440-66-6	Zinc	ND	0.10	mg/L

EPA 6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 09:20	575075	EPA 3010A	100	12/23/2015 13:00	LWZ	575411

CAS#	Parameter	Result	LOQ	Units
7440-23-5	Sodium	648	10.0	mg/L
7440-24-6	Strontium	1.03	0.10	mg/L

EPA 6020A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 17:15	575106	EPA 3005A Dissolved	5	12/23/2015 15:43	LWZ	575411

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	0.0074	0.0050	mg/L
7440-39-3	Barium	0.62	0.0050	mg/L
7440-43-9	Cadmium	ND	0.0050	mg/L
7440-47-3	Chromium	ND	0.0050	mg/L
7439-89-6	Iron	3.22	0.50	mg/L
7439-92-1	Lead	ND	0.0050	mg/L
7439-96-5	Manganese	0.32	0.025	mg/L
7440-66-6	Zinc	ND	0.10	mg/L

EPA 6020A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 17:15	575106	EPA 3005A Dissolved	100	12/23/2015 15:40	LWZ	575411

CAS#	Parameter	Result	LOQ	Units
7440-24-6	Strontium	0.94	0.10	mg/L

Sample Results

TBB-3S

Collect Date	12/18/2015 09:30	**GCAL ID**	21512191903
Receive Date	12/18/2015 16:10	**Matrix**	Water

EPA 7470A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 09:55	575077	EPA 7470A	1	12/21/2015 15:04	LWZ	575159

CAS#	Parameter	Result	LOQ	Units
7439-97-6	Mercury	ND	0.00020	mg/L

EPA 7470A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/20/2015 09:55	575077	EPA 7470A Dissolved	1	12/21/2015 15:10	LWZ	575159

CAS#	Parameter	Result	LOQ	Units
7439-97-6	Mercury	ND	0.00020	mg/L

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	5	12/23/2015 13:18	DMT	575384

CAS#	Parameter	Result	LOQ	Units
24959-67-9	Bromide	3.77	1.00	mg/L
14808-79-8	Sulfate	1.63	1.00	mg/L

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	500	12/23/2015 13:36	DMT	575384

CAS#	Parameter	Result	LOQ	Units
16887-00-6	Chloride	1120	100	mg/L

SM 2320 B-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/23/2015 10:24	DMT	575395

CAS#	Parameter	Result	LOQ	Units
T-005-B	Bicarbonate Alkalinity	393	1.0	mg/L CaCO3

Sample Results

TBB-3S	**Collect Date**	12/18/2015 09:30	**GCAL ID**	21512191903
	Receive Date	12/18/2015 16:10	**Matrix**	Water

SM 2320 B-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/23/2015 10:24	DMT	575395

CAS#	Parameter	Result	LOQ	Units
T-005-C	Carbonate Alkalinity	ND	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	12/23/2015 10:58	WRW	575389

CAS#	Parameter	Result	LOQ	Units
WET-035	Total Dissolved Solids(TDS)	2010	10.0	mg/L

GC/MS Volatiles QC Summary

Analytical Batch 575466	Client ID	MB575466		LCS575466				LCSD575466				
	GCAL ID	1523525		1523526				1523527				
	Sample Type	MB		LCS				LCSD				
	Prep Date	NA		NA				NA				
	Analysis Date	12/24/2015 11:03		12/24/2015 08:55				12/24/2015 09:19				
	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	0.048	96	70 - 129	0.050	0.048	96	0	20
Ethylbenzene	100-41-4	ND	0.00500	0.050	0.049	98	74 - 126	0.050	0.048	96	2	30
Toluene	108-88-3	ND	0.00500	0.050	0.045	91	72 - 120	0.050	0.046	91	2	20
Xylene (total)	1330-20-7	ND	0.015	0.150	0.158	105	74 - 127	0.150	0.158	105	0	30
Surrogate												
1,2-Dichloroethane-d4	17060-07-0	.0522	104	.05	.0493	99	71 - 127	.05	.0492	98		NA
4-Bromofluorobenzene	460-00-4	.0504	101	.05	.0512	102	78 - 130	.05	.0504	101		NA
Dibromofluoromethane	1868-53-7	.0515	103	.05	.0492	98	77 - 127	.05	.0496	99		NA
Toluene d8	2037-26-5	.0518	104	.05	.0493	99	76 - 134	.05	.0499	100		NA

GC/MS Semi-Volatiles QC Summary

Analytical Batch	Client ID	MB575048	LCS575048	LCSD575048
575284	GCAL ID	1521751	1521752	1521753
Prep Batch	Sample Type	MB	LCS	LCSD
575048	Prep Date	12/21/2015 13:30	12/21/2015 13:30	12/21/2015 13:30
Prep Method	Analysis Date	12/21/2015 22:21	12/21/2015 22:38	12/21/2015 22:54
EPA 3510C	Matrix	Water	Water	Water

EPA 8270C		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
1,2,4-Trichlorobenzene	120-82-1	ND	0.010	0.050	0.035	70	29 - 116	0.050	0.037	75	6	30
1,2-Dichlorobenzene	95-50-1	ND	0.010	0.050	0.031	62	32 - 111	0.050	0.032	63	3	30
1,2Diphenylhydrazine/Azobenzen	122-66-7	ND	0.010	0.050	0.054	107	49 - 122	0.050	0.053	106	2	30
1,3-Dichlorobenzene	541-73-1	ND	0.010	0.050	0.028	56	28 - 110	0.050	0.030	60	7	30
1,4-Dichlorobenzene	106-46-7	ND	0.010	0.050	0.028	57	29 - 112	0.050	0.030	60	7	30
2,4,6-Trichlorophenol	88-06-2	ND	0.010	0.050	0.050	99	50 - 125	0.050	0.046	93	8	30
2,4-Dichlorophenol	120-83-2	ND	0.010	0.050	0.048	95	47 - 121	0.050	0.046	92	4	30
2,4-Dimethylphenol	105-67-9	ND	0.010	0.050	0.046	92	31 - 124	0.050	0.045	89	2	30
2,4-Dinitrophenol	51-28-5	ND	0.010	0.050	0.042	84	23 - 143	0.050	0.037	74	13	30
2,4-Dinitrotoluene	121-14-2	ND	0.010	0.050	0.045	89	57 - 128	0.050	0.042	84	7	30
2,6-Dinitrotoluene	606-20-2	ND	0.010	0.050	0.048	95	57 - 124	0.050	0.047	93	2	30
2-Chloronaphthalene	91-58-7	ND	0.010	0.050	0.046	92	40 - 116	0.050	0.044	89	4	30
2-Chlorophenol	95-57-8	ND	0.010	0.050	0.043	85	38 - 117	0.050	0.042	83	2	30
2-Methylnaphthalene	91-57-6	ND	0.010	0.050	0.041	82	40 - 121	0.050	0.043	86	5	30
2-Nitrophenol	88-75-5	ND	0.010	0.050	0.046	92	47 - 123	0.050	0.044	89	4	30
3,3'-Dichlorobenzidine	91-94-1	ND	0.010	0.050	0.052	104	27 - 129	0.050	0.050	100	4	30
4,6-Dinitro-2-methylphenol	534-52-1	ND	0.010	0.050	0.051	101	44 - 137	0.050	0.045	91	13	30
4-Bromophenyl phenyl ether	101-55-3	ND	0.010	0.050	0.050	100	55 - 124	0.050	0.050	99	0	30
4-Chloro-3-methylphenol	59-50-7	ND	0.010	0.050	0.045	89	52 - 119	0.050	0.043	86	5	30
4-Chlorophenyl phenyl ether	7005-72-3	ND	0.010	0.050	0.046	92	53 - 121	0.050	0.045	91	2	30
4-Nitrophenol	100-02-7	ND	0.010	0.050	0.026	51	10 - 120	0.050	0.023	47	12	30
Acenaphthene	83-32-9	ND	0.010	0.050	0.048	96	47 - 122	0.050	0.047	94	2	30
Acenaphthylene	208-96-8	ND	0.010	0.050	0.050	99	41 - 130	0.050	0.048	96	4	30
Anthracene	120-12-7	ND	0.010	0.050	0.052	104	57 - 123	0.050	0.052	104	0	30
Benzidine	92-87-5	ND	0.050	0.050	0.051	101	10 - 120	0.050	0.073	145*	35*	30
Benzo(a)anthracene	56-55-3	ND	0.010	0.050	0.050	100	58 - 125	0.050	0.049	98	2	30
Benzo(a)pyrene	50-32-8	ND	0.010	0.050	0.053	106	54 - 128	0.050	0.052	104	2	30
Benzo(b)fluoranthene	205-99-2	ND	0.010	0.050	0.049	98	53 - 131	0.050	0.047	94	4	30
Benzo(g,h,i)perylene	191-24-2	ND	0.010	0.050	0.053	105	50 - 134	0.050	0.051	102	4	30
Benzo(k)fluoranthene	207-08-9	ND	0.010	0.050	0.051	101	57 - 129	0.050	0.049	98	4	30
Bis(2-Chloroethoxy)methane	111-91-1	ND	0.010	0.050	0.048	97	48 - 120	0.050	0.048	96	0	30
Bis(2-Chloroethyl)ether	111-44-4	ND	0.010	0.050	0.046	92	43 - 118	0.050	0.044	89	4	30
Bis(2-Chloroisopropyl)ether	108-60-1	ND	0.010	0.050	0.044	88	37 - 130	0.050	0.044	88	0	30
Bis(2-Ethylhexyl)phthalate	117-81-7	ND	0.010	0.050	0.051	103	55 - 135	0.050	0.051	102	0	30
Butyl benzyl phthalate	85-68-7	ND	0.010	0.050	0.051	102	53 - 134	0.050	0.050	100	2	30
Chrysene	218-01-9	ND	0.010	0.050	0.049	99	59 - 123	0.050	0.049	98	0	30
Dibenz(a,h)anthracene	53-70-3	ND	0.010	0.050	0.054	107	51 - 134	0.050	0.052	103	4	30
Diethyl phthalate	84-66-2	ND	0.010	0.050	0.047	95	56 - 125	0.050	0.045	89	4	30
Dimethyl phthalate	131-11-3	ND	0.010	0.050	0.049	97	45 - 127	0.050	0.047	93	4	30
Di-n-butyl phthalate	84-74-2	ND	0.010	0.050	0.049	98	59 - 127	0.050	0.048	96	2	30
Di-n-octyl phthalate	117-84-0	ND	0.010	0.050	0.051	103	51 - 140	0.050	0.050	100	2	30
Fluoranthene	206-44-0	ND	0.010	0.050	0.046	92	57 - 128	0.050	0.045	90	2	30
Fluorene	86-73-7	ND	0.010	0.050	0.048	95	52 - 124	0.050	0.047	93	2	30
Hexachlorobenzene	118-74-1	ND	0.010	0.050	0.047	93	53 - 125	0.050	0.047	94	0	30
Hexachlorobutadiene	87-68-3	ND	0.010	0.050	0.030	59	22 - 124	0.050	0.032	65	6	30
Hexachlorocyclopentadiene	77-47-4	ND	0.010	0.050	0.036	72	16 - 120	0.050	0.036	73	0	30
Hexachloroethane	67-72-1	ND	0.010	0.050	0.026	52	21 - 115	0.050	0.029	57	11	30
Indeno(1,2,3-cd)pyrene	193-39-5	ND	0.010	0.050	0.055	111	52 - 134	0.050	0.053	107	4	30
Isophorone	78-59-1	ND	0.010	0.050	0.051	102	42 - 124	0.050	0.050	100	2	30
Naphthalene	91-20-3	ND	0.010	0.050	0.040	80	40 - 121	0.050	0.041	82	2	30
Nitrobenzene	98-95-3	ND	0.010	0.050	0.048	95	45 - 121	0.050	0.048	96	0	30
n-Nitrosodimethylamine	62-75-9	ND	0.010	0.050	0.030	59	12 - 120	0.050	0.030	60	0	30
n-Nitrosodi-n-propylamine	621-64-7	ND	0.010	0.050	0.048	96	49 - 119	0.050	0.047	93	2	30
n-Nitrosodiphenylamine	86-30-6	ND	0.010	0.050	0.050	101	51 - 123	0.050	0.051	101	2	30
Pentachlorophenol	87-86-5	ND	0.010	0.050	0.049	99	35 - 138	0.050	0.045	89	9	30
Phenanthrene	85-01-8	ND	0.010	0.050	0.049	98	59 - 120	0.050	0.049	97	0	30
Phenol	108-95-2	ND	0.010	0.050	0.021	43	16 - 120	0.050	0.020	41	5	30
Pyrene	129-00-0	ND	0.010	0.050	0.051	102	57 - 126	0.050	0.051	102	0	30

GC/MS Semi-Volatiles QC Summary

Analytical Batch	Client ID	MB575048		LCS575048				LCSD575048				
575284	GCAL ID	1521751		1521752				1521753				
Prep Batch	Sample Type	MB		LCS				LCSD				
575048	Prep Date	12/21/2015 13:30		12/21/2015 13:30				12/21/2015 13:30				
Prep Method	Analysis Date	12/21/2015 22:21		12/21/2015 22:38				12/21/2015 22:54				
EPA 3510C	Matrix	Water		Water				Water				
EPA 8270C		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Surrogate												
2,4,6-Tribromophenol	118-79-6	.0853	85	.1	.0882	88	43 - 140	.1	.0774	77		NA
2-Fluorobiphenyl	321-60-8	.0403	81	.05	.045	90	44 - 119	.05	.0428	86		NA
2-Fluorophenol	367-12-4	.0562	56	.1	.0542	54	19 - 119	.1	.0511	51		NA
Nitrobenzene-d5	4165-60-0	.0449	90	.05	.0445	89	44 - 120	.05	.0441	88		NA
Phenol-d5	4165-62-2	.0405	41	.1	.0392	39	10 - 120	.1	.0377	38		NA
Terphenyl-d14	1718-51-0	.0585	117	.05	.0523	105	50 - 134	.05	.0518	104		NA

GC Volatiles QC Summary

Analytical Batch 575141	Client ID	MB575141		LCS575141				LCSD575141				
	GCAL ID	1521966		1521967				1521968				
	Sample Type	MB		LCS				LCSD				
	Prep Date	NA		NA				NA				
	Analysis Date	12/22/2015 11:58		12/22/2015 11:32				12/22/2015 11:41				
	Matrix	Water		Water				Water				
EPA 8015C GRO		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Gasoline Range Organics	8006-61-9	ND	0.100	0.500	0.553	111	70 - 128	0.500	0.540	108	2	25
Surrogate												
Bromochlorobenzene	106-39-8	.0233	78	.03	.0291	97	49 - 136	.03	.0278	93		NA

Analytical Batch 575224	Client ID	MB575224		LCS575224				LCSD575224				
	GCAL ID	1522505		1522506				1522507				
	Sample Type	MB		LCS				LCSD				
	Prep Date	NA		NA				NA				
	Analysis Date	12/22/2015 12:42		12/22/2015 04:32				12/22/2015 11:49				
	Matrix	Water		Water				Water				
MADEP VPH Revision 1.1		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	0.116	116	60 - 140	0.100	0.106	106	9	30
Aliphatic C6-C8	GCSV-02-30	ND	0.030	0.150	0.170	113	60 - 140	0.150	0.147	98	15	30
Aromatic >C8-C10	GCSV-02-14	ND	0.030	0.150	0.157	105	60 - 140	0.150	0.146	97	7	30
Surrogate												
2,5-Dibromotoluene (FID)	GCV-00-8	.0574	115	.05	.0557	111	70 - 130	.05	.0511	102		NA
2,5-Dibromotoluene (PID)	GCV-00-7	.0496	99	.05	.0538	108	70 - 130	.05	.0463	93		NA

GC Semi-Volatiles QC Summary

Analytical Batch	Client ID	MB575053		LCS575053				LCSD575053				
575182	GCAL ID	1521766		1521767				1521768				
Prep Batch	Sample Type	MB		LCS				LCSD				
575053	Prep Date	12/20/2015 11:00		12/20/2015 11:00				12/20/2015 11:00				
Prep Method	Analysis Date	12/21/2015 12:01		12/21/2015 12:39				12/21/2015 12:53				
EPA 3510C	Matrix	Water		Water				Water				
EPA 8015C DRO		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Diesel Range Organics	GCSV-00-4	ND	0.125	1.00	0.828	83	47 - 120	1.00	0.877	88	6	30
Surrogate												
o-Terphenyl	84-15-1	.0451	90	.05	.0435	87	56 - 125	.05	.0458	92		NA

Analytical Batch	Client ID	MB575054		LCS575054				LCSD575054				
575183	GCAL ID	1521769		1521770				1521771				
Prep Batch	Sample Type	MB		LCS				LCSD				
575054	Prep Date	12/20/2015 11:00		12/20/2015 11:00				12/20/2015 11:00				
Prep Method	Analysis Date	12/21/2015 12:01		12/21/2015 13:08				12/21/2015 13:22				
EPA 3510C	Matrix	Water		Water				Water				
EPA 8015C ORO		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Oil Range Organics	GCSV-00-44	ND	0.125	2.00	1.65	83	41 - 113	2.00	1.71	86	4	40
Surrogate												
o-Terphenyl	84-15-1	.0485	97	.05	.05	100	56 - 125	.05	.047	94		NA

Analytical Batch	Client ID	MB575052		LCS575052				LCSD575052				
575270	GCAL ID	1521763		1521764				1521765				
Prep Batch	Sample Type	MB		LCS				LCSD				
575052	Prep Date	12/20/2015 09:00		12/20/2015 09:00				12/20/2015 09:00				
Prep Method	Analysis Date	12/21/2015 22:05		12/21/2015 22:24				12/21/2015 22:43				
MADEP EPH Revision 1.1	Matrix	Water		Water				Water				
MADEP EPH Revision 1.1		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	0.100	0.075	75	30 - 140	0.100	0.077	77	3	25
Aliphatic >C12-C16	GCSV-02-12	ND	0.100	0.100	0.085	85	40 - 140	0.100	0.073	73	15	25
Aliphatic >C16-C35	GCSV-02-31	ND	0.150	0.450	0.432	96	40 - 140	0.450	0.433	96	0	25
Surrogate												
1-Chlorooctadecane	3386-33-2	.0282	71	.04	.0208	52	40 - 140	.04	.0293	73		NA

Analytical Batch	Client ID	MB575052		LCS575052				LCSD575052				
575269	GCAL ID	1521763		1521764				1521765				
Prep Batch	Sample Type	MB		LCS				LCSD				
575052	Prep Date	12/20/2015 09:00		12/20/2015 09:00				12/20/2015 09:00				
Prep Method	Analysis Date	12/21/2015 13:42		12/21/2015 14:01				12/21/2015 14:21				
MADEP EPH Revision 1.1	Matrix	Water		Water				Water				
MADEP EPH Revision 1.1		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Aromatic >C10-C12	GCSV-02-15	ND	0.100	0.050	0.039	78	30 - 140	0.050	0.043	85	10	25
Aromatic >C12-C16	GCSV-02-16	ND	0.100	0.200	0.166	83	40 - 140	0.200	0.177	89	6	25
Aromatic >C16-C21	GCSV-02-17	ND	0.150	0.100	0.091	91	40 - 140	0.100	0.092	92	1	25
Aromatic >C21-C35	GCSV-05-18	ND	0.100	0.500	0.407	81	40 - 140	0.500	0.382	76	6	25
Surrogate												
2-Bromonaphthalene	580-13-2	.0432	108	.04	.0398	100	40 - 140	.04	.0432	108		NA
2-Fluorobiphenyl	321-60-8	.0439	110	.04	.0389	97	40 - 140	.04	.0429	107		NA
o-Terphenyl	84-15-1	.0371	93	.04	.0344	86	40 - 140	.04	.036	90		NA

Inorganics QC Summary

Analytical Batch	Client ID	MB575077		LCS575077			
575159	GCAL ID	1521832		1521833			
Prep Batch	Sample Type	MB		LCS			
575077	Prep Date	12/20/2015 09:55		12/20/2015 09:55			
Prep Method	Analysis Date	12/21/2015 14:21		12/21/2015 14:23			
EPA 7470A	Matrix	Water		Water			
EPA 7470A		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Mercury	7439-97-6	ND	0.00020	0.0050	0.0043	86	80 - 120

Analytical Batch	Client ID	MGT-SW-UP		MGT-SW-UP MS				MGT-SW-UP MSD				
575159	GCAL ID	21512183488		21512183489				21512183490				
Prep Batch	Sample Type	SAMPLE		MS				MSD				
575077	Prep Date	12/20/2015 09:55		12/20/2015 09:55				12/20/2015 09:55				
Prep Method	Analysis Date	12/21/2015 14:50		12/21/2015 14:52				12/21/2015 14:54				
EPA 7470A	Matrix	Water		Water				Water				
EPA 7470A		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Mercury	7439-97-6	0.0	0.00020	0.0050	0.0045	89	80 - 120	0.0050	0.0042	84	7	20

Analytical Batch	Client ID	MB575077		LCS575077			
575159	GCAL ID	1521832		1521833			
Prep Batch	Sample Type	MB		LCS			
575077	Prep Date	12/20/2015 09:55		12/20/2015 09:55			
Prep Method	Analysis Date	12/21/2015 14:21		12/21/2015 14:23			
EPA 7470A	Matrix	Water		Water			
EPA 7470A Dissolved		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Mercury	7439-97-6	ND	0.00020	0.0050	0.0043	86	80 - 120

Analytical Batch	Client ID	MGT-SW-UP		MGT-SW-UP MS				MGT-SW-UP MSD				
575159	GCAL ID	21512183488		21512183489				21512183490				
Prep Batch	Sample Type	SAMPLE		MS				MSD				
575077	Prep Date	12/20/2015 09:55		12/20/2015 09:55				12/20/2015 09:55				
Prep Method	Analysis Date	12/21/2015 14:50		12/21/2015 14:52				12/21/2015 14:54				
EPA 7470A	Matrix	Water		Water				Water				
EPA 7470A Dissolved		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Mercury	7439-97-6	0.0	0.00020	0.0050	0.0045	89	80 - 120	0.0050	0.0042	84	7	20

Analytical Batch	Client ID	MB575075		LCS575075			
575411	GCAL ID	1521828		1521829			
Prep Batch	Sample Type	MB		LCS			
575075	Prep Date	12/20/2015 09:20		12/20/2015 09:20			
Prep Method	Analysis Date	12/23/2015 12:46		12/23/2015 12:50			
EPA 3010A	Matrix	Water		Water			
EPA 6020A		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Arsenic	7440-38-2	ND	0.0010	0.050	0.047	94	80 - 120
Barium	7440-39-3	ND	0.0010	0.050	0.050	100	80 - 120
Cadmium	7440-43-9	ND	0.0010	0.050	0.048	97	80 - 120
Calcium	7440-70-2	ND	0.50	25.0	25.0	100	80 - 120
Chromium	7440-47-3	ND	0.0010	0.050	0.050	100	80 - 120
Iron	7439-89-6	ND	0.10	5.00	5.04	101	80 - 120
Lead	7439-92-1	ND	0.0010	0.050	0.050	100	80 - 120
Magnesium	7439-95-4	ND	0.10	5.00	5.13	103	80 - 120
Manganese	7439-96-5	ND	0.0050	0.050	0.049	97	80 - 120
Potassium	7440-09-7	ND	0.10	5.00	5.04	101	80 - 120
Sodium	7440-23-5	ND	0.10	5.00	5.08	102	80 - 120
Strontium	7440-24-6	ND	0.0010	0.050	0.050	101	80 - 120
Zinc	7440-66-6	ND	0.020	1.00	0.93	93	80 - 120

Inorganics QC Summary

Analytical Batch	Client ID	MB575106	LCS575106
575411	GCAL ID	1521870	1521871
Prep Batch	Sample Type	MB	LCS
575106	Prep Date	12/20/2015 17:15	12/20/2015 17:15
Prep Method	Analysis Date	12/23/2015 14:25	12/23/2015 14:28
EPA 3005A Dissolved	Matrix	Water	Water

EPA 6020A Dissolved		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Arsenic	7440-38-2	ND	0.0010	0.050	0.048	96	80 - 120
Barium	7440-39-3	ND	0.0010	0.050	0.049	98	80 - 120
Cadmium	7440-43-9	ND	0.0010	0.050	0.049	99	80 - 120
Chromium	7440-47-3	ND	0.0010	0.050	0.047	95	80 - 120
Iron	7439-89-6	ND	0.10	5.00	4.81	96	80 - 120
Lead	7439-92-1	ND	0.0010	0.050	0.049	98	80 - 120
Manganese	7439-96-5	ND	0.0050	0.050	0.047	94	80 - 120
Strontium	7440-24-6	ND	0.0010	0.050	0.048	96	80 - 120
Zinc	7440-66-6	ND	0.020	1.00	0.97	97	80 - 120

Analytical Batch	Client ID	TBB-1D	1521729MS	1521729MSD
575411	GCAL ID	21512191901	1521872	1521873
Prep Batch	Sample Type	SAMPLE	MS	MSD
575106	Prep Date	12/20/2015 17:15	12/20/2015 17:15	12/20/2015 17:15
Prep Method	Analysis Date	12/23/2015 14:52	12/23/2015 14:59	12/23/2015 15:06
EPA 3005A Dissolved	Matrix	Water	Water	Water

EPA 6020A Dissolved		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Arsenic	7440-38-2	0.0040	0.0050	0.050	0.050	92	80 - 120	0.050	0.052	96	4	20
Barium	7440-39-3	0.89	0.0050	0.050	0.93	95	80 - 120	0.050	0.94	101	1	20
Cadmium	7440-43-9	0.0	0.0050	0.050	0.050	100	80 - 120	0.050	0.050	100	0	20
Chromium	7440-47-3	0.0017	0.0050	0.050	0.045	87	80 - 120	0.050	0.044	84	2	20
Iron	7439-89-6	3.05	0.50	5.00	9.17	123*	80 - 120	5.00	8.14	102	12	20
Lead	7439-92-1	0.0095	0.0050	0.050	0.060	100	80 - 120	0.050	0.060	101	0	20
Manganese	7439-96-5	0.55	0.025	0.050	0.60	117	80 - 120	0.050	0.59	95	2	20
Zinc	7440-66-6	0.0	0.10	1.00	0.96	96	80 - 120	1.00	0.97	97	1	20

Analytical Batch	Client ID	TBB-1D	1521729MS	1521729MSD
575411	GCAL ID	21512191901	1521872	1521873
Prep Batch	Sample Type	SAMPLE	MS	MSD
575106	Prep Date	12/20/2015 17:15	12/20/2015 17:15	12/20/2015 17:15
Prep Method	Analysis Date	12/23/2015 14:38	12/23/2015 14:42	12/23/2015 14:45
EPA 3005A Dissolved	Matrix	Water	Water	Water

EPA 6020A Dissolved		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Strontium	7440-24-6	1.16	0.10	0.050	1.19	66*	80 - 120	0.050	1.20	76*	1	20

General Chemistry QC Summary

Analytical Batch 575384	Client ID	MB575384		LCS575384				LCSD575384				
	GCAL ID	1523116		1523117				1523341				
	Sample Type	MB		LCS				LCSD				
	Prep Date	NA		NA				NA				
	Analysis Date	12/23/2015 08:13		12/22/2015 23:51				12/23/2015 14:45				
	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	2.44	98	80 - 120	2.50	2.37	95	3	15
Chloride	16887-00-6	ND	0.200	2.50	2.57	103	80 - 120	2.50	2.58	103	0	15
Sulfate	14808-79-8	ND	0.200	2.50	2.46	98	80 - 120	2.50	2.49	100	1	15

Analytical Batch 575389	Client ID	MB575389		LCS575389			
	GCAL ID	1523137		1523138			
	Sample Type	MB		LCS			
	Prep Date	NA		NA			
	Analysis Date	12/23/2015 10:58		12/23/2015 10:58			
	Matrix	Water		Water			
SM 2540 C-2011		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Total Dissolved Solids(TDS)	WET-035	ND	10.0	1000	900	90	80 - 120

Analytical Batch 575389	Client ID	TK-470		1522801DUP		
	GCAL ID	21512226001		1523139		
	Sample Type	SAMPLE		DUP		
	Prep Date	NA		NA		
	Analysis Date	12/23/2015 10:58		12/23/2015 10:58		
	Matrix	Water		Water		
SM 2540 C-2011		Units Result	mg/L LOQ	Result	RPD	RPD Limit
Total Dissolved Solids(TDS)	WET-035	232	10.0	231	0	5.4

CHAIN OF CUSTODY RECORD

GCAL ANALYTICAL LABORATORIES, LLC
7979 Innovation Park Dr., Baton Rouge, LA 70820-7402
Phone: 225.769.4900 • Fax: 225.767.5717 • www.gcal.com

Client ID: 4271 - Michael Pisani & Associates
SDG: 215121919
PM: RKW

Report to:	**Bill to:**
Client: Michael Pisani & Associates	Client:
Address: 1160 Poydras Suite 1430	Address: SAME
Contact: Lance Cooper	Contact:
Phone: 504.582.2476	Phone:
E-mail: lcooper@mpisani.com	E-mail:

P.O. Number: 07-47
Project Name/Number: EWL- GW Sampling (Oversight)
Sampled By: Lance Cooper / Rall

GCAL use only:
Custody Seal used ☐ yes ☐ no
intact ☐ yes ☐ no
Temperature °C 8-6 E26 9-9 on ice

☑ Dissolved Analysis Requested
☑ Field filtered
☐ Lab filtered

Matrix[1]	Date	Time (2400)	Comp	Grab	Sample Description	No Containers	Total Metals	Dissolved metals (Field Filtered)	Bromide / TDS / Chloride	Sodium / Calcium / Magnesium / Potassium	Sulfate / Alkalinity / Carb & Bicarb	TPH fraction (EPH/VPH) mass, method	BTEX	TPH (D·G·O) 8015	Semivolatiles (8270)		Preservative
W	12/17/15	1345		✓	TBB-1D	12	X	X	X	X	X	X	X	X			1
W	12/17/15	1545		✓	TBB-1S	12	X	X	X	X	X	X	X	X			2
W	12/18/15	0930		✓	TBB-3S	13	X	X	X	X	X	X	X	X	X		3

Air Bill No:

Turn Around Time (Business Days): ☐ 24h* ☐ 48h* ☐ 3 days* ☐ 1 week* ☐ Standard (Per Contract/Quote)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
	12/18/15	1610		12-18-15	1610
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Note: metals: As, Ba, Cd, Cr, Fe, Mn, Pb, Sr, Zn Hg)
Turnaround: See Randy Whittington

By submitting these samples, you agree to GCAL's terms and conditions contained in our most recent schedule of services.

Matrix[1]: 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 PM.

WHITE: CLIENT FINAL REPORT - CANARY: CLIENT

GCAL ANALYTICAL LABORATORIES, LLC

SAMPLE RECEIVING CHECKLIST

215121919

SAMPLE DELIVERY GROUP 215121919

Client PM RKW 4271 - Michael Pisani & Associates	**Transport Method** CUST
Profile Number 174115	**Received By** Lofton, Katie E.
Line Item(s) 3 - Surface Water	**Receive Date(s)** 12/18/15

CHECKLIST	YES	NO	NA
Were all samples received using proper thermal preservation?	☑	☐	☐
When used, were all custody seals intact?	☐	☐	☑
Were all samples received in proper containers?	☑	☐	☐
Were all samples received using proper chemical preservation?	☑	☐	☐
Was preservative added to any container at the lab?	☐	☑	☐
Were all containers received in good condition?	☑	☐	☐
Were all VOC water samples received without head space?	☑	☐	☐
Do all sample labels match the Chain of Custody?	☑	☐	☐
Did the Chain of Custody list the sampling technician?	☑	☐	☐
Was the COC maintained i.e. all signatures, dates and time of receipt included?	☑	☐	☐

COOLERS

Airbill	Thermometer ID: E26	Temp(°C)
		8.6
		4.9

DISCREPANCIES

21512191901 - TBB-1D:
Sample temp > 6C, on ice

LAB PRESERVATIONS

None

NOTES

Revision 1.4

NELAP CERTIFICATE NUMBER: 01955
DOD ELAP CERTIFICATE NUMBER: L14-243

ANALYTICAL RESULTS

PERFORMED BY

GCAL, LLC
7979 Innovation Park Dr.
Baton Rouge, LA 70820

Report Date 12/28/2015

GCAL Report 215121807

Project 07-47 East White Lake

Deliver To	***Additional Recipients***
Dave Angle Michael Pisani and Associates 13313 Southwest Freeway Suite 221 Sugar Land, TX 77478 281-242-5700	Jonathan Miller, Michael Pisani & Associates Lance Cooper, Michael Pisani & Associates

PJLA Testing DoD ELAP

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 GCAL'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
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
DL	Diluted analysis – when appended to Client Sample ID
LOD	Limit of Detection
LOQ	Limit of Quantitation
RE	Re-analysis
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	The result is estimated because it exceeded the instrument calibration range
E	Metals - % diference for the serial dilution is > 10%

Sample receipt at GCAL 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 GCAL. 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 standard 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
GCAL Report 215121807

Certifications

10/02/2015

Certification	Certification Number
DOD ELAP	L14-243
Alabama	01955
Arizona	AZ0718
Arkansas	12-060-0
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
USDA Soil Permit	P330-10-00117

Case Narrative

Client: Michael Pisani & Associates **Report:** 215121807

Gulf Coast Analytical Laboratories 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 analysis, sample 21512180703 (TBB-3D) had to be diluted to bracket the concentration of a target analyte within the calibration range of the instrument.

In the EPA 8270C analysis, the recoveries for all surrogates are below the lower control limits for sample 21512180704 (TBB-3D Purge Water @ 5 GAL). No sample volume was available to re-extract and re-analyze the sample. The extractions analyst recorded the sample had high solids content that causing interference in the extraction process.

In the EPA 8270C analysis for prep batch 574938, the LCS/LCSD exhibited recoveries above the established control limits for Benzidine. The LCS/LCSD RPD is above the control limit for Benzidine. This analyte was not detected in the associated samples.

VOLATILES GAS CHROMATOGRAPHY

In the MADEP VPH Revision 1.1 analysis, sample 21512180703 (TBB-3D) had to be diluted to bracket the concentration of a target range within the calibration range of the instrument.

SEMI-VOLATILES GAS CHROMATOGRAPHY

In the EPA 8015C DRO and ORO analyses, sample 21512180703 (TBB-3D) had to be diluted to bracket the DRO concentration within the calibration range of the instrument.

METALS

In the EPA 6020A analysis, a chemical or physical interference necessitated a dilution for sample 21512180701 (TBB-2M). This is reflected in the elevated detection limits that may exceed the regulatory limits.

In the EPA 6020A analysis, samples 21512180702 (TBB-2D), 21512180703 (TBB-3D) and 21512180705 (MC-1) were analyzed at a dilution. The reporting limits are at or below the regulatory limits at this dilution.

CONVENTIONALS

In the EPA 9056A analysis, all samples had to be diluted in order to bracket the concentration of target analytes within the calibration range of the instrument.

MISCELLANEOUS

N-nitrosodiphenylamine decomposes in the GC inlet and cannot be separated from Diphenylamine. The laboratory uses N-nitrosodiphenylamine as the calibration and QC standard.

Sample Summary

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21512180701	TBB-2M	Water	12/14/2015 12:30	12/17/2015 15:45
21512180702	TBB-2D	Water	12/15/2015 11:00	12/17/2015 15:45
21512180703	TBB-3D	Water	12/15/2015 11:30	12/17/2015 15:45
21512180704	TBB-3D Purge Water @ 5 GAL	Water	12/15/2015 12:10	12/17/2015 15:45
21512180705	MC-1	Water	12/16/2015 11:30	12/17/2015 15:45

Sample Results

TBB-2M	**Collect Date**	12/14/2015 12:30	**GCAL ID**	21512180701
	Receive Date	12/17/2015 15:45	**Matrix**	Water

EPA 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/21/2015 21:15	CJR	575233

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	.049	ug/L	98	78 - 130
1868-53-7	Dibromofluoromethane	0.05	.05	ug/L	100	77 - 127
2037-26-5	Toluene d8	0.05	.053	ug/L	105	76 - 134
17060-07-0	1,2-Dichloroethane-d4	0.05	.05	ug/L	99	71 - 127

EPA 8015C GRO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/22/2015 12:11	JAR	575141

CAS#	Parameter	Result	LOQ	Units
8006-61-9	Gasoline Range Organics	ND	0.100	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
106-39-8	Bromochlorobenzene	0.03	.024	ug/L	78	49 - 136

MADEP VPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/22/2015 13:09	JAR	575224

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

Sample Results

TBB-2M

Collect Date	12/14/2015 12:30	**GCAL ID**	21512180701
Receive Date	12/17/2015 15:45	**Matrix**	Water

MADEP VPH Revision 1.1 (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/22/2015 13:09	JAR	575224

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
GCV-00-7	2,5-Dibromotoluene (PID)	0.05	.043	ug/L	87	70 - 130
GCV-00-8	2,5-Dibromotoluene (FID)	0.05	.05	ug/L	100	70 - 130

EPA 8015C DRO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 09:30	574951	EPA 3510C	1	12/19/2015 18:16	SDD	575073

CAS#	Parameter	Result	LOQ	Units
GCSV-00-4	Diesel Range Organics	0.236	0.125	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.05	.043	ug/L	85	56 - 125

EPA 8015C ORO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 09:30	574952	EPA 3510C	1	12/19/2015 18:16	SDD	575074

CAS#	Parameter	Result	LOQ	Units
GCSV-00-44	Oil Range Organics	ND	0.125	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.05	.046	ug/L	92	56 - 125

MADEP EPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 07:00	574953	MADEP EPH Revision 1.1	1	12/23/2015 11:56	DLB	575405

CAS#	Parameter	Result	LOQ	Units
GCSV-02-11	Aliphatic >C10-C12	ND	0.100	mg/L

Sample Results

TBB-2M

Collect Date	12/14/2015 12:30	**GCAL ID**	21512180701
Receive Date	12/17/2015 15:45	**Matrix**	Water

MADEP EPH Revision 1.1 (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 07:00	574953	MADEP EPH Revision 1.1 (Continued)	1	12/23/2015 11:56	DLB	575405

CAS#	Parameter	Result	LOQ	Units
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	0.04	.031	ug/L	76	40 - 140

MADEP EPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 07:00	574953	MADEP EPH Revision 1.1	1	12/22/2015 11:02	DLB	575394

CAS#	Parameter	Result	LOQ	Units
GCSV-02-15	Aromatic >C10-C12	ND	0.100	mg/L
GCSV-02-16	Aromatic >C12-C16	ND	0.100	mg/L
GCSV-02-17	Aromatic >C16-C21	ND	0.150	mg/L
GCSV-05-18	Aromatic >C21-C35	ND	0.100	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.04	.026	ug/L	64	40 - 140
580-13-2	2-Bromonaphthalene	0.04	.042	ug/L	104	40 - 140
321-60-8	2-Fluorobiphenyl	0.04	.042	ug/L	106	40 - 140

EPA 6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 09:55	575010	EPA 3010A	20	12/22/2015 12:14	AWG	575265

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	ND	0.020	mg/L
7440-43-9	Cadmium	ND	0.020	mg/L
7440-70-2	Calcium	574	10.0	mg/L
7440-47-3	Chromium	ND	0.020	mg/L
7439-89-6	Iron	15.8	2.00	mg/L
7439-92-1	Lead	ND	0.020	mg/L
7440-09-7	Potassium	8.71	2.00	mg/L
7440-66-6	Zinc	ND	0.40	mg/L

Sample Results

TBB-2M

Collect Date	12/14/2015 12:30	**GCAL ID**	21512180701
Receive Date	12/17/2015 15:45	**Matrix**	Water

EPA 6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 09:55	575010	EPA 3010A	500	12/22/2015 12:09	AWG	575265

CAS#	Parameter	Result	LOQ	Units
7440-39-3	Barium	6.1	0.50	mg/L
7439-95-4	Magnesium	316	50.0	mg/L
7439-96-5	Manganese	4.1	2.5	mg/L
7440-23-5	Sodium	2190	50.0	mg/L
7440-24-6	Strontium	5.82	0.50	mg/L

EPA 6020A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/18/2015 16:00	574994	EPA 3005A Dissolved	100	12/21/2015 22:57	AWG	575258

CAS#	Parameter	Result	LOQ	Units
7440-39-3	Barium	5.81	0.10	mg/L
7439-89-6	Iron	13.2	10.0	mg/L
7439-96-5	Manganese	3.60	0.50	mg/L
7440-24-6	Strontium	5.47	0.10	mg/L

EPA 6020A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/18/2015 16:00	574994	EPA 3005A Dissolved	20	12/22/2015 11:27	AWG	575265

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	ND	0.020	mg/L
7440-43-9	Cadmium	ND	0.020	mg/L
7440-47-3	Chromium	ND	0.020	mg/L
7439-92-1	Lead	ND	0.020	mg/L
7440-66-6	Zinc	ND	0.40	mg/L

EPA 7470A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 13:55	575012	EPA 7470A	1	12/21/2015 17:13	LWZ	575192

CAS#	Parameter	Result	LOQ	Units
7439-97-6	Mercury	ND	0.00020	mg/L

Sample Results

TBB-2M

Collect Date	12/14/2015 12:30	**GCAL ID**	21512180701
Receive Date	12/17/2015 15:45	**Matrix**	Water

EPA 7470A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 10:40	575013	EPA 7470A Dissolved	1	12/19/2015 15:27	LWZ	575023

CAS#	Parameter	Result	LOQ	Units
7439-97-6	Mercury	ND	0.00020	mg/L

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	2000	12/21/2015 10:21	JEM	575131

CAS#	Parameter	Result	LOQ	Units
16887-00-6	Chloride	4820	400	mg/L

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	50	12/21/2015 19:48	SMR	575131

CAS#	Parameter	Result	LOQ	Units
24959-67-9	Bromide	ND	10.0	mg/L
14808-79-8	Sulfate	ND	10.0	mg/L

SM 2320 B-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/22/2015 12:34	DMT	575286

CAS#	Parameter	Result	LOQ	Units
T-005-B	Bicarbonate Alkalinity	416	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	12/22/2015 12:34	DMT	575286

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

Sample Results

TBB-2M

Collect Date	12/14/2015 12:30	**GCAL ID**	21512180701
Receive Date	12/17/2015 15:45	**Matrix**	Water

SM 2540 C-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/18/2015 13:22	WRW	574977

CAS#	Parameter	Result	LOQ	Units
WET-035	Total Dissolved Solids(TDS)	7160	10.0	mg/L

TBB-2D

Collect Date	12/15/2015 11:00	**GCAL ID**	21512180702
Receive Date	12/17/2015 15:45	**Matrix**	Water

EPA 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/21/2015 21:38	CJR	575233

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	.049	ug/L	98	78 - 130
1868-53-7	Dibromofluoromethane	0.05	.05	ug/L	101	77 - 127
2037-26-5	Toluene d8	0.05	.052	ug/L	103	76 - 134
17060-07-0	1,2-Dichloroethane-d4	0.05	.048	ug/L	95	71 - 127

EPA 8015C GRO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/22/2015 12:23	JAR	575141

CAS#	Parameter	Result	LOQ	Units
8006-61-9	Gasoline Range Organics	ND	0.100	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
106-39-8	Bromochlorobenzene	0.03	.024	ug/L	79	49 - 136

Sample Results

TBB-2D	**Collect Date**	12/15/2015 11:00	**GCAL ID**	21512180702
	Receive Date	12/17/2015 15:45	**Matrix**	Water

MADEP VPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/22/2015 13:34	JAR	575224

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
GCSV-02-14	Aromatic >C8-C10	ND	0.030	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
GCV-00-7	2,5-Dibromotoluene (PID)	0.05	.048	ug/L	95	70 - 130
GCV-00-8	2,5-Dibromotoluene (FID)	0.05	.052	ug/L	104	70 - 130

EPA 8015C DRO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 09:30	574951	EPA 3510C	1	12/19/2015 18:30	SDD	575073

CAS#	Parameter	Result	LOQ	Units
GCSV-00-4	Diesel Range Organics	0.130	0.125	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.05	.035	ug/L	69	56 - 125

EPA 8015C ORO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 09:30	574952	EPA 3510C	1	12/19/2015 18:30	SDD	575074

CAS#	Parameter	Result	LOQ	Units
GCSV-00-44	Oil Range Organics	ND	0.125	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.05	.037	ug/L	74	56 - 125

Sample Results

TBB-2D

Collect Date	12/15/2015 11:00	**GCAL ID**	21512180702
Receive Date	12/17/2015 15:45	**Matrix**	Water

MADEP EPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 07:00	574953	MADEP EPH Revision 1.1	1	12/21/2015 11:27	DLB	575270

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	0.04	.031	ug/L	77	40 - 140

MADEP EPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 07:00	574953	MADEP EPH Revision 1.1	1	12/22/2015 11:23	DLB	575394

CAS#	Parameter	Result	LOQ	Units
GCSV-02-15	Aromatic >C10-C12	ND	0.100	mg/L
GCSV-02-16	Aromatic >C12-C16	ND	0.100	mg/L
GCSV-02-17	Aromatic >C16-C21	ND	0.150	mg/L
GCSV-05-18	Aromatic >C21-C35	ND	0.100	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.04	.029	ug/L	73	40 - 140
580-13-2	2-Bromonaphthalene	0.04	.038	ug/L	95	40 - 140
321-60-8	2-Fluorobiphenyl	0.04	.039	ug/L	99	40 - 140

EPA 6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 09:55	575010	EPA 3010A	100	12/21/2015 23:34	AWG	575258

CAS#	Parameter	Result	LOQ	Units
7440-39-3	Barium	1.33	0.10	mg/L
7440-70-2	Calcium	162	50.0	mg/L
7439-89-6	Iron	19.9	10.0	mg/L
7439-95-4	Magnesium	67.1	10.0	mg/L
7439-96-5	Manganese	1.13	0.50	mg/L
7440-23-5	Sodium	661	10.0	mg/L
7440-24-6	Strontium	1.51	0.10	mg/L

Sample Results

TBB-2D

Collect Date	12/15/2015 11:00	**GCAL ID**	21512180702
Receive Date	12/17/2015 15:45	**Matrix**	Water

EPA 6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 09:55	575010	EPA 3010A	5	12/22/2015 12:25	AWG	575265

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	0.0062	0.0050	mg/L
7440-43-9	Cadmium	ND	0.0050	mg/L
7440-47-3	Chromium	0.012	0.0050	mg/L
7439-92-1	Lead	0.012	0.0050	mg/L
7440-09-7	Potassium	7.00	0.50	mg/L
7440-66-6	Zinc	ND	0.10	mg/L

EPA 6020A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/18/2015 16:00	574994	EPA 3005A Dissolved	100	12/21/2015 23:02	AWG	575258

CAS#	Parameter	Result	LOQ	Units
7440-39-3	Barium	1.06	0.10	mg/L
7439-96-5	Manganese	0.72	0.50	mg/L
7440-24-6	Strontium	1.35	0.10	mg/L

EPA 6020A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/18/2015 16:00	574994	EPA 3005A Dissolved	5	12/22/2015 11:37	AWG	575265

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	ND	0.0050	mg/L
7440-43-9	Cadmium	ND	0.0050	mg/L
7440-47-3	Chromium	ND	0.0050	mg/L
7439-89-6	Iron	4.37	0.50	mg/L
7439-92-1	Lead	ND	0.0050	mg/L
7440-66-6	Zinc	ND	0.10	mg/L

EPA 7470A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 13:55	575012	EPA 7470A	1	12/21/2015 17:15	LWZ	575192

CAS#	Parameter	Result	LOQ	Units
7439-97-6	Mercury	ND	0.00020	mg/L

Sample Results

TBB-2D

Collect Date	12/15/2015 11:00	**GCAL ID**	21512180702
Receive Date	12/17/2015 15:45	**Matrix**	Water

EPA 7470A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 10:40	575013	EPA 7470A Dissolved	1	12/19/2015 15:30	LWZ	575023

CAS#	Parameter	Result	LOQ	Units
7439-97-6	Mercury	ND	0.00020	mg/L

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	500	12/21/2015 11:48	JEM	575131

CAS#	Parameter	Result	LOQ	Units
16887-00-6	Chloride	1020	100	mg/L

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	5	12/21/2015 20:40	SMR	575131

CAS#	Parameter	Result	LOQ	Units
24959-67-9	Bromide	1.54	1.00	mg/L
14808-79-8	Sulfate	45.2	1.00	mg/L

SM 2320 B-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/22/2015 12:34	DMT	575286

CAS#	Parameter	Result	LOQ	Units
T-005-B	Bicarbonate Alkalinity	345	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	12/22/2015 12:34	DMT	575286

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

Sample Results

TBB-2D

Collect Date	12/15/2015 11:00	**GCAL ID**	21512180702
Receive Date	12/17/2015 15:45	**Matrix**	Water

SM 2540 C-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/18/2015 13:22	WRW	574977

CAS#	Parameter	Result	LOQ	Units
WET-035	Total Dissolved Solids(TDS)	1910	10.0	mg/L

TBB-3D

Collect Date	12/15/2015 11:30	**GCAL ID**	21512180703
Receive Date	12/17/2015 15:45	**Matrix**	Water

EPA 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/21/2015 22:00	CJR	575233

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	.051	ug/L	103	78 - 130
1868-53-7	Dibromofluoromethane	0.05	.05	ug/L	100	77 - 127
2037-26-5	Toluene d8	0.05	.051	ug/L	102	76 - 134
17060-07-0	1,2-Dichloroethane-d4	0.05	.049	ug/L	98	71 - 127

EPA 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 18:50	574938	EPA 3510C	1	12/22/2015 17:15	CEK	575332

CAS#	Parameter	Result	LOQ	Units
120-82-1	1,2,4-Trichlorobenzene	ND	0.010	mg/L
95-50-1	1,2-Dichlorobenzene	ND	0.010	mg/L
122-66-7	1,2Diphenylhydrazine/Azobenzen	ND	0.010	mg/L
541-73-1	1,3-Dichlorobenzene	ND	0.010	mg/L
106-46-7	1,4-Dichlorobenzene	ND	0.010	mg/L
88-06-2	2,4,6-Trichlorophenol	ND	0.010	mg/L
120-83-2	2,4-Dichlorophenol	ND	0.010	mg/L
105-67-9	2,4-Dimethylphenol	ND	0.010	mg/L
51-28-5	2,4-Dinitrophenol	ND	0.010	mg/L
121-14-2	2,4-Dinitrotoluene	ND	0.010	mg/L
606-20-2	2,6-Dinitrotoluene	ND	0.010	mg/L
91-58-7	2-Chloronaphthalene	ND	0.010	mg/L

Sample Results

TBB-3D

Collect Date	12/15/2015 11:30	**GCAL ID**	21512180703
Receive Date	12/17/2015 15:45	**Matrix**	Water

EPA 8270C (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 18:50	574938	EPA 3510C	1	12/22/2015 17:15	CEK	575332

CAS#	Parameter	Result	LOQ	Units
95-57-8	2-Chlorophenol	ND	0.010	mg/L
91-57-6	2-Methylnaphthalene	0.111	0.010	mg/L
88-75-5	2-Nitrophenol	ND	0.010	mg/L
91-94-1	3,3'-Dichlorobenzidine	ND	0.010	mg/L
534-52-1	4,6-Dinitro-2-methylphenol	ND	0.010	mg/L
101-55-3	4-Bromophenyl phenyl ether	ND	0.010	mg/L
59-50-7	4-Chloro-3-methylphenol	ND	0.010	mg/L
7005-72-3	4-Chlorophenyl phenyl ether	ND	0.010	mg/L
100-02-7	4-Nitrophenol	ND	0.010	mg/L
83-32-9	Acenaphthene	0.122	0.010	mg/L
208-96-8	Acenaphthylene	ND	0.010	mg/L
120-12-7	Anthracene	0.018	0.010	mg/L
92-87-5	Benzidine	ND	0.051	mg/L
56-55-3	Benzo(a)anthracene	ND	0.010	mg/L
50-32-8	Benzo(a)pyrene	ND	0.010	mg/L
205-99-2	Benzo(b)fluoranthene	ND	0.010	mg/L
191-24-2	Benzo(g,h,i)perylene	ND	0.010	mg/L
207-08-9	Benzo(k)fluoranthene	ND	0.010	mg/L
111-91-1	Bis(2-Chloroethoxy)methane	ND	0.010	mg/L
111-44-4	Bis(2-Chloroethyl)ether	ND	0.010	mg/L
108-60-1	Bis(2-Chloroisopropyl)ether	ND	0.010	mg/L
117-81-7	Bis(2-Ethylhexyl)phthalate	ND	0.010	mg/L
85-68-7	Butyl benzyl phthalate	ND	0.010	mg/L
218-01-9	Chrysene	ND	0.010	mg/L
53-70-3	Dibenz(a,h)anthracene	ND	0.010	mg/L
84-66-2	Diethyl phthalate	ND	0.010	mg/L
131-11-3	Dimethyl phthalate	ND	0.010	mg/L
84-74-2	Di-n-butyl phthalate	ND	0.010	mg/L
117-84-0	Di-n-octyl phthalate	ND	0.010	mg/L
206-44-0	Fluoranthene	0.020	0.010	mg/L
86-73-7	Fluorene	0.096	0.010	mg/L
118-74-1	Hexachlorobenzene	ND	0.010	mg/L
87-68-3	Hexachlorobutadiene	ND	0.010	mg/L
77-47-4	Hexachlorocyclopentadiene	ND	0.010	mg/L
67-72-1	Hexachloroethane	ND	0.010	mg/L
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.010	mg/L
78-59-1	Isophorone	ND	0.010	mg/L
98-95-3	Nitrobenzene	ND	0.010	mg/L
62-75-9	n-Nitrosodimethylamine	ND	0.010	mg/L
621-64-7	n-Nitrosodi-n-propylamine	ND	0.010	mg/L
86-30-6	n-Nitrosodiphenylamine	ND	0.010	mg/L
87-86-5	Pentachlorophenol	ND	0.010	mg/L
85-01-8	Phenanthrene	0.140	0.010	mg/L
108-95-2	Phenol	ND	0.010	mg/L

Sample Results

TBB-3D

Collect Date	12/15/2015 11:30	**GCAL ID**	21512180703
Receive Date	12/17/2015 15:45	**Matrix**	Water

EPA 8270C (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 18:50	574938	EPA 3510C	1	12/22/2015 17:15	CEK	575332

CAS#	Parameter	Result	LOQ	Units
129-00-0	Pyrene	0.010	0.010	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	0.0510	.04	ug/L	79	44 - 120
321-60-8	2-Fluorobiphenyl	0.0510	.042	ug/L	82	44 - 119
1718-51-0	Terphenyl-d14	0.0510	.048	ug/L	94	50 - 134
4165-62-2	Phenol-d5	0.1020	.04	ug/L	39	10 - 120
367-12-4	2-Fluorophenol	0.1020	.057	ug/L	56	19 - 119
118-79-6	2,4,6-Tribromophenol	0.1020	.094	ug/L	92	43 - 140

EPA 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 18:50	574938	EPA 3510C	5	12/22/2015 17:49	CEK	575332

CAS#	Parameter	Result	LOQ	Units
91-20-3	Naphthalene	0.548	0.051	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	0.0510	.04	ug/L	79	44 - 120
321-60-8	2-Fluorobiphenyl	0.0510	.046	ug/L	90	44 - 119
1718-51-0	Terphenyl-d14	0.0510	.048	ug/L	95	50 - 134
4165-62-2	Phenol-d5	0.1020	.04	ug/L	40	10 - 120
367-12-4	2-Fluorophenol	0.1020	.059	ug/L	58	19 - 119
118-79-6	2,4,6-Tribromophenol	0.1020	.096	ug/L	94	43 - 140

Sample Results

TBB-3D	**Collect Date**	12/15/2015 11:30	**GCAL ID**	21512180703
	Receive Date	12/17/2015 15:45	**Matrix**	Water

EPA 8015C GRO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/22/2015 12:30	JAR	575141

CAS#	Parameter	Result	LOQ	Units
8006-61-9	Gasoline Range Organics	ND	0.100	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
106-39-8	Bromochlorobenzene	0.03	.036	ug/L	118	49 - 136

MADEP VPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	10	12/22/2015 14:57	JAR	575224

CAS#	Parameter	Result	LOQ	Units
GCSV-02-10	Aliphatic >C8-C10	ND	0.200	mg/L
GCSV-02-30	Aliphatic C6-C8	ND	0.300	mg/L
GCSV-02-14	Aromatic >C8-C10	2.05	0.300	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
GCV-00-7	2,5-Dibromotoluene (PID)	0.50	.474	ug/L	95	70 - 130
GCV-00-8	2,5-Dibromotoluene (FID)	0.50	.581	ug/L	116	70 - 130

EPA 8015C DRO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 09:30	574951	EPA 3510C	2	12/20/2015 10:10	SDD	575086

CAS#	Parameter	Result	LOQ	Units
GCSV-00-4	Diesel Range Organics	2.13	0.250	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.05	.04	ug/L	81	56 - 125

Sample Results

TBB-3D	**Collect Date**	12/15/2015 11:30	**GCAL ID**	21512180703
	Receive Date	12/17/2015 15:45	**Matrix**	Water

EPA 8015C ORO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 09:30	574952	EPA 3510C	2	12/20/2015 10:10	SDD	575085

CAS#	Parameter	Result	LOQ	Units
GCSV-00-44	Oil Range Organics	ND	0.250	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.05	.043	ug/L	87	56 - 125

MADEP EPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 07:00	574953	MADEP EPH Revision 1.1	1	12/21/2015 11:46	DLB	575270

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	0.04	.026	ug/L	65	40 - 140

MADEP EPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 07:00	574953	MADEP EPH Revision 1.1	1	12/22/2015 11:42	DLB	575394

CAS#	Parameter	Result	LOQ	Units
GCSV-02-15	Aromatic >C10-C12	ND	0.100	mg/L
GCSV-02-16	Aromatic >C12-C16	ND	0.100	mg/L
GCSV-02-17	Aromatic >C16-C21	ND	0.150	mg/L
GCSV-05-18	Aromatic >C21-C35	ND	0.100	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.04	.025	ug/L	63	40 - 140
580-13-2	2-Bromonaphthalene	0.04	.042	ug/L	105	40 - 140
321-60-8	2-Fluorobiphenyl	0.04	.043	ug/L	108	40 - 140

Sample Results

TBB-3D

Collect Date	12/15/2015 11:30	**GCAL ID**	21512180703
Receive Date	12/17/2015 15:45	**Matrix**	Water

EPA 6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 09:55	575010	EPA 3010A	100	12/21/2015 23:39	AWG	575258

CAS#	Parameter	Result	LOQ	Units
7440-39-3	Barium	1.07	0.10	mg/L
7440-70-2	Calcium	164	50.0	mg/L
7439-95-4	Magnesium	48.0	10.0	mg/L
7440-23-5	Sodium	404	10.0	mg/L
7440-24-6	Strontium	1.08	0.10	mg/L

EPA 6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 09:55	575010	EPA 3010A	5	12/22/2015 12:35	AWG	575265

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	ND	0.0050	mg/L
7440-43-9	Cadmium	ND	0.0050	mg/L
7440-47-3	Chromium	0.0053	0.0050	mg/L
7439-89-6	Iron	1.86	0.50	mg/L
7439-92-1	Lead	ND	0.0050	mg/L
7439-96-5	Manganese	0.19	0.025	mg/L
7440-09-7	Potassium	5.17	0.50	mg/L
7440-66-6	Zinc	ND	0.10	mg/L

EPA 6020A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/18/2015 16:00	574994	EPA 3005A Dissolved	100	12/21/2015 23:08	AWG	575258

CAS#	Parameter	Result	LOQ	Units
7440-39-3	Barium	1.01	0.10	mg/L
7440-24-6	Strontium	1.07	0.10	mg/L

EPA 6020A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/18/2015 16:00	574994	EPA 3005A Dissolved	5	12/22/2015 11:48	AWG	575265

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	ND	0.0050	mg/L
7440-43-9	Cadmium	ND	0.0050	mg/L
7440-47-3	Chromium	ND	0.0050	mg/L

Sample Results

TBB-3D

Collect Date	12/15/2015 11:30	**GCAL ID**	21512180703
Receive Date	12/17/2015 15:45	**Matrix**	Water

EPA 6020A Dissolved (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/18/2015 16:00	574994	EPA 3005A Dissolved	5	12/22/2015 11:48	AWG	575265

CAS#	Parameter	Result	LOQ	Units
7439-89-6	Iron	ND	0.50	mg/L
7439-92-1	Lead	ND	0.0050	mg/L
7439-96-5	Manganese	0.16	0.025	mg/L
7440-66-6	Zinc	ND	0.10	mg/L

EPA 7470A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 13:55	575012	EPA 7470A	1	12/21/2015 17:17	LWZ	575192

CAS#	Parameter	Result	LOQ	Units
7439-97-6	Mercury	ND	0.00020	mg/L

EPA 7470A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 10:40	575013	EPA 7470A Dissolved	1	12/19/2015 15:32	LWZ	575023

CAS#	Parameter	Result	LOQ	Units
7439-97-6	Mercury	ND	0.00020	mg/L

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	500	12/21/2015 12:05	JEM	575131

CAS#	Parameter	Result	LOQ	Units
16887-00-6	Chloride	721	100	mg/L

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	5	12/21/2015 20:58	SMR	575131

CAS#	Parameter	Result	LOQ	Units
24959-67-9	Bromide	1.18	1.00	mg/L

Sample Results

TBB-3D	**Collect Date**	12/15/2015 11:30	**GCAL ID**	21512180703
	Receive Date	12/17/2015 15:45	**Matrix**	Water

EPA 9056A (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	5	12/21/2015 20:58	SMR	575131

CAS#	Parameter	Result	LOQ	Units
14808-79-8	Sulfate	7.06	1.00	mg/L

SM 2320 B-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/22/2015 12:34	DMT	575286

CAS#	Parameter	Result	LOQ	Units
T-005-B	Bicarbonate Alkalinity	320	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	12/22/2015 12:34	DMT	575286

CAS#	Parameter	Result	LOQ	Units
T-005-C	Carbonate Alkalinity	ND	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	12/18/2015 13:22	WRW	574977

CAS#	Parameter	Result	LOQ	Units
WET-035	Total Dissolved Solids(TDS)	1220	10.0	mg/L

Sample Results

TBB-3D Purge Water @ 5 GAL

Collect Date 12/15/2015 12:10 **GCAL ID** 21512180704
Receive Date 12/17/2015 15:45 **Matrix** Water

EPA 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 18:50	574938	EPA 3510C	1	12/22/2015 17:32	JMC2	575332

CAS#	Parameter	Result	LOQ	Units
120-82-1	1,2,4-Trichlorobenzene	ND	0.020	mg/L
95-50-1	1,2-Dichlorobenzene	ND	0.020	mg/L
122-66-7	1,2Diphenylhydrazine/Azobenzen	ND	0.020	mg/L
541-73-1	1,3-Dichlorobenzene	ND	0.020	mg/L
106-46-7	1,4-Dichlorobenzene	ND	0.020	mg/L
88-06-2	2,4,6-Trichlorophenol	ND	0.020	mg/L
120-83-2	2,4-Dichlorophenol	ND	0.020	mg/L
105-67-9	2,4-Dimethylphenol	ND	0.020	mg/L
51-28-5	2,4-Dinitrophenol	ND	0.020	mg/L
121-14-2	2,4-Dinitrotoluene	ND	0.020	mg/L
606-20-2	2,6-Dinitrotoluene	ND	0.020	mg/L
91-58-7	2-Chloronaphthalene	ND	0.020	mg/L
95-57-8	2-Chlorophenol	ND	0.020	mg/L
91-57-6	2-Methylnaphthalene	0.029	0.020	mg/L
88-75-5	2-Nitrophenol	ND	0.020	mg/L
91-94-1	3,3'-Dichlorobenzidine	ND	0.020	mg/L
534-52-1	4,6-Dinitro-2-methylphenol	ND	0.020	mg/L
101-55-3	4-Bromophenyl phenyl ether	ND	0.020	mg/L
59-50-7	4-Chloro-3-methylphenol	ND	0.020	mg/L
7005-72-3	4-Chlorophenyl phenyl ether	ND	0.020	mg/L
100-02-7	4-Nitrophenol	ND	0.020	mg/L
83-32-9	Acenaphthene	0.042	0.020	mg/L
208-96-8	Acenaphthylene	ND	0.020	mg/L
120-12-7	Anthracene	0.030	0.020	mg/L
92-87-5	Benzidine	ND	0.100	mg/L
56-55-3	Benzo(a)anthracene	ND	0.020	mg/L
50-32-8	Benzo(a)pyrene	ND	0.020	mg/L
205-99-2	Benzo(b)fluoranthene	ND	0.020	mg/L
191-24-2	Benzo(g,h,i)perylene	ND	0.020	mg/L
207-08-9	Benzo(k)fluoranthene	ND	0.020	mg/L
111-91-1	Bis(2-Chloroethoxy)methane	ND	0.020	mg/L
111-44-4	Bis(2-Chloroethyl)ether	ND	0.020	mg/L
108-60-1	Bis(2-Chloroisopropyl)ether	ND	0.020	mg/L
117-81-7	Bis(2-Ethylhexyl)phthalate	ND	0.020	mg/L
85-68-7	Butyl benzyl phthalate	ND	0.020	mg/L
218-01-9	Chrysene	ND	0.020	mg/L
53-70-3	Dibenz(a,h)anthracene	ND	0.020	mg/L
84-66-2	Diethyl phthalate	ND	0.020	mg/L
131-11-3	Dimethyl phthalate	ND	0.020	mg/L
84-74-2	Di-n-butyl phthalate	ND	0.020	mg/L
117-84-0	Di-n-octyl phthalate	ND	0.020	mg/L
206-44-0	Fluoranthene	0.077	0.020	mg/L
86-73-7	Fluorene	0.044	0.020	mg/L
118-74-1	Hexachlorobenzene	ND	0.020	mg/L
87-68-3	Hexachlorobutadiene	ND	0.020	mg/L
77-47-4	Hexachlorocyclopentadiene	ND	0.020	mg/L
67-72-1	Hexachloroethane	ND	0.020	mg/L
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.020	mg/L

Sample Results

TBB-3D Purge Water @ 5 GAL

Collect Date 12/15/2015 12:10 **GCAL ID** 21512180704
Receive Date 12/17/2015 15:45 **Matrix** Water

EPA 8270C (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 18:50	574938	EPA 3510C	1	12/22/2015 17:32	JMC2	575332

CAS#	Parameter	Result	LOQ	Units
78-59-1	Isophorone	ND	0.020	mg/L
91-20-3	Naphthalene	0.063	0.020	mg/L
98-95-3	Nitrobenzene	ND	0.020	mg/L
62-75-9	n-Nitrosodimethylamine	ND	0.020	mg/L
621-64-7	n-Nitrosodi-n-propylamine	ND	0.020	mg/L
86-30-6	n-Nitrosodiphenylamine	ND	0.020	mg/L
87-86-5	Pentachlorophenol	ND	0.020	mg/L
85-01-8	Phenanthrene	0.147	0.020	mg/L
108-95-2	Phenol	ND	0.020	mg/L
129-00-0	Pyrene	0.050	0.020	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	0.10	.00605	ug/L	6*	44 - 120
321-60-8	2-Fluorobiphenyl	0.10	.000912	ug/L	.9*	44 - 119
1718-51-0	Terphenyl-d14	0.10	.0012	ug/L	1*	50 - 134
4165-62-2	Phenol-d5	0.20	.00941	ug/L	5*	10 - 120
367-12-4	2-Fluorophenol	0.20	.00747	ug/L	4*	19 - 119
118-79-6	2,4,6-Tribromophenol	0.20	.00131	ug/L	.7*	43 - 140

MC-1

Collect Date 12/16/2015 11:30 **GCAL ID** 21512180705
Receive Date 12/17/2015 15:45 **Matrix** Water

EPA 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/21/2015 22:46	CJR	575233

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	.049	ug/L	97	78 - 130
1868-53-7	Dibromofluoromethane	0.05	.049	ug/L	98	77 - 127
2037-26-5	Toluene d8	0.05	.052	ug/L	104	76 - 134
17060-07-0	1,2-Dichloroethane-d4	0.05	.049	ug/L	97	71 - 127

Sample Results

MC-1

Collect Date	12/16/2015 11:30	**GCAL ID**	21512180705
Receive Date	12/17/2015 15:45	**Matrix**	Water

EPA 8015C GRO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/22/2015 12:49	JAR	575141

CAS#	Parameter	Result	LOQ	Units
8006-61-9	Gasoline Range Organics	ND	0.100	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
106-39-8	Bromochlorobenzene	0.03	.025	ug/L	83	49 - 136

MADEP VPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/22/2015 16:19	JAR	575224

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
GCSV-02-14	Aromatic >C8-C10	ND	0.030	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
GCV-00-7	2,5-Dibromotoluene (PID)	0.05	.046	ug/L	93	70 - 130
GCV-00-8	2,5-Dibromotoluene (FID)	0.05	.051	ug/L	102	70 - 130

EPA 8015C DRO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 09:30	574951	EPA 3510C	1	12/19/2015 18:59	SDD	575073

CAS#	Parameter	Result	LOQ	Units
GCSV-00-4	Diesel Range Organics	ND	0.125	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.05	.041	ug/L	81	56 - 125

Sample Results

MC-1

Collect Date	12/16/2015 11:30	**GCAL ID**	21512180705
Receive Date	12/17/2015 15:45	**Matrix**	Water

EPA 8015C ORO

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 09:30	574952	EPA 3510C	1	12/19/2015 18:59	SDD	575074

CAS#	Parameter	Result	LOQ	Units
GCSV-00-44	Oil Range Organics	ND	0.125	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.05	.044	ug/L	87	56 - 125

MADEP EPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 07:00	574953	MADEP EPH Revision 1.1	1	12/21/2015 12:06	DLB	575270

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	0.04	.024	ug/L	60	40 - 140

MADEP EPH Revision 1.1

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 07:00	574953	MADEP EPH Revision 1.1	1	12/21/2015 12:06	DLB	575269

CAS#	Parameter	Result	LOQ	Units
GCSV-02-15	Aromatic >C10-C12	ND	0.100	mg/L
GCSV-02-16	Aromatic >C12-C16	ND	0.100	mg/L
GCSV-02-17	Aromatic >C16-C21	ND	0.150	mg/L
GCSV-05-18	Aromatic >C21-C35	ND	0.100	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
84-15-1	o-Terphenyl	0.04	.034	ug/L	85	40 - 140
580-13-2	2-Bromonaphthalene	0.04	.053	ug/L	133	40 - 140
321-60-8	2-Fluorobiphenyl	0.04	.054	ug/L	135	40 - 140

Sample Results

MC-1

Collect Date	12/16/2015 11:30	**GCAL ID**	21512180705
Receive Date	12/17/2015 15:45	**Matrix**	Water

EPA 6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 09:55	575010	EPA 3010A	100	12/21/2015 23:44	AWG	575258

CAS#	Parameter	Result	LOQ	Units
7440-39-3	Barium	1.85	0.10	mg/L
7440-70-2	Calcium	151	50.0	mg/L
7439-95-4	Magnesium	57.9	10.0	mg/L
7439-96-5	Manganese	0.67	0.50	mg/L
7440-23-5	Sodium	514	10.0	mg/L
7440-24-6	Strontium	1.54	0.10	mg/L

EPA 6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 09:55	575010	EPA 3010A	5	12/22/2015 12:46	AWG	575265

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	ND	0.0050	mg/L
7440-43-9	Cadmium	ND	0.0050	mg/L
7440-47-3	Chromium	ND	0.0050	mg/L
7439-89-6	Iron	1.48	0.50	mg/L
7439-92-1	Lead	ND	0.0050	mg/L
7440-09-7	Potassium	6.11	0.50	mg/L
7440-66-6	Zinc	ND	0.10	mg/L

EPA 6020A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/18/2015 16:00	574994	EPA 3005A Dissolved	100	12/21/2015 23:13	AWG	575258

CAS#	Parameter	Result	LOQ	Units
7440-39-3	Barium	1.74	0.10	mg/L
7439-96-5	Manganese	0.65	0.50	mg/L
7440-24-6	Strontium	1.42	0.10	mg/L

EPA 6020A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/18/2015 16:00	574994	EPA 3005A Dissolved	5	12/22/2015 11:58	AWG	575265

CAS#	Parameter	Result	LOQ	Units
7440-38-2	Arsenic	ND	0.0050	mg/L
7440-43-9	Cadmium	ND	0.0050	mg/L

Sample Results

MC-1

Collect Date	12/16/2015 11:30	**GCAL ID**	21512180705
Receive Date	12/17/2015 15:45	**Matrix**	Water

EPA 6020A Dissolved (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/18/2015 16:00	574994	EPA 3005A Dissolved	5	12/22/2015 11:58	AWG	575265

CAS#	Parameter	Result	LOQ	Units
7440-47-3	Chromium	ND	0.0050	mg/L
7439-89-6	Iron	1.08	0.50	mg/L
7439-92-1	Lead	ND	0.0050	mg/L
7440-66-6	Zinc	ND	0.10	mg/L

EPA 7470A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 13:55	575012	EPA 7470A	1	12/21/2015 17:19	LWZ	575192

CAS#	Parameter	Result	LOQ	Units
7439-97-6	Mercury	0.0010	0.00020	mg/L

EPA 7470A Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
12/19/2015 10:40	575013	EPA 7470A Dissolved	1	12/19/2015 15:34	LWZ	575023

CAS#	Parameter	Result	LOQ	Units
7439-97-6	Mercury	ND	0.00020	mg/L

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	500	12/21/2015 12:23	JEM	575131

CAS#	Parameter	Result	LOQ	Units
16887-00-6	Chloride	837	100	mg/L
14808-79-8	Sulfate	106	100	mg/L

Sample Results

MC-1

Collect Date	12/16/2015 11:30	**GCAL ID**	21512180705
Receive Date	12/17/2015 15:45	**Matrix**	Water

EPA 9056A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	5	12/21/2015 21:15	SMR	575131

CAS#	Parameter	Result	LOQ	Units
24959-67-9	Bromide	2.18	1.00	mg/L

SM 2320 B-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	12/22/2015 12:34	DMT	575286

CAS#	Parameter	Result	LOQ	Units
T-005-B	Bicarbonate Alkalinity	349	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	12/22/2015 12:34	DMT	575286

CAS#	Parameter	Result	LOQ	Units
T-005-C	Carbonate Alkalinity	ND	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	12/18/2015 13:22	WRW	574977

CAS#	Parameter	Result	LOQ	Units
WET-035	Total Dissolved Solids(TDS)	1750	10.0	mg/L

GC/MS Volatiles QC Summary

Analytical Batch 575233	Client ID	MB575233		LCS575233				LCSD575233				
	GCAL ID	1522538		1522539				1522540				
	Sample Type	MB		LCS				LCSD				
	Prep Date	NA		NA				NA				
	Analysis Date	12/21/2015 19:35		12/21/2015 18:04				12/21/2015 18:27				
	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	0.053	106	70 - 129	0.050	0.055	111	3	20
Ethylbenzene	100-41-4	ND	0.00500	0.050	0.053	106	74 - 126	0.050	0.055	110	3	30
Toluene	108-88-3	ND	0.00500	0.050	0.051	103	72 - 120	0.050	0.053	106	3	20
Xylene (total)	1330-20-7	ND	0.015	0.150	0.155	103	74 - 127	0.150	0.159	106	3	30
Surrogate												
1,2-Dichloroethane-d4	17060-07-0	.0492	98	.05	.0512	102	71 - 127	.05	.0507	101		NA
4-Bromofluorobenzene	460-00-4	.048	96	.05	.0506	101	78 - 130	.05	.0513	103		NA
Dibromofluoromethane	1868-53-7	.0486	97	.05	.0494	99	77 - 127	.05	.049	98		NA
Toluene d8	2037-26-5	.0515	103	.05	.0498	100	76 - 134	.05	.0497	99		NA

GC/MS Semi-Volatiles QC Summary

Analytical Batch	Client ID	MB574938		LCS574938				LCSD574938				
575332	GCAL ID	1520878		1520879				1520880				
Prep Batch	Sample Type	MB		LCS				LCSD				
574938	Prep Date	12/19/2015 18:50		12/19/2015 18:50				12/19/2015 18:50				
Prep Method	Analysis Date	12/22/2015 16:13		12/22/2015 16:30				12/22/2015 16:47				
EPA 3510C	Matrix	Water		Water				Water				
EPA 8270C		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
1,2,4-Trichlorobenzene	120-82-1	ND	0.010	0.050	0.024	47	29 - 116	0.050	0.022	43	9	30
1,2-Dichlorobenzene	95-50-1	ND	0.010	0.050	0.021	41	32 - 111	0.050	0.019	38	10	30
1,2Diphenylhydrazine/Azobenzen	122-66-7	ND	0.010	0.050	0.043	86	49 - 122	0.050	0.043	86	0	30
1,3-Dichlorobenzene	541-73-1	ND	0.010	0.050	0.019	38	28 - 110	0.050	0.018	35	5	30
1,4-Dichlorobenzene	106-46-7	ND	0.010	0.050	0.019	39	29 - 112	0.050	0.018	35	5	30
2,4,6-Trichlorophenol	88-06-2	ND	0.010	0.050	0.048	95	50 - 125	0.050	0.048	95	0	30
2,4-Dichlorophenol	120-83-2	ND	0.010	0.050	0.044	88	47 - 121	0.050	0.046	91	4	30
2,4-Dimethylphenol	105-67-9	ND	0.010	0.050	0.038	77	31 - 124	0.050	0.039	78	3	30
2,4-Dinitrophenol	51-28-5	ND	0.010	0.050	0.042	83	23 - 143	0.050	0.044	88	5	30
2,4-Dinitrotoluene	121-14-2	ND	0.010	0.050	0.042	83	57 - 128	0.050	0.043	86	2	30
2,6-Dinitrotoluene	606-20-2	ND	0.010	0.050	0.045	90	57 - 124	0.050	0.047	94	4	30
2-Chloronaphthalene	91-58-7	ND	0.010	0.050	0.035	71	40 - 116	0.050	0.032	63	9	30
2-Chlorophenol	95-57-8	ND	0.010	0.050	0.041	82	38 - 117	0.050	0.041	82	0	30
2-Methylnaphthalene	91-57-6	ND	0.010	0.050	0.030	59	40 - 121	0.050	0.026	52	14	30
2-Nitrophenol	88-75-5	ND	0.010	0.050	0.048	97	47 - 123	0.050	0.048	96	0	30
3,3'-Dichlorobenzidine	91-94-1	ND	0.010	0.050	0.049	98	27 - 129	0.050	0.049	98	0	30
4,6-Dinitro-2-methylphenol	534-52-1	ND	0.010	0.050	0.047	94	44 - 137	0.050	0.048	97	2	30
4-Bromophenyl phenyl ether	101-55-3	ND	0.010	0.050	0.047	94	55 - 124	0.050	0.047	95	0	30
4-Chloro-3-methylphenol	59-50-7	ND	0.010	0.050	0.041	81	52 - 119	0.050	0.043	85	5	30
4-Chlorophenyl phenyl ether	7005-72-3	ND	0.010	0.050	0.040	80	53 - 121	0.050	0.040	80	0	30
4-Nitrophenol	100-02-7	ND	0.010	0.050	0.025	49	10 - 120	0.050	0.025	51	0	30
Acenaphthene	83-32-9	ND	0.010	0.050	0.040	79	47 - 122	0.050	0.037	75	8	30
Acenaphthylene	208-96-8	ND	0.010	0.050	0.041	82	41 - 130	0.050	0.039	77	5	30
Anthracene	120-12-7	ND	0.010	0.050	0.048	96	57 - 123	0.050	0.050	100	4	30
Benzidine	92-87-5	ND	0.050	0.050	0.124	248*	10 - 120	0.050	0.087	174*	35*	30
Benzo(a)anthracene	56-55-3	ND	0.010	0.050	0.046	91	58 - 125	0.050	0.047	95	2	30
Benzo(a)pyrene	50-32-8	ND	0.010	0.050	0.051	101	54 - 128	0.050	0.052	104	2	30
Benzo(b)fluoranthene	205-99-2	ND	0.010	0.050	0.046	92	53 - 131	0.050	0.048	96	4	30
Benzo(g,h,i)perylene	191-24-2	ND	0.010	0.050	0.048	96	50 - 134	0.050	0.049	99	2	30
Benzo(k)fluoranthene	207-08-9	ND	0.010	0.050	0.050	100	57 - 129	0.050	0.050	99	0	30
Bis(2-Chloroethoxy)methane	111-91-1	ND	0.010	0.050	0.041	82	48 - 120	0.050	0.042	84	2	30
Bis(2-Chloroethyl)ether	111-44-4	ND	0.010	0.050	0.038	76	43 - 118	0.050	0.037	75	3	30
Bis(2-Chloroisopropyl)ether	108-60-1	ND	0.010	0.050	0.035	69	37 - 130	0.050	0.033	65	6	30
Bis(2-Ethylhexyl)phthalate	117-81-7	ND	0.010	0.050	0.042	84	55 - 135	0.050	0.043	86	2	30
Butyl benzyl phthalate	85-68-7	ND	0.010	0.050	0.044	88	53 - 134	0.050	0.045	90	2	30
Chrysene	218-01-9	ND	0.010	0.050	0.047	93	59 - 123	0.050	0.047	93	0	30
Dibenz(a,h)anthracene	53-70-3	ND	0.010	0.050	0.050	99	51 - 134	0.050	0.052	105	4	30
Diethyl phthalate	84-66-2	ND	0.010	0.050	0.040	79	56 - 125	0.050	0.042	83	5	30
Dimethyl phthalate	131-11-3	ND	0.010	0.050	0.042	83	45 - 127	0.050	0.043	87	2	30
Di-n-butyl phthalate	84-74-2	ND	0.010	0.050	0.042	84	59 - 127	0.050	0.043	86	2	30
Di-n-octyl phthalate	117-84-0	ND	0.010	0.050	0.038	75	51 - 140	0.050	0.038	76	0	30
Fluoranthene	206-44-0	ND	0.010	0.050	0.043	87	57 - 128	0.050	0.045	90	5	30
Fluorene	86-73-7	ND	0.010	0.050	0.042	85	52 - 124	0.050	0.042	83	0	30
Hexachlorobenzene	118-74-1	ND	0.010	0.050	0.048	97	53 - 125	0.050	0.050	100	4	30
Hexachlorobutadiene	87-68-3	ND	0.010	0.050	0.018	36	22 - 124	0.050	0.018	36	0	30
Hexachlorocyclopentadiene	77-47-4	ND	0.010	0.050	0.022	44	16 - 120	0.050	0.020	40	10	30
Hexachloroethane	67-72-1	ND	0.010	0.050	0.016	32	21 - 115	0.050	0.016	31	0	30
Indeno(1,2,3-cd)pyrene	193-39-5	ND	0.010	0.050	0.050	99	52 - 134	0.050	0.050	100	0	30
Isophorone	78-59-1	ND	0.010	0.050	0.043	86	42 - 124	0.050	0.044	88	2	30
Naphthalene	91-20-3	ND	0.010	0.050	0.030	60	40 - 121	0.050	0.027	53	11	30
Nitrobenzene	98-95-3	ND	0.010	0.050	0.041	81	45 - 121	0.050	0.040	79	2	30
n-Nitrosodimethylamine	62-75-9	ND	0.010	0.050	0.026	53	12 - 120	0.050	0.027	53	4	30
n-Nitrosodi-n-propylamine	621-64-7	ND	0.010	0.050	0.039	77	49 - 119	0.050	0.038	77	3	30
n-Nitrosodiphenylamine	86-30-6	ND	0.010	0.050	0.047	94	51 - 123	0.050	0.047	95	0	30
Pentachlorophenol	87-86-5	ND	0.010	0.050	0.046	92	35 - 138	0.050	0.047	94	2	30
Phenanthrene	85-01-8	ND	0.010	0.050	0.045	90	59 - 120	0.050	0.047	93	4	30
Phenol	108-95-2	ND	0.010	0.050	0.023	45	16 - 120	0.050	0.024	48	4	30
Pyrene	129-00-0	ND	0.010	0.050	0.052	104	57 - 126	0.050	0.052	105	0	30

GC/MS Semi-Volatiles QC Summary

Analytical Batch	Client ID	MB574938		LCS574938				LCSD574938				
575332	GCAL ID	1520878		1520879				1520880				
Prep Batch	Sample Type	MB		LCS				LCSD				
574938	Prep Date	12/19/2015 18:50		12/19/2015 18:50				12/19/2015 18:50				
Prep Method	Analysis Date	12/22/2015 16:13		12/22/2015 16:30				12/22/2015 16:47				
EPA 3510C	Matrix	Water		Water				Water				
EPA 8270C		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Surrogate												
2,4,6-Tribromophenol	118-79-6	.0871	87	.1	.0842	84	43 - 140	.1	.0891	89		NA
2-Fluorobiphenyl	321-60-8	.0362	72	.05	.0405	81	44 - 119	.05	.0415	83		NA
2-Fluorophenol	367-12-4	.0494	49	.1	.0515	52	19 - 119	.1	.0556	56		NA
Nitrobenzene-d5	4165-60-0	.0375	75	.05	.0386	77	44 - 120	.05	.0392	78		NA
Phenol-d5	4165-62-2	.034	34	.1	.0372	37	10 - 120	.1	.0396	40		NA
Terphenyl-d14	1718-51-0	.0478	96	.05	.0515	103	50 - 134	.05	.0531	106		NA

GC Volatiles QC Summary

Analytical Batch 575141	Client ID	MB575141		LCS575141				LCSD575141				
	GCAL ID	1521966		1521967				1521968				
	Sample Type	MB		LCS				LCSD				
	Prep Date	NA		NA				NA				
	Analysis Date	12/22/2015 11:58		12/22/2015 11:32				12/22/2015 11:41				
	Matrix	Water		Water				Water				
EPA 8015C GRO		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Gasoline Range Organics	8006-61-9	ND	0.100	0.500	0.553	111	70 - 128	0.500	0.540	108	2	25
Surrogate												
Bromochlorobenzene	106-39-8	.0233	78	.03	.0291	97	49 - 136	.03	.0278	93		NA

Analytical Batch 575224	Client ID	MB575224		LCS575224				LCSD575224				
	GCAL ID	1522505		1522506				1522507				
	Sample Type	MB		LCS				LCSD				
	Prep Date	NA		NA				NA				
	Analysis Date	12/22/2015 12:42		12/22/2015 04:32				12/22/2015 11:49				
	Matrix	Water		Water				Water				
MADEP VPH Revision 1.1		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	0.116	116	60 - 140	0.100	0.106	106	9	30
Aliphatic C6-C8	GCSV-02-30	ND	0.030	0.150	0.170	113	60 - 140	0.150	0.147	98	15	30
Aromatic >C8-C10	GCSV-02-14	ND	0.030	0.150	0.157	105	60 - 140	0.150	0.146	97	7	30
Surrogate												
2,5-Dibromotoluene (FID)	GCV-00-8	.0574	115	.05	.0557	111	70 - 130	.05	.0511	102		NA
2,5-Dibromotoluene (PID)	GCV-00-7	.0496	99	.05	.0538	108	70 - 130	.05	.0463	93		NA

GC Semi-Volatiles QC Summary

Analytical Batch	Client ID	MB574951		LCS574951				LCSD574951				
575073	GCAL ID	1520949		1520950				1520951				
Prep Batch	Sample Type	MB		LCS				LCSD				
574951	Prep Date	12/19/2015 09:30		12/19/2015 09:30				12/19/2015 09:30				
Prep Method	Analysis Date	12/19/2015 16:10		12/19/2015 16:34				12/19/2015 16:48				
EPA 3510C	Matrix	Water		Water				Water				
EPA 8015C DRO		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Diesel Range Organics	GCSV-00-4	ND	0.125	1.00	0.685	69	47 - 120	1.00	0.764	76	11	30
Surrogate												
o-Terphenyl	84-15-1	.0377	75	.05	.0428	86	56 - 125	.05	.0444	89		NA

Analytical Batch	Client ID	MB574952		LCS574952				LCSD574952				
575074	GCAL ID	1520952		1520953				1520954				
Prep Batch	Sample Type	MB		LCS				LCSD				
574952	Prep Date	12/19/2015 09:30		12/19/2015 09:30				12/19/2015 09:30				
Prep Method	Analysis Date	12/19/2015 16:10		12/19/2015 17:02				12/19/2015 17:17				
EPA 3510C	Matrix	Water		Water				Water				
EPA 8015C ORO		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Oil Range Organics	GCSV-00-44	ND	0.125	2.00	1.80	90	41 - 113	2.00	1.79	89	1	40
Surrogate												
o-Terphenyl	84-15-1	.0406	81	.05	.0445	89	56 - 125	.05	.0447	89		NA

Analytical Batch	Client ID	MB574953		LCS574953				LCSD574953				
575270	GCAL ID	1520955		1520956				1520957				
Prep Batch	Sample Type	MB		LCS				LCSD				
574953	Prep Date	12/19/2015 07:00		12/19/2015 07:00				12/19/2015 07:00				
Prep Method	Analysis Date	12/21/2015 09:30		12/21/2015 09:49				12/21/2015 10:09				
MADEP EPH Revision 1.1	Matrix	Water		Water				Water				
MADEP EPH Revision 1.1		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	0.100	0.074	74	30 - 140	0.100	0.075	75	1	25
Aliphatic >C12-C16	GCSV-02-12	ND	0.100	0.100	0.089	89	40 - 140	0.100	0.096	96	8	25
Aliphatic >C16-C35	GCSV-02-31	ND	0.150	0.450	0.413	92	40 - 140	0.450	0.411	91	1	25
Surrogate												
1-Chlorooctadecane	3386-33-2	.0191	48	.04	.0316	79	40 - 140	.04	.0269	67		NA

Analytical Batch	Client ID	MB574953		LCS574953				LCSD574953				
575269	GCAL ID	1520955		1520956				1520957				
Prep Batch	Sample Type	MB		LCS				LCSD				
574953	Prep Date	12/19/2015 07:00		12/19/2015 07:00				12/19/2015 07:00				
Prep Method	Analysis Date	12/21/2015 21:45		12/21/2015 22:05				12/21/2015 22:24				
MADEP EPH Revision 1.1	Matrix	Water		Water				Water				
MADEP EPH Revision 1.1		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Aromatic >C10-C12	GCSV-02-15	ND	0.100	0.050	0.038	77	30 - 140	0.050	0.043	87	12	25
Aromatic >C12-C16	GCSV-02-16	ND	0.100	0.200	0.163	82	40 - 140	0.200	0.174	87	7	25
Aromatic >C16-C21	GCSV-02-17	ND	0.150	0.100	0.090	90	40 - 140	0.100	0.092	92	2	25
Aromatic >C21-C35	GCSV-05-18	ND	0.100	0.500	0.412	82	40 - 140	0.500	0.384	77	7	25
Surrogate												
2-Bromonaphthalene	580-13-2	.047	118	.04	.0389	97	40 - 140	.04	.0413	103		NA
2-Fluorobiphenyl	321-60-8	.0455	114	.04	.039	98	40 - 140	.04	.0422	106		NA
o-Terphenyl	84-15-1	.0413	103	.04	.0343	86	40 - 140	.04	.0338	85		NA

Inorganics QC Summary

Analytical Batch	Client ID	MB575012		LCS575012			
575192	GCAL ID	1521411		1521412			
Prep Batch	Sample Type	MB		LCS			
575012	Prep Date	12/19/2015 13:55		12/19/2015 13:55			
Prep Method	Analysis Date	12/21/2015 16:32		12/21/2015 16:38			
EPA 7470A	Matrix	Water		Water			
EPA 7470A		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Mercury	7439-97-6	ND	0.00020	0.0050	0.0044	89	80 - 120

Analytical Batch	Client ID	MB575013		LCS575013			
575023	GCAL ID	1521413		1521414			
Prep Batch	Sample Type	MB		LCS			
575013	Prep Date	12/19/2015 10:40		12/19/2015 10:40			
Prep Method	Analysis Date	12/19/2015 15:23		12/19/2015 15:25			
EPA 7470A	Matrix	Water		Water			
EPA 7470A Dissolved		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Mercury	7439-97-6	ND	0.00020	0.0050	0.0042	83	80 - 120

Analytical Batch	Client ID	B90MWG415		1521104MS				1521104MSD				
575023	GCAL ID	21512182620		1521415				1521416				
Prep Batch	Sample Type	SAMPLE		MS				MSD				
575013	Prep Date	12/19/2015 10:40		12/19/2015 10:40				12/19/2015 10:40				
Prep Method	Analysis Date	12/19/2015 15:52		12/19/2015 15:54				12/19/2015 15:56				
EPA 7470A	Matrix	Water		Water				Water				
EPA 7470A Dissolved		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Mercury	7439-97-6	0.0	0.00020	0.0050	0.0044	89	80 - 120	0.0050	0.0042	85	5	20

Analytical Batch	Client ID	MB575010		LCS575010			
575258	GCAL ID	1521405		1521406			
Prep Batch	Sample Type	MB		LCS			
575010	Prep Date	12/19/2015 09:55		12/19/2015 09:55			
Prep Method	Analysis Date	12/21/2015 23:18		12/21/2015 23:23			
EPA 3010A	Matrix	Water		Water			
EPA 6020A		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Arsenic	7440-38-2	ND	0.0010	0.050	0.055	109	80 - 120
Barium	7440-39-3	ND	0.0010	0.050	0.050	106	80 - 120
Cadmium	7440-43-9	ND	0.0010	0.050	0.053	106	80 - 120
Calcium	7440-70-2	ND	0.50	25.0	27.0	108	80 - 120
Chromium	7440-47-3	ND	0.0010	0.050	0.056	112	80 - 120
Iron	7439-89-6	ND	0.10	5.00	5.60	112	80 - 120
Lead	7439-92-1	ND	0.0010	0.050	0.054	108	80 - 120
Magnesium	7439-95-4	ND	0.10	5.00	5.48	110	80 - 120
Manganese	7439-96-5	ND	0.0050	0.050	0.060	113	80 - 120
Potassium	7440-09-7	ND	0.10	5.00	5.39	108	80 - 120
Sodium	7440-23-5	ND	0.10	5.00	5.46	109	80 - 120
Strontium	7440-24-6	ND	0.0010	0.050	0.056	112	80 - 120
Zinc	7440-66-6	ND	0.020	1.00	1.09	109	80 - 120

Inorganics QC Summary

Analytical Batch	Client ID	MB574994		LCS574994			
575258	GCAL ID	1521339		1521340			
Prep Batch	Sample Type	MB		LCS			
574994	Prep Date	12/18/2015 16:00		12/18/2015 16:00			
Prep Method	Analysis Date	12/21/2015 22:46		12/21/2015 22:52			
EPA 3005A Dissolved	Matrix	Water		Water			
EPA 6020A Dissolved		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Arsenic	7440-38-2	ND	0.0010	0.050	0.048	95	80 - 120
Barium	7440-39-3	ND	0.0010	0.050	0.047	94	80 - 120
Cadmium	7440-43-9	ND	0.0010	0.050	0.049	97	80 - 120
Chromium	7440-47-3	ND	0.0010	0.050	0.047	93	80 - 120
Iron	7439-89-6	ND	0.10	5.00	4.72	94	80 - 120
Lead	7439-92-1	ND	0.0010	0.050	0.048	95	80 - 120
Manganese	7439-96-5	ND	0.0050	0.050	0.049	97	80 - 120
Strontium	7440-24-6	ND	0.0010	0.050	0.048	96	80 - 120
Zinc	7440-66-6	ND	0.020	1.00	0.99	99	80 - 120

General Chemistry QC Summary

Analytical Batch 575286	Client ID	MC-1	1520930DUP
	GCAL ID	21512180705	1522721
	Sample Type	SAMPLE	DUP
	Prep Date	NA	NA
	Analysis Date	12/22/2015 12:34	12/22/2015 12:34
	Matrix	Water	Water

SM 2320 B-2011		Units Result	mg/L CaCO3 LOQ	Result	RPD	RPD Limit
Bicarbonate Alkalinity	T-005-B	349	1.0	344	1	11

Analytical Batch 575131	Client ID	MB575131	LCS575131
	GCAL ID	1521929	1521930
	Sample Type	MB	LCS
	Prep Date	NA	NA
	Analysis Date	12/21/2015 09:46	12/21/2015 09:29
	Matrix	Water	Water

EPA 9056A		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Bromide	24959-67-9	ND	0.200	2.50	2.26	90	80 - 120
Chloride	16887-00-6	ND	0.200	2.50	2.53	101	80 - 120
Sulfate	14808-79-8	ND	0.200	2.50	2.46	98	80 - 120

Analytical Batch 575131	Client ID	TBB-2M	1520926MS	1520926MSD
	GCAL ID	21512180701	1521931	1521932
	Sample Type	SAMPLE	MS	MSD
	Prep Date	NA	NA	NA
	Analysis Date	12/21/2015 10:21	12/21/2015 10:38	12/21/2015 10:56
	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
Chloride	16887-00-6	4820	400	5000	9200	88	80 - 120	5000	9380	91	2	15

Analytical Batch 575131	Client ID	TBB-2M	1520926MS	1520926MSD
	GCAL ID	21512180701	1521931	1521932
	Sample Type	SAMPLE	MS	MSD
	Prep Date	NA	NA	NA
	Analysis Date	12/21/2015 19:48	12/21/2015 20:05	12/21/2015 20:23
	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	8.07	10.0	125	148	112	80 - 120	125	146	110	1	15
Sulfate	14808-79-8	7.92	10.0	125	129	97	80 - 120	125	127	95	2	15

Analytical Batch 574977	Client ID	MB574977	LCS574977
	GCAL ID	1521187	1521188
	Sample Type	MB	LCS
	Prep Date	NA	NA
	Analysis Date	12/18/2015 13:22	12/18/2015 13:22
	Matrix	Water	Water

SM 2540 C-2011		Units Result	mg/L LOQ	Spike Added	Result	%R	Control Limits%R
Total Dissolved Solids(TDS)	WET-035	ND	10.0	1000	1000	100	80 - 120

General Chemistry QC Summary

Analytical Batch 574977	Client ID	MRAA-01D		1520847DUP		
	GCAL ID	21512176301		1521189		
	Sample Type	SAMPLE		DUP		
	Prep Date	NA		NA		
	Analysis Date	12/18/2015 13:22		12/18/2015 13:22		
	Matrix	Water		Water		
SM 2540 C-2011		Units Result	mg/L LOQ	Result	RPD	RPD Limit
Total Dissolved Solids(TDS)	WET-035	13600	10.0	13600	0	5.4

Analytical Batch 574977	Client ID	LB-2D		1520894DUP		
	GCAL ID	21512180102		1521190		
	Sample Type	SAMPLE		DUP		
	Prep Date	NA		NA		
	Analysis Date	12/18/2015 13:22		12/18/2015 13:22		
	Matrix	Water		Water		
SM 2540 C-2011		Units Result	mg/L LOQ	Result	RPD	RPD Limit
Total Dissolved Solids(TDS)	WET-035	6430	10.0	6410	0	5.4

Client ID: 4271 - Michael Pisani & Associates
SDG: 215121807
PM: RKW

GCAL ANALYTICAL LABORATORIES, LLC

7979 GSRI Ave., Baton Rouge, LA 70820-7402
Phone: 225.769.4900 • Fax: 225.767.5717 • www.gcal.com

CHAIN OF CUSTODY RECORD

Report to:
Client: Michael Pisani & Assoc
Address: 1100 Poydras St Suite 1430
Contact: Dave Angle
Phone: 281 542 5700
E-mail:

Bill to:
Client: ←
Address:
Contact:
Phone:
E-mail:

P.O. Number: 07-47
Project Name/Number: EWL - GW sampling (oversight)
Sampled By: Jonathan Miller / [signature]

Analytical Requests & Method: Total Metals *; Diss Metals * (field filtered); Bromide TDS Chloride; Sodium Calcium Magnesium Potassium (Cat); Sulfate Alkalinity Bicarbonate Carbonate (An); TPH Fractions (split EPH); BTEX; TPH DRO 8015; Semi-Vols 8270

GCAL use only:
Custody Seal used ☐ yes ☒ no E2C
intact ☐ yes ☐ no
Temperature °C 3.9, 4.7, 0.5,

☐ Dissolved Analysis Requested
☐ Field filtered
☐ Lab filtered

Matrix[1]	Date 2015	Time (2400)	Comp	Grab	Sample Description	No Containers	Total Metals	Diss Metals	Bromide TDS Chloride	Sodium Calcium Magnesium	Potassium	Sulfate	Alkalinity Bicarbonate Carbonate	TPH Fractions	BTEX	TPH DRO 8015	Semi-Vols 8270	Preservative
GW	12-14	1030			TBB-2M		X	X	X	X	X	X	X	X	X	X		1
GW	12-15	1100			TBB-2D		X	X	X	X	X	X	X	X	X	X		2
GW	12-15	11:30			TBB-3D		X	X	X	X	X	X	X	X	X	X	X	3
GW	12-15	1210			TBB-3D Purge Water @ 5 gal												X	4
GW	12-16	1130			MC-1		X	X	X	X	X	X	X	X	X	X		5

Air Bill No:

Turn Around Time (Business Days): ☐ 24h* ☐ 48h* ☐ 3 days* ☐ 1 week* ☐ Standard (Per Contract/Quote) [Turnaround: see Randy Whillinston]

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
[signature]			Donald Pollard	12-17-15	1155
Donald Pollard	12-17-15	1545	[signature]	12-17-15	1545

Note: * As, Ba, Cd, Cr, Fe, Mn, Pb, Sr Zn, Hg

By submitting these samples, you agree to GCAL's terms and conditions contained in our most recent schedule of services.

Matrix[1]: 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 PM.

WHITE: CLIENT FINAL REPORT - CANARY: CLIENT

GCAL ANALYTICAL LABORATORIES, LLC

SAMPLE RECEIVING CHECKLIST

215121805

SAMPLE DELIVERY GROUP 215121805	
Client PM JLM 4183 - Louisiana Pigment	**Transport Method** COURIER
Profile Number 7787	**Received By** Lofton, Katie E.
Line Item(s) 1 - Waste Characterization	**Receive Date(s)** 12/17/15

CHECKLIST	YES	NO	NA
Were all samples received using proper thermal preservation?	☐	☐	☐
When used, were all custody seals intact?	☐	☐	☐
Were all samples received in proper containers?	☐	☐	☐
Were all samples received using proper chemical preservation?	☐	☐	☐
Was preservative added to any container at the lab?	☐	☐	☐
Were all containers received in good condition?	☐	☐	☐
Were all VOC water samples received without head space?	☐	☐	☐
Do all sample labels match the Chain of Custody?	☐	☐	☐
Did the Chain of Custody list the sampling technician?	☐	☐	☐
Was the COC maintained i.e. all signatures, dates and time of receipt included?	☐	☐	☐

COOLERS		
Airbill	**Thermometer ID:**	**Temp(°C)**

DISCREPANCIES
None

LAB PRESERVATIONS
None

NOTES	

Revision 1.1

Page 1 of 1

MICHAEL PISANI & ASSOCIATES, INC.

New Orleans, LA

07-47

East White Lake Groundwater

STANDARD LEVEL IV
REPORT OF ANALYSIS

WORK ORDER #15-12122-OR

January 21, 2016

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 # 15-12122

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

Date for Partial	Initials	Date	Initials	Checklist Items
		12-30-15	JEB	Sample Log-In
		01/13/16	EJT	Data Compilation
		1-19-16	MLT	First Technical Data Review
		1/19/16	M	Second Technical Data Review
		01/20/16	EJT	Data Entry/Electronic Deliverable
		01/20/16	EJT	Case Narrative
		1-24-16	MLT	Electronic Deliverable Proof
		1/21/16	M	Samples Analyzed within Holding Time Yes? [X] No? [ ]
		1/21/16	M	QA/QC Review
		01/14/16	EJT	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: _____ 1/21/16

Laboratory Manager Date

Copy No. _____

SECTION I

CHAIN OF CUSTODY
&
pH CHECK SHEET

CHAIN OF CUSTODY RECORD

Lab use only

Client Name	Client #	Workorder #	Due Date

Report to:
Client: Michael Pisani & Associates
Address: 1100 Poydras Street Suite 1430, NOLA 70163
Contact: Lance Cooper
Phone: 504-582-2476
Fax: lcooper@mpisani.com

Bill to:
Client: SAME
Address:
Contact:
Phone:
Fax:

15-12122
REC'D DEC 30 2015

P.O. Number: 7-47
Project Name/Number: EWL Groundwater Sampling
Sampled By: LRC/DBM/JQM

Lab use only:
Custody Seal used ☐ yes ☐ no
in tact ☐ yes ☐ no
Temperature °C

	Matrix[1]	Date	Time (2400)	Comp	Grab	Sample Description	Preservatives	No Containers	Ra 226	Ra 228	TDS	Lab ID
4	W	12/15/15	0930		✓	TBB-3S	None	1	✓	✓	✓	
5	W	12/17/15	1346		✓	TBB-1D	None	1	✓	✓	✓	
6	W	12/17/15	1545		✓	TBB-1S	None	1	✓	✓	✓	
7	W	12/22/15	1045		✓	TBA-1D	None	1	✓	✓	✓	
8	W	12/5/15	1330		✓	TBB-3D	None	1	✓	✓	✓	
9	W	12/5/15	1100		✓	TBB-2D	None	1	✓	✓	✓	
10	W	12/14/15	1230		✓	TBB-2M	None	1	✓	✓	✓	
11	W	12/16/15	1130		✓	MC-1	None	1	✓	✓	✓	

Remarks:

Turn Around Time: ☐ 24-48 hrs. ☐ 3 days ☐ 1 week ☑ Standard ☐ Other

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
	Fed Ex 7752 9178 6642	12/24/15	1200
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
		12/30/15	1000
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

Note: Call Dave Angle regarding turnaround time @ 281-242-3271

By submitting these samples, you agree to the terms and conditions contained in our most recent schedule of services.

55655

EBERLINE SERVICES — Richmond Laboratory

Chain of Custody

CLIENT: Michael Pisani & Assoc

PURCHASE ORDER NO. _____

ADDRESS: 1100 Poydras St. Suite 1430 New Orleans, LA 70163
Lance Cooper (504) 582-2476 lcooper@mpisani.com

PROJECT: EWL-GW Sampling (Oversight) 07-47

SAMPLERS SIGNATURE: [signature]

DATE _____ PAGE ____ OF ____

TAT (IN DAYS) _____

SAMPLE NO.	DATE	TIME	LOCATION	PARAMETERS: Radium 226/228	PARAMETERS: TDS	SAMPLE TYPE OR MATRIX	# CONTAINERS	OBSERVATIONS, COMMENTS, VOLUMES, SPECIAL OR ADDITIONAL TEST
12								
BC-1	12-28-15	1640	EWL	X	X	W	1	
ext to 1/30/15								

15-12122
~~15-12123~~ ext to 1/30/15

REC'D DEC 30 2015

1) RELINQUISHED BY / DATE:	2) RECEIVED BY / DATE:	3) RELINQUISHED BY / DATE:	4) RECEIVED BY / DATE:
[signature] 12/29/15 1600	Trk: 7753 0983 5190 12/29/15 1600	Fed Ex	[signature] 12-30-15 1000
COMPANY: MPA	COMPANY: Fedex	COMPANY:	COMPANY: Eberline
5) RELINQUISHED BY / DATE:	6) RECEIVED BY / DATE:	7) RELINQUISHED BY / DATE:	8) RECEIVED BY / DATE:
COMPANY:	COMPANY:	COMPANY:	COMPANY:

TOTAL NO. OF CONTAINERS: 1

METHOD OF SHIPMENT: Fedex

SPECIAL SHIPMENT-HANDLING, STORAGE REQUIREMENTS, OR POSSIBLE HAZARDS

2030 Wright Avenue P.O. Box 4040 Richmond, CA 94804-0040 (510) 235-2633 FAX No. (510) 235-0438

EBERLINE SERVICES Oak Ridge Laboratory	Internal Chain of Custody	Work Order #	15-12122
		Lab Deadline	1/11/2016
		Analysis	Ra226 - Level 4
		Sample Matrix	Water

Comments	Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
	04	35	PP1.4
	05	37	PP1.4
	06	34	PP1.4
	07	36	PP1.4
	08	34	PP1.4
	09	39	PP1.4
	10	42	PP1.4
	11	36	PP1.4
	12	36	PP1.4

	Location (circle one)					Initials	Date
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	JNope	1/4/16 0940
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	JNope	1/5/16 0630
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	700 KC	1/5/16
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	1130 KC	1/7/16
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	KB 1/7/16	1139
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	KB 1/7/16	1755
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		

EBERLINE SERVICES
Oak Ridge Laboratory

Internal Chain of Custody

Work Order #	15-12122
Lab Deadline	1/11/2016
Analysis	Ra228 - Level 4
Sample Matrix	Water

Comments

Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
04	35	PP1.4
05	37	PP1.4
06	34	PP1.4
07	36	PP1.4
08	34	PP1.4
09	39	PP1.4
10	42	PP1.4
11	36	PP1.4
12	36	PP1.4

	Location (circle one)	Initials	Date
Received by	(Sample Storage) Rough Prep Prep Separations Count Room	Jnope 1/4/16 0840	
Relinquished by	Sample Storage Rough Prep (Prep) Separations Count Room	Jnope 1/5/16 0650	
Received by	Sample Storage Rough Prep Prep (Separations) Count Room	700 KC	1/5/16
Relinquished by	Sample Storage Rough Prep Prep (Separations) Count Room	1130 KC	1/7/16
Received by	Sample Storage Rough Prep Prep Separations (Count Room)	JCB 1/7/16	1139
Relinquished by	Sample Storage Rough Prep Prep Separations Count Room	KCB 1/7/16	1705
Received by	Sample Storage Rough Prep Prep (Separations) Count Room	700 KC	1/11/16
Relinquished by	Sample Storage Rough Prep Prep (Separations) Count Room	915 KC	1/13/16
Received by	Sample Storage Rough Prep Prep Separations (Count Room)	0815	1/13/16
Relinquished by	Sample Storage Rough Prep Prep ~~Separations~~ (Count Room)		1/13/16 1127
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		

EBERLINE SERVICES
Oak Ridge Laboratory

Internal Chain of Custody

Work Order #	15-12122
Lab Deadline	12/31/2015
Analysis	TDS - Level 4
Sample Matrix	Water

Comments	Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
	04	35	PP1.4
	05	37	PP1.4
	06	34	PP1.4
	07	36	PP1.4
	08	34	PP1.4
	09	39	PP1.4
	10	42	PP1.4
	11	36	PP1.4
	12	36	PP1.4

	Location (circle one)					Initials	Date
Received by	(Sample Storage)	Rough Prep	Prep	Separations	Count Room 800	JPackett	12-30-15
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	MH	31DEC15 0340
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		
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		

EBERLINE SERVICES

Sample Receiving Report
(Volumes, pH, & CPM)

Internal Work Order
15-12122
Received By
JBAILEY

FR	ClientID	# Btls	Comments	Matrix	Storage	Rec Vol Ttl	CPM Max
01	LCS	0		WA	PP1.4		
02	BLANK	0		WA	PP1.4		
03	DUP	0		WA	PP1.4		
04	TBB-3S	1		WA	PP1.4	3.76	35
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	3.7600	35
05	TBB-1D	1		WA	PP1.4	3.76	37
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	3.7600	37
06	TBB-1S	1		WA	PP1.4	3.76	34
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	3.7600	34
07	TBA-1D	1		WA	PP1.4	3.76	36
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	3.7600	36
08	TBB-3D	1		WA	PP1.4	3.76	34
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	3.7600	34
09	TBB-2D	1		WA	PP1.4	3.76	39
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	3.7600	39
10	TBB-2M	1		WA	PP1.4	3.76	42
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	3.7600	42
11	MC-1	1		WA	PP1.4	3.76	36
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	3.7600	36
12	BC-1	1		WA	PP1.4	3.76	36
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	3.7600	36

✓ ejf 12/30/15

Received by: _____ Date: 123015

SECTION II

SAMPLE ACKNOWLEDGEMENT

Client Name	Contract/PO	Project Type	Date Received	Required Turnaround Days	Eberline Services Work Order
Michael Pisani & Associates, Inc.	07-47 E White Lake	Environmental	12/30/2015	14	15-12122
Project Name	**Client WO**	**Sample Disp**	**Lab Deadline**	**Internal Deadline**	**Client Deadline**
07-47 E White Lake	07-47 E White Lake	W	01/11/2016	01/12/2016	01/13/2016

Internal ID	Client ID	Sample Date	Matrix	Storage	Ra226	Ra228	TDS																						Ttl
01	LCS	12/30/15	WA	PP1.4	X	X	X																						3
02	BLANK	12/30/15	WA	PP1.4	X	X	X																						3
03	DUP	12/30/15	WA	PP1.4	X	X	X																						3
04	TBB-3S	12/18/15 09:30	WA	PP1.4	X	X	X																						3
05	TBB-1D	12/17/15 13:45	WA	PP1.4	X	X	X																						3
06	TBB-1S	12/17/15 15:45	WA	PP1.4	X	X	X																						3
07	TBA-1D	12/22/15 10:45	WA	PP1.4	X	X	X																						3
08	TBB-3D	12/15/15 13:30	WA	PP1.4	X	X	X																						3
09	TBB-2D	12/15/15 11:00	WA	PP1.4	X	X	X																						3
10	TBB-2M	12/14/15 12:30	WA	PP1.4	X	X	X																						3
11	MC-1	12/16/15 11:30	WA	PP1.4	X	X	X																						3
12	BC-1	12/28/15 16:40	WA	PP1.4	X	X	X																						3
																													0
																													0
																													0
																													0
																													0
																													0
																													0
																													0
Totals Per Analysis (non QA samples)					9	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

EBERLINE SERVICES

Sample Log In Report

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

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

Invoice	Accounts Payable Michael Pisani & Associates 1100 Poydras St. #1430 New Orleans, LA 70163	
Voice	504-582-2468	
Fax	504-582-2470	
Contact	Lance Cooper	
Voice	504-582-2468	
Fax		
Report Data	Lance Cooper Michael Pisani & Associates 1100 Poydras St, 1430 Energy Ctr New Orleans, LA 70163	
Voice	504-582-2468	
Fax		

Printed: 12/31/2015 8:17 AM

Eberline Services – Oak Ridge Laboratory

SAMPLE RECEIPT CHECKLIST
MP-001-2

WORK ORDER # 15-12122

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: _____

SIGNATURE: James E Bailey DATE: 12 30 15

SECTION III

CASE NARRATIVE

EBERLINE SERVICES

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

EBS-OR-40207

January 21, 2016

Lance Cooper
Michael Pisani & Associates, Inc.
1100 Poydras St, Suite 1430
New Orleans, LA 70163

CASE NARRATIVE
Work Order # 15-12122-OR

SAMPLE RECEIPT

This work order contains nine water samples received 12/30/2015. All samples were analyzed for Radium-226/228 and Total Dissolved Solids.

CLIENT ID	LAB ID	CLIENT ID	LAB ID
TBB-3S	15-12122-04	TBB-2D	15-12122-09
TBB-1D	15-12122-05	TBB-2M	15-12122-10
TBB-1S	15-12122-06	MC-1	15-12122-11
TBA-1D	15-12122-07	BC-1	15-12122-12
TBB-3D	15-12122-08		

ANALYTICAL METHODS

Radium-226 was analyzed using EPA Method 903.0 Modified. Radium-228 was analyzed using EPA Method 904.0. Total Dissolved Solids was performed using Standard Methods 2540C.

ANALYTICAL RESULTS

Combined Standard Uncertainty is reported at 2-sigma value.

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 then 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 by the use of a Barium-133 tracer, which was determined by HPGe gamma spectroscopy.

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 an acceptable relative percent difference and normalized difference. Results for the Radium-226 laboratory control sample demonstrated an acceptable percent recovery.

ANALYTICAL RESULTS CONTINUED

RADIUM-228

Following alpha spectroscopy analysis of Radium-226, Barium/Radium Sulfate precipitates were re-dissolved and time was 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 then counted on a gas proportional counter. Chemical recovery was determined by the use of 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 a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Radium-228 laboratory control sample demonstrated an acceptable percent recovery.

TOTAL DISSOLVED SOLIDS (TDS)

A volumetric aliquot of each sample was taken and filtered through a tared 0.45µm filter media into a tared 250ml beaker. Samples were then dried on a hot plate and were allowed to cool. The TDS content was determined by reweighing tared beakers.

Samples demonstrated Total Dissolved Solids contents that ranged from 584.0 to 26,822.0 mg/L.

CERTIFICATION OF ACCURACY

I certify that this data report is in compliance 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: 1/21/2016

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

SECTION IV

ANALYTICAL RESULTS SUMMARY

Eberline Analytical
Final Report of Analysis

Report To:
Lance Cooper
Michael Pisani & Associates
1100 Poydras St, 1430 Energy Ctr
New Orleans, LA 70163

Work Order Details:
SDG: 15-12122
Project: 07-47 E White Lake
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
15-12122-01	LCS	KNOWN	12/30/15 00:00	12/30/2015	1/7/2016	15-12122	Radium-226	EPA 903.0 Modified	9.90E+00	4.56E-01			pCi/l
15-12122-01	LCS	SPIKE	12/30/15 00:00	12/30/2015	1/7/2016	15-12122	Radium-226	EPA 903.0 Modified	1.06E+01	1.38E+00	2.64E+00	4.29E-01	pCi/l
15-12122-02	MBL	BLANK	12/30/15 00:00	12/30/2015	1/7/2016	15-12122	Radium-226	EPA 903.0 Modified	6.46E-03	9.02E-02	9.02E-02	2.58E-01	pCi/l
15-12122-03	DUP	BC-1	12/28/15 16:40	12/30/2015	1/7/2016	15-12122	Radium-226	EPA 903.0 Modified	7.37E-01	3.71E-01	4.03E-01	3.43E-01	pCi/l
15-12122-04	TRG	TBB-3S	12/18/15 09:30	12/30/2015	1/7/2016	15-12122	Radium-226	EPA 903.0 Modified	6.75E-01	5.14E-01	5.33E-01	5.69E-01	pCi/l
15-12122-05	TRG	TBB-1D	12/17/15 13:45	12/30/2015	1/7/2016	15-12122	Radium-226	EPA 903.0 Modified	1.75E+00	5.91E-01	6.97E-01	3.67E-01	pCi/l
15-12122-06	TRG	TBB-1S	12/17/15 15:45	12/30/2015	1/7/2016	15-12122	Radium-226	EPA 903.0 Modified	3.85E+00	8.08E-01	1.15E+00	2.40E-01	pCi/l
15-12122-07	TRG	TBA-1D	12/22/15 10:45	12/30/2015	1/7/2016	15-12122	Radium-226	EPA 903.0 Modified	1.31E+00	4.94E-01	5.66E-01	2.78E-01	pCi/l
15-12122-08	TRG	TBB-3D	12/15/15 13:30	12/30/2015	1/7/2016	15-12122	Radium-226	EPA 903.0 Modified	1.82E+00	8.64E-01	9.47E-01	6.02E-01	pCi/l
15-12122-09	TRG	TBB-2D	12/15/15 11:00	12/30/2015	1/7/2016	15-12122	Radium-226	EPA 903.0 Modified	1.75E+00	5.91E-01	6.97E-01	3.00E-01	pCi/l
15-12122-10	TRG	TBB-2M	12/14/15 12:30	12/30/2015	1/7/2016	15-12122	Radium-226	EPA 903.0 Modified	2.46E+00	7.33E-01	8.98E-01	3.84E-01	pCi/l
15-12122-11	TRG	MC-1	12/16/15 11:30	12/30/2015	1/7/2016	15-12122	Radium-226	EPA 903.0 Modified	2.03E+00	6.49E-01	7.77E-01	2.76E-01	pCi/l
15-12122-12	DO	BC-1	12/28/15 16:40	12/30/2015	1/7/2016	15-12122	Radium-226	EPA 903.0 Modified	8.34E-01	4.28E-01	4.63E-01	2.35E-01	pCi/l
15-12122-01	LCS	KNOWN	12/30/15 00:00	12/30/2015	1/13/2016	15-12122	Radium-228	EPA 904.0	9.03E+00	4.60E-01			pCi/l
15-12122-01	LCS	SPIKE	12/30/15 00:00	12/30/2015	1/13/2016	15-12122	Radium-228	EPA 904.0	8.57E+00	7.06E-01	2.06E+00	7.91E-01	pCi/l
15-12122-02	MBL	BLANK	12/30/15 00:00	12/30/2015	1/13/2016	15-12122	Radium-228	EPA 904.0	2.36E-01	3.61E-01	3.65E-01	7.47E-01	pCi/l
15-12122-03	DUP	BC-1	12/28/15 16:40	12/30/2015	1/13/2016	15-12122	Radium-228	EPA 904.0	7.24E-01	3.93E-01	4.26E-01	7.61E-01	pCi/l
15-12122-04	TRG	TBB-3S	12/18/15 09:30	12/30/2015	1/13/2016	15-12122	Radium-228	EPA 904.0	1.41E+00	8.26E-01	8.85E-01	1.60E+00	pCi/l
15-12122-05	TRG	TBB-1D	12/17/15 13:45	12/30/2015	1/13/2016	15-12122	Radium-228	EPA 904.0	6.80E-01	5.10E-01	5.33E-01	1.02E+00	pCi/l
15-12122-06	TRG	TBB-1S	12/17/15 15:45	12/30/2015	1/13/2016	15-12122	Radium-228	EPA 904.0	8.36E+00	6.78E-01	2.01E+00	7.13E-01	pCi/l
15-12122-07	TRG	TBA-1D	12/22/15 10:45	12/30/2015	1/13/2016	15-12122	Radium-228	EPA 904.0	1.20E+00	3.98E-01	4.82E-01	7.12E-01	pCi/l
15-12122-08	TRG	TBB-3D	12/15/15 13:30	12/30/2015	1/13/2016	15-12122	Radium-228	EPA 904.0	2.15E+00	1.14E+00	1.24E+00	2.18E+00	pCi/l
15-12122-09	TRG	TBB-2D	12/15/15 11:00	12/30/2015	1/13/2016	15-12122	Radium-228	EPA 904.0	1.23E+00	4.94E-01	5.67E-01	9.23E-01	pCi/l
15-12122-10	TRG	TBB-2M	12/14/15 12:30	12/30/2015	1/13/2016	15-12122	Radium-228	EPA 904.0	6.18E+00	7.69E-01	1.60E+00	1.09E+00	pCi/l
15-12122-11	TRG	MC-1	12/16/15 11:30	12/30/2015	1/13/2016	15-12122	Radium-228	EPA 904.0	1.92E+00	4.86E-01	6.51E-01	8.46E-01	pCi/l
15-12122-12	DO	BC-1	12/28/15 16:40	12/30/2015	1/13/2016	15-12122	Radium-228	EPA 904.0	1.02E+00	4.78E-01	5.31E-01	9.09E-01	pCi/l

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (2-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original

Eberline Analytical
Final Report of Analysis

Report To:	Work Order Details:	
Lance Cooper	SDG:	**15-12122**
Michael Pisani & Associates	Project:	07-47 E White Lake
1100 Poydras St, 1430 Energy Ctr	Analysis Category:	ENVIRONMENTAL
New Orleans, LA 70163	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
15-12122-04	TRG	TBB-3S	12/18/15 09:30	12/30/2015	12/31/2015	15-12122	TDS	SM 2540C	1.91E+03				mg/l
15-12122-05	TRG	TBB-1D	12/17/15 13:45	12/30/2015	12/31/2015	15-12122	TDS	SM 2540C	1.97E+03				mg/l
15-12122-06	TRG	TBB-1S	12/17/15 15:45	12/30/2015	12/31/2015	15-12122	TDS	SM 2540C	2.68E+04				mg/l
15-12122-07	TRG	TBA-1D	12/22/15 10:45	12/30/2015	12/31/2015	15-12122	TDS	SM 2540C	1.35E+03				mg/l
15-12122-08	TRG	TBB-3D	12/15/15 13:30	12/30/2015	12/31/2015	15-12122	TDS	SM 2540C	1.43E+03				mg/l
15-12122-09	TRG	TBB-2D	12/15/15 11:00	12/30/2015	12/31/2015	15-12122	TDS	SM 2540C	1.94E+03				mg/l
15-12122-10	TRG	TBB-2M	12/14/15 12:30	12/30/2015	12/31/2015	15-12122	TDS	SM 2540C	7.82E+03				mg/l
15-12122-11	TRG	MC-1	12/16/15 11:30	12/30/2015	12/31/2015	15-12122	TDS	SM 2540C	1.66E+03				mg/l
15-12122-12	TRG	BC-1	12/28/15 16:40	12/30/2015	12/31/2015	15-12122	TDS	SM 2540C	5.84E+02				mg/l

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (2-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original

EBERLINE SERVICES

EBERLINE ANALYTICAL CORPORATION
601 SCARBORO ROAD OAK RIDGE, TN 37830 865/481-0683 FAX 865/483-4621

SECTION V

ANALYTICAL STANDARDS

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 10/27/2015 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: October 20, 2016

Verified & Approved By _____ Date: 10/27/2015

QC Approval _____ Date: 10/28/15

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 10/27/2015 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
Parent Solution Conc.: 2.22E+03 dpm/ml

Reference Date: 2/1/1994 0:00

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: October 20, 2016

Verified & Approved By _____ Date: 10/27/2015 0:00

QC Approval _____ Date: 10/28/15

RA-11

ANALYTICS

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

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

62680-416

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):	2.585 E3
HALF-LIFE:	5.75 years
CALIBRATION DATE:	November 7, 2001 12:00 EST
TOTAL UNCERTAINTY*:	4.0%
SYSTEMATIC:	3.0%
RANDOM:	1.0%

*99% Confidence Level

Impurities: γ-impurities (other than decay products) <0.1%

5.07198 grams 0.1M HCl solution with 50 µg/g Ba carrier.

P O NUMBER 9508, Item 1 (Part #4339A)

SOURCE PREPARED BY: M. D. Currie
M. D. Currie, Radiochemist

Q A APPROVED: 11/7/01

New vial from the 6/11/01 shipment.
P.S. Different activity Level
8/19/11

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: 4/15/2015 0:00

SOLUTION REFERENCE #: Analytics 62680-416 | SOLUTION #: Ra-11

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

Radionuclide: ^{228}Ra
Certified Activity: 6.986E-02 µCi
Certified Concentration: µCi per gram

Reference Date: 11/7/2001 0:00

Ampoule /Solution Gross	9.4982	Weight, Grams
Empty Ampoule	4.4895	Weight, Grams
Solution Net	5.0087	Weight, Grams
Total Activity in Ampoule	0.0699	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 1000.00 milliliters

Certified Total Activity of 0.0699 µCi Which Equals 1.551E+05 dpm at the date listed above

And after dilution the activity of this solution is 1.551E+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: March 4, 2016

Recertified By _____ Date: 4/15/15

QC Approval _____ Date: 4/15/15

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 SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
QCP 009-1

CURRENT DATE: 7/2/2015 0:00

SOLUTION REFERENCE #: NIST SRM4251C

SOLUTION #: Ba-6

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

Radionuclide: ^{133}Barium

Reference Date: 9/1/1993 0:00

Certified Activity: µCi

Certified Concentration: 1.318E+01 µCi per gram

Ampoule /Solution Gross	9.3081	Weight, Grams
Empty Ampoule	4.2582	Weight, Grams
Solution Net	5.0499	Weight, Grams
Total Activity in Ampoule	66.5577	µCi

Chemical Composition of Standard Solution

$^{133}BaCl_2$ in 1M HCl

Dilution Instructions:

Dilution Solvent Used: 1M HCl

Dilute to a volume of: 1000.00 milliliters

Certified Total Activity of: 66.5577 µCi

Which Equals: 1.478E+08 dpm at the date listed above

And after dilution the activity of this solution is: 1.478E+05 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: May 8, 2016

Verified & Approved By: _____ Date: 7/2/15

QC Approval: _____ Date: 7-6-15

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

Solution Reference # NIST SRM4251C

Date 7/2/15

Solution # Ba-6a

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

Radionuclide of Interest ^{133}Ba

Parent Solution Conc. 1.48E+05 dpm/ml

Reference Date 9/1/1993 0:00

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

Total Activity: 3.6950E+06 dpm

Final Volume: 1000.00 ml

Final Activity Concentration: 3.6950E+03 dpm/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: May 8, 2016

Verified & Approved By _____ Date: 7/2/15

QC Approval _____ Date: 7-6-15

SECTION VI

QUALITY CONTROL SAMPLE RESULTS SUMMARY

Eberline Services
Analysis Control Chart

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
15-12122	Ra226	1	pCi	l	Michael Pisani & Associates, Inc.

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		107.26%	24.82%	100.00%	4.60%	9.90E+00	4.56E-01	1.06E+01	2.64E+00	Ra-5b	4.40E+01	4.60E+00	4.99E-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 / QC Summary

Analyte	Normalized Difference	RPD	Original Result	Original CSU	Replicate Result	Replicate CSU	LCS Relative Bias	LCS % R		MS % R	MS ND	Rep RPD	Rep ND
RA-226	0.31	12.29	8.34E-01	4.63E-01	7.37E-01	4.03E-01	1.07	OK				NA	OK

Version

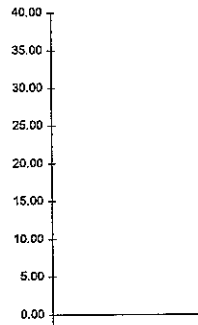
000030 ext 01/20/16

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
15-12122	Ra226	1	pCi	l	Michael Pisani & Associates, Inc.

LCS % Recovery

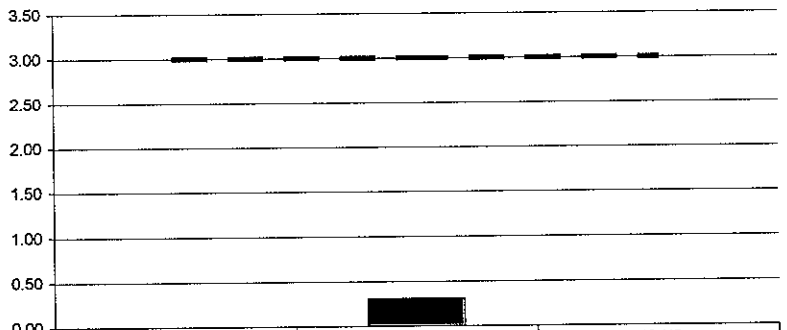
	RA-226
Lower Error	77.84
Upper Error	136.68
%R	107.26
LCL	75
Mean	100
UCL	125

Replicate Sample RPD



	RA-226
Lower Error	15.68
Upper Error	8.91
RPD	12.29
CL	35

Normalized Difference



	LCS ND	REP ND	MS ND
RA-226	0.00	0.31	0.00
UCL	3	3	3

No Matrix Spike

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
15-12122	Ra228	1	pCi	l	Michael Pisani & Associates, Inc.

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		94.92%	24.09%	100.00%	5.10%	9.03E+00	4.60E-01	8.57E+00	2.06E+00	Ra-11	2.81E+01	5.10E+00	7.14E-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

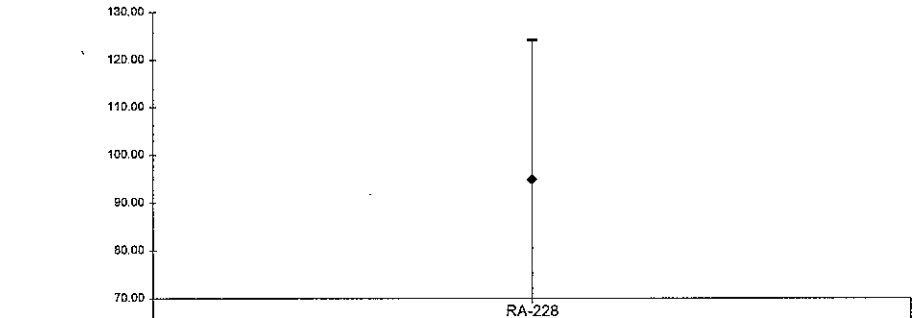
Analyte	*Normalized Difference*	*RPD*	*Original Result*	*Original CSU*	*Replicate Result*	*Replicate CSU*
RA-228	0.86	34.35	1.02E+00	5.31E-01	7.24E-01	4.26E-01

QC Summary

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

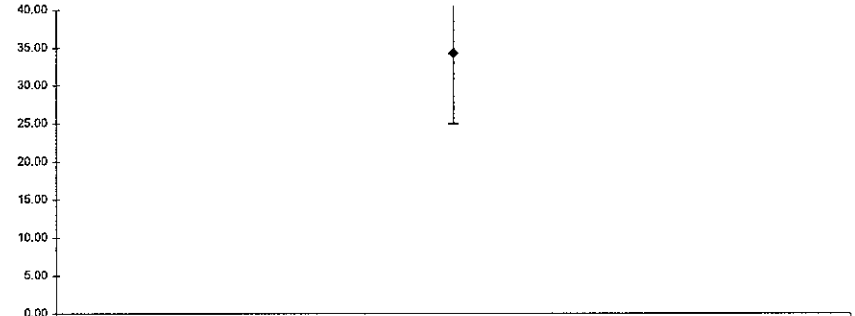
WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
15-12122	Ra228	1	pCi	l	Michael Pisani & Associates, Inc.

LCS % Recovery



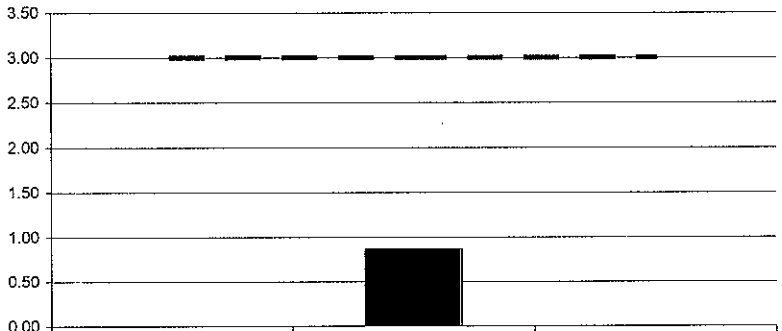
	RA-228
Lower Error	65.73
Upper Error	124.12
%R	94.92
LCL	75
Mean	100
UCL	125

Replicate Sample RPD



	RA-228
Lower Error	43.76
Upper Error	24.95
RPD	34.35
CL	35

Normalized Difference



	LCS ND	REP ND	MS ND
RA-228	0.00	0.86	0.00
UCL	3	3	3

No Matrix Spike

SECTION VII

LABORATORY TECHNICIAN'S NOTES & RUNLOGS

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	15-12122
Analysis Code	Ra226
Run Number	1

#	Date	Dept	User	Notes
1	01/04/16 09:13	PREP	JWOLFE	ALIQUOTED AND ADDED SPIKES AND TRACERS- PH'D SAMPLES- PRECIPITATED WITH BA AND PB CARRIERS AND AMMONIUM SULFATE- DECANTED SAMPLES AND CENTRIFUGED- SUBMITTED RADIUM PRECIP TO SEPARATIONS

JWolfe
1/4/16

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	15-12122
Analysis Code	Ra226
Run Number	1

#	Date	Dept	User	Notes
1	01/04/16 09:13	PREP	JWOLFE	ALIQUOTED AND ADDED SPIKES AND TRACERS- PH'D SAMPLES- PRECIPITATED WITH BA AND PB CARRIERS AND AMMONIUM SULFATE- DECANTED SAMPLES AND CENTRIFUGED- SUBMITTED RADIUM PRECIP TO SEPARATIONS
2	01/07/16 10:52	CHEM	KCOULSTON	ADDED EDTA TO SAMPLES AND LET SIT OVERNIGHT. SYRINGE FILTERED SAMPLES, ADDED AMMONIUM SILFIDE AND ACETIC ACID TO SAMPLES. FILTERED ONTO TARRED FILTER PAPERS, LET DRY UNDER HEAT LAMP, REWEIGHED, AND SUBMITTED TO COUNT.

Kristen Coulston 1/7/16

EBERLINE SERVICES

Reagents Used in an Analysis

Internal Work Order	
15-12122	
Analysis Code	Run
Ra226	1

Reagent ID	Reagent Name	Reagent Concentration	Analyst ID	Date Recorded
015857P	Ammonium Hydroxide	Reagent Grade	JWOLFE	1/4/2016
016882D02	Ammonium Sulfate	200 mg/ml	JWOLFE	1/4/2016
016561D07	Barium Carrier	1 mg/ml	JWOLFE	1/4/2016
015956D06	Lead Carrier	166 mg/ml	JWOLFE	1/4/2016
016886P	Nitric Acid	Reagent Grade	JWOLFE	1/4/2016
013820P	Acetic Acid	Reagent Grade	KCOULSTON	1/7/2016
016473S	Ammonium Sulfate	200 mg/ml	KCOULSTON	1/7/2016
016797S	EDTA	0.25M	KCOULSTON	1/7/2016

Alpha #3

Date	Sample#	Client	Load Time	Count Time	Analysis	Ped
1/7	1512077A(1-4)	Ucon	0852	2hr50	UU-Iso	—
1/7	1512077ANY(1-4)	Ucon	0852	2hr50	UUNY	—
1/7	1512078A(1-4)	Ucon	0852	2hr50	UU-Iso	—
1/7	1512078ANY(1-4)	Ucon	0853	2hr50	UUNY	—
1/7	1512087A(1-4)	Lowstream	0853	2hr50	UU-Iso	—
1/7	1512072A(1-4)	Ucon	0854	2hr50	Pu-Iso	—
1/7	1512077A(1-2)	Ucon	0854	2hr50	Pu-Iso	—
1/7/16	1512072A(4)	Ucon	1153	2hr50	Th229	KB
1/7/16	1512077A(1-4)	Ucon	1153	2hr50	Np	KB
1/7/16	1512078A(1-4)	Ucon	1154	2hr50	Np	KB
1/7/16	1512066A(1-6)	Seacy	1154	2hr50	Iso-Pu	KB
1/7/16	1512077A(1-4)	Ucon	1155	2hr50	Th229	KB
1/7/16	1512108A (1-4)	Access	1156	2hr50	Ra6	KB
1/7/16	1512102A (1-5)	Accutest	1154	2hr50	Ra6	KB
1/7/16	1512105A (1-6)	Tetra Tech	1451	2hr50mins	Ra6	KB
1/7/16	1512122A (1-12)	MPA	1453	2hr50mins	Ra6	KB
1/7/16	1512101A (1-4)	Accutest	1454	2hr50mins	Ra6	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	15-12122
Analysis Code	Ra228
Run Number	1

#	Date	Dept	User	Notes
1	01/04/16 09:13	PREP	JWOLFE	ALIQUOTED AND ADDED SPIKES AND TRACERS- PH'D SAMPLES- PRECIPITATED WITH BA AND PB CARRIERS AND AMMONIUM SULFATE- DECANTED SAMPLES AND CENTRIFUGED- SUBMITTED RADIUM PRECIP TO SEPARATIONS

JWolfe
1/4/16

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	15-12122
Analysis Code	Ra228
Run Number	1

#	Date	Dept	User	Notes
1	01/04/16 09:13	PREP	JWOLFE	ALIQUOTED AND ADDED SPIKES AND TRACERS- PH'D SAMPLES- PRECIPITATED WITH BA AND PB CARRIERS AND AMMONIUM SULFATE- DECANTED SAMPLES AND CENTRIFUGED- SUBMITTED RADIUM PRECIP TO SEPARATIONS
2	01/13/16 07:30	CHEM	KCOULSTON	ADDED FILTER PAPERS FROM COUNT ROOM TO LABELED C-TUBES, FILLED WITH EDTA SOLUTION AND LET SIT OVERNIGHT. REMOVED FILTER FROM EDTA-ADDED 13 DROPS CONC HNO3, 2MLS YTTRIUM 9MG/ML CARRIER, 2MLS 1.5MG/ML PB CARRIER, 0.3 MLS AMMONIUM SULFITE, 25 DROPS OF 10M SODIUM HYDROXIDE, SHAKE SAMPLES, CENTRIFUGE, POUR SUPERNATE INTO CLEAN C-TUBE AND ADD 0.3MLS AMMONIUM SULFITE AND 2MLS 1.5MG/ML PB CARRIER, SHAKE SAMPLES, CENTRIFUGE, RINSE OTHER C-TUBES WITH DI-H2O THEN SYRINGE FILTER SUPERNATE BACK INTO RINSED C-TUBES. 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 TARRED FILTER PAPERS. LET DRY UNDER HEAT LAMP, REWEIGHED AND SUBMITTED TO COUNT.

Kristin Coulston 1/13/16

EBERLINE SERVICES

Reagents Used in an Analysis

Internal Work Order	
15-12122	
Analysis Code	Run
Ra228	1

Reagent ID	Reagent Name	Reagent Concentration	Analyst ID	Date Recorded
015857P	Ammonium Hydroxide	Reagent Grade	JWOLFE	1/4/2016
016882D02	Ammonium Sulfate	200 mg/ml	JWOLFE	1/4/2016
016561D07	Barium Carrier	1 mg/ml	JWOLFE	1/4/2016
015956D06	Lead Carrier	166 mg/ml	JWOLFE	1/4/2016
016886P	Nitric Acid	Reagent Grade	JWOLFE	1/4/2016
013820P	Acetic Acid	Reagent Grade	KCOULSTON	1/13/2016
016472S	Ammonium Sulfate	200 mg/ml	KCOULSTON	1/13/2016
016083D02	Ammonium Sulfide	2%	KCOULSTON	1/13/2016
016797S	EDTA	0.25M	KCOULSTON	1/13/2016
016459S	Lead Carrier	1.5 mg/ml	KCOULSTON	1/13/2016
016453S	Nitric Acid	1N	KCOULSTON	1/13/2016
016455S	Nitric Acid	6N	KCOULSTON	1/13/2016
016403P	Nitric Acid	Reagent Grade	KCOULSTON	1/13/2016
016448S	Sodium Hydroxide	10M	KCOULSTON	1/13/2016
016445S	Sodium Hydroxide	18M	KCOULSTON	1/13/2016
016916S	Yttrium Carrier	9 mg/ml	KCOULSTON	1/13/2016

LB4110 RED

Date	Sample	Client	Load Time	Time	Analysis	Rev
1/7	1512050RH(2-9)	Rep. Serv.	0929	2h	RH8	—
1/7	1512097RH(1-4)	UCON	1244	2h	RH8	[illegible]
1/7	1512098RH(1-4)	UCON	1244	2h	RH8	
1/8	GFFoc	LAB	0507	30	LB	[illegible]
1/8	Bluedoc	LAB	0547	6	LB	
~~1/8~~	~~1512109SR(2-6)~~	~~UCON~~	~~—~~	~~2h~~	~~SR90/4~~	[illegible]
~~1/8~~	~~1512104SR(1)~~	~~UCON~~	~~—~~	~~7~~	~~SR90/4~~	
~~1/8~~	~~1512097SR(1-3)~~	~~UCON~~	~~—~~	~~2h~~	~~SR90/4~~	—
1/8	1601011AB (1-6)	UCON	0718	2h	LAB	—
1/8	1512059Pb (2-4)	UCON	0718	2h	Pb210	—
1/8	1512097Pb(1)	UCON	0922	7	Pb210	—
1/8	1512089Pb(1-5)	Energy Trans.	0922	2h	Pb210	—
1/9/16	Weekly Bkgd.	Lab	1036	12 hr	αβ	AG
1/11/16	GFFoc	LAB	0506	30	LB	[illegible]
1/11/16	Bluedoc	LAB	0542	6	LB	
1/11/16	1601020AB(1-7,9)	UCON	0721	30	U/76	—
1/11/16	1512049RH(1-8)	Rep. Serv.	0958	2h	RH8	—
1/11/16	1601020AB(1-5,8)	UCOR	1204	2 hr	αβ	RB
1/12/16	GFFoc	LAB	0509	30	LB	[illegible]
1/12/16	Bluedoc	LAB	0547	6	LB	
1/12/16	1601035AB(1-2,5-8)	CG Services	0722	15	LB	[illegible]
1/12/16	1601035AB(4)	CG Services	0745	15	LAB	[illegible]
1/12/16	1512117AP(1-3,9,10)	TN Dept.	0812	1	NR22	—
1/12/16	1512071RH(1-7)	~~Accutest~~	0924	2h	RH8	—
1/12/16	1512104RH(2-4)	UCON	0926	4h	RH8	—
1/13	GFFoc	LAB	0511	30	LB	[illegible]
1/13	Bluedoc	LAB	0552	6	LB	
1/17/16	1512104Pb(1-4)	UCON	~~0708~~	2h	Pb210	[illegible]
1/17/16	1512411Pb(1-4)	UCON	0708	2h	Pb210	
1/17/16	1512122RH(1-7)	MRA	0927	2h	RH8	—
1/17/16	1512122RH(8)	MRA	1131	2h	RH8	—

TDS 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	15-12122
Analysis Code	TDS
Run Number	1

#	Date	Dept	User	Notes
1	12/31/15 02:05	PREP	MHIGHTOWER	Filtered sample into tared beaker, dried, re-weighed

Mg 31DEC15

SECTION VIII

ANALYTICAL DATA (RADIUM-226)

Eberline Services
Oak Ridge Laboratory
Analysis Sheet

15-12122
Ra226
Run 1

Work Order	**15-12122**
Analysis Code	**Ra226**
Run	**1**
Date Received	**12/30/2015**
Lab Deadline	**1/11/2016**
Client	Michael Pisani & Associates, Inc.
Project	07-47 E White Lake
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)	844.37
Carrier	
Carrier Conc (mg/ml)	

Internal Fraction	*Sample Desc*	*Client ID*	*Login CPM*	*Sample Date*	*Sample Aliquot*
01	LCS	LCS		12/30/15 00:00	1.0000E+00
02	MBL	BLANK		12/30/15 00:00	1.0000E+00
03	DUP	BC-1	36	12/28/15 16:40	1.0000E+00
04	TRG	TBB-3S	35	12/18/15 09:30	1.0000E+00
05	TRG	TBB-1D	37	12/17/15 13:45	1.0000E+00
06	TRG	TBB-1S	34	12/17/15 15:45	1.0000E+00
07	TRG	TBA-1D	36	12/22/15 10:45	1.0000E+00
08	TRG	TBB-3D	34	12/15/15 13:30	1.0000E+00
09	TRG	TBB-2D	39	12/15/15 11:00	1.0000E+00
10	TRG	TBB-2M	42	12/14/15 12:30	1.0000E+00
11	TRG	MC-1	36	12/16/15 11:30	1.0000E+00
12	DO	BC-1	36	12/28/15 16:40	1.0000E+00

* 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.

15-12122
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	0.9988	843.4	415.0	109.24		0.0227	0.0328	0.0101		109.24	3.00^	1.00
02	MBL	0.9829	829.9	377.0	100.84		0.0228	0.0333	0.0105		100.84	3.00^	1.00
03	DUP	0.9981	842.8	458.0	120.65		0.0228	0.0350	0.0122		110.00	3.00^	1.00
04	TRG	0.9914	837.1	194.0	51.45		0.0226	0.0341	0.0115		51.45	3.00^	1.00
05	TRG	0.9906	836.4	327.0	86.79		0.0228	0.0339	0.0111		86.79	3.00^	1.00
06	TRG	0.9924	838.0	396.0	104.91		0.0229	0.0685	0.0456		104.91	3.00^	1.00
07	TRG	0.9992	843.7	421.0	110.78		0.0228	0.0359	0.0131		110.00	3.00^	1.00
08	TRG	0.9963	841.2	156.0	41.17		0.0227	0.0309	0.0082		41.17	2.82	1.00
09	TRG	0.9918	837.4	352.0	93.31		0.0228	0.0384	0.0156		93.31	3.00^	1.00
10	TRG	0.9727	821.3	310.0	83.79		0.0228	0.0513	0.0285		83.79	3.00^	1.00
11	TRG	0.9913	837.0	413.0	109.54		0.0226	0.0377	0.0151		109.54	3.00^	1.00
12	DO	0.9893	835.3	363.0	96.47		0.0228	0.0358	0.0130		96.47	3.00^	1.00

* 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.

15-12122
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			01/04/16 08:16	JWOLFE	01/07/16 10:51	KCOULSTON		
02	MBL			01/04/16 08:16	JWOLFE	01/07/16 10:51	KCOULSTON		
03	DUP			01/04/16 08:16	JWOLFE	01/07/16 10:51	KCOULSTON		
04	TRG			01/04/16 08:16	JWOLFE	01/07/16 10:51	KCOULSTON		
05	TRG			01/04/16 08:16	JWOLFE	01/07/16 10:51	KCOULSTON		
06	TRG			01/04/16 08:16	JWOLFE	01/07/16 10:51	KCOULSTON		
07	TRG			01/04/16 08:16	JWOLFE	01/07/16 10:51	KCOULSTON		
08	TRG			01/04/16 08:16	JWOLFE	01/07/16 10:51	KCOULSTON		
09	TRG			01/04/16 08:16	JWOLFE	01/07/16 10:51	KCOULSTON		
10	TRG			01/04/16 08:16	JWOLFE	01/07/16 10:51	KCOULSTON		
11	TRG			01/04/16 08:16	JWOLFE	01/07/16 10:51	KCOULSTON		
12	DO			01/04/16 08:16	JWOLFE	01/07/16 10:51	KCOULSTON		

* 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.

Eberline Services
Oak Ridge Laboratory

Preliminary Data Report & Analytical Calculations

Work Order: 15-12122-Ra226-1

Run	1
Analysis Code	Ra226
Eberline Services Work Order	15-12122
Client	Michael Pisani & Associates, Inc.

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	1.06E+01	1.38E+00	4.29E-01	9.90E+00	107.26	OK		OK	
02	RA-226	MBL	BLANK	pCi/l	6.46E-03	9.02E-02	2.58E-01					OK	OK
03	RA-226	DUP	BC-1	pCi/l	7.37E-01	3.71E-01	3.43E-01				NA	OK	
04	RA-226	TRG	TBB-3S	pCi/l	6.75E-01	5.14E-01	5.69E-01					OK	
05	RA-226	TRG	TBB-1D	pCi/l	1.75E+00	5.91E-01	3.67E-01					OK	
06	RA-226	TRG	TBB-1S	pCi/l	3.85E+00	8.08E-01	2.40E-01					OK	
07	RA-226	TRG	TBA-1D	pCi/l	1.31E+00	4.94E-01	2.78E-01					OK	
08	RA-226	TRG	TBB-3D	pCi/l	1.82E+00	8.64E-01	6.02E-01					OK	
09	RA-226	TRG	TBB-2D	pCi/l	1.75E+00	5.91E-01	3.00E-01					OK	
10	RA-226	TRG	TBB-2M	pCi/l	2.46E+00	7.33E-01	3.84E-01					OK	
11	RA-226	TRG	MC-1	pCi/l	2.03E+00	6.49E-01	2.76E-01					OK	
12	RA-226	DO	BC-1	pCi/l	8.34E-01	4.28E-01	2.35E-01					OK	

Client: Michael Pisani & Associates, Inc.
Eberline Services Work Order: 15-12122
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	12/30/15 00:00	1.00E+00	100.00	0.00	109.24		1/7/2016 10:51	
02	RA-226	MBL	12/30/15 00:00	1.00E+00	100.00	0.00	100.84		1/7/2016 10:51	
03	RA-226	DUP	12/28/15 16:40	1.00E+00	100.00	0.00	110.00		1/7/2016 10:51	
04	RA-226	TRG	12/18/15 09:30	1.00E+00	51.45	0.00	51.45		1/7/2016 10:51	
05	RA-226	TRG	12/17/15 13:45	1.00E+00	86.79	0.00	86.79		1/7/2016 10:51	
06	RA-226	TRG	12/17/15 15:45	1.00E+00	100.00	0.00	104.91		1/7/2016 10:51	
07	RA-226	TRG	12/22/15 10:45	1.00E+00	100.00	0.00	110.00		1/7/2016 10:51	
08	RA-226	TRG	12/15/15 13:30	1.00E+00	41.17	0.00	41.17		1/7/2016 10:51	
09	RA-226	TRG	12/15/15 11:00	1.00E+00	93.31	0.00	93.31		1/7/2016 10:51	
10	RA-226	TRG	12/14/15 12:30	1.00E+00	83.79	0.00	83.79		1/7/2016 10:51	
11	RA-226	TRG	12/16/15 11:30	1.00E+00	100.00	0.00	109.54		1/7/2016 10:51	
12	RA-226	DO	12/28/15 16:40	1.00E+00	96.47	0.00	96.47		1/7/2016 10:51	

Client	Eberline Services Work Order	Analysis Code	Run
Michael Pisani & Associates, Inc.	15-12122	Ra226	1

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	RA-226	LCS	01/07/16 14:51		A_Spec	Alpha_039	170	2.49 E+02	2.50 E-02	18.6
02	RA-226	MBL	01/07/16 14:51		A_Spec	Alpha_040	170	1.50 E-01	5.00 E-03	18.5
03	RA-226	DUP	01/07/16 14:51		A_Spec	Alpha_041	170	1.76 E+01	1.40 E-02	19
04	RA-226	TRG	01/07/16 14:51		A_Spec	Alpha_042	170	7.81 E+00	7.00 E-03	17.9
05	RA-226	TRG	01/07/16 14:51		A_Spec	Alpha_043	170	3.61 E+01	1.10 E-02	18.9
06	RA-226	TRG	01/07/16 14:51		A_Spec	Alpha_044	170	9.03 E+01	4.00 E-03	18.6
07	RA-226	TRG	01/07/16 14:51		A_Spec	Alpha_045	170	2.81 E+01	5.00 E-03	17.1
08	RA-226	TRG	01/07/16 14:51		A_Spec	Alpha_046	170	1.81 E+01	5.00 E-03	18.1
09	RA-226	TRG	01/07/16 14:51		A_Spec	Alpha_047	170	3.50 E+01	0.00 E+00	17
10	RA-226	TRG	01/07/16 14:51		A_Spec	Alpha_048	170	4.55 E+01	9.00 E-03	17.6
11	RA-226	TRG	01/07/16 14:52		A_Spec	Alpha_049	170	3.85 E+01	3.00 E-03	15.1
12	RA-226	DO	01/07/16 14:52		A_Spec	Alpha_050	170	1.48 E+01	1.00 E-03	14.7

Count Room Report
Client: Michael Pisani Associat

15-12122-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	12/30/15 00:00	1.0000	0.9988	843.3568	415.0000	109.24	3.00^	1.00
02	MBL	BLANK	12/30/15 00:00	1.0000	0.9829	829.9313	377.0000	100.84	3.00^	1.00
03	DUP	BC-1	12/28/15 16:40	1.0000	0.9981	842.7657	458.0000	120.65	3.00^	1.00
04	TRG	TBB-3S	12/18/15 09:30	1.0000	0.9914	837.1084	194.0000	51.45	3.00^	1.00
05	TRG	TBB-1D	12/17/15 13:45	1.0000	0.9906	836.4329	327.0000	86.79	3.00^	1.00
06	TRG	TBB-1S	12/17/15 15:45	1.0000	0.9924	837.9528	396.0000	104.91	3.00^	1.00
07	TRG	TBA-1D	12/22/15 10:45	1.0000	0.9992	843.6945	421.0000	110.78	3.00^	1.00
08	TRG	TBB-3D	12/15/15 13:30	1.0000	0.9963	841.2458	156.0000	41.17	2.82	1.00
09	TRG	TBB-2D	12/15/15 11:00	1.0000	0.9918	837.4462	352.0000	93.31	3.00^	1.00
10	TRG	TBB-2M	12/14/15 12:30	1.0000	0.9727	821.3187	310.0000	83.79	3.00^	1.00
11	TRG	MC-1	12/16/15 11:30	1.0000	0.9913	837.0240	413.0000	109.54	3.00^	1.00
12	DO	BC-1	12/28/15 16:40	1.0000	0.9893	835.3352	363.0000	96.47	3.00^	1.00

Eberline Services
Oak Ridge Laboratory

Spike and Tracer Worksheet

Internal Work Order	Run	Analysis Code	Date	Technician	Technician Initials	Witness Initials
15-12122	1	Ra226	1/4/2016 7:57	JWOLFE		

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	44.020	1/4/2016	0.500	0.4994				9.90	0.456	0.00	0.000	0.00	0.000	0.00	0.000
Tc-99 MS	Tc-2a	22043.636	7/5/2014	0.1												

Tracers

fraction	Isotope	Sol #	Activity dpm/g	Solution Date	Volume Used (g)	Approx Addition
01	Ba-133	Ba-6a	844.370	1/4/2016	0.9988	1.2000
02	Ba-133	Ba-6a	844.370	1/4/2016	0.9829	1.2000
03	Ba-133	Ba-6a	844.370	1/4/2016	0.9981	1.2000
04	Ba-133	Ba-6a	844.370	1/4/2016	0.9914	1.2000
05	Ba-133	Ba-6a	844.370	1/4/2016	0.9906	1.2000
06	Ba-133	Ba-6a	844.370	1/4/2016	0.9924	1.2000
07	Ba-133	Ba-6a	844.370	1/4/2016	0.9992	1.2000
08	Ba-133	Ba-6a	844.370	1/4/2016	0.9963	1.2000
09	Ba-133	Ba-6a	844.370	1/4/2016	0.9918	1.2000
10	Ba-133	Ba-6a	844.370	1/4/2016	0.9727	1.2000
11	Ba-133	Ba-6a	844.370	1/4/2016	0.9913	1.2000
12	Ba-133	Ba-6a	844.370	1/4/2016	0.9893	1.2000

Balance Printer Tapes

Tracer

0.9988 g
0.9829 g
-0.9981 g
-0.9914 g
-0.9906 g
-0.9924 g
-0.9992 g
-0.9963 g
-0.9918 g
-0.9727 g
-0.9913 g
- 9893 g

LCS

0.4994 g

Matrix Spike

00055

Eberline Analytical
Oak Ridge Laboratory

Aliquot Worksheet

Printed: 1/4/2016 8:21 AM

Work Order	Run	Analysis Code	Rpt Units	Lab Deadline	Technician
15-12122	1	Ra226	liters	1/11/2016	JWOLFE

Lab Fraction	Michael Pisani & Associates, Inc. Client ID	Sample Type	Muffle Data	Dilution Data			Aliquot Data		MS Aliquot Data		H-3 Solids Only	
			Ratio Post/Pre	No of Dils	Dil Factor	Ratio	Aliquot	Net Equiv	Aliquot	Net Equiv	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	BC-1	DUP					1.0000E+00	1.0000E+00				
04	TBB-3S	TRG					1.0000E+00	1.0000E+00				
05	TBB-1D	TRG					1.0000E+00	1.0000E+00				
06	TBB-1S	TRG					1.0000E+00	1.0000E+00				
07	TBA-1D	TRG					1.0000E+00	1.0000E+00				
08	TBB-3D	TRG					1.0000E+00	1.0000E+00				
09	TBB-2D	TRG					1.0000E+00	1.0000E+00				
10	TBB-2M	TRG					1.0000E+00	1.0000E+00				
11	MC-1	TRG					1.0000E+00	1.0000E+00				
12	BC-1	DO					1.0000E+00	1.0000E+00				

Comments	

Technician: _____ Date: 1/4/16

Gravimetric Worksheet

Work Order	Run	Analysis Code	Gravimetric Carrier	Carrier Conc (mg/ml)	Technician
15-12122	1	Ra226			KCOULSTON

TRetec	Michael Pisani & Associates, Inc.	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		0.0227	0.0328	0.0101	
02	BLANK	MBL		0.0228	0.0333	0.0105	
03	DUP	DUP		0.0228	0.0350	0.0122	
04	TBB-3S	TRG		0.0226	0.0341	0.0115	
05	TBB-1D	TRG		0.0228	0.0339	0.0111	
06	TBB-1S	TRG		0.0229	0.0685	0.0456	
07	TBA-1D	TRG		0.0228	0.0359	0.0131	
08	TBB-3D	TRG		0.0227	0.0309	0.0082	
09	TBB-2D	TRG		0.0228	0.0384	0.0156	
10	TBB-2M	TRG		0.0228	0.0513	0.0285	
11	MC-1	TRG		0.0226	0.0377	0.0151	
12	BC-1	DO		0.0228	0.0358	0.0130	

15668

Technician: Kristen Coulston Date: 1/7/16

KB 1/7/16

Apex-Alpha™

Sample Description: SPIKE
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00001384
Batch Identification: 1512122A-RA
Sample Identification: 01
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_039
Chamber Serial Number: 06027396A
Detector Serial Number: 83109
Env. Background: System Bkgd 138673
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: 1/7/2016 12:16:11 PM
Acquisition Date/Time: 1/7/2016 2:51:33 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.1862 +/- 0.0032 on 12/11/2015 8:20:49 AM
Effective Efficiency: 0.1862 +/- 0.0032

Control Certificate Name: Ra226_Ra-5b
Chem. Recov. of Control: RA-226 0.357531 +/- 0.026040
Peak Match Tolerance: 0.350 MeV

PEAK AREA REPORT

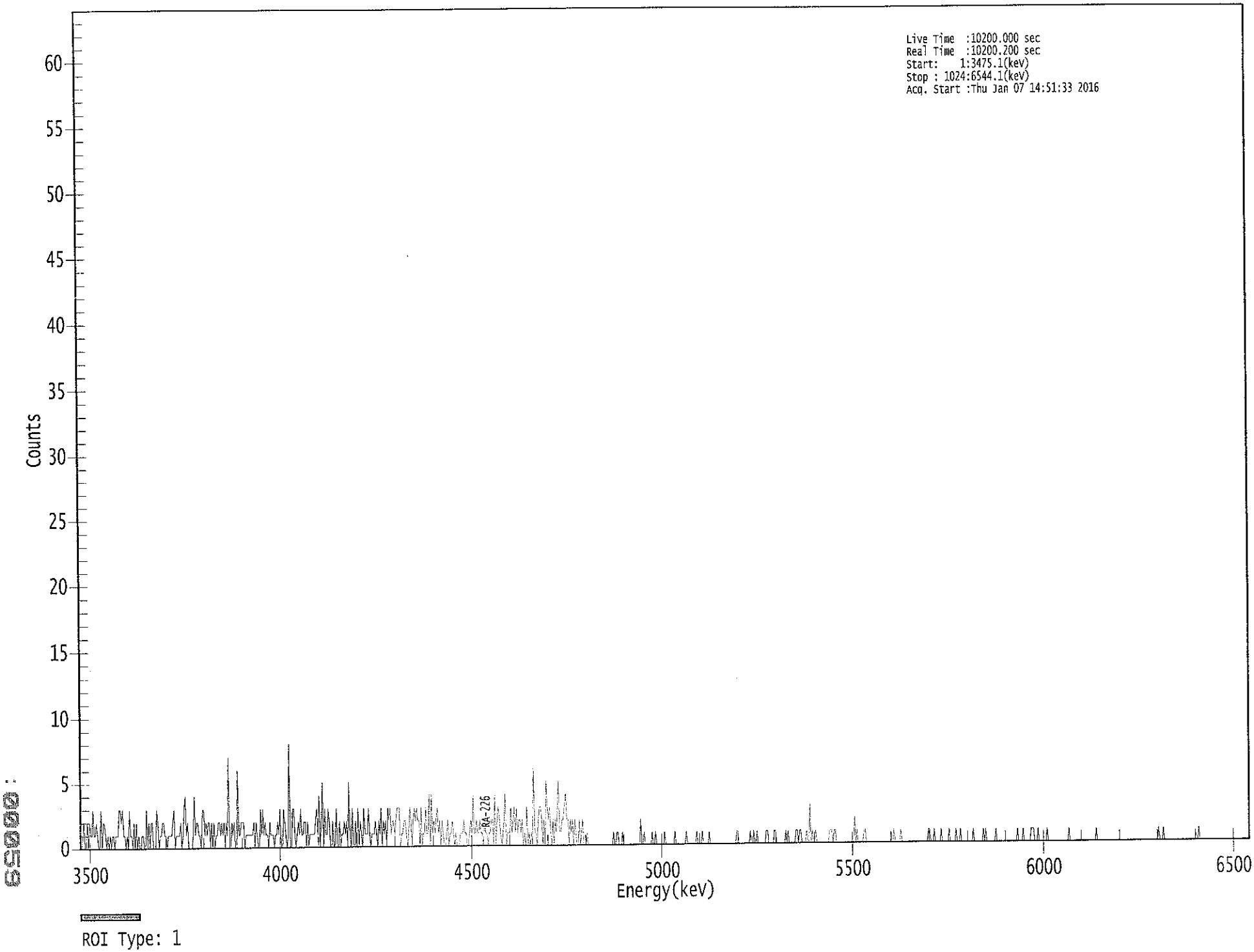
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.467	15.11	55.78	2.89	0.00E+000	3.0
RA-226	4.541	248.75	12.55	4.25	0.00E+000	3.3

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.940	5685.50*	6.78E-001 +/- 3.79E-001	3.93E-001 +/- 1.34E-002
RA-226	0.925	4785.00*	1.06E+001 +/- 1.38E+000	4.29E-001 +/- 1.47E-002

AG 1/8/16

0000138418.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: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	1	2	0	0	2	0
9:	2	1	1	3	1	1	2	1
17:	0	0	3	0	2	2	1	0
25:	1	0	1	0	1	1	0	1
33:	1	1	3	3	2	3	1	1
41:	0	1	0	3	1	1	0	2
49:	0	2	0	1	0	0	1	1
57:	0	0	3	0	2	0	2	2
65:	0	0	0	3	2	0	1	1
73:	2	2	1	1	0	1	1	1
81:	1	2	3	0	1	1	1	1
89:	2	0	1	3	4	1	2	0
97:	0	0	0	1	4	1	2	2
105:	1	1	0	3	3	1	2	1
113:	2	2	0	2	0	2	0	1
121:	1	2	2	1	2	1	2	0
129:	2	1	7	0	0	2	1	2
137:	0	0	6	1	1	2	2	2
145:	0	1	1	1	1	1	1	1
153:	2	0	2	1	0	0	3	1
161:	3	1	2	1	1	0	2	1
169:	1	1	0	1	1	2	1	3
177:	0	0	3	2	1	0	1	8
185:	0	0	3	3	1	0	1	2
193:	1	3	1	1	2	2	0	2
201:	0	1	1	1	1	1	2	3
209:	1	4	0	2	5	0	3	1
217:	1	3	2	0	0	2	0	0
225:	3	0	0	2	0	1	1	2
233:	1	2	0	5	1	0	3	0
241:	0	2	0	3	0	2	1	0
249:	3	1	1	1	3	1	0	1
257:	1	1	2	1	0	2	1	3
265:	0	2	1	2	0	3	2	3
273:	1	2	2	1	2	3	3	3
281:	0	1	1	2	2	1	0	1
289:	3	2	0	2	3	2	3	2
297:	2	0	3	0	1	1	3	1
305:	1	4	0	4	1	2	1	2
313:	3	1	2	0	2	1	0	0
321:	1	2	0	1	1	2	1	0
329:	1	0	0	0	1	1	1	2
337:	1	1	0	0	1	2	1	4
345:	1	1	2	1	1	2	1	1
353:	0	2	1	1	0	1	1	2
361:	2	0	4	0	2	3	2	1

369:	0	1	2	4	0	1	1	1

Sample Title: 01

Channel								
377:	3	1	2	3	1	3	1	2
385:	2	1	2	0	1	0	3	0
393:	1	0	1	0	6	1	1	0
401:	2	3	3	2	0	2	0	5
409:	3	2	3	1	0	2	0	2
417:	1	3	5	1	1	2	2	3
425:	4	2	2	0	2	1	2	0
433:	2	1	0	0	2	0	1	2
441:	0	0	0	1	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	1	0	0	1	1	0
473:	0	0	1	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	2	0	0	1	0	0
497:	0	0	0	0	1	0	0	1
505:	0	0	0	0	0	0	0	1
513:	0	0	0	0	0	0	0	0
521:	1	0	0	0	0	0	0	0
529:	0	0	1	0	0	0	0	0
537:	0	0	0	1	0	0	0	0
545:	1	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	1	1
577:	0	0	0	0	0	0	0	0
585:	0	0	1	0	0	1	0	0
593:	1	0	0	0	0	0	0	0
601:	1	1	0	0	0	0	0	1
609:	1	0	0	0	0	0	0	0
617:	0	1	0	1	0	0	0	0
625:	0	0	1	1	0	1	1	0
633:	0	0	0	1	0	0	3	0
641:	1	0	0	1	0	0	0	0
649:	0	0	0	0	0	0	0	1
657:	1	1	0	1	1	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	2	0	1
681:	0	0	0	0	0	1	1	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	1
713:	0	0	0	0	0	1	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	1	1	0
745:	0	0	1	0	0	0	0	0
753:	1	0	0	0	0	0	0	1
761:	0	0	0	0	0	1	0	0
769:	0	1	0	0	0	0	0	0
777:	0	0	0	0	1	0	0	0
785:	0	0	0	0	0	1	0	1
793:	0	0	0	0	0	0	0	0

801:	1	0	0	0	0	0	0	0

Sample Title: 01

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	1	0	0	0	0
825:	1	0	0	0	0	0	0	1
833:	1	1	0	0	0	1	0	0
841:	0	0	0	0	0	1	0	0
849:	0	0	0	0	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	0	0	0
881:	0	0	0	0	0	0	0	0
889:	1	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	0	1
945:	0	0	0	1	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	1	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 1/7/16

Apex-Alpha™

Sample Description: BLANK
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00001384
Batch Identification: 1512122A-RA
Sample Identification: 02
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_040
Chamber Serial Number: 06027396B
Detector Serial Number: 91135
Env. Background: System Bkgd 138674
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: 1/7/2016 12:16:11 PM
Acquisition Date/Time: 1/7/2016 2:51:35 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.1847 +/- 0.0032 on 12/11/2015 8:20:48 AM
Effective Efficiency: 0.1847 +/- 0.0032

Peak Match Tolerance: 0.350 MeV

PEAK AREA REPORT

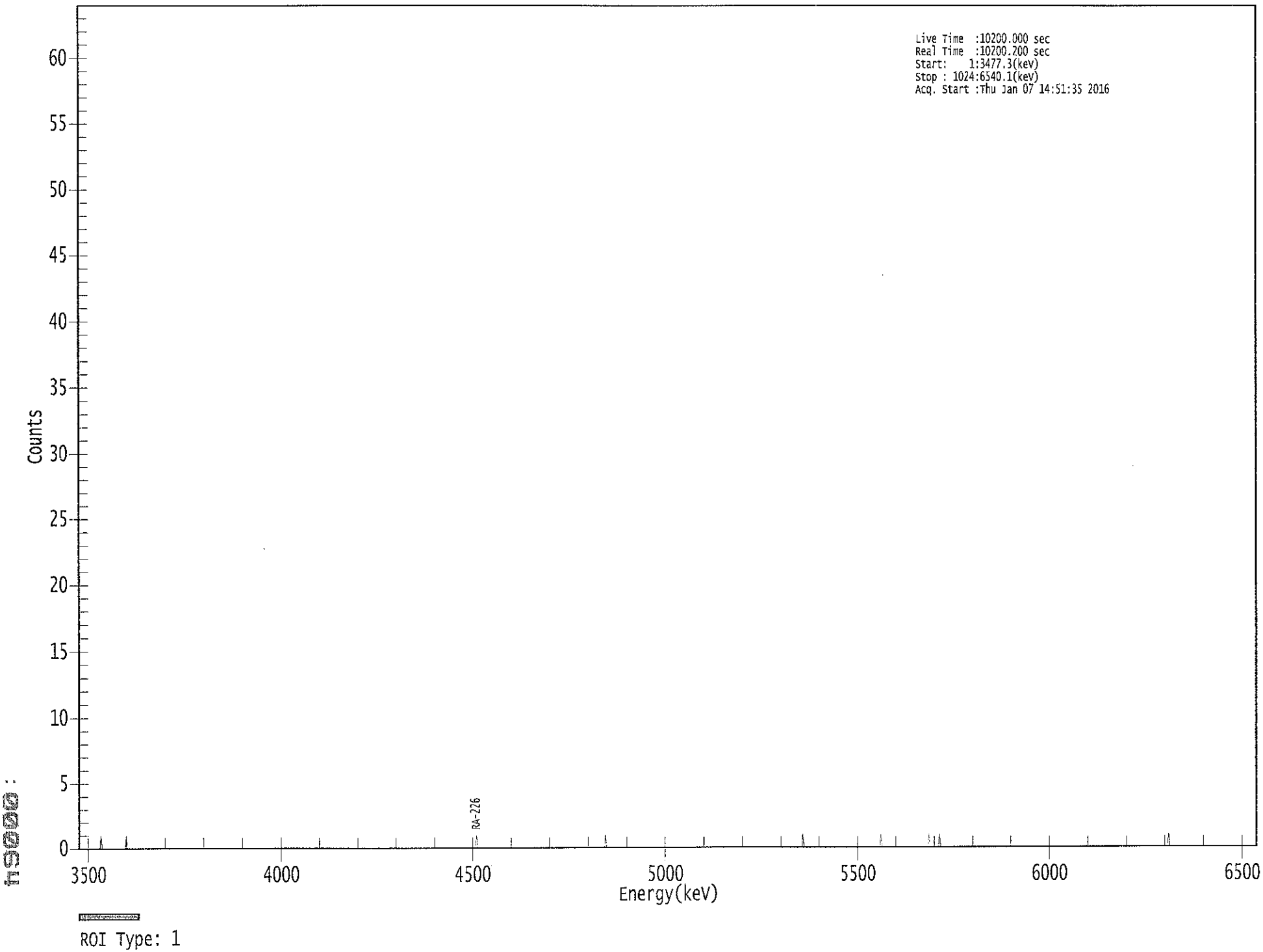
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.624	0.98	294.85	1.02	0.00E+000	3.0
RA-226	4.510	0.15	1397.8	0.85	0.00E+000	3.0

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.995	5685.50*	4.43E-002 +/- 1.31E-001	2.85E-001 +/- 9.73E-003
RA-226	0.906	4785.00*	6.46E-003 +/- 9.02E-002	2.58E-001 +/- 8.80E-003

AG 1/8/16

0000138403.CNF



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:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	1	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	1	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:	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	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	0	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	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	1	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	0	0	0	0	0	0	0
457:	0	1	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:	0	0	0	0	0	0	0	0
625:	0	0	0	0	1	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	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:	1	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	1	0	0	0	0	0
745:	0	0	0	1	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	0	0
945:	0	0	1	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™

KB 1/7/16

Sample Description: BC-1 DUP
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00001384
Batch Identification: 1512122A-RA
Sample Identification: 03
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_041
Chamber Serial Number: 05026930A
Detector Serial Number: 91087
Env. Background: System Bkgd 138675
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: 12/28/2015 12:16:11 PM
Acquisition Date/Time: 1/7/2016 2:51:37 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.1900 +/- 0.0033 on 12/11/2015 8:21:11 AM
Effective Efficiency: 0.1900 +/- 0.0033

Peak Match Tolerance: 0.350 MeV

PEAK AREA REPORT

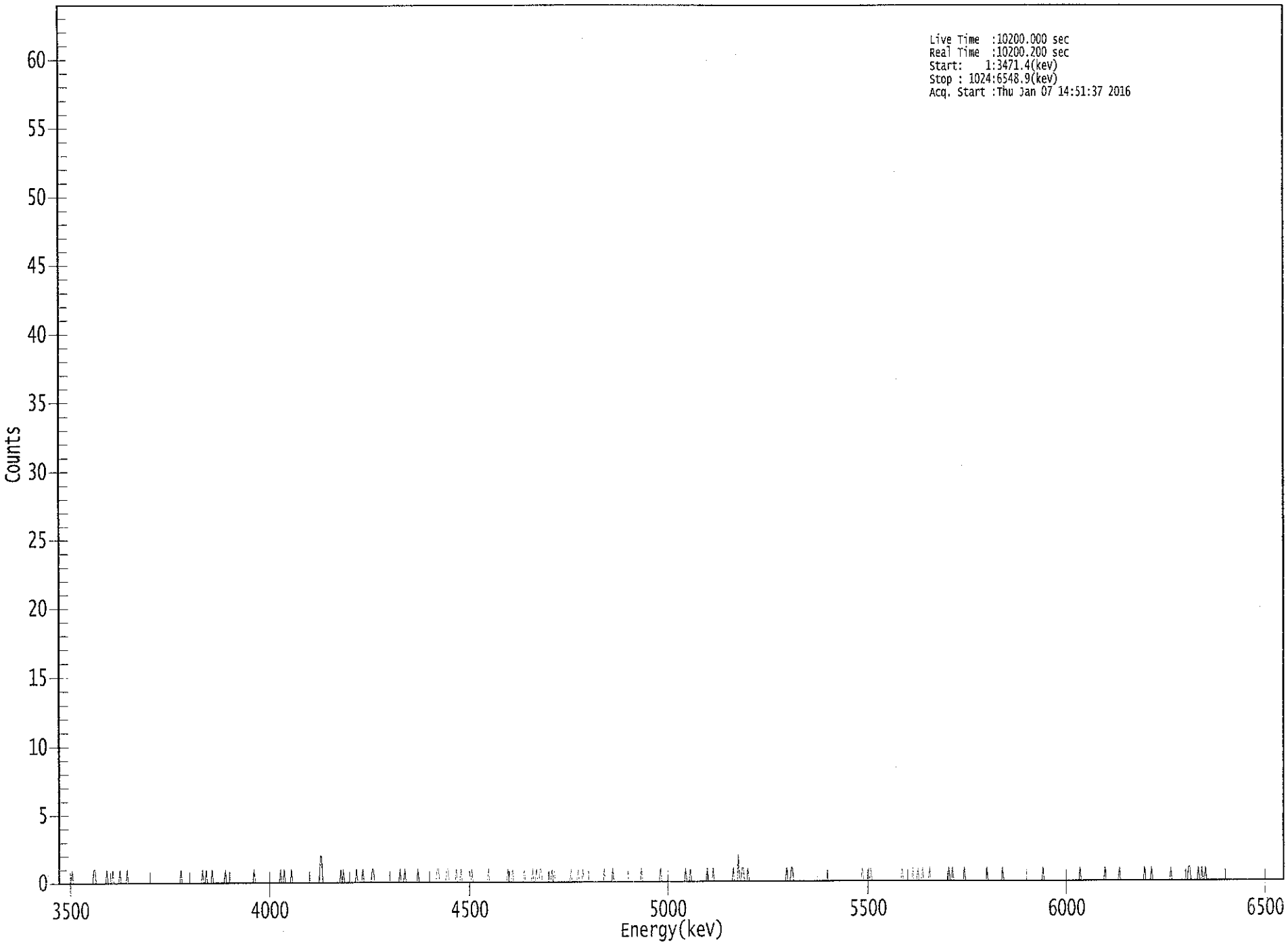
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.577	7.66	72.63	0.34	0.00E+000	3.0
RA-226	4.600	17.62	50.25	2.38	0.00E+000	6.0

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.985	5685.50*	3.38E-001 +/- 2.46E-001	2.11E-001 +/- 7.18E-003
RA-226	0.956	4785.00*	7.37E-001 +/- 3.71E-001	3.43E-001 +/- 1.17E-002

AG 1/8/16

0000138409.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:	1	0	0	0	0	0	0
9:	0	0	0	1	0	0	0
17:	0	0	0	0	0	0	0
25:	0	0	0	0	0	1	1
33:	0	0	0	0	0	0	0
41:	1	0	0	0	0	1	0
49:	0	0	0	1	0	0	0
57:	0	1	0	0	0	0	0
65:	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	1
105:	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0
121:	1	0	0	1	0	0	0
129:	1	0	0	0	0	0	0
137:	0	0	0	1	0	0	0
145:	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0
161:	0	0	0	1	0	0	0
169:	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0
185:	0	1	0	0	1	0	0
193:	0	0	1	0	0	0	0
201:	0	0	0	0	0	0	0
209:	0	0	0	0	0	0	0
217:	0	0	2	2	0	0	0
225:	0	0	0	0	0	0	0
233:	0	0	0	1	0	1	0
241:	0	0	0	0	0	0	0
249:	1	0	0	0	0	1	0
257:	0	0	0	0	0	1	1
265:	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0
281:	0	0	0	0	1	0	0
289:	1	0	0	0	0	0	0
297:	0	0	0	1	0	0	0
305:	0	0	0	0	0	0	0
313:	0	0	0	1	1	0	0
321:	0	0	0	1	1	0	0
329:	0	0	0	1	0	0	0
337:	0	0	0	0	0	0	0
345:	1	0	0	0	0	0	0
353:	0	0	0	0	0	0	1
361:	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	1	0

Sample Title: 03

Channel								
377:	0	0	1	0	0	0	0	0
385:	0	0	0	0	1	0	0	0
393:	0	0	0	1	0	0	1	0
401:	0	1	1	0	0	0	0	0
409:	0	0	0	1	0	1	0	0
417:	0	0	0	0	0	0	0	0
425:	0	0	0	1	0	0	0	0
433:	0	1	0	0	0	1	0	0
441:	0	0	0	0	0	0	0	0
449:	0	0	0	0	0	0	0	1
457:	0	0	0	0	0	0	1	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	1	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	1	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	1	0	0	0	1
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	1	0	0
545:	0	0	1	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	1	0	0	0	2
569:	0	0	1	1	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	1
609:	0	0	0	1	1	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	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	1	0
673:	0	0	0	1	0	1	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	1
705:	0	0	0	0	0	0	0	0
713:	1	0	0	0	1	0	0	0
721:	1	0	0	0	0	0	1	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	1	0
745:	0	1	0	0	0	0	0	0
753:	0	0	0	1	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	1	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	1	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	1	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	1	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	1	0	0	0	0	0	0
881:	0	0	0	0	0	1	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	1	0	0	0	0	0
913:	1	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	1	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	1
945:	1	0	0	0	0	0	0	1
953:	0	0	1	0	0	1	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

KD 1/7/16

Apex-Alpha™

Sample Description: TBB-3S
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00001384
Batch Identification: 1512122A-RA
Sample Identification: 04
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_042
Chamber Serial Number: 05026930B
Detector Serial Number: 84185
Env. Background: System Bkgd 138676
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: 12/18/2015 12:16:11 PM
Acquisition Date/Time: 1/7/2016 2:51:39 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.5145 +/- 0.0000
Counting Efficiency: 0.1789 +/- 0.0031 on 12/11/2015 8:21:10 AM
Effective Efficiency: 0.0920 +/- 0.0016

Peak Match Tolerance: 0.350 MeV

PEAK AREA REPORT

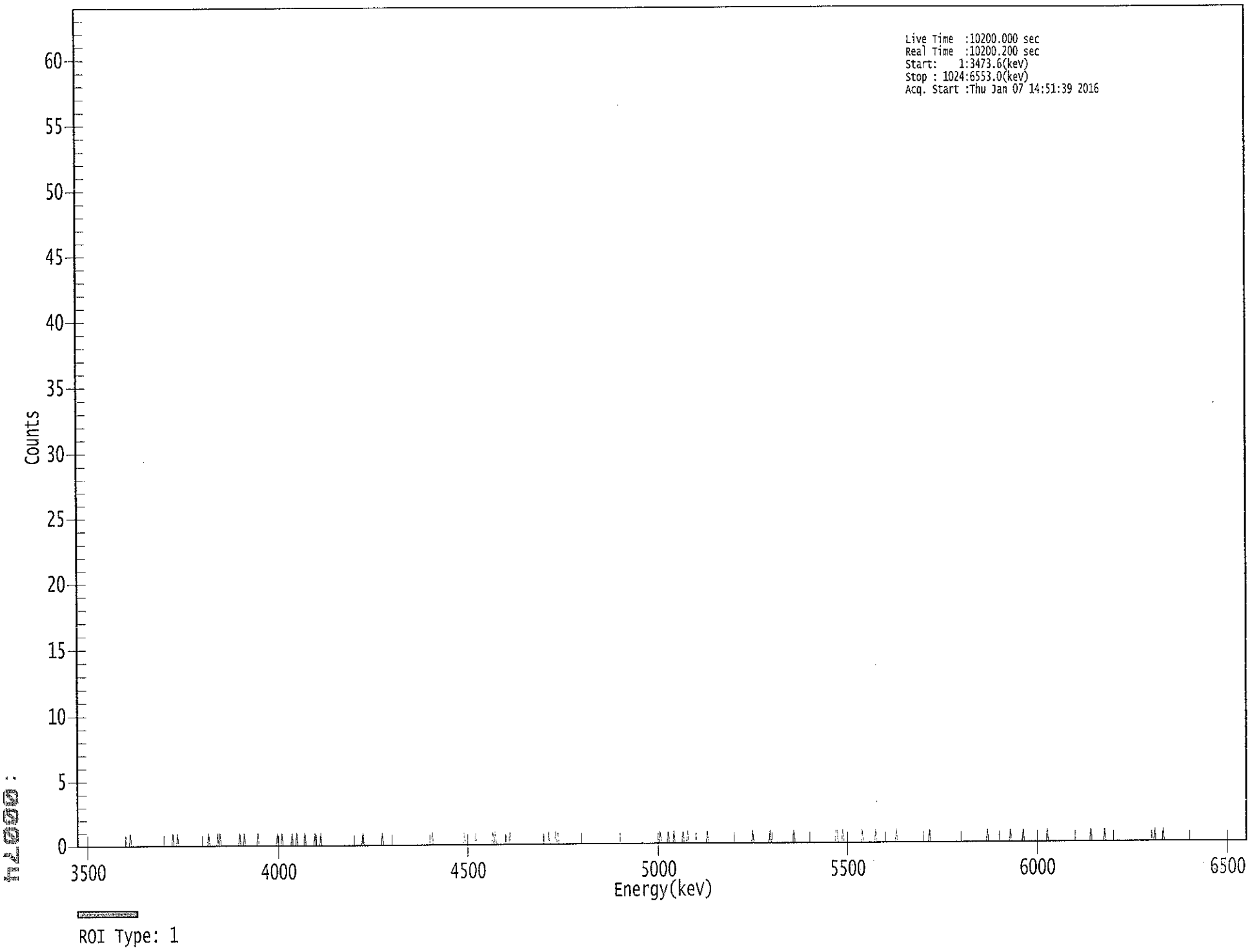
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.529	5.32	91.11	0.68	0.00E+000	6.0
RA-226	4.595	7.81	76.13	1.19	0.00E+000	3.0

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.968	5685.50*	4.86E-001 +/- 4.43E-001	5.16E-001 +/- 1.77E-002
RA-226	0.954	4785.00*	6.75E-001 +/- 5.14E-001	5.69E-001 +/- 1.95E-002

AG 1/8/16

0000138405.CNF



****
***** 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	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	1	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	1	0	0	0	1
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	1	0	0	0	0	0
121:	0	0	1	0	1	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	1	0	0
145:	0	1	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	1	0
177:	0	0	1	0	0	0	0	0
185:	0	0	0	1	0	0	0	1
193:	0	0	0	0	0	0	1	0
201:	0	0	0	0	0	0	0	1
209:	0	0	0	0	1	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	1	0	0	0	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	1	0	0	0	0	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	0	0	0	0	0	0
305:	0	0	0	0	0	0	1	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	1	0	0	0	0	0
345:	0	0	0	0	1	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	1	0	1	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 04

Channel								
377:	0	0	1	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	1	0	0	0
417:	0	0	1	0	1	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	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	0	0	0	0	0	0
505:	0	0	0	0	0	1	0	0
513:	0	0	0	0	1	0	0	0
521:	0	1	0	0	0	0	0	0
529:	0	1	0	0	0	1	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	0	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	0	0	0	0	1	0	0
609:	0	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	0
625:	0	0	1	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	1
665:	1	0	0	0	0	1	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	1	0
689:	0	0	0	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	1	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	1	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	1	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:	1	0	0	0	0	0	0	0
825:	0	0	0	1	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	1	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	1	0
889:	0	0	0	0	0	0	0	0
897:	0	0	1	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	0	0	0	1	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™

KB 1/7/16

Sample Description: TBB-1D
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00001384
Batch Identification: 1512122A-RA
Sample Identification: 05
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_043
Chamber Serial Number: 04026481A
Detector Serial Number: 91088
Env. Background: System Bkgd 138677
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: 12/17/2015 12:16:11 PM
Acquisition Date/Time: 1/7/2016 2:51:41 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.8679 +/- 0.0000
Counting Efficiency: 0.1890 +/- 0.0033 on 12/11/2015 8:21:08 AM
Effective Efficiency: 0.1640 +/- 0.0029

Peak Match Tolerance: 0.350 MeV

PEAK AREA REPORT

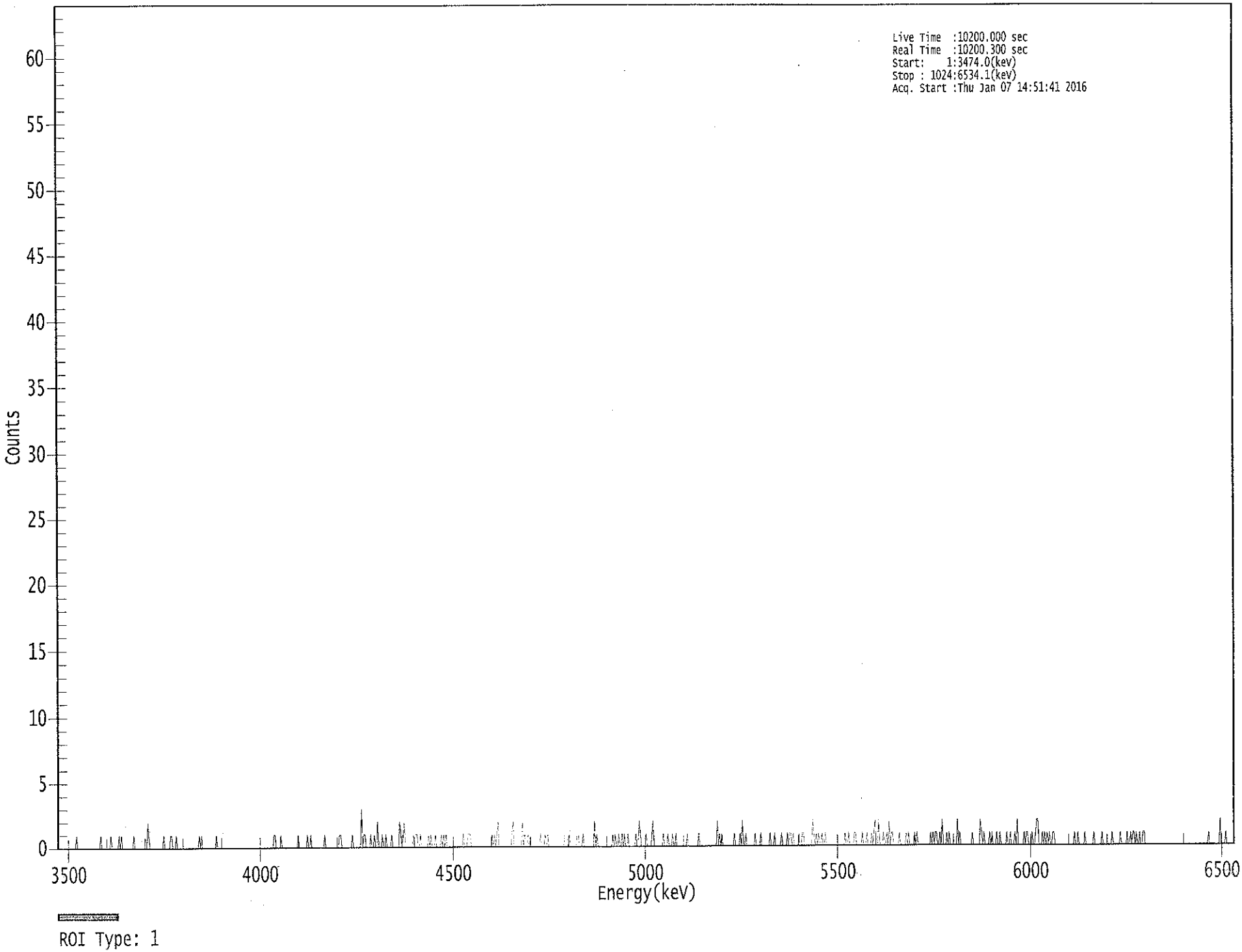
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.535	31.79	36.15	2.21	0.00E+000	4.5
RA-226	4.591	36.13	33.58	1.87	0.00E+000	4.5

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.971	5685.50*	1.63E+000 +/- 5.92E-001	4.10E-001 +/- 1.40E-002
RA-226	0.952	4785.00*	1.75E+000 +/- 5.91E-001	3.67E-001 +/- 1.25E-002

AG 1/8/16

0000138404.CNF



6,000 :

****
***** 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	0	0
17:	1	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	1	0	0
41:	0	0	0	0	0	0	1	0
49:	0	0	0	0	0	1	0	1
57:	0	0	0	0	0	0	0	0
65:	0	0	1	0	0	0	0	0
73:	0	0	0	0	0	0	2	1
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	1	0	0	0
97:	0	0	1	1	0	0	0	1
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	1	0	1	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	1	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	1	1	0	0
193:	0	0	1	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	1	0	0	1	0	0	0
225:	0	0	0	0	0	0	0	0
233:	1	0	0	0	0	0	0	0
241:	0	0	0	0	0	1	1	0
249:	0	0	0	0	0	0	0	0
257:	1	0	0	0	0	0	0	0
265:	3	0	1	1	0	0	0	0
273:	1	0	0	1	0	0	2	0
281:	0	0	1	0	0	1	0	0
289:	0	0	1	0	0	0	0	0
297:	0	2	1	0	1	2	0	0
305:	0	0	0	0	0	1	0	1
313:	1	0	0	1	0	0	0	0
321:	0	0	1	0	1	0	0	0
329:	1	0	0	0	0	1	0	1
337:	0	1	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	1	0	0	0	1	1	1	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 05

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

801:	0	2	1	0	1	0	0	0

Sample Title: 05

Channel							
809:	0	1	0	1	0	0	0	1
817:	0	0	1	0	0	0	0	0
825:	1	0	0	1	0	0	0	1
833:	0	2	0	0	0	0	0	1
841:	0	1	1	0	0	0	1	0
849:	0	1	2	2	0	0	0	1
857:	0	1	0	1	0	1	0	0
865:	1	1	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	1	0	0	1	0
889:	0	0	0	0	1	0	0	0
897:	0	0	0	0	1	0	0	0
905:	0	0	0	1	0	0	0	0
913:	0	0	0	0	1	0	0	0
921:	0	0	0	1	0	0	0	0
929:	0	1	0	0	1	0	1	1
937:	0	1	0	0	1	0	0	1
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:	1	0	0	0	0	0	0	0
1009:	0	0	2	0	0	0	0	1
1017:	0	0	0	0	0	0	0	0

ICB 1/7/16

Apex-Alpha™

Sample Description: TBB-1S
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00001384
Batch Identification: 1512122A-RA
Sample Identification: 06
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_044
Chamber Serial Number: 04026481B
Detector Serial Number: 84168
Env. Background: System Bkgd 138678
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: 12/17/2015 12:16:11 PM
Acquisition Date/Time: 1/7/2016 2:51:43 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.1864 +/- 0.0033 on 12/11/2015 8:21:07 AM
Effective Efficiency: 0.1864 +/- 0.0033

Peak Match Tolerance: 0.350 MeV

PEAK AREA REPORT

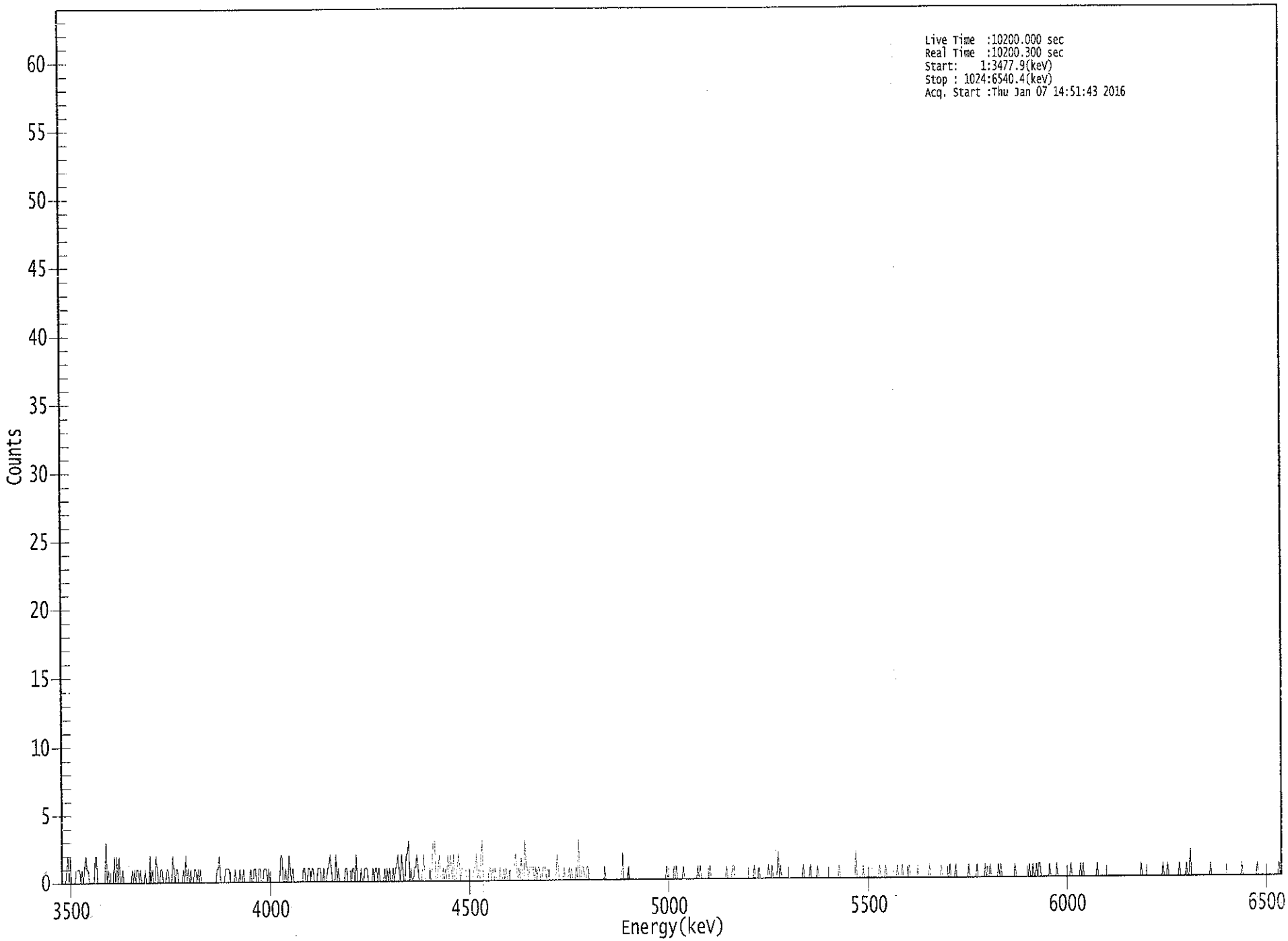
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.540	12.66	55.94	0.34	0.00E+000	3.0
RA-226	4.569	90.32	20.71	0.68	0.00E+000	8.2

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.973	5685.50*	5.72E-001 +/- 3.20E-001	2.16E-001 +/- 7.41E-003
RA-226	0.941	4785.00*	3.85E+000 +/- 8.08E-001	2.40E-001 +/- 8.23E-003

AG 1/8/16

0000138406.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	1	2	0	2
9:	0	0	0	0	1	1	1	1
17:	0	1	0	1	2	1	1	0
25:	0	0	0	0	2	2	0	0
33:	0	0	0	0	0	3	0	1
41:	0	0	0	0	2	0	2	0
49:	2	0	0	1	0	0	0	0
57:	0	0	0	1	0	1	0	1
65:	1	0	1	0	0	0	1	0
73:	0	0	2	0	1	0	0	2
81:	1	0	0	1	1	0	0	0
89:	1	1	0	0	0	2	1	0
97:	1	1	0	0	0	0	1	0
105:	2	0	1	0	1	0	0	1
113:	1	0	1	0	1	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	1	1	2	0	0	0
137:	0	1	1	1	1	0	0	0
145:	0	1	0	0	0	1	0	0
153:	1	0	0	0	0	0	1	0
161:	0	1	1	0	0	1	1	0
169:	0	1	1	1	0	1	0	0
177:	0	0	0	0	0	0	0	2
185:	2	0	0	1	0	0	2	1
193:	0	1	0	0	0	0	0	0
201:	0	0	1	1	0	0	1	1
209:	0	1	1	0	0	0	1	1
217:	1	0	0	1	0	0	1	1
225:	2	1	0	0	0	2	0	1
233:	0	0	0	0	0	1	1	0
241:	0	0	0	1	1	0	2	0
249:	0	0	1	0	0	1	1	1
257:	0	0	0	0	1	0	1	1
265:	0	1	0	0	0	0	1	0
273:	1	0	1	0	0	1	0	1
281:	1	2	1	0	2	1	0	0
289:	2	2	3	0	1	0	0	1
297:	1	2	1	0	0	0	1	2
305:	0	0	0	0	1	0	2	3
313:	3	0	0	1	2	0	0	1
321:	0	1	0	2	0	2	1	0
329:	2	0	0	1	2	1	0	1
337:	1	1	1	0	0	1	0	0
345:	0	1	1	2	0	1	0	2
353:	3	0	0	0	0	0	1	1
361:	0	1	0	1	0	0	0	1

369:	0	0	1	0	1	0	0	0

Sample Title: 06

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

801:	0	0	0	0	0	0	0	0

Sample Title: 06

Channel								
809:	0	0	0	1	0	0	1	0
817:	0	1	0	1	1	0	0	0
825:	0	0	0	0	1	0	0	0
833:	0	0	1	0	0	0	0	0
841:	0	0	0	0	0	0	1	0
849:	0	0	0	0	0	0	1	0
857:	1	0	0	0	0	0	0	0
865:	0	0	0	0	1	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	1	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	1	0	0	0	1
929:	0	0	0	0	0	0	0	0
937:	0	1	0	0	0	0	0	1
945:	0	0	2	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	1	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	1	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	1	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	1	0	0	0

Apex-Alpha™

ICB 1/7/16

Sample Description: TBA-1D
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00001384
Batch Identification: 1512122A-RA
Sample Identification: 07
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_045
Chamber Serial Number: 04026482A
Detector Serial Number: 91131
Env. Background: System Bkgd 138679
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: 12/22/2015 12:16:11 PM
Acquisition Date/Time: 1/7/2016 2:51:45 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.1710 +/- 0.0030 on 12/11/2015 8:21:05 AM
Effective Efficiency: 0.1710 +/- 0.0030

Peak Match Tolerance: 0.350 MeV

PEAK AREA REPORT

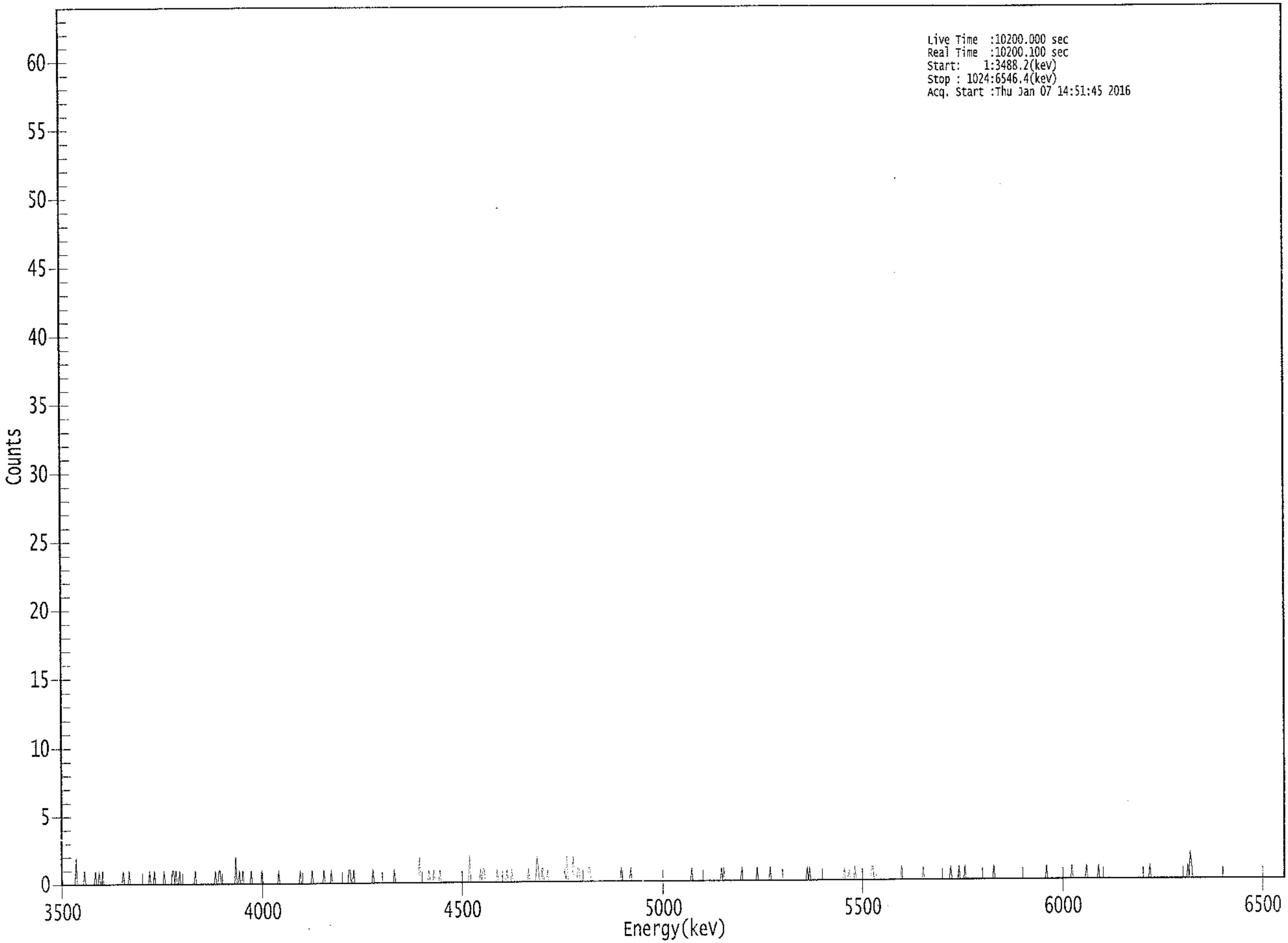
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.518	4.62	115.44	2.38	0.00E+000	3.0
RA-226	4.626	28.15	37.59	0.85	0.00E+000	3.0

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.964	5685.50*	2.27E-001 +/- 2.62E-001	4.03E-001 +/- 1.40E-002
RA-226	0.967	4785.00*	1.31E+000 +/- 4.94E-001	2.78E-001 +/- 9.64E-003

AG 1/8/16

0000138400.CNF



ROI Type: 1

00059 :

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

Sample Title: 07

Elapsed Live time: 10200
Elapsed Real Time: 10200

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

369:	0	0	0	0	1	0	0	0

Sample Title: 07

Channel								
377:	1	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	1	0
393:	0	0	0	0	0	2	1	0
401:	0	1	1	0	0	0	1	0
409:	0	0	0	0	0	0	0	0
417:	0	0	0	0	1	0	2	0
425:	0	0	0	2	0	0	0	1
433:	1	0	0	0	0	0	0	0
441:	1	1	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	1	0	0	0	0
473:	0	0	0	1	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	1	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	1
553:	0	1	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	1	0	0	0	0	0	0	0
577:	0	0	0	0	0	1	0	0
585:	0	0	0	0	0	0	0	0
593:	1	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	1	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	1	0
657:	0	0	1	0	0	0	0	1
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	1	1	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	1	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	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	1
745:	0	0	0	0	0	0	1	0
753:	0	0	0	1	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	0	0	0	0	0	0	0

Sample Title: 07

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	1
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	1	0	0	0
849:	0	0	0	0	0	0	0	0
857:	1	0	0	0	0	0	0	0
865:	0	0	1	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	1	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	1	0	2
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

KD 1/7/16

Apex-Alpha™

Sample Description: TBB-3D
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00001384
Batch Identification: 1512122A-RA
Sample Identification: 08
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_046
Chamber Serial Number: 04026482B
Detector Serial Number: 58762
Env. Background: System Bkgd 138680
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: 12/15/2015 12:16:11 PM
Acquisition Date/Time: 1/7/2016 2:51:48 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.4117 +/- 0.0000
Counting Efficiency: 0.1806 +/- 0.0032 on 12/11/2015 8:21:03 AM
Effective Efficiency: 0.0743 +/- 0.0013

Peak Match Tolerance: 0.350 MeV

PEAK AREA REPORT

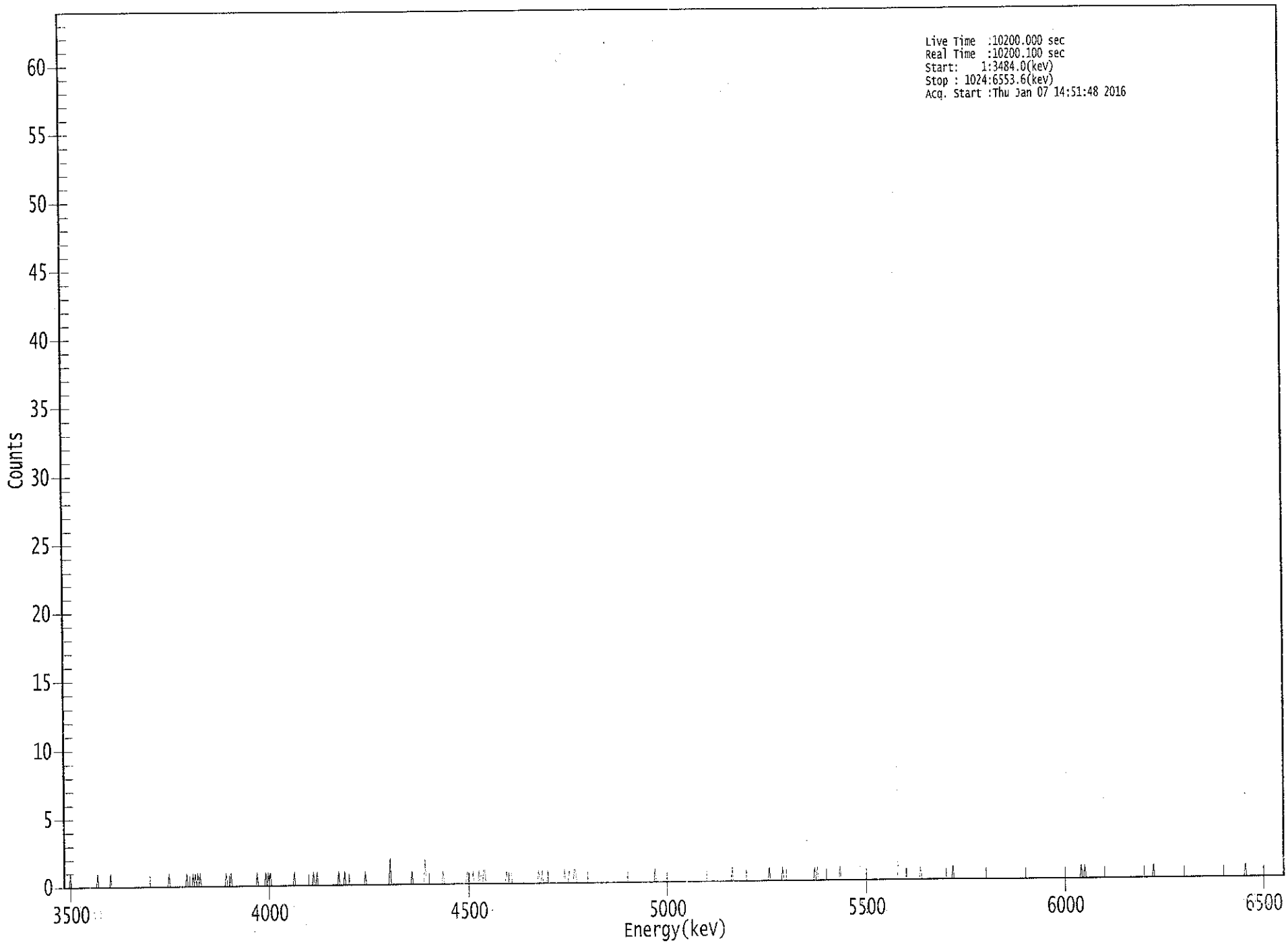
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.455	1.62	253.92	2.38	0.00E+000	3.0
RA-226	4.601	18.15	47.25	0.85	0.00E+000	3.0

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.933	5685.50*	1.73E-001 +/- 4.38E-001	8.73E-001 +/- 3.01E-002
RA-226	0.957	4785.00*	1.82E+000 +/- 8.64E-001	6.02E-001 +/- 2.07E-002

AG 1/8/16

0000138401.CNF



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

Sample Title: 08

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	1	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	1	0	0	0
33:	0	0	0	0	0	0	0	1
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:	1	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	1
105:	0	0	0	0	1	0	1	0
113:	1	0	1	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	1	0	0	0	1	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	1	0	1	0	1	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	1	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	0
209:	0	1	0	0	1	0	0	0
217:	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	1	0
233:	0	0	0	1	0	0	0	0
241:	0	0	0	0	0	0	0	0
249:	0	0	0	0	1	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	2	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	1	0	0	0	0
297:	0	0	0	0	0	0	2	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	1	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	1	0	0	0	0	1	0
345:	0	0	0	1	0	0	0	1
353:	1	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	1	0	0	1	1	0

Sample Title: 08

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	1	0	0
401:	1	0	0	0	0	1	1	0
409:	0	0	0	0	0	0	0	0
417:	0	0	0	1	0	0	0	1
425:	0	0	0	1	1	0	0	0
433:	0	0	0	0	0	0	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	1
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:	1	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	1
593:	0	0	0	0	0	0	0	0
601:	0	0	1	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	1	0	1
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	1	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	1	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:	1	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: 08

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	1	0	0	1
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	1	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	1	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™

KCB 1/7/16

Sample Description: TBB-2D
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00001384
Batch Identification: 1512122A-RA
Sample Identification: 09
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_047
Chamber Serial Number: 02030596A
Detector Serial Number: 91086
Env. Background: System Bkgd 138681
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: 12/15/2015 12:16:11 PM
Acquisition Date/Time: 1/7/2016 2:51:50 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9331 +/- 0.0000
Counting Efficiency: 0.1705 +/- 0.0030 on 12/11/2015 8:21:02 AM
Effective Efficiency: 0.1591 +/- 0.0028

Peak Match Tolerance: 0.350 MeV

PEAK AREA REPORT

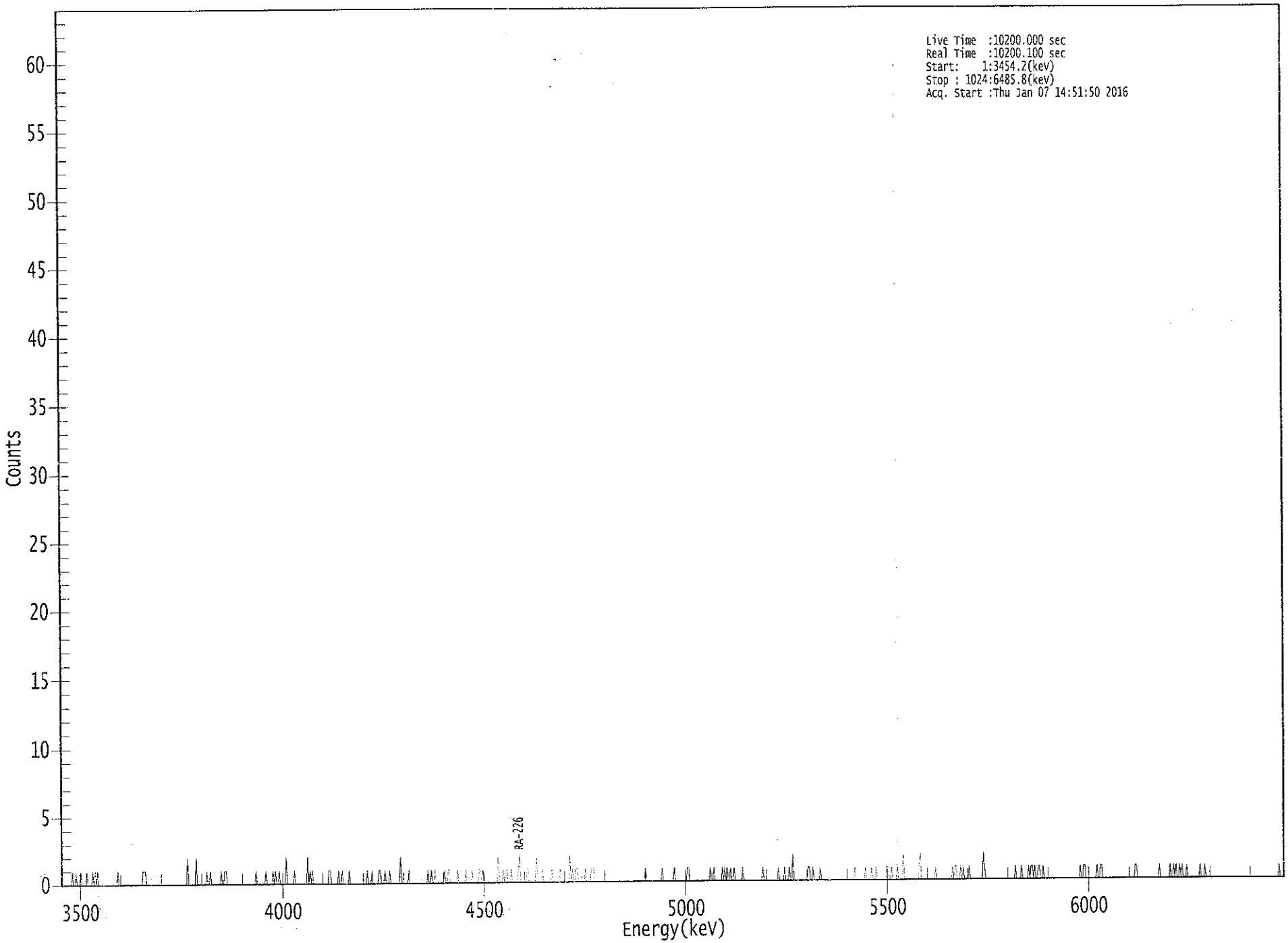
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.561	19.00	46.13	0.00	0.00E+000	3.0
RA-226	4.590	35.00	33.60	0.00	0.00E+000	3.0

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.980	5685.50*	1.01E+000 +/- 4.65E-001	3.17E-001 +/- 1.10E-002
RA-226	0.952	4785.00*	1.75E+000 +/- 5.91E-001	3.00E-001 +/- 1.04E-002

AG 1/8/16

0000138407.CNF



ROI Type: 1

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

Sample Title: 09

Elapsed Live time: 10200
Elapsed Real Time: 10200

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

369:	0	1	0	1	1	0	0	0

Sample Title: 09

Channel								
377:	1	0	0	0	0	0	1	2
385:	0	0	0	0	0	1	1	0
393:	0	0	0	0	0	2	0	0
401:	0	0	1	0	0	0	0	0
409:	0	0	1	0	0	0	0	0
417:	0	1	0	0	0	0	0	0
425:	0	2	0	1	0	0	1	1
433:	0	0	0	0	0	0	1	0
441:	0	0	0	1	1	1	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:	1	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	1	0
505:	0	0	0	0	0	0	0	0
513:	1	0	0	0	0	0	0	0
521:	0	0	0	1	1	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	1	0
545:	0	1	0	0	0	0	0	0
553:	1	0	1	0	1	0	0	1
561:	0	0	1	0	0	0	0	0
569:	0	1	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	1	0	0	0	0	0
593:	0	0	0	0	0	0	0	1
601:	0	0	0	0	1	0	0	0
609:	1	0	0	2	0	0	0	0
617:	0	0	0	0	0	0	0	0
625:	1	1	0	0	1	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	1
665:	0	0	0	0	0	0	0	0
673:	1	0	0	0	0	1	0	0
681:	0	1	0	0	0	0	0	0
689:	0	0	1	1	0	0	1	0
697:	0	0	0	1	0	0	0	0
705:	2	0	0	0	0	0	0	0
713:	0	0	0	0	0	1	2	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	1	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	1	0	1	1	0	0	0
753:	1	0	1	0	0	0	0	1
761:	0	0	0	0	0	0	0	0
769:	0	0	0	2	1	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	1	0

801:	0	0	0	1	0	0	0	0

Sample Title: 09

Channel								
809:	0	1	0	1	1	0	1	0
817:	0	1	1	0	0	1	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	1	0	0	1
857:	1	0	0	0	0	0	0	0
865:	0	0	1	0	0	1	1	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	1	1	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	1
929:	0	0	1	0	1	0	0	1
937:	0	1	0	0	0	1	0	0
945:	0	0	0	0	0	0	0	0
953:	1	0	0	0	1	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	1	0	0	0	0	0

XD 1/12/16

Apex-Alpha™

Sample Description:	TBB-2M
Spectrum File:	\\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00001384
Batch Identification:	1512122A-RA
Sample Identification:	10
Sample Geometry:	Shelf 2
Procedure Description:	Ra
Detector Name:	Alpha_048
Chamber Serial Number:	02030596B
Detector Serial Number:	83111
Env. Background:	System Bkgd 138682
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:	12/14/2015 12:16:11 PM
Acquisition Date/Time:	1/7/2016 2:51:53 PM
Acquisition Live Time:	170.0 minutes
Acquisition Real Time:	170.0 minutes
Chem. Recovery Factor:	0.8379 +/- 0.0000
Counting Efficiency:	0.1756 +/- 0.0031 on 12/11/2015 8:21:00 AM
Effective Efficiency:	0.1472 +/- 0.0026
Peak Match Tolerance:	0.350 MeV

PEAK AREA REPORT

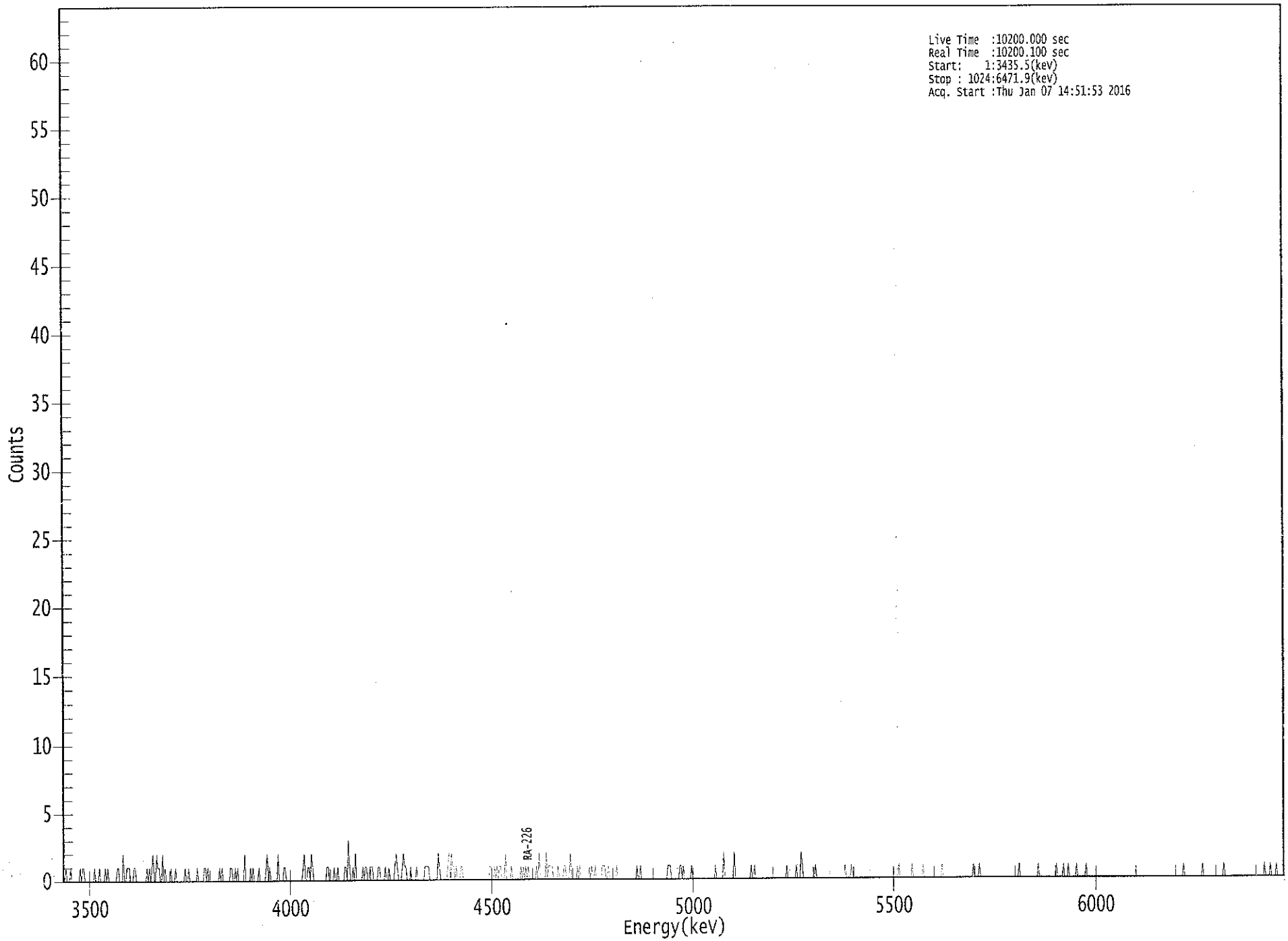
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.504	4.98	97.79	1.02	0.00E+000	3.0
RA-226	4.591	45.47	29.63	1.53	0.00E+000	4.5

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.958	5685.50*	2.85E-001 +/- 2.79E-001	3.61E-001 +/- 1.25E-002
RA-226	0.952	4785.00*	2.46E+000 +/- 7.33E-001	3.84E-001 +/- 1.32E-002

AG 1/18/16

0000138408.CNF



ROI Type: 1

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

Sample Title: 10

Elapsed Live time: 10200
Elapsed Real Time: 10200

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

369:	0	0	2	0	0	0	0	1

Sample Title: 10

Channel								
377:	0	0	0	0	0	0	0	1
385:	0	1	0	1	0	1	0	0
393:	0	0	0	0	1	0	2	0
401:	0	0	0	0	2	0	1	1
409:	1	1	0	0	0	0	1	0
417:	0	0	0	1	1	0	0	0
425:	2	0	0	0	0	0	1	0
433:	1	0	0	0	0	0	0	0
441:	1	0	1	0	0	1	0	0
449:	0	0	0	1	1	1	0	0
457:	1	0	0	0	0	0	0	1
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	1	0	0	1	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	1	1	1	0	0	0
513:	0	0	0	0	1	1	0	1
521:	0	0	0	0	0	0	1	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	1	0	0	0	0	0
553:	0	2	0	0	0	0	0	0
561:	0	0	2	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	1	0	0	1	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	1	0
609:	0	0	0	0	0	0	1	0
617:	0	0	2	1	0	0	0	0
625:	0	0	0	0	0	0	1	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	1
657:	0	0	0	0	1	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	1	0	0	0
705:	0	0	0	0	0	0	0	1
713:	0	0	0	0	0	0	0	0
721:	1	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	1	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	1	0	0	0	0	1
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:	1	0	0	0	0	0	0	0

Sample Title: 10

Channel								
809:	0	0	0	0	0	0	0	0
817:	1	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	1
833:	0	0	0	0	0	1	0	0
841:	0	1	0	0	0	0	0	0
849:	1	0	0	0	0	0	0	0
857:	1	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	1	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	1	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	1	0
1009:	0	0	0	1	0	0	0	0
1017:	1	0	0	0	0	0	0	0

Apex-Alpha™

KB 1/7/16

Sample Description: MC-1
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00001384
Batch Identification: 1512122A-RA
Sample Identification: 11
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_049
Chamber Serial Number: 10006121A
Detector Serial Number: 49
Env. Background: System Bkgd 138683
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: 12/16/2015 12:16:11 PM
Acquisition Date/Time: 1/7/2016 2:52:55 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.1510 +/- 0.0027 on 12/11/2015 11:36:41 AM
Effective Efficiency: 0.1510 +/- 0.0027

Peak Match Tolerance: 0.350 MeV

PEAK AREA REPORT

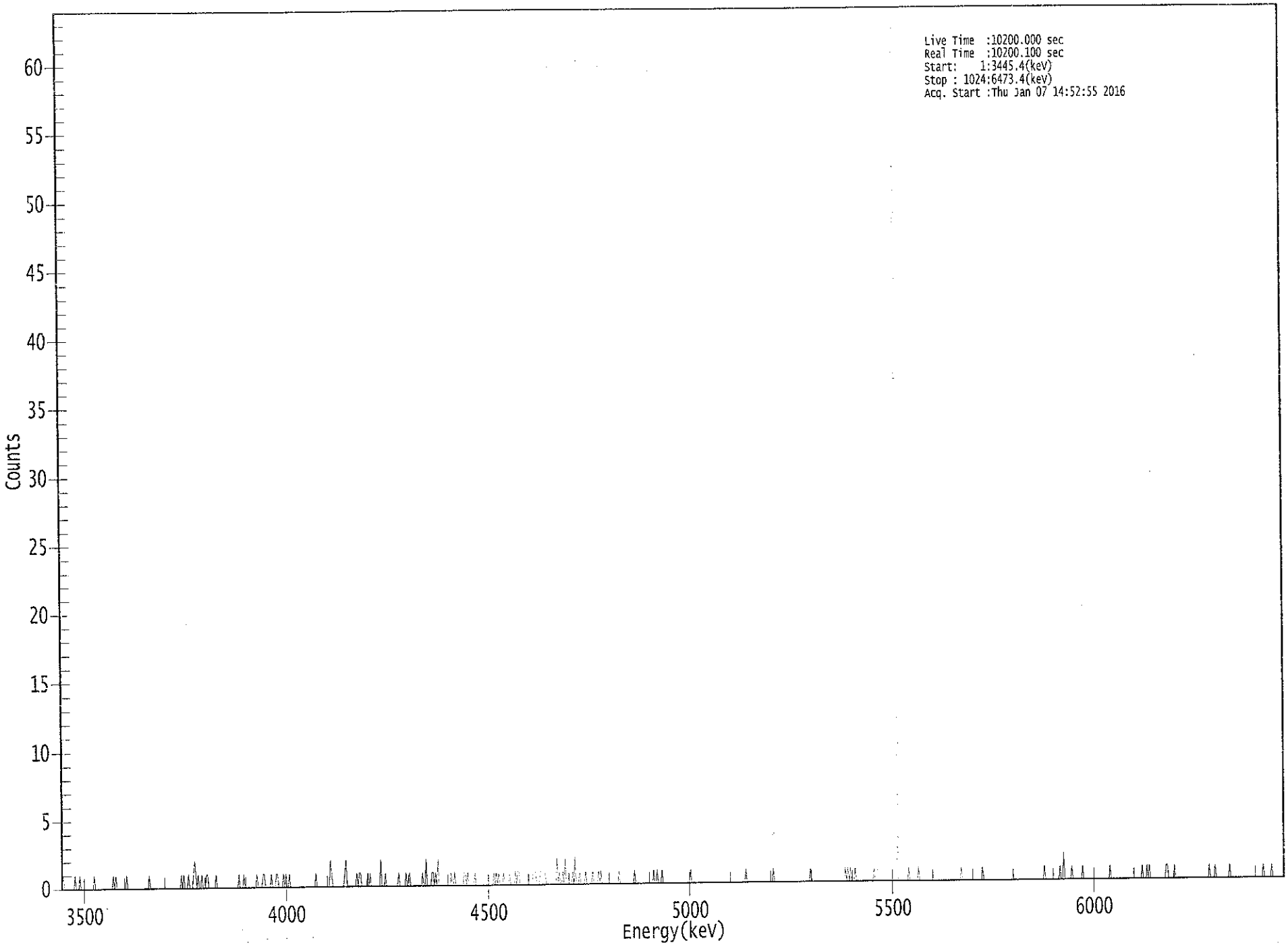
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.476	6.64	84.69	1.36	0.00E+000	3.0
RA-226	4.605	38.49	31.84	0.51	0.00E+000	3.0

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.944	5685.50*	3.70E-001 +/- 3.14E-001	3.82E-001 +/- 1.35E-002
RA-226	0.959	4785.00*	2.03E+000 +/- 6.49E-001	2.76E-001 +/- 9.76E-003

AG
1/8/16

0000138410.CNF



ROI Type: 1

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

Sample Title: 11

Elapsed Live time: 10200
Elapsed Real Time: 10200

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

369:	0	1	0	0	0	0	1	0

Sample Title: 11

Channel								
377:	0	0	0	1	0	1	1	0
385:	0	0	0	0	0	0	0	0
393:	0	0	1	1	1	0	0	0
401:	1	1	1	1	1	0	0	0
409:	0	0	0	0	0	0	2	0
417:	1	0	0	1	0	2	0	0
425:	0	0	0	1	0	2	0	0
433:	0	1	0	0	0	0	1	0
441:	0	0	0	0	1	0	0	0
449:	0	1	0	1	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	1	0	0	0	0	0
473:	0	0	0	0	0	0	0	1
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	1
497:	0	0	1	0	0	0	1	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	1	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	1	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	1	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	0
625:	0	0	1	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	1
657:	0	1	0	1	0	0	0	1
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	1
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:	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:	1	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	1	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: 11

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	1	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	1	0	0	2	0
841:	0	0	0	0	0	1	0	0
849:	0	0	0	0	0	0	1	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	1	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:	1	0	0	0	1	0	1	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	1	1	0	0
929:	0	0	0	1	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:	1	0	0	0	0	1	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	1	0	0
1009:	0	0	0	0	1	0	0	0
1017:	0	0	0	0	0	0	0	0

JCP 1/13/16

Apex-Alpha™

Sample Description: BC-1
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00001384
Batch Identification: 1512122A-RA
Sample Identification: 12
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_050
Chamber Serial Number: 10006121B
Detector Serial Number: 50
Env. Background: System Bkgd 138684
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: 12/28/2015 12:16:11 PM
Acquisition Date/Time: 1/7/2016 2:52:57 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9647 +/- 0.0000
Counting Efficiency: 0.1465 +/- 0.0026 on 12/11/2015 11:36:39 AM
Effective Efficiency: 0.1414 +/- 0.0025

Peak Match Tolerance: 0.350 MeV

PEAK AREA REPORT

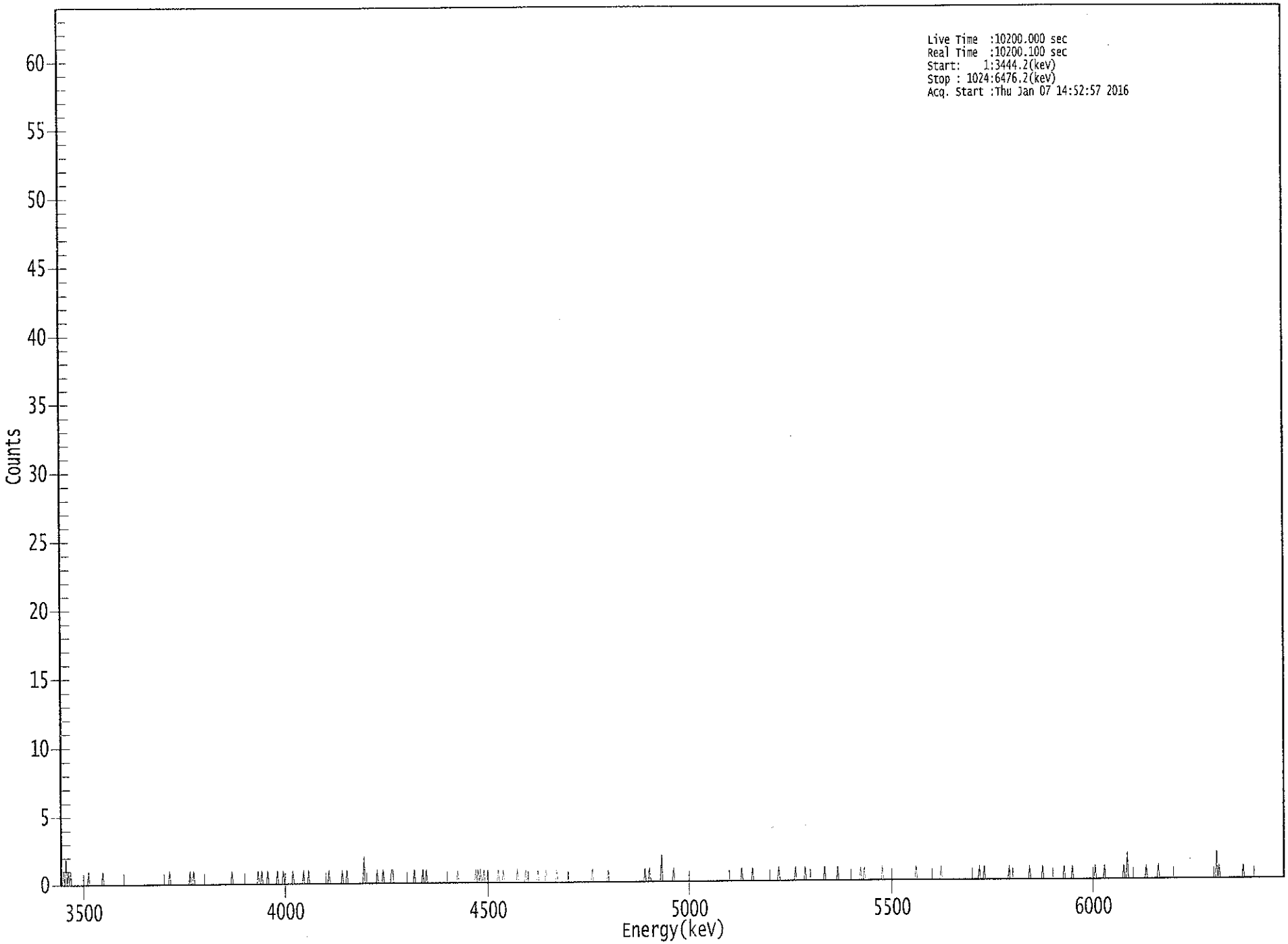
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.503	3.81	117.34	1.19	0.00E+000	3.0
RA-226	4.571	14.83	51.24	0.17	0.00E+000	3.0

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.958	5685.50*	2.26E-001 +/- 2.65E-001	3.91E-001 +/- 1.38E-002
RA-226	0.942	4785.00*	8.34E-001 +/- 4.28E-001	2.35E-001 +/- 8.28E-003

AG
1/8/16

0000138411.CNF



ROI Type: 1

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

Sample Title: 12

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel							
1:	0	0	1	0	2	0	1	0
9:	1	0	0	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	0	0	1	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	1	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	1	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	0	0
137:	0	0	0	0	0	0	0	1
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	1	0	0
169:	1	0	0	0	0	1	0	0
177:	0	0	0	0	0	1	0	0
185:	0	0	1	0	0	0	0	0
193:	0	0	1	0	0	0	0	0
201:	0	0	0	1	0	0	0	1
209:	0	0	0	0	0	0	0	0
217:	0	0	0	0	0	0	0	0
225:	1	0	0	0	0	0	0	0
233:	0	0	0	1	0	0	0	1
241:	0	0	0	0	0	0	0	0
249:	0	0	0	0	0	2	0	0
257:	0	0	0	0	0	0	0	0
265:	1	0	0	0	0	1	0	0
273:	0	0	0	0	1	1	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	1
297:	0	0	0	0	0	0	1	0
305:	0	1	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	1	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	1	0	1	0	1	0
353:	0	1	0	0	1	0	0	0
361:	0	0	0	0	0	1	0	0

369:	0	1	0	0	0	0	0	0

Sample Title: 12

Channel								
377:	0	0	0	0	0	1	0	0
385:	0	0	0	0	1	0	0	0
393:	0	0	0	0	0	0	1	0
401:	0	0	0	0	0	1	0	0
409:	0	0	0	0	0	0	1	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	1	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	1	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:	1	0	0	0	1	0	0	0
497:	0	0	0	0	0	0	2	0
505:	0	0	0	0	0	0	0	0
513:	1	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	1	0	0	0	0	0	0
577:	0	0	1	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	1	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	1	0
617:	0	0	0	0	0	0	1	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	1	0
641:	0	0	0	0	0	0	0	0
649:	0	1	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	1	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	1	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	1
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	1
769:	0	0	0	1	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	1	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 12

Channel								
809:	0	1	0	0	0	0	0	0
817:	0	0	0	0	1	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	1	0
841:	0	0	0	0	0	1	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	1	0	0	0	0	0	0	0
873:	1	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	1	0	0	2	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	1	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	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	2	0
969:	1	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	1	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

1/7/2016 5:34:38 AM

Apex-Alpha™

QA SUMMARY REPORT

Review Of QA Results - Pulser Check

Date : 1/7/2016
Time : 5:34:38 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha_001	21f	ALL	Not Done	
Alpha_002	21f	ALL	Not Done	
Alpha_003	21f	ALL	Passed	1/7/2016 5:19:45 AM
Alpha_004	21f	ALL	Passed	1/7/2016 5:19:46 AM
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	1/7/2016 5:19:47 AM
Alpha_011	21f	ALL	Passed	1/7/2016 5:19:48 AM
Alpha_012	21f	ALL	Passed	1/7/2016 5:19:49 AM
Alpha_013	21f	ALL	Not Done	
Alpha_014	21f	ALL	Not Done	
Alpha_015	21f	ALL	Passed	1/7/2016 5:19:50 AM
Alpha_016	21f	ALL	Not Done	
Alpha_033	Alpha Analyst100DC	ALL	Passed	1/7/2016 5:19:51 AM
Alpha_034	Alpha Analyst100DC	ALL	Passed	1/7/2016 5:19:53 AM
Alpha_035	Alpha Analyst100DC	ALL	Passed	1/7/2016 5:19:54 AM
Alpha_036	Alpha Analyst100DC	ALL	Passed	1/7/2016 5:19:56 AM
Alpha_037	Alpha Analyst100DC	ALL	Passed	1/7/2016 5:19:58 AM
Alpha_038	Alpha Analyst100DC	ALL	Passed	1/7/2016 5:20:00 AM
Alpha_039	Alpha Analyst100DC	ALL	Passed	1/7/2016 5:20:02 AM
Alpha_040	Alpha Analyst100DC	ALL	Passed	1/7/2016 5:20:04 AM
Alpha_041	Alpha Analyst100DC	ALL	Passed	1/7/2016 5:20:06 AM
Alpha_042	Alpha Analyst100DC	ALL	Passed	1/7/2016 5:20:08 AM
Alpha_043	Alpha Analyst100DC	ALL	Passed	1/7/2016 5:20:11 AM
Alpha_044	Alpha Analyst100DC	ALL	Passed	1/7/2016 5:20:13 AM
Alpha_045	Alpha Analyst100DC	ALL	Passed	1/7/2016 5:20:15 AM
Alpha_046	Alpha Analyst100DC	ALL	Passed	1/7/2016 5:20:17 AM
Alpha_047	Alpha Analyst100DC	ALL	Passed	1/7/2016 5:20:20 AM
Alpha_048	Alpha Analyst100DC	ALL	Passed	1/7/2016 5:20:22 AM
Alpha_049	Alpha Analyst100DC	ALL	Passed	1/7/2016 5:20:25 AM
Alpha_050	Alpha Analyst100DC	ALL	Passed	1/7/2016 5:20:27 AM
Alpha_051	Alpha Analyst100DC	ALL	Passed	1/7/2016 5:20:30 AM
Alpha_052	Alpha Analyst100DC	ALL	Passed	1/7/2016 5:20:33 AM
Alpha_053	Alpha Analyst100DC	Peak FWHM	Action	1/7/2016 5:20:35 AM
Alpha_054	Alpha Analyst100DC	ALL	Passed	1/7/2016 5:20:38 AM
Alpha_055	Alpha Analyst100DC	Peak FWHM	Action	1/7/2016 5:20:41 AM
Alpha_056	Alpha Analyst100DC	ALL	Passed	1/7/2016 5:20:44 AM
Alpha_057	Alpha Analyst100DC	ALL	Passed	1/7/2016 5:20:47 AM
Alpha_058	Alpha Analyst100DC	ALL	Passed	1/7/2016 5:20:49 AM

Review of QA Results - Pulser Check

1/7/2016 5:34:38 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha_059	Alpha Analyst100DC	ALL	Passed	1/7/2016 5:20:53 AM
Alpha_060	Alpha Analyst100DC	ALL	Passed	1/7/2016 5:20:55 AM

APPROVED BY: _____

APPROVAL DATE: 1/7

****
***** 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)

15-12122
Ra228
Run 1

Work Order	15-12122
Analysis Code	Ra228
Run	1
Date Received	12/30/2015
Lab Deadline	1/11/2016
Client	Michael Pisani & Associates, Inc.
Project	07-47 E White Lake
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)	843.3
Carrier	Yttirum
Carrier Conc (mg/ml)	33.264

Internal Fraction	*Sample Desc*	*Client ID*	*Login CPM*	*Sample Date*	*Sample Aliquot*
01	LCS	LCS		12/30/15 00:00	1.0000E+00
02	MBL	BLANK		12/30/15 00:00	1.0000E+00
03	DUP	BC-1	36	12/28/15 16:40	1.0000E+00
04	TRG	TBB-3S	35	12/18/15 09:30	1.0000E+00
05	TRG	TBB-1D	37	12/17/15 13:45	1.0000E+00
06	TRG	TBB-1S	34	12/17/15 15:45	1.0000E+00
07	TRG	TBA-1D	36	12/22/15 10:45	1.0000E+00
08	TRG	TBB-3D	34	12/15/15 13:30	1.0000E+00
09	TRG	TBB-2D	39	12/15/15 11:00	1.0000E+00
10	TRG	TBB-2M	42	12/14/15 12:30	1.0000E+00
11	TRG	MC-1	36	12/16/15 11:30	1.0000E+00
12	DO	BC-1	36	12/28/15 16:40	1.0000E+00

* 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.

Eberline Services
Oak Ridge Laboratory
Analysis Sheet

15-12122
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	0.9988	842.3	415.0	109.38	2.400	0.0929	0.1720	0.0791	99.08	108.38	1.00	1.00
02	MBL	0.9829	828.9	377.0	100.97	2.000	0.0946	0.1571	0.0625	93.95	94.86	1.00	1.00
03	DUP	0.9981	841.7	458.0	120.80	2.000	0.0922	0.1571	0.0649	97.55	107.31	1.00	1.00
04	TRG	0.9914	836.0	194.0	51.51	2.000	0.0928	0.1541	0.0613	92.14	47.47	1.00	1.00
05	TRG	0.9906	835.4	327.0	86.90	2.000	0.0943	0.1591	0.0648	97.40	84.64	1.00	1.00
06	TRG	0.9924	836.9	396.0	105.05	2.100	0.0947	0.1636	0.0689	98.63	103.61	1.00	1.00
07	TRG	0.9992	842.6	421.0	110.92	2.500	0.0926	0.1726	0.0800	96.20	105.82	1.00	1.00
08	TRG	0.9963	840.2	156.0	41.22	2.000	0.0904	0.1561	0.0657	98.76	40.71	1.00	1.00
09	TRG	0.9918	836.4	352.0	93.43	2.000	0.0910	0.1550	0.0640	96.20	89.88	1.00	1.00
10	TRG	0.9727	820.3	310.0	83.90	2.000	0.0928	0.1570	0.0642	96.50	80.96	1.00	1.00
11	TRG	0.9913	836.0	413.0	109.68	2.000	0.0934	0.1573	0.0639	96.05	105.34	1.00	1.00
12	DO	0.9893	834.3	363.0	96.59	2.000	0.0911	0.1534	0.0623	93.64	90.46	1.00	1.00

* 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.

Eberline Services
Oak Ridge Laboratory
Analysis Sheet

15-12122
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			01/11/16 12:51	KCOULSTON	01/07/16 10:51	KCOULSTON	01/13/16 07:29	KCOULSTON
02	MBL			01/11/16 12:51	KCOULSTON	01/07/16 10:51	KCOULSTON	01/13/16 07:29	KCOULSTON
03	DUP			01/11/16 12:51	KCOULSTON	01/07/16 10:51	KCOULSTON	01/13/16 07:29	KCOULSTON
04	TRG			01/11/16 12:51	KCOULSTON	01/07/16 10:51	KCOULSTON	01/13/16 07:29	KCOULSTON
05	TRG			01/11/16 12:51	KCOULSTON	01/07/16 10:51	KCOULSTON	01/13/16 07:29	KCOULSTON
06	TRG			01/11/16 12:51	KCOULSTON	01/07/16 10:51	KCOULSTON	01/13/16 07:29	KCOULSTON
07	TRG			01/11/16 12:51	KCOULSTON	01/07/16 10:51	KCOULSTON	01/13/16 07:29	KCOULSTON
08	TRG			01/11/16 12:51	KCOULSTON	01/07/16 10:51	KCOULSTON	01/13/16 07:29	KCOULSTON
09	TRG			01/11/16 12:51	KCOULSTON	01/07/16 10:51	KCOULSTON	01/13/16 07:29	KCOULSTON
10	TRG			01/11/16 12:51	KCOULSTON	01/07/16 10:51	KCOULSTON	01/13/16 07:29	KCOULSTON
11	TRG			01/11/16 12:51	KCOULSTON	01/07/16 10:51	KCOULSTON	01/13/16 07:29	KCOULSTON
12	DO			01/11/16 12:51	KCOULSTON	01/07/16 10:51	KCOULSTON	01/13/16 07:29	KCOULSTON

* 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.

Work Order: 15-12122-Ra228-1

Client: Michael Pisani & Associates, Inc.
Eberline Services Work Order: 15-12122
Analysis Code: Ra228
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-228	LCS	LCS	pCi/l	8.57E+00	7.06E-01	7.91E-01	9.03E+00	94.92	OK		OK	
02	RA-228	MBL	BLANK	pCi/l	2.36E-01	3.61E-01	7.47E-01					OK	OK
03	RA-228	DUP	BC-1	pCi/l	7.24E-01	3.93E-01	7.61E-01				NA	OK	
04	RA-228	TRG	TBB-3S	pCi/l	1.41E+00	8.26E-01	1.60E+00					OK	
05	RA-228	TRG	TBB-1D	pCi/l	6.80E-01	5.10E-01	1.02E+00					OK	
06	RA-228	TRG	TBB-1S	pCi/l	8.36E+00	6.78E-01	7.13E-01					OK	
07	RA-228	TRG	TBA-1D	pCi/l	1.20E+00	3.98E-01	7.12E-01					OK	
08	RA-228	TRG	TBB-3D	pCi/l	2.15E+00	1.14E+00	2.18E+00					INV	
09	RA-228	TRG	TBB-2D	pCi/l	1.23E+00	4.94E-01	9.23E-01					OK	
10	RA-228	TRG	TBB-2M	pCi/l	6.18E+00	7.69E-01	1.09E+00					OK	
11	RA-228	TRG	MC-1	pCi/l	1.92E+00	4.86E-01	8.46E-01					OK	
12	RA-228	DO	BC-1	pCi/l	1.02E+00	4.78E-01	9.09E-01					OK	

Work Order: 15-12122-Ra228-1

Client: Michael Pisani & Associates, Inc.
Eberline Services Work Order: 15-12122
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	12/30/15 00:00	1.00E+00	109.38	99.08	108.38	1.00	1/7/2016 10:51	1/13/2016 7:29
02	RA-228	MBL	12/30/15 00:00	1.00E+00	100.97	93.95	94.86	1.00	1/7/2016 10:51	1/13/2016 7:29
03	RA-228	DUP	12/28/15 16:40	1.00E+00	120.80	97.55	107.31	1.00	1/7/2016 10:51	1/13/2016 7:29
04	RA-228	TRG	12/18/15 09:30	1.00E+00	51.51	92.14	47.47	1.00	1/7/2016 10:51	1/13/2016 7:29
05	RA-228	TRG	12/17/15 13:45	1.00E+00	86.90	97.40	84.64	1.00	1/7/2016 10:51	1/13/2016 7:29
06	RA-228	TRG	12/17/15 15:45	1.00E+00	105.05	98.63	103.61	1.00	1/7/2016 10:51	1/13/2016 7:29
07	RA-228	TRG	12/22/15 10:45	1.00E+00	110.92	96.20	105.82	1.00	1/7/2016 10:51	1/13/2016 7:29
08	RA-228	TRG	12/15/15 13:30	1.00E+00	41.22	98.76	40.71	1.00	1/7/2016 10:51	1/13/2016 7:29
09	RA-228	TRG	12/15/15 11:00	1.00E+00	93.43	96.20	89.88	1.00	1/7/2016 10:51	1/13/2016 7:29
10	RA-228	TRG	12/14/15 12:30	1.00E+00	83.90	96.50	80.96	1.00	1/7/2016 10:51	1/13/2016 7:29
11	RA-228	TRG	12/16/15 11:30	1.00E+00	109.68	96.05	105.34	1.00	1/7/2016 10:51	1/13/2016 7:29
12	RA-228	DO	12/28/15 16:40	1.00E+00	96.59	93.64	90.46	1.00	1/7/2016 10:51	1/13/2016 7:29

Work Order: 15-12122-Ra228-1

Run	Analysis Code	Eberline Services Work Order	Client
1	Ra228	15-12122	Michael Pisani & Associates, Inc.

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	RA-228	LCS	01/13/16 09:27		LB4110A	E1	120	924	1.216666667	0.4776
02	RA-228	MBL	01/13/16 09:27		LB4110A	E2	120	132	0.933333333	0.4699
03	RA-228	DUP	01/13/16 09:27		LB4110A	E3	120	229	1.316666667	0.4809
04	RA-228	TRG	01/13/16 09:27		LB4110A	E4	120	192	1.1	0.4732
05	RA-228	TRG	01/13/16 09:27		LB4110A	F1	120	224	1.433333333	0.4754
06	RA-228	TRG	01/13/16 09:27		LB4110A	F2	120	887	1	0.4658
07	RA-228	TRG	01/13/16 09:27		LB4110A	F3	120	242	1.066666667	0.4713
08	RA-228	TRG	01/13/16 11:31		LB4110A	F4	120	177	0.95	0.4773
09	RA-228	TRG	01/13/16 09:27		LB4110A	G1	120	255	1.3	0.4705
10	RA-228	TRG	01/13/16 09:27		LB4110A	G2	120	621	1.466666667	0.4676
11	RA-228	TRG	01/13/16 09:27		LB4110A	G3	120	351	1.45	0.4614
12	RA-228	DO	01/13/16 09:27		LB4110A	G4	120	237	1.283333333	0.4714

Count Room Report
Client: Michael Pisani Associat

15-12122-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	12/30/15 00:00	1.0000	0.9988	842.2880	415.0000	109.38	1.00	1.00
02	MBL	BLANK	12/30/15 00:00	1.0000	0.9829	828.8796	377.0000	100.97	1.00	1.00
03	DUP	BC-1	12/28/15 16:40	1.0000	0.9981	841.6977	458.0000	120.80	1.00	1.00
04	TRG	TBB-3S	12/18/15 09:30	1.0000	0.9914	836.0476	194.0000	51.51	1.00	1.00
05	TRG	TBB-1D	12/17/15 13:45	1.0000	0.9906	835.3730	327.0000	86.90	1.00	1.00
06	TRG	TBB-1S	12/17/15 15:45	1.0000	0.9924	836.8909	396.0000	105.05	1.00	1.00
07	TRG	TBA-1D	12/22/15 10:45	1.0000	0.9992	842.6254	421.0000	110.92	1.00	1.00
08	TRG	TBB-3D	12/15/15 13:30	1.0000	0.9963	840.1798	156.0000	41.22	1.00	1.00
09	TRG	TBB-2D	12/15/15 11:00	1.0000	0.9918	836.3849	352.0000	93.43	1.00	1.00
10	TRG	TBB-2M	12/14/15 12:30	1.0000	0.9727	820.2779	310.0000	83.90	1.00	1.00
11	TRG	MC-1	12/16/15 11:30	1.0000	0.9913	835.9633	413.0000	109.68	1.00	1.00
12	DO	BC-1	12/28/15 16:40	1.0000	0.9893	834.2767	363.0000	96.59	1.00	1.00

Eberline Services
Oak Ridge Laboratory

Spike and Tracer Worksheet

Printed: 1/4/2016 8:18 AM

Internal Work Order	Run	Analysis Code	Date	Technician	Technician Initials	Witness Initials
15-12122	1	Ra228	1/4/2016 8:17	JWOLFE		

LCS & Matrix Spikes

Isotope	Sol #	Activity dpm/g	Solution Date	Approx Addition	LCS Volume Used (g)	MS Volume Used (g)	LCSD Volume Used (g)	MSD Volume Used (g)	LCS Known pCi	LCS Error Estimate	MS Added pCi	MS Error Estimate	LCSD Known pCi	LCSD Error Estimate	MSD Added pCi	MSD Error Estimate
Ra-228	Ra-11	28.140	1/4/2016	0.710	0.0000				0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
Tc-99 MS	Tc-2a	22043.636	7/5/2014	0.1												

Tracers

fraction	Isotope	Sol #	Activity dpm/g	Solution Date	Volume Used (g)	Approx Addition
01	Ba-133	Ba-6a	844.370	1/4/2016	0.9988	1.2000
02	Ba-133	Ba-6a	844.370	1/4/2016	0.9829	1.2000
03	Ba-133	Ba-6a	844.370	1/4/2016	0.9981	1.2000
04	Ba-133	Ba-6a	844.370	1/4/2016	0.9914	1.2000
05	Ba-133	Ba-6a	844.370	1/4/2016	0.9906	1.2000
06	Ba-133	Ba-6a	844.370	1/4/2016	0.9924	1.2000
07	Ba-133	Ba-6a	844.370	1/4/2016	0.9992	1.2000
08	Ba-133	Ba-6a	844.370	1/4/2016	0.9963	1.2000
09	Ba-133	Ba-6a	844.370	1/4/2016	0.9918	1.2000
10	Ba-133	Ba-6a	844.370	1/4/2016	0.9727	1.2000
11	Ba-133	Ba-6a	844.370	1/4/2016	0.9913	1.2000
12	Ba-133	Ba-6a	844.370	1/4/2016	0.9893	1.2000

Balance Printer Tapes

Tracer	LCS

Matrix Spike

Eberline Services
Oak Ridge Laboratory

Spike and Tracer Worksheet

Internal Work Order	Run	Analysis Code	Date	Technician	Technician Initials	Witness Initials
15-12122	1	Ra228	1/11/2016 12:51	KCOULSTON	KC	

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-11	28.080	1/11/2016	0.710	0.7137				9.03	0.460	0.00	0.000	0.00	0.000	0.00	0.000
Tc-99 MS	Tc-2a	22043.636	7/5/2014	0.1												

Tracers

fraction	Isotope	Sol #	Activity dpm/g	Solution Date	Volume Used (g)	Approx Addition
01	Ba-133	Ba-6a	843.300	1/11/2016	0.9988	1.2000
02	Ba-133	Ba-6a	843.300	1/11/2016	0.9829	1.2000
03	Ba-133	Ba-6a	843.300	1/11/2016	0.9981	1.2000
04	Ba-133	Ba-6a	843.300	1/11/2016	0.9914	1.2000
05	Ba-133	Ba-6a	843.300	1/11/2016	0.9906	1.2000
06	Ba-133	Ba-6a	843.300	1/11/2016	0.9924	1.2000
07	Ba-133	Ba-6a	843.300	1/11/2016	0.9992	1.2000
08	Ba-133	Ba-6a	843.300	1/11/2016	0.9963	1.2000
09	Ba-133	Ba-6a	843.300	1/11/2016	0.9918	1.2000
10	Ba-133	Ba-6a	843.300	1/11/2016	0.9727	1.2000
11	Ba-133	Ba-6a	843.300	1/11/2016	0.9913	1.2000
12	Ba-133	Ba-6a	843.300	1/11/2016	0.9893	1.2000

Balance Printer Tapes

Tracer

LCS

Matrix Spike

Eberline Analytical
Oak Ridge Laboratory

Aliquot Worksheet

Printed: 1/4/2016 8:22 AM

Work Order	Run	Analysis Code	Rpt Units	Lab Deadline	Technician
15-12122	1	Ra228	liters	1/11/2016	JWOLFE

Lab Fraction	Michael Pisani & Associates, Inc. Client ID	Sample Type	Muffle Data	Dilution Data			Aliquot Data		MS Aliquot Data		H-3 Solids Only	
			Ratio Post/Pre	No of Dils	Dil Factor	Ratio	Aliquot	Net Equiv	Aliquot	Net Equiv	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	BC-1	DUP					1.0000E+00	1.0000E+00				
04	TBB-3S	TRG					1.0000E+00	1.0000E+00				
05	TBB-1D	TRG					1.0000E+00	1.0000E+00				
06	TBB-1S	TRG					1.0000E+00	1.0000E+00				
07	TBA-1D	TRG					1.0000E+00	1.0000E+00				
08	TBB-3D	TRG					1.0000E+00	1.0000E+00				
09	TBB-2D	TRG					1.0000E+00	1.0000E+00				
10	TBB-2M	TRG					1.0000E+00	1.0000E+00				
11	MC-1	TRG					1.0000E+00	1.0000E+00				
12	BC-1	DO										

Comments	

Technician: JWolfe Date: 1/4/16

Eberline Services - Oak Ridge
Version 1.0 9/1999

Gravimetric Worksheet

Printed: 1/13/2016 9:04 AM

Work Order	Run	Analysis Code	Gravimetric Carrier	Carrier Conc (mg/ml)	Technician
15-12122	1	Ra228	Yttirum	33.2640	KCOULSTON

TRetec	Michael Pisani & Associates, Inc.	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	2.4000	0.0929	0.1720	0.0791	99.08
02	BLANK	MBL	2.0000	0.0946	0.1571	0.0625	93.95
03	DUP	DUP	2.0000	0.0922	0.1571	0.0649	97.55
04	TBB-3S	TRG	2.0000	0.0928	0.1541	0.0613	92.14
05	TBB-1D	TRG	2.0000	0.0943	0.1591	0.0648	97.40
06	TBB-1S	TRG	2.1000	0.0947	0.1636	0.0689	98.63
07	TBA-1D	TRG	2.5000	0.0926	0.1726	0.0800	96.20
08	TBB-3D	TRG	2.0000	0.0904	0.1561	0.0657	98.76
09	TBB-2D	TRG	2.0000	0.0910	0.1550	0.0640	96.20
10	TBB-2M	TRG	2.0000	0.0928	0.1570	0.0642	96.50
11	MC-1	TRG	2.0000	0.0934	0.1573	0.0639	96.05
12	BC-1	DO	2.0000	0.0911	0.1534	0.0623	93.64

Technician: Kristen Coulston Date: 1/13/16

Detector ID	Sample ID	Alpha	Beta	Count Time	Voltage	TOD
E1	1512122-01	43	924	120	1410	1/13/2016 9:27:23 AM
E2	1512122-02	11	132	120	1410	1/13/2016 9:27:23 AM
E3	1512122-03	15	229	120	1410	1/13/2016 9:27:23 AM
E4	1512122-04	13	192	120	1410	1/13/2016 9:27:23 AM
F1	1512122-05	22	224	120	1410	1/13/2016 9:27:23 AM
F2	1512122-06	25	887	120	1410	1/13/2016 9:27:23 AM
F3	1512122-07	15	242	120	1410	1/13/2016 9:27:24 AM
F4	1512122-08	23	177	120	1410	1/13/2016 11:31:38 AM
G1	1512122-09	23	255	120	1410	1/13/2016 9:27:24 AM
G2	1512122-10	25	621	120	1410	1/13/2016 9:27:24 AM
G3	1512122-11	12	351	120	1410	1/13/2016 9:27:24 AM
G4	1512122-12	17	237	120	1410	1/13/2016 9:27:24 AM

Eberline Analytical
Oak Ridge Laboratory

GPC Detector Report
(ALL Backgrounds)

1/13/16

Detector	Alpha/Beta	Calibration Date	Count Date	Bkg CPM	PFW	LCL	Mean	UCL
LB4110A - A1	Alpha	10/20/2015	1/13/2016	8.33E-02	P	-8.81E-02	1.18E-01	3.25E-01
LB4110A - A2	Alpha	10/20/2015	1/13/2016	8.33E-02	P	-6.56E-02	8.44E-02	2.34E-01
LB4110A - A3	Alpha	10/20/2015	1/13/2016	3.33E-02	P	-5.99E-02	1.09E-01	2.78E-01
LB4110A - A4	Alpha	10/20/2015	1/13/2016	6.67E-02	P	-8.60E-02	1.02E-01	2.90E-01
LB4110A - B1	Alpha	10/20/2015	1/13/2016	1.67E-02	P	-9.32E-02	1.43E-01	3.79E-01
LB4110A - B2	Alpha	10/20/2015	1/13/2016	8.33E-02	P	-2.77E-02	1.25E-01	2.78E-01
LB4110A - B3	Alpha	10/20/2015	1/13/2016	8.33E-02	P	-6.31E-02	1.17E-01	2.96E-01
LB4110A - B4	Alpha	10/20/2015	1/13/2016	1.17E-01	P	-6.62E-02	8.87E-02	2.44E-01
LB4110A - C1	Alpha	10/20/2015	1/13/2016	1.50E-01	P	-1.77E-01	1.14E-01	4.04E-01
LB4110A - C2	Alpha	10/20/2015	1/13/2016	5.00E-02	P	-1.08E-01	7.86E-02	2.65E-01
LB4110A - C3	Alpha	10/20/2015	1/13/2016	1.17E-01	P	-1.06E-01	1.13E-01	3.32E-01
LB4110A - C4	Alpha	10/20/2015	1/13/2016	1.50E-01	P	-6.83E-02	9.40E-02	2.56E-01
LB4110A - D1	Alpha	10/20/2015	1/13/2016	3.00E-01	P	-1.81E-02	1.97E-01	4.12E-01
LB4110A - D2	Alpha	10/20/2015	1/13/2016	1.50E-01	P	-4.72E-02	1.84E-01	4.15E-01
LB4110A - D3	Alpha	10/20/2015	1/13/2016	1.00E-01	P	-9.59E-02	8.05E-02	2.57E-01
LB4110A - D4	Alpha	10/20/2015	1/13/2016	1.17E-01	P	-1.02E-02	9.88E-02	2.08E-01
LB4110A - E1	Alpha	10/20/2015	1/13/2016	5.00E-02	P	-2.12E-01	1.87E-01	5.86E-01
LB4110A - E2	Alpha	10/20/2015	1/13/2016	6.67E-02	P	-9.07E-02	7.37E-02	2.38E-01
LB4110A - E3	Alpha	10/20/2015	1/13/2016	1.50E-01	P	-8.97E-02	1.69E-01	4.28E-01
LB4110A - E4	Alpha	10/20/2015	1/13/2016	6.67E-02	P	-6.36E-02	1.01E-01	2.66E-01
LB4110A - F1	Alpha	10/20/2015	1/13/2016	1.00E-01	P	-5.87E-02	1.33E-01	3.25E-01
LB4110A - F2	Alpha	10/20/2015	1/13/2016	3.33E-02	P	-4.74E-01	9.97E-02	6.73E-01
LB4110A - F3	Alpha	10/20/2015	1/13/2016	5.00E-02	P	-7.55E-02	1.81E-01	4.37E-01
LB4110A - F4	Alpha	10/20/2015	1/13/2016	8.33E-02	P	-5.31E-02	9.28E-02	2.39E-01
LB4110A - G1	Alpha	10/20/2015	1/13/2016	1.00E-01	P	-8.62E-02	1.34E-01	3.54E-01
LB4110A - G2	Alpha	10/20/2015	1/13/2016	1.33E-01	P	-1.24E-01	9.63E-02	3.16E-01
LB4110A - G3	Alpha	10/20/2015	1/13/2016	5.00E-02	P	-6.40E-02	1.78E-01	4.20E-01
LB4110A - G4	Alpha	10/20/2015	1/13/2016	3.33E-02	P	-3.03E-02	9.94E-02	2.29E-01

Eberline Analytical
Oak Ridge Laboratory

GPC Detector Report
(ALL Backgrounds)

T 1/13/16

Detector	Alpha/Beta	Calibration Date	Count Date	Bkg CPM	PFW	LCL	Mean	UCL
LB4110A - A1	Beta	10/20/2015	1/13/2016	1.55E+00	P	9.40E-01	1.54E+00	2.15E+00
LB4110A - A2	Beta	10/20/2015	1/13/2016	1.35E+00	P	1.02E+00	1.48E+00	1.93E+00
LB4110A - A3	Beta	10/20/2015	1/13/2016	1.53E+00	P	1.04E+00	1.69E+00	2.33E+00
LB4110A - A4	Beta	10/20/2015	1/13/2016	1.53E+00	P	-1.68E+00	2.13E+00	5.93E+00
LB4110A - B1	Beta	10/20/2015	1/13/2016	1.58E+00	P	1.09E+00	1.71E+00	2.33E+00
LB4110A - B2	Beta	10/20/2015	1/13/2016	1.18E+00	P	9.20E-01	1.55E+00	2.19E+00
LB4110A - B3	Beta	10/20/2015	1/13/2016	1.57E+00	P	9.18E-01	1.51E+00	2.10E+00
LB4110A - B4	Beta	10/20/2015	1/13/2016	1.47E+00	P	8.49E-01	1.52E+00	2.20E+00
LB4110A - C1	Beta	10/20/2015	1/13/2016	1.38E+00	P	9.32E-01	1.43E+00	1.93E+00
LB4110A - C2	Beta	10/20/2015	1/13/2016	1.30E+00	P	7.84E-01	1.21E+00	1.64E+00
LB4110A - C3	Beta	10/20/2015	1/13/2016	1.50E+00	P	7.71E-01	1.76E+00	2.74E+00
LB4110A - C4	Beta	10/20/2015	1/13/2016	1.33E+00	P	7.55E-01	1.32E+00	1.88E+00
LB4110A - D1	Beta	10/20/2015	1/13/2016	5.53E+00	F	1.28E+00	5.20E+00	9.12E+00
LB4110A - D2	Beta	10/20/2015	1/13/2016	4.33E+00	F	4.11E+00	4.90E+00	5.69E+00
LB4110A - D3	Beta	10/20/2015	1/13/2016	2.52E+00	F	1.45E+00	3.56E+00	5.67E+00
LB4110A - D4	Beta	10/20/2015	1/13/2016	4.60E+00	F	1.06E+00	5.09E+00	9.12E+00
LB4110A - E1	Beta	10/20/2015	1/13/2016	1.22E+00	P	8.54E-01	1.50E+00	2.14E+00
LB4110A - E2	Beta	10/20/2015	1/13/2016	9.33E-01	P	4.63E-01	9.46E-01	1.43E+00
LB4110A - E3	Beta	10/20/2015	1/13/2016	1.32E+00	P	6.17E-01	1.30E+00	1.97E+00
LB4110A - E4	Beta	10/20/2015	1/13/2016	1.10E+00	P	6.25E-01	1.07E+00	1.52E+00
LB4110A - F1	Beta	10/20/2015	1/13/2016	1.43E+00	P	1.07E+00	1.58E+00	2.10E+00
LB4110A - F2	Beta	10/20/2015	1/13/2016	1.00E+00	P	-8.92E+02	8.08E+01	1.05E+03
LB4110A - F3	Beta	10/20/2015	1/13/2016	1.07E+00	P	6.39E-01	1.38E+00	2.12E+00
LB4110A - F4	Beta	10/20/2015	1/13/2016	9.50E-01	P	6.74E-01	1.12E+00	1.57E+00
LB4110A - G1	Beta	10/20/2015	1/13/2016	1.30E+00	P	7.44E-01	1.32E+00	1.89E+00
LB4110A - G2	Beta	10/20/2015	1/13/2016	1.47E+00	P	1.12E+00	1.66E+00	2.20E+00
LB4110A - G3	Beta	10/20/2015	1/13/2016	1.45E+00	P	8.25E-01	1.42E+00	2.02E+00
LB4110A - G4	Beta	10/20/2015	1/13/2016	1.28E+00	P	9.19E-01	1.39E+00	1.85E+00

GPC Detector Report
(ALL Efficiencies)

1/17/16

Detector	Alpha/Beta	Calibration Date	Count Date	Eff	PFW	LCL	Mean	UCL
LB4110A - A1	Alpha	10/20/2015	1/13/2016	0.2274	P	0.2253	0.2330	0.2407
LB4110A - A2	Alpha	10/20/2015	1/13/2016	0.2074	P	0.2037	0.2112	0.2187
LB4110A - A3	Alpha	10/20/2015	1/13/2016	0.2004	P	0.1925	0.2021	0.2117
LB4110A - A4	Alpha	10/20/2015	1/13/2016	0.2320	P	0.2201	0.2294	0.2388
LB4110A - B1	Alpha	10/20/2015	1/13/2016	0.2166	P	0.1975	0.2099	0.2224
LB4110A - B2	Alpha	10/20/2015	1/13/2016	0.2154	P	0.2021	0.2150	0.2280
LB4110A - B3	Alpha	10/20/2015	1/13/2016	0.2368	P	0.2215	0.2349	0.2483
LB4110A - B4	Alpha	10/20/2015	1/13/2016	0.2308	P	0.2135	0.2246	0.2356
LB4110A - C1	Alpha	10/20/2015	1/13/2016	0.2106	P	0.2040	0.2119	0.2199
LB4110A - C2	Alpha	10/20/2015	1/13/2016	0.2222	P	0.2112	0.2218	0.2324
LB4110A - C3	Alpha	10/20/2015	1/13/2016	0.2531	P	0.2376	0.2478	0.2580
LB4110A - C4	Alpha	10/20/2015	1/13/2016	0.2175	P	0.2124	0.2214	0.2303
LB4110A - D1	Alpha	10/20/2015	1/13/2016	0.2222	P	0.2125	0.2209	0.2293
LB4110A - D2	Alpha	10/20/2015	1/13/2016	0.2484	P	0.2376	0.2478	0.2580
LB4110A - D3	Alpha	10/20/2015	1/13/2016	0.2606	P	0.2453	0.2566	0.2678
LB4110A - D4	Alpha	10/20/2015	1/13/2016	0.1869	P	0.1830	0.1924	0.2019
LB4110A - E1	Alpha	10/20/2015	1/13/2016	0.2341	P	0.2269	0.2366	0.2462
LB4110A - E2	Alpha	10/20/2015	1/13/2016	0.2151	P	0.2038	0.2147	0.2256
LB4110A - E3	Alpha	10/20/2015	1/13/2016	0.2088	P	0.2035	0.2124	0.2213
LB4110A - E4	Alpha	10/20/2015	1/13/2016	0.2475	P	0.2375	0.2462	0.2548
LB4110A - F1	Alpha	10/20/2015	1/13/2016	0.2069	P	0.1276	0.1938	0.2600
LB4110A - F2	Alpha	10/20/2015	1/13/2016	0.2022	P	0.1305	0.1985	0.2664
LB4110A - F3	Alpha	10/20/2015	1/13/2016	0.2359	P	0.1561	0.2374	0.3188
LB4110A - F4	Alpha	10/20/2015	1/13/2016	0.2088	P	0.1406	0.2137	0.2868
LB4110A - G1	Alpha	10/20/2015	1/13/2016	0.2095	P	0.2010	0.2068	0.2125
LB4110A - G2	Alpha	10/20/2015	1/13/2016	0.2105	P	0.2025	0.2101	0.2177
LB4110A - G3	Alpha	10/20/2015	1/13/2016	0.2315	P	0.2255	0.2308	0.2362
LB4110A - G4	Alpha	10/20/2015	1/13/2016	0.2074	P	0.1989	0.2043	0.2096

Eberline Analytical
Oak Ridge Laboratory

GPC Detector Report
(ALL Efficiencies)

Printed: 1/13/2016 7:03 AM

Detector	Alpha/Beta	Calibration Date	Count Date	Eff	PFW	LCL	Mean	UCL
LB4110A - A1	Beta	10/20/2015	1/13/2016	0.5515	P	0.5337	0.5496	0.5655
LB4110A - A2	Beta	10/20/2015	1/13/2016	0.4738	P	0.4645	0.4793	0.4940
LB4110A - A3	Beta	10/20/2015	1/13/2016	0.4662	P	0.4594	0.4784	0.4974
LB4110A - A4	Beta	10/20/2015	1/13/2016	0.5508	P	0.5338	0.5534	0.5730
LB4110A - B1	Beta	10/20/2015	1/13/2016	0.5337	P	0.5007	0.5242	0.5476
LB4110A - B2	Beta	10/20/2015	1/13/2016	0.5234	P	0.4941	0.5175	0.5408
LB4110A - B3	Beta	10/20/2015	1/13/2016	0.5801	P	0.5560	0.5813	0.6067
LB4110A - B4	Beta	10/20/2015	1/13/2016	0.5538	P	0.5303	0.5521	0.5739
LB4110A - C1	Beta	10/20/2015	1/13/2016	0.4986	P	0.4795	0.4971	0.5148
LB4110A - C2	Beta	10/20/2015	1/13/2016	0.5301	P	0.5099	0.5302	0.5505
LB4110A - C3	Beta	10/20/2015	1/13/2016	0.6294	P	0.5938	0.6175	0.6412
LB4110A - C4	Beta	10/20/2015	1/13/2016	0.5376	P	0.5224	0.5450	0.5676
LB4110A - D1	Beta	10/20/2015	1/13/2016	0.6530	P	0.6305	0.6528	0.6751
LB4110A - D2	Beta	10/20/2015	1/13/2016	0.6391	P	0.6212	0.6402	0.6591
LB4110A - D3	Beta	10/20/2015	1/13/2016	0.6514	P	0.6129	0.6366	0.6604
LB4110A - D4	Beta	10/20/2015	1/13/2016	0.4761	P	0.4607	0.4768	0.4929
LB4110A - E1	Beta	10/20/2015	1/13/2016	0.5681	P	0.5484	0.5635	0.5787
LB4110A - E2	Beta	10/20/2015	1/13/2016	0.5100	P	0.4976	0.5157	0.5337
LB4110A - E3	Beta	10/20/2015	1/13/2016	0.5125	P	0.5031	0.5172	0.5312
LB4110A - E4	Beta	10/20/2015	1/13/2016	0.6128	P	0.5929	0.6110	0.6292
LB4110A - F1	Beta	10/20/2015	1/13/2016	0.5086	P	0.3204	0.4765	0.6326
LB4110A - F2	Beta	10/20/2015	1/13/2016	0.4762	P	0.3107	0.4735	0.6363
LB4110A - F3	Beta	10/20/2015	1/13/2016	0.5961	P	0.3905	0.5938	0.7972
LB4110A - F4	Beta	10/20/2015	1/13/2016	0.4995	P	0.3454	0.5249	0.7045
LB4110A - G1	Beta	10/20/2015	1/13/2016	0.4646	W	0.4620	0.4733	0.4845
LB4110A - G2	Beta	10/20/2015	1/13/2016	0.5047	P	0.4955	0.5068	0.5181
LB4110A - G3	Beta	10/20/2015	1/13/2016	0.5641	P	0.5495	0.5637	0.5779
LB4110A - G4	Beta	10/20/2015	1/13/2016	0.4977	W	0.4953	0.5078	0.5203

SECTION X

BARIUM-133 ANALYTICAL TRACER DATA

Apex-Gamma

Analysis Report for 1512122-01
SPIKE

GAMMA SPECTRUM ANALYSIS

Sample Identification	: 1512122-01
Sample Description	: SPIKE
Sample Type	: RA RECOVERY
Sample Size	: 1.000E+00 units
Facility	: Countroom
Sample Taken On	: 1/7/2016 11:40:09AM
Acquisition Started	: 1/7/2016 11:44:09AM
Procedure	: BAFIL
Operator	: Administrator
Detector Name	: GE1
Geometry	: BAFIL
Live Time	: 900.0 seconds
Real Time	: 900.3 seconds
Dead Time	: 0.03 %
Peak Locate Threshold	: 2.50
Peak Locate Range (in channels)	: 1 - 4096
Peak Area Range (in channels)	: 19 - 4096
Identification Energy Tolerance	: 1.000 keV
Energy Calibration Used Done On	: 10/25/2014
Efficiency Calibration Used Done On	: 11/9/2014
Efficiency Calibration Description	:
Sample Number	: 31487

PEAK ANALYSIS REPORT

Peak Analysis Performed on : 1/7/2016 11:59:12AM

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 1512122-01

SPIKE

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
M	1	30.78	27 -	40	31.13	1.95E+03	92.35	1.67E+02	1.64
m	2	35.06	27 -	40	35.41	4.33E+02	52.65	1.50E+02	1.66
M	3	61.74	49 -	73	62.09	2.44E+02	40.94	1.06E+02	1.91
m	4	65.94	49 -	73	66.29	1.04E+02	37.79	1.21E+02	1.92
	5	81.20	77 -	87	81.54	7.70E+02	70.99	2.54E+02	1.94
M	6	108.96	107 -	121	109.29	3.05E+01	19.18	6.40E+01	2.58
m	7	112.01	107 -	121	112.34	2.18E+02	37.84	9.60E+01	1.87
m	8	116.08	107 -	121	116.41	6.33E+01	34.87	1.12E+02	2.46
M	9	176.17	172 -	195	176.48	1.91E+01	24.23	9.50E+01	2.14
	10	263.45	260 -	267	263.73	2.02E+01	18.44	4.17E+01	4.23
	11	276.34	272 -	281	276.61	6.42E+01	27.98	7.57E+01	1.70
	12	302.86	298 -	305	303.12	1.22E+02	30.72	7.52E+01	1.47
M	13	333.91	330 -	344	334.16	6.58E+01	20.57	3.25E+01	1.77
m	14	337.69	330 -	344	337.94	2.88E+01	17.18	2.26E+01	1.77
m	15	356.06	351 -	361	356.31	5.15E+02	46.37	2.50E+01	1.82
M	16	383.78	372 -	396	384.01	1.30E+02	24.06	1.18E+01	1.81
m	17	386.93	372 -	396	387.16	1.61E+02	35.20	6.70E+00	1.82
m	18	391.60	372 -	396	391.83	3.92E+01	16.45	1.09E+00	1.82
M	19	414.61	410 -	421	414.83	2.88E+01	17.75	2.50E+01	1.84
m	20	417.94	410 -	421	418.17	1.89E+01	18.73	4.55E+01	1.84
	21	436.92	432 -	441	437.14	1.11E+02	23.47	1.50E+01	1.88
	22	599.91	597 -	602	600.08	1.30E+01	7.21	0.00E+00	1.19
	23	614.55	611 -	618	614.71	1.08E+01	10.58	1.03E+01	4.74
	24	1000.78	998 -	1004	1000.80	1.00E+01	6.32	0.00E+00	2.12

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 : 1/7/2016 11:59:12AM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000031224.CNF

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
M	1	30.78	1.95E+03	92.35			1.95E+03	9.23E+01
m	2	35.06	4.33E+02	52.65			4.33E+02	5.27E+01
M	3	61.74	2.44E+02	40.94			2.44E+02	4.09E+01
m	4	65.94	1.04E+02	37.79			1.04E+02	3.78E+01
	5	81.20	7.70E+02	70.99			7.70E+02	7.10E+01

Analysis Report for 1512122-01

SPIKE

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
M	6	108.96	3.05E+01	19.18			3.05E+01	1.92E+01
m	7	112.01	2.18E+02	37.84			2.18E+02	3.78E+01
m	8	116.08	6.33E+01	34.87			6.33E+01	3.49E+01
M	9	176.17	1.91E+01	24.23			1.91E+01	2.42E+01
	10	263.45	2.02E+01	18.44			2.02E+01	1.84E+01
	11	276.34	6.42E+01	27.98			6.42E+01	2.80E+01
	12	302.86	1.22E+02	30.72			1.22E+02	3.07E+01
M	13	333.91	6.58E+01	20.57			6.58E+01	2.06E+01
m	14	337.69	2.88E+01	17.18	1.33E+00	1.44E+00	2.75E+01	1.72E+01
m	15	356.06	5.15E+02	46.37			5.15E+02	4.64E+01
M	16	383.78	1.30E+02	24.06			1.30E+02	2.41E+01
m	17	386.93	1.61E+02	35.20			1.61E+02	3.52E+01
m	18	391.60	3.92E+01	16.45			3.92E+01	1.65E+01
M	19	414.61	2.88E+01	17.75			2.88E+01	1.77E+01
m	20	417.94	1.89E+01	18.73			1.89E+01	1.87E+01
	21	436.92	1.11E+02	23.47			1.11E+02	2.35E+01
	22	599.91	1.30E+01	7.21			1.30E+01	7.21E+00
	23	614.55	1.08E+01	10.58			1.08E+01	1.06E+01
	24	1000.78	1.00E+01	6.32	7.23E-01	8.49E-01	9.28E+00	6.38E+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	0.96	255.12		1.93		
		391.69	*	61.90	2.32E+01	9.89E+00
I-125	0.97	35.49	*	6.49	7.59E+00	9.23E-01
BA-133	1.00	30.80	*	97.60	7.81E-01	3.70E-02
		302.84	*	17.80	4.83E+02	1.90E+02
		356.01	*	60.00	4.15E+02	5.41E+01
PA-231	1.00	9.28		42.00		
		10.11		20.20		
		283.67		1.60		
		302.67	*	2.30	3.74E+03	1.47E+03

Analysis Report for 1512122-01

SPIKE

* = Energy line found in the spectrum.
\- = Manually added nuclide.
? = Manually edited nuclide.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 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	0.968	2.32E+01	9.89E+00	
	I-125	0.970	7.59E+00	9.23E-01	
X	I-129	0.643			
	BA-133	1.000	7.81E-01	3.70E-02	
	PA-231	1.000	3.73E+03	1.47E+03	

? = 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 1512122-01

SPIKE

UNIDENTIFIED PEAKS

Peak Locate Performed on : 1/7/2016 11:59:12AM
Peak Locate From Channel : 1
Peak Locate To Channel : 4096

	Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
M	3	61.74	2.71309E-01	8.38	Sum	
m	4	65.94	1.15377E-01	18.20	Sum	
	5	81.20	8.55348E-01	4.61		
M	6	108.96	3.39222E-02	31.42		
m	7	112.01	2.42253E-01	8.68		
m	8	116.08	7.03179E-02	27.55		
M	9	176.17	2.11681E-02	63.59		
	10	263.45	2.23984E-02	45.74		
	11	276.34	7.12908E-02	21.81		
M	13	333.91	7.31184E-02	15.63	Sum	
m	14	337.69	3.05365E-02	31.36	Sum	
M	16	383.78	1.44053E-01	9.28		
m	17	386.93	1.78656E-01	10.94	Sum	
M	19	414.61	3.20087E-02	30.80		
m	20	417.94	2.10469E-02	49.45		
	21	436.92	1.23870E-01	10.53		
	22	599.91	1.44444E-02	27.74		
	23	614.55	1.20486E-02	48.80		
	24	1000.78	1.03073E-02	34.39		

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

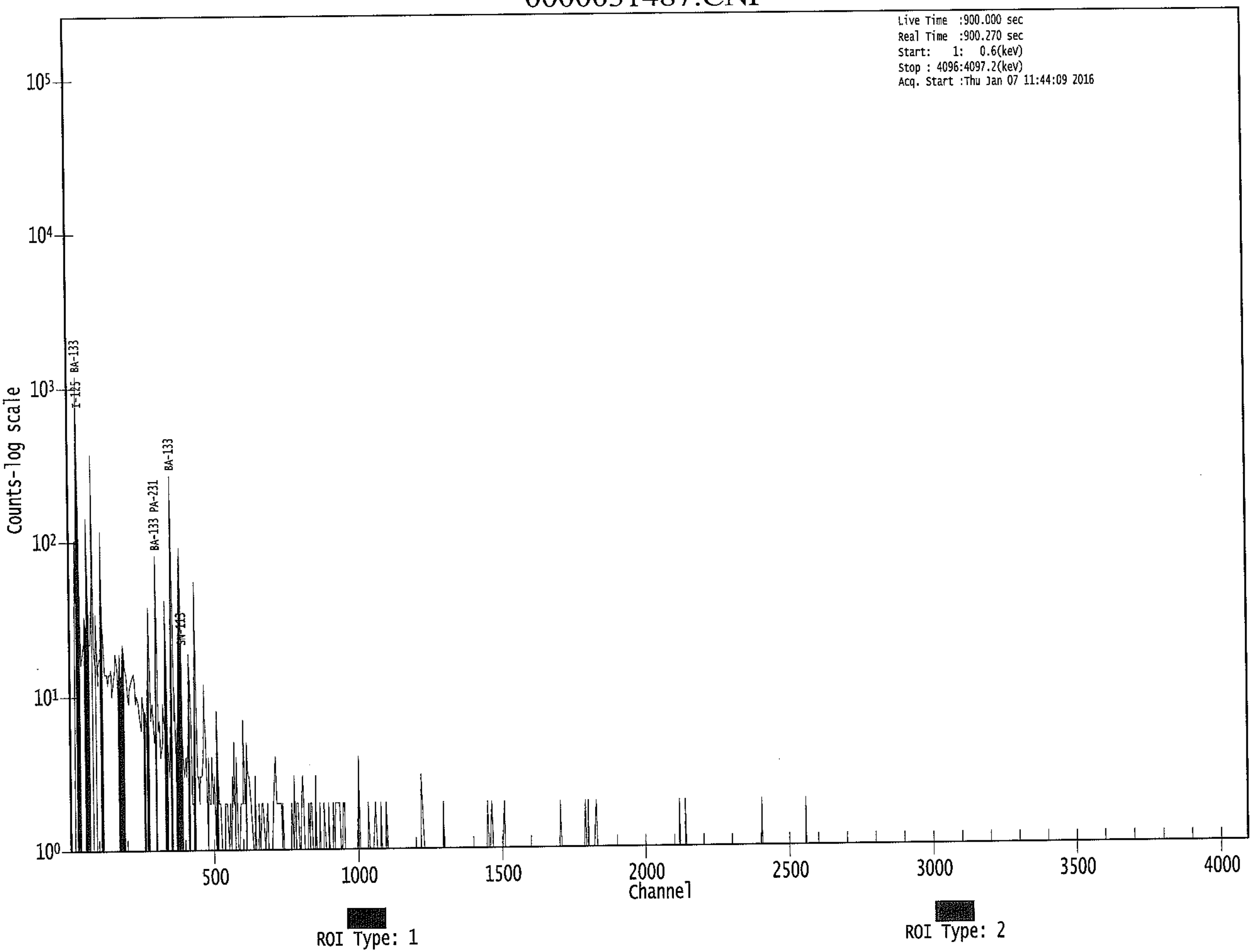
Analysis Report for 1512122-01

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	6.60E-12	6.60E-12	0.00E+00	0.00E+00
	CO-57	122.06		85.51	2.69E+01	2.69E+01	-6.85E-01	1.25E+01
		136.48		10.60	2.79E+02		3.66E+01	1.30E+02
	NI-59	6.92		29.80	6.80E-11	6.80E-11	0.00E+00	0.00E+00
	MO-93	16.59		52.90	3.35E-05	3.35E-05	-3.07E-05	1.46E-05
		18.60		10.00	1.70E-03		8.57E-04	8.07E-04
	NB-93M	16.57		9.43	1.85E-04	1.85E-04	-1.70E-04	8.06E-05
	CD-109	88.03		3.72	2.55E+02	2.55E+02	2.02E+01	1.19E+02
+	SN-113	255.12		1.93	1.47E+03	2.28E+01	4.14E+02	6.72E+02
		391.69	*	61.90	2.28E+01		2.32E+01	1.06E+01
	SN-119M	23.87		16.10	1.88E-02	1.88E-02	1.89E-02	9.08E-03
		25.10		22.70	1.95E-02		1.99E-02	9.37E-03
+	I-125	35.49	*	6.49	1.76E+00	1.76E+00	7.59E+00	8.57E-01
	I-129	29.78	*	57.00	6.92E-02	6.92E-02	1.34E+00	3.37E-02
		33.60		13.20	9.40E-01		-6.42E+00	4.62E-01
		39.58		7.52	1.59E+00		2.20E-01	7.43E-01
+	BA-133	30.80	*	97.60	4.04E-02	4.04E-02	7.81E-01	1.97E-02
		302.84	*	17.80	1.49E+02		4.83E+02	6.92E+01
		356.01	*	60.00	2.71E+01		4.15E+02	1.24E+01
	CE-139	165.85		80.35	4.77E+01	4.77E+01	1.42E+01	2.22E+01
	CE-144	133.54		10.80	2.27E+02	2.27E+02	-1.58E+02	1.04E+02
	HG-203	279.19		77.30	4.10E+01	4.10E+01	3.50E+01	1.91E+01
	PB-210	46.50		4.25	7.40E+00	7.40E+00	2.46E+00	3.42E+00
+	PA-231	9.28		42.00	3.55E-09	3.55E-09	0.00E+00	0.00E+00
		10.11		20.20	2.40E-08		0.00E+00	0.00E+00
		283.67		1.60	1.26E+03		-2.56E+02	5.63E+02
		302.67	*	2.30	1.15E+03		3.74E+03	5.36E+02
	TH-231	25.64		14.70	2.95E-02	2.95E-02	-1.80E-02	1.41E-02
		84.21		6.40	1.41E+02		-1.71E+03	6.65E+01
	PA-234M	9.89		89.00	4.04E-09	4.04E-09	0.00E+00	0.00E+00
		21.72		64.90	2.05E-03		4.62E-03	9.91E-04
		37.93		23.75	7.42E-01		9.66E-01	3.59E-01
		131.42		20.40	1.17E+02		-5.04E+01	5.36E+01
	TH-234	63.29		3.80	1.29E+02	1.29E+02	1.88E+02	6.23E+01
	NP-237	29.37		14.00	3.93E-01	3.93E-01	3.41E+00	1.94E-01
		86.50		12.60	7.20E+01		-2.30E-01	3.36E+01
	U-237	97.08		16.30	7.63E+01	5.80E+01	-4.94E+01	3.54E+01
		101.07		26.30	5.80E+01		1.32E+01	2.71E+01
		114.00		12.30	3.42E+02		5.39E+02	1.65E+02
		208.01		22.00	1.38E+02		-2.92E+01	6.23E+01
	AM-241	59.54		35.90	8.26E+00	8.26E+00	4.54E+00	3.98E+00
	AM-243	74.67		66.00	7.81E+00	7.81E+00	3.31E+00	3.66E+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

0000031487.CNF



Apex-Gamma

Analysis Report for 1512122-02
BLANK

GAMMA SPECTRUM ANALYSIS

Sample Identification	: 1512122-02
Sample Description	: BLANK
Sample Type	: RA RECOVERY
Sample Size	: 1.000E+00 units
Facility	: Countroom
Sample Taken On	: 1/7/2016 11:40:17AM
Acquisition Started	: 1/7/2016 11:44:18AM
Procedure	: BAFIL
Operator	: Administrator
Detector Name	: GE2
Geometry	: BAFIL
Live Time	: 900.0 seconds
Real Time	: 900.3 seconds
Dead Time	: 0.03 %
Peak Locate Threshold	: 2.50
Peak Locate Range (in channels)	: 1 - 4096
Peak Area Range (in channels)	: 5 - 4096
Identification Energy Tolerance	: 1.000 keV
Energy Calibration Used Done On	: 11/2/2014
Efficiency Calibration Used Done On	: 11/9/2014
Efficiency Calibration Description	:
Sample Number	: 31488

PEAK ANALYSIS REPORT

Peak Analysis Performed on : 1/7/2016 11:59:24AM

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 1512122-02

BLANK

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
	1	20.86	18 -	24	20.98	9.46E+01	57.14	5.31E+02	1.39
M	2	30.92	27 -	40	31.03	1.84E+03	92.30	2.47E+02	1.46
m	3	35.12	27 -	40	35.23	3.76E+02	51.30	1.32E+02	1.46
	4	46.84	45 -	49	46.94	2.75E+01	21.40	7.71E+01	1.87
	5	52.96	50 -	56	53.07	3.90E+01	32.62	1.66E+02	2.33
M	6	61.95	58 -	73	62.04	1.96E+02	35.55	1.04E+02	1.61
m	7	66.16	58 -	73	66.25	9.26E+01	28.84	8.36E+01	1.61
m	8	81.05	76 -	85	81.14	5.88E+02	56.67	8.53E+01	1.33
M	9	101.45	99 -	119	101.53	1.61E+01	22.09	7.42E+01	1.68
m	10	108.57	99 -	119	108.64	2.01E+01	23.23	8.41E+01	1.70
m	11	111.72	99 -	119	111.79	1.64E+02	34.00	9.80E+01	1.71
m	12	115.81	99 -	119	115.87	2.42E+01	21.73	9.47E+01	1.43
	13	133.37	131 -	137	133.42	3.21E+01	22.01	6.77E+01	3.98
	14	161.83	157 -	167	161.87	4.30E+01	37.00	1.60E+02	4.60
	15	213.71	211 -	216	213.72	2.00E+01	18.49	5.00E+01	2.91
	16	275.96	273 -	278	275.94	5.84E+01	19.97	3.33E+01	1.63
	17	302.77	299 -	305	302.73	1.24E+02	30.08	8.73E+01	1.34
M	18	323.40	319 -	341	323.35	1.20E+01	14.53	1.59E+01	2.05
m	19	333.40	319 -	341	333.35	5.73E+01	21.89	3.34E+01	2.07
	20	356.03	352 -	360	355.96	4.60E+02	48.13	6.67E+01	1.41
	21	364.34	361 -	367	364.27	1.82E+01	13.01	1.77E+01	1.26
M	22	381.08	380 -	393	381.00	6.24E+00	6.24	7.97E+00	1.47
m	23	386.76	380 -	393	386.68	1.75E+02	33.69	2.02E+01	1.96
m	24	390.73	380 -	393	390.64	2.81E+01	18.08	1.83E+01	1.97
M	25	413.10	410 -	429	413.00	1.06E+01	12.69	1.33E+01	1.50
m	26	418.53	410 -	429	418.43	2.26E+01	16.88	1.28E+01	2.43
	27	437.04	433 -	439	436.93	7.82E+01	20.72	2.16E+01	1.47
	28	467.90	464 -	473	467.77	2.21E+01	13.96	1.58E+01	1.95
M	29	508.30	507 -	515	508.16	5.89E+00	6.44	9.00E+00	1.76
	30	660.47	657 -	662	660.25	5.00E+00	7.07	6.00E+00	1.28
	31	827.16	825 -	829	826.87	5.08E+00	5.50	1.83E+00	2.72

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 : 1/7/2016 11:59:24AM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000031225.CNF

Analysis Report for 1512122-02

BLANK

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
	1	20.86	9.46E+01	57.14			9.46E+01	5.71E+01
M	2	30.92	1.84E+03	92.30			1.84E+03	9.23E+01
m	3	35.12	3.76E+02	51.30			3.76E+02	5.13E+01
	4	46.84	2.75E+01	21.40	9.86E+00	2.37E+00	1.76E+01	2.15E+01
	5	52.96	3.90E+01	32.62	9.74E-01	1.91E+00	3.80E+01	3.27E+01
M	6	61.95	1.96E+02	35.55			1.96E+02	3.55E+01
m	7	66.16	9.26E+01	28.84			9.26E+01	2.88E+01
m	8	81.05	5.88E+02	56.67			5.88E+02	5.67E+01
M	9	101.45	1.61E+01	22.09			1.61E+01	2.21E+01
m	10	108.57	2.01E+01	23.23			2.01E+01	2.32E+01
m	11	111.72	1.64E+02	34.00			1.64E+02	3.40E+01
m	12	115.81	2.42E+01	21.73			2.42E+01	2.17E+01
	13	133.37	3.21E+01	22.01			3.21E+01	2.20E+01
	14	161.83	4.30E+01	37.00			4.30E+01	3.70E+01
	15	213.71	2.00E+01	18.49			2.00E+01	1.85E+01
	16	275.96	5.84E+01	19.97			5.84E+01	2.00E+01
	17	302.77	1.24E+02	30.08			1.24E+02	3.01E+01
M	18	323.40	1.20E+01	14.53			1.20E+01	1.45E+01
m	19	333.40	5.73E+01	21.89			5.73E+01	2.19E+01
	20	356.03	4.60E+02	48.13			4.60E+02	4.81E+01
	21	364.34	1.82E+01	13.01			1.82E+01	1.30E+01
M	22	381.08	6.24E+00	6.24			6.24E+00	6.24E+00
m	23	386.76	1.75E+02	33.69			1.75E+02	3.37E+01
m	24	390.73	2.81E+01	18.08			2.81E+01	1.81E+01
M	25	413.10	1.06E+01	12.69			1.06E+01	1.27E+01
m	26	418.53	2.26E+01	16.88			2.26E+01	1.69E+01
	27	437.04	7.82E+01	20.72			7.82E+01	2.07E+01
	28	467.90	2.21E+01	13.96			2.21E+01	1.40E+01
M	29	508.30	5.89E+00	6.44			5.89E+00	6.44E+00
	30	660.47	5.00E+00	7.07			5.00E+00	7.07E+00
	31	827.16	5.08E+00	5.50			5.08E+00	5.50E+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

Analysis Report for 1512122-02
BLANK

Nuclide Name	Id Confidence	Energy (keV)		Yield(%)	Activity (pCi/units)	Activity Uncertainty
SN-113	0.82	255.12		1.93		
		391.69	*	61.90	1.95E+01	1.27E+01
I-125	0.97	35.49	*	6.49	3.98E+01	5.44E+00
BA-133	0.99	30.80	*	97.60	6.67E+00	3.35E-01
		302.84	*	17.80	4.13E+02	1.42E+02
		356.01	*	60.00	3.77E+02	5.40E+01
CE-144	0.99	133.54	*	10.80	1.46E+02	1.05E+02
PB-210	0.98	46.50	*	4.25	1.08E+01	1.33E+01

* = Energy line found in the spectrum.
\- = Manually added nuclide.
? = Manually edited nuclide.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 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	0.827	1.95E+01	1.27E+01	
I-125	0.978	3.98E+01	5.44E+00	
BA-133	0.999	6.69E+00	3.35E-01	
CE-144	0.995	1.46E+02	1.05E+02	
PB-210	0.982	1.08E+01	1.33E+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 1512122-02

BLANK

UNIDENTIFIED PEAKS

Peak Locate Performed on : 1/7/2016 11:59:24AM
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	20.86	1.05060E-01	30.22	Tol.	PA-234M
	5	52.96	4.22328E-02	42.98		
M	6	61.95	2.17872E-01	9.06	Sum	
m	7	66.16	1.02911E-01	15.57	Sum	
m	8	81.05	6.53125E-01	4.82	Sum	
M	9	101.45	1.78909E-02	68.58	Tol.	U-237
m	10	108.57	2.23134E-02	57.84		
m	11	111.72	1.82762E-01	10.33		
m	12	115.81	2.68537E-02	44.95		
	14	161.83	4.77552E-02	43.05		
	15	213.71	2.22222E-02	46.23		
	16	275.96	6.48444E-02	17.11		
M	18	323.40	1.33604E-02	60.40		
m	19	333.40	6.36926E-02	19.09	Sum	
	21	364.34	2.01852E-02	35.81		
M	22	381.08	6.92820E-03	50.08		
m	23	386.76	1.94003E-01	9.65	Sum	
M	25	413.10	1.17996E-02	59.74		
m	26	418.53	2.50638E-02	37.42		
	27	437.04	8.68914E-02	13.25	Sum	
	28	467.90	2.45556E-02	31.59		
M	29	508.30	6.54097E-03	54.72		
	30	660.47	5.55556E-03	70.71		
	31	827.16	5.64815E-03	54.10		

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

Analysis Report for 1512122-02

BLANK

NUCLIDE MDA REPORT

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

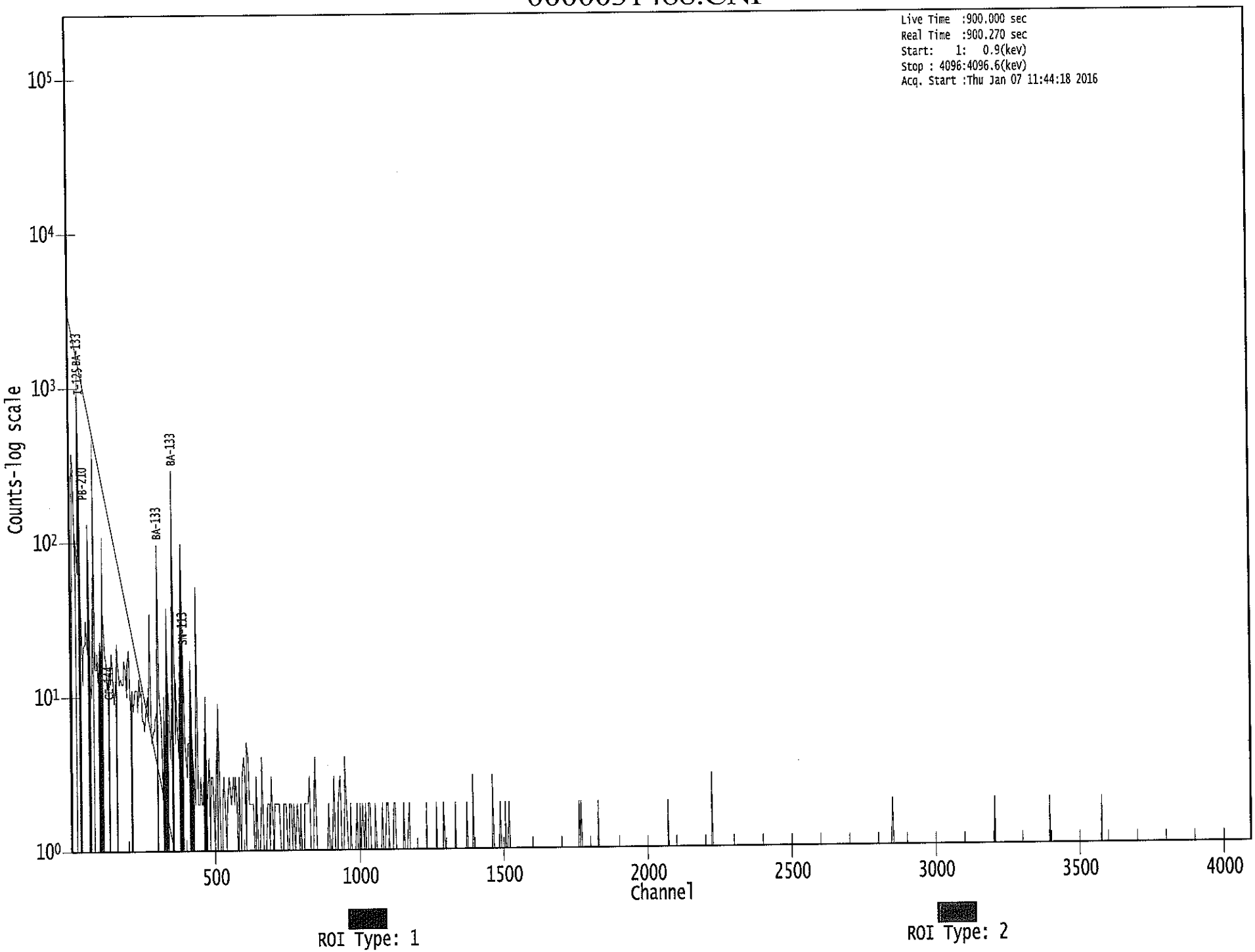
	Nuclide Name	Energy (keV)		Yield(%)	Line MDA (pCi/units)	Nuclide MDA (pCi/units)	Activity (pCi/units)	Dec. Level (pCi/units)
	FE-55	5.89		24.50	8.07E-07	8.07E-07	-4.11E-06	3.45E-07
	CO-57	122.06		85.51	1.92E+01	1.92E+01	5.43E+00	8.92E+00
		136.48		10.60	1.67E+02		-1.01E+01	7.70E+01
	NI-59	6.92		29.80	7.97E-06	7.97E-06	-2.90E-05	3.76E-06
	MO-93	16.59		52.90	6.41E-03	6.41E-03	-1.92E-03	3.02E-03
		18.60		10.00	8.67E-02		-1.67E-01	4.12E-02
	NB-93M	16.57		9.43	3.57E-02	3.57E-02	-1.07E-02	1.68E-02
	CD-109	88.03		3.72	2.18E+02	2.18E+02	3.85E+01	1.01E+02
+	SN-113	255.12		1.93	9.08E+02	2.41E+01	3.43E+01	4.07E+02
		391.69	*	61.90	2.41E+01		1.95E+01	1.11E+01
	SN-119M	23.87		16.10	2.65E-01	2.65E-01	-1.68E-01	1.26E-01
		25.10		22.70	2.69E-01		3.29E-02	1.28E-01
+	I-125	35.49	*	6.49	1.35E+01	1.35E+01	3.98E+01	6.62E+00
	I-129	29.78		57.00	9.68E-01	9.68E-01	5.35E+00	4.77E-01
		33.60		13.20	3.88E+00		-1.90E+01	1.88E+00
		39.58		7.52	5.02E+00		7.06E-01	2.29E+00
+	BA-133	30.80	*	97.60	4.71E-01	4.71E-01	6.67E+00	2.31E-01
		302.84	*	17.80	1.42E+02		4.13E+02	6.64E+01
		356.01	*	60.00	3.17E+01		3.77E+02	1.48E+01
	CE-139	165.85		80.35	2.64E+01	2.64E+01	-9.60E+00	1.21E+01
+	CE-144	133.54	*	10.80	1.53E+02	1.53E+02	1.46E+02	7.05E+01
	HG-203	279.19		77.30	2.53E+01	2.53E+01	3.32E+00	1.15E+01
+	PB-210	46.50	*	4.25	2.18E+01	2.18E+01	1.08E+01	1.00E+01
	PA-231	9.28		42.00	2.18E-04	2.18E-04	3.91E-04	1.06E-04
		10.11		20.20	1.07E-03		4.22E-03	5.27E-04
		283.67		1.60	9.16E+02		-1.95E+02	4.05E+02
		302.67		2.30	1.56E+03		3.12E+03	7.45E+02
	TH-231	25.64		14.70	4.65E-01	4.65E-01	5.76E-02	2.21E-01
		84.21		6.40	1.06E+02		-5.33E+02	4.89E+01
	PA-234M	9.89		89.00	2.02E-04	2.02E-04	7.94E-04	9.92E-05
		21.72		64.90	4.62E-02		3.73E-02	2.22E-02
		37.93		23.75	1.75E+00		-2.74E+00	8.18E-01
		131.42		20.40	6.94E+01		4.72E+00	3.15E+01
	TH-234	63.29		3.80	1.49E+02	1.49E+02	3.08E+02	7.14E+01
	NP-237	29.37		14.00	1.82E+00	1.82E+00	-3.21E+01	8.86E-01
		86.50		12.60	6.52E+01		4.83E+00	3.04E+01
	U-237	97.08		16.30	5.41E+01	4.50E+01	-4.69E+00	2.48E+01
		101.07		26.30	4.50E+01		3.62E+01	2.09E+01
		114.00		12.30	2.17E+02		2.78E+02	1.04E+02
		208.01		22.00	9.76E+01		-1.93E+01	4.46E+01
	AM-241	59.54		35.90	8.02E+00	8.02E+00	-3.03E+01	3.76E+00
	AM-243	74.67		66.00	5.42E+00	5.42E+00	0.00E+00	2.42E+00

Analysis Report for 1512122-02

BLANK

+ = 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

0000031488.CNF



CS137:

Apex-Gamma

Analysis Report for 1512122-03
BC-1

GAMMA SPECTRUM ANALYSIS

Sample Identification	: 1512122-03
Sample Description	: BC-1
Sample Type	: RA RECOVERY
Sample Size	: 1.000E+00 units
Facility	: Countroom
Sample Taken On	: 1/7/2016 11:40:28AM
Acquisition Started	: 1/7/2016 11:44:34AM
Procedure	: BAFIL
Operator	: Administrator
Detector Name	: GE3
Geometry	: BAFIL
Live Time	: 900.0 seconds
Real Time	: 904.2 seconds
Dead Time	: 0.46 %
Peak Locate Threshold	: 2.50
Peak Locate Range (in channels)	: 1 - 4096
Peak Area Range (in channels)	: 9 - 4096
Identification Energy Tolerance	: 1.000 keV
Energy Calibration Used Done On	: 10/25/2014
Efficiency Calibration Used Done On	: 11/9/2014
Efficiency Calibration Description	:
Sample Number	: 31489

PEAK ANALYSIS REPORT

Peak Analysis Performed on : 1/7/2016 11:59:41AM

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 1512122-03

BC-1

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
	1	21.22	19 -	25	21.47	9.79E+01	46.03	3.12E+02	2.38
M	2	31.04	26 -	39	31.28	1.92E+03	91.98	1.81E+02	1.63
m	3	35.30	26 -	39	35.54	4.64E+02	52.72	1.48E+02	1.68
	4	51.00	44 -	55	51.23	9.90E+01	51.03	2.76E+02	2.96
	5	61.68	58 -	65	61.90	1.29E+02	59.06	4.94E+02	1.30
	6	66.39	65 -	70	66.61	7.68E+01	42.71	2.90E+02	1.79
	7	81.29	77 -	86	81.50	7.98E+02	71.06	2.65E+02	1.90
M	8	112.29	108 -	119	112.49	1.68E+02	34.58	1.13E+02	2.09
m	9	116.46	108 -	119	116.65	5.36E+01	27.35	9.47E+01	2.10
	10	171.41	168 -	174	171.58	3.88E+01	22.37	6.25E+01	1.91
	11	200.04	195 -	207	200.19	3.58E+01	43.63	2.04E+02	9.04
	12	275.64	267 -	280	275.75	3.13E+01	35.52	1.27E+02	1.04
	13	295.98	292 -	300	296.08	2.05E+01	20.07	4.89E+01	5.46
M	14	303.19	300 -	318	303.28	1.40E+02	24.93	1.74E+01	1.75
m	15	307.32	300 -	318	307.41	2.24E+01	20.33	1.36E+01	2.37
M	16	333.98	330 -	342	334.06	6.57E+01	19.60	2.40E+01	1.89
m	17	338.85	330 -	342	338.92	2.34E+01	18.38	2.80E+01	2.45
	18	356.47	354 -	360	356.54	4.71E+02	45.28	2.86E+01	1.95
M	19	384.46	381 -	395	384.51	9.68E+01	33.59	3.30E+01	2.56
m	20	387.54	381 -	395	387.59	1.43E+02	28.52	1.17E+01	1.68
m	21	391.84	381 -	395	391.89	3.67E+01	23.61	3.35E+00	2.47
M	22	415.10	410 -	426	415.14	4.64E+01	14.53	1.28E+01	2.15
m	23	418.94	410 -	426	418.98	3.06E+01	14.86	5.12E+00	2.26
	24	437.44	432 -	440	437.47	8.65E+01	20.11	9.00E+00	2.09
M	25	468.20	464 -	476	468.22	2.67E+01	13.56	1.35E+01	2.03
m	26	472.62	464 -	476	472.63	8.60E+00	12.96	1.00E+01	2.54
	27	491.37	489 -	494	491.38	8.00E+00	5.66	0.00E+00	3.00
	28	571.19	567 -	573	571.15	6.30E+00	8.03	7.40E+00	2.61
	29	662.58	659 -	665	662.50	8.00E+00	5.66	0.00E+00	1.33

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 : 1/7/2016 11:59:41AM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000031226.CNF

Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.

Analysis Report for 1512122-03

BC-1

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
	1	21.22	9.79E+01	46.03			9.79E+01	4.60E+01
M	2	31.04	1.92E+03	91.98			1.92E+03	9.20E+01
m	3	35.30	4.64E+02	52.72			4.64E+02	5.27E+01
	4	51.00	9.90E+01	51.03			9.90E+01	5.10E+01
	5	61.68	1.29E+02	59.06			1.29E+02	5.91E+01
	6	66.39	7.68E+01	42.71			7.68E+01	4.27E+01
	7	81.29	7.98E+02	71.06			7.98E+02	7.11E+01
M	8	112.29	1.68E+02	34.58			1.68E+02	3.46E+01
m	9	116.46	5.36E+01	27.35			5.36E+01	2.73E+01
	10	171.41	3.88E+01	22.37			3.88E+01	2.24E+01
	11	200.04	3.58E+01	43.63			3.58E+01	4.36E+01
	12	275.64	3.13E+01	35.52			3.13E+01	3.55E+01
	13	295.98	2.05E+01	20.07	9.13E-01	1.34E+00	1.96E+01	2.01E+01
M	14	303.19	1.40E+02	24.93			1.40E+02	2.49E+01
m	15	307.32	2.24E+01	20.33			2.24E+01	2.03E+01
M	16	333.98	6.57E+01	19.60			6.57E+01	1.96E+01
m	17	338.85	2.34E+01	18.38			2.34E+01	1.84E+01
	18	356.47	4.71E+02	45.28			4.71E+02	4.53E+01
M	19	384.46	9.68E+01	33.59			9.68E+01	3.36E+01
m	20	387.54	1.43E+02	28.52			1.43E+02	2.85E+01
m	21	391.84	3.67E+01	23.61			3.67E+01	2.36E+01
M	22	415.10	4.64E+01	14.53			4.64E+01	1.45E+01
m	23	418.94	3.06E+01	14.86			3.06E+01	1.49E+01
	24	437.44	8.65E+01	20.11			8.65E+01	2.01E+01
M	25	468.20	2.67E+01	13.56			2.67E+01	1.36E+01
m	26	472.62	8.60E+00	12.96			8.60E+00	1.30E+01
	27	491.37	8.00E+00	5.66			8.00E+00	5.66E+00
	28	571.19	6.30E+00	8.03			6.30E+00	8.03E+00
	29	662.58	8.00E+00	5.66	1.79E+00	1.01E+00	6.21E+00	5.75E+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

Analysis Report for 1512122-03

BC-1

Nuclide Name	Id Confidence	Energy (keV)		Yield(%)	Activity (pCi/units)	Activity Uncertainty
SN-113	0.96	255.12		1.93		
		391.69	*	61.90	2.79E+01	1.81E+01
I-125	0.99	35.49	*	6.49	1.44E+01	1.63E+00
BA-133	0.98	30.80	*	97.60	1.56E+00	7.48E-02
		302.84	*	17.80	6.11E+02	2.43E+02
		356.01	*	60.00	4.58E+02	6.41E+01

* = Energy line found in the spectrum.
\- = Manually added nuclide.
? = Manually edited nuclide.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 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	0.962	2.79E+01	1.81E+01	
I-125	0.994	1.44E+01	1.63E+00	
BA-133	0.981	1.56E+00	7.48E-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 1512122-03

BC-1

UNIDENTIFIED PEAKS

Peak Locate Performed on : 1/7/2016 11:59:41AM
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	21.22	1.08832E-01	23.50		
	4	51.00	1.10000E-01	25.77		
	5	61.68	1.43295E-01	22.90	Sum	
	6	66.39	8.53353E-02	27.80	Sum	
	7	81.29	8.86951E-01	4.45		
M	8	112.29	1.86726E-01	10.29		
m	9	116.46	5.95482E-02	25.52		
	10	171.41	4.30794E-02	28.85		
	11	200.04	3.97746E-02	60.95		
	12	275.64	3.47368E-02	56.82		
	13	295.98	2.18128E-02	51.23		
m	15	307.32	2.49281E-02	45.32		
M	16	333.98	7.30059E-02	14.91	Sum	
m	17	338.85	2.59750E-02	39.32	Sum	
M	19	384.46	1.07588E-01	17.34		
m	20	387.54	1.58816E-01	9.98	Sum	
M	22	415.10	5.16101E-02	15.64		
m	23	418.94	3.39997E-02	24.28		
	24	437.44	9.61111E-02	11.63		
M	25	468.20	2.96635E-02	25.40		
m	26	472.62	9.56014E-03	75.32		
	27	491.37	8.88889E-03	35.36		
	28	571.19	7.00000E-03	63.74		
	29	662.58	6.89693E-03	46.29		

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

Analysis Report for 1512122-03

BC-1

NUCLIDE MDA REPORT

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

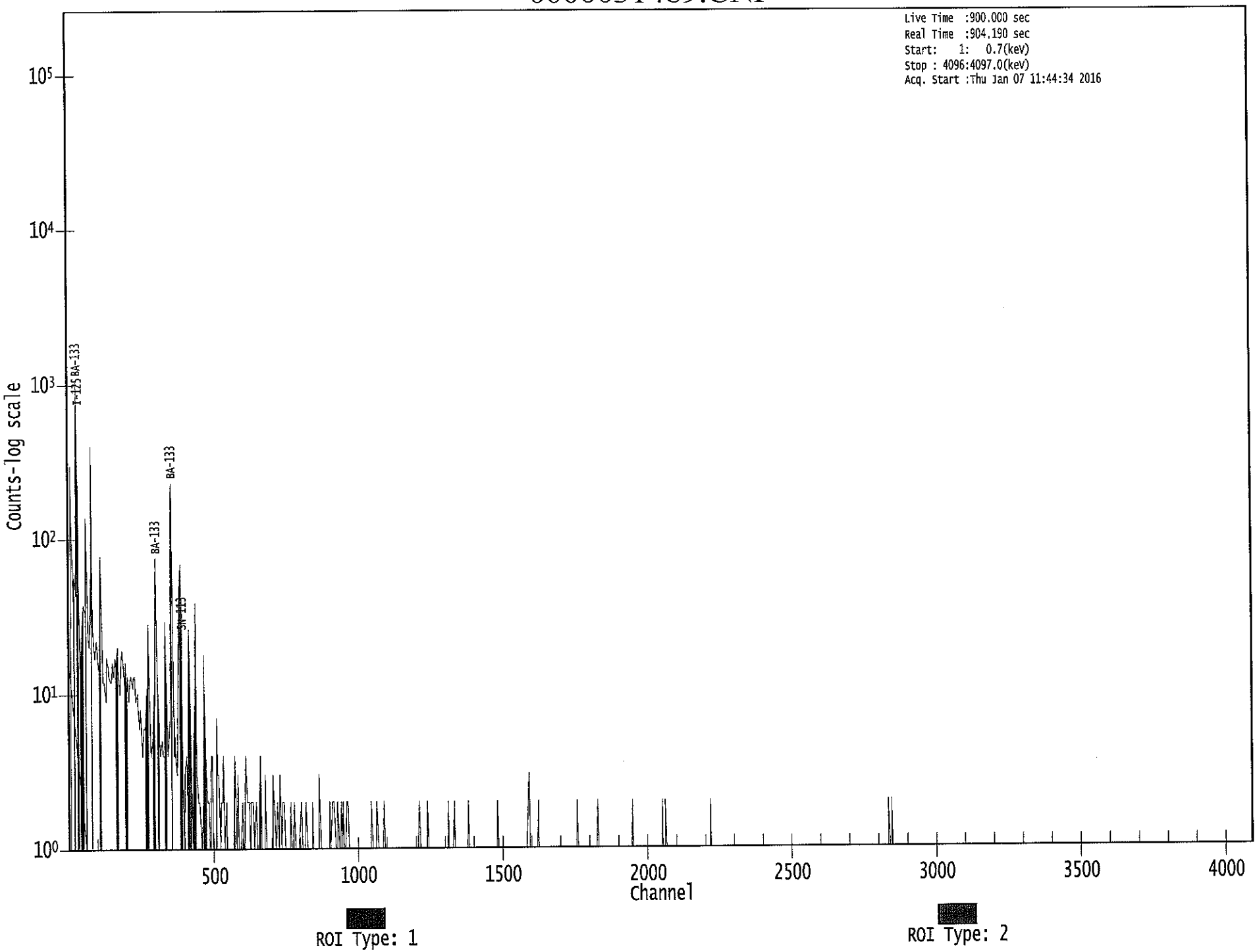
	Nuclide Name	Energy (keV)		Yield(%)	Line MDA (pCi/units)	Nuclide MDA (pCi/units)	Activity (pCi/units)	Dec. Level (pCi/units)
	FE-55	5.89		24.50	1.53E-10	1.53E-10	0.00E+00	0.00E+00
	CO-57	122.06		85.51	2.17E+01	2.17E+01	-7.68E+00	9.94E+00
		136.48		10.60	2.48E+02		-1.17E+01	1.15E+02
	NI-59	6.92		29.80	1.64E-08	1.64E-08	-1.02E-07	7.63E-09
	MO-93	16.59		52.90	4.29E-04	4.29E-04	-5.27E-05	2.06E-04
		18.60		10.00	6.62E-03		1.09E-03	3.17E-03
	NB-93M	16.57		9.43	2.38E-03	2.38E-03	-2.92E-04	1.14E-03
	CD-109	88.03		3.72	2.59E+02	2.59E+02	-5.42E+01	1.21E+02
+	SN-113	255.12		1.93	1.27E+03	2.53E+01	3.12E+01	5.67E+02
		391.69	*	61.90	2.53E+01		2.79E+01	1.16E+01
	SN-119M	23.87		16.10	3.69E-02	3.52E-02	-5.87E-03	1.76E-02
		25.10		22.70	3.52E-02		-8.23E-02	1.67E-02
+	I-125	35.49	*	6.49	3.22E+00	3.22E+00	1.44E+01	1.57E+00
	I-129	29.78		57.00	2.13E-01	2.13E-01	1.82E+00	1.05E-01
		33.60		13.20	1.76E+00		-4.98E+00	8.64E-01
		39.58		7.52	2.38E+00		1.00E+00	1.11E+00
+	BA-133	30.80	*	97.60	8.51E-02	8.51E-02	1.56E+00	4.14E-02
		302.84	*	17.80	1.84E+02		6.11E+02	8.62E+01
		356.01	*	60.00	2.34E+01		4.58E+02	1.04E+01
	CE-139	165.85		80.35	3.76E+01	3.76E+01	7.36E+00	1.73E+01
	CE-144	133.54		10.80	2.30E+02	2.30E+02	4.98E+01	1.07E+02
	HG-203	279.19		77.30	4.12E+01	4.12E+01	-1.36E+00	1.91E+01
	PB-210	46.50		4.25	1.25E+01	1.25E+01	6.35E+00	5.85E+00
	PA-231	9.28		42.00	1.65E-06	1.65E-06	6.04E-06	8.10E-07
		10.11		20.20	9.66E-06		3.53E-05	4.73E-06
		283.67		1.60	1.40E+03		2.38E+02	6.29E+02
		302.67		2.30	2.03E+03		3.01E+03	9.68E+02
	TH-231	25.64		14.70	6.74E-02	6.74E-02	-7.47E-02	3.21E-02
		84.21		6.40	3.27E+02		1.08E+03	1.59E+02
	PA-234M	9.89		89.00	1.69E-06	1.69E-06	6.16E-06	8.26E-07
		21.72		64.90	4.62E-03		7.02E-03	2.22E-03
		37.93		23.75	1.17E+00		1.70E+00	5.65E-01
		131.42		20.40	1.12E+02		3.07E+01	5.16E+01
	TH-234	63.29		3.80	1.41E+02	1.41E+02	7.05E+01	6.86E+01
	NP-237	29.37		14.00	7.81E-01	7.81E-01	6.66E+00	3.85E-01
		86.50		12.60	8.06E+01		6.67E+00	3.79E+01
	U-237	97.08		16.30	7.65E+01	5.69E+01	-1.02E+01	3.56E+01
		101.07		26.30	5.69E+01		3.75E+01	2.66E+01
		114.00		12.30	2.75E+02		3.54E+02	1.32E+02
		208.01		22.00	1.77E+02		-1.07E+01	8.24E+01
	AM-241	59.54		35.90	9.50E+00	9.50E+00	8.21E+00	4.58E+00
	AM-243	74.67		66.00	8.37E+00	8.37E+00	6.20E-01	3.93E+00

Analysis Report for 1512122-03

BC-1

+ = 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

0000031489.CNF



Apex-Gamma

Analysis Report for 1512122-04
TBB-3S

GAMMA SPECTRUM ANALYSIS

Sample Identification	: 1512122-04
Sample Description	: TBB-3S
Sample Type	: RA RECOVERY
Sample Size	: 1.000E+00 units
Facility	: Countroom
Sample Taken On	: 1/7/2016 12:16:02PM
Acquisition Started	: 1/7/2016 12:35:57PM
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)	: 19 - 4096
Identification Energy Tolerance	: 1.000 keV
Energy Calibration Used Done On	: 10/25/2014
Efficiency Calibration Used Done On	: 11/9/2014
Efficiency Calibration Description	:
Sample Number	: 31499

PEAK ANALYSIS REPORT

Peak Analysis Performed on : 1/7/2016 12:51:00PM

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 1512122-04

TBB-3S

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
M	1	30.78	27 -	40	31.13	8.24E+02	61.35	1.04E+02	1.58
m	2	35.06	27 -	40	35.41	1.94E+02	36.06	8.54E+01	1.66
M	3	62.14	58 -	70	62.49	1.14E+02	31.65	1.02E+02	1.91
m	4	66.36	58 -	70	66.70	3.86E+01	27.53	1.02E+02	1.92
	5	80.98	76 -	86	81.32	3.71E+02	52.95	1.77E+02	1.87
	6	111.68	108 -	115	112.01	6.98E+01	34.18	1.48E+02	1.30
	7	135.63	133 -	139	135.95	2.56E+01	16.69	2.69E+01	4.58
	8	275.94	272 -	279	276.21	4.32E+01	17.78	2.36E+01	1.39
	9	302.35	292 -	310	302.62	7.80E+01	40.29	1.14E+02	1.72
	10	336.05	328 -	344	336.31	6.00E+01	26.18	4.20E+01	6.73
	11	355.94	351 -	360	356.19	2.41E+02	34.26	3.00E+01	1.76
	12	376.65	373 -	379	376.89	9.76E+00	13.03	2.25E+01	1.34
M	13	383.60	380 -	394	383.84	4.75E+01	16.14	5.00E+00	1.81
m	14	386.92	380 -	394	387.15	6.49E+01	22.01	5.00E+00	1.82
	15	415.88	411 -	420	416.11	2.30E+01	19.29	4.00E+01	5.53
	16	437.01	433 -	440	437.23	4.79E+01	16.25	1.22E+01	1.38
	17	467.77	464 -	471	467.98	1.22E+01	10.95	1.16E+01	2.10
	18	533.10	530 -	536	533.29	5.21E+00	6.34	3.57E+00	1.95
	19	567.41	564 -	571	567.58	7.82E+00	8.72	6.36E+00	1.77
	20	645.28	643 -	647	645.43	7.00E+00	5.29	0.00E+00	1.47

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 : 1/7/2016 12:51:00PM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000031224.CNF

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
M	1	30.78	8.24E+02	61.35			8.24E+02	6.14E+01
m	2	35.06	1.94E+02	36.06			1.94E+02	3.61E+01
M	3	62.14	1.14E+02	31.65			1.14E+02	3.17E+01
m	4	66.36	3.86E+01	27.53			3.86E+01	2.75E+01
	5	80.98	3.71E+02	52.95			3.71E+02	5.30E+01
	6	111.68	6.98E+01	34.18			6.98E+01	3.42E+01
	7	135.63	2.56E+01	16.69			2.56E+01	1.67E+01
	8	275.94	4.32E+01	17.78			4.32E+01	1.78E+01
	9	302.35	7.80E+01	40.29			7.80E+01	4.03E+01

Analysis Report for 1512122-04

TBB-3S

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
	10	336.05	6.00E+01	26.18			6.00E+01	2.62E+01
	11	355.94	2.41E+02	34.26			2.41E+02	3.43E+01
	12	376.65	9.76E+00	13.03			9.76E+00	1.30E+01
M	13	383.60	4.75E+01	16.14			4.75E+01	1.61E+01
m	14	386.92	6.49E+01	22.01			6.49E+01	2.20E+01
	15	415.88	2.30E+01	19.29			2.30E+01	1.93E+01
	16	437.01	4.79E+01	16.25			4.79E+01	1.62E+01
	17	467.77	1.22E+01	10.95			1.22E+01	1.10E+01
	18	533.10	5.21E+00	6.34			5.21E+00	6.34E+00
	19	567.41	7.82E+00	8.72			7.82E+00	8.72E+00
	20	645.28	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-125	0.97	35.49	*	6.49	3.40E+00	6.32E-01
BA-133	0.99	30.80	*	97.60	3.30E-01	2.46E-02
		302.84	*	17.80	3.09E+02	1.85E+02
		356.01	*	60.00	1.94E+02	3.32E+01
PA-231	0.99	9.28		42.00		
		10.11		20.20		
		283.67		1.60		
		302.67	*	2.30	2.39E+03	1.43E+03

* = Energy line found in the spectrum.
\- = Manually added nuclide.
? = Manually edited nuclide.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000sigma

Analysis Report for 1512122-04

TBB-3S

INTERFERENCE CORRECTED REPORT

	Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/units)	Wt mean Activity Uncertainty	Comments
	I-125	0.970	3.40E+00	6.32E-01	
X	I-129	0.644			
	BA-133	0.996	3.30E-01	2.46E-02	
	PA-231	0.999	2.39E+03	1.43E+03	

? = 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 1512122-04

TBB-3S

UNIDENTIFIED PEAKS

Peak Locate Performed on : 1/7/2016 12:51:00PM
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	3	62.14	1.26168E-01	13.94	Sum	
m	4	66.36	4.28819E-02	35.67	Sum	
	5	80.98	4.11813E-01	7.14		
	6	111.68	7.75965E-02	24.47		
	7	135.63	2.83903E-02	32.66		
	8	275.94	4.79798E-02	20.58		
	10	336.05	6.66392E-02	21.82		
	12	376.65	1.08466E-02	66.73		
M	13	383.60	5.28235E-02	16.97		
m	14	386.92	7.21351E-02	16.95	Sum	
	15	415.88	2.55556E-02	41.93		
	16	437.01	5.32407E-02	16.95		
	17	467.77	1.35802E-02	44.81		
	18	533.10	5.79365E-03	60.84		
	19	567.41	8.68687E-03	55.75		
	20	645.28	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

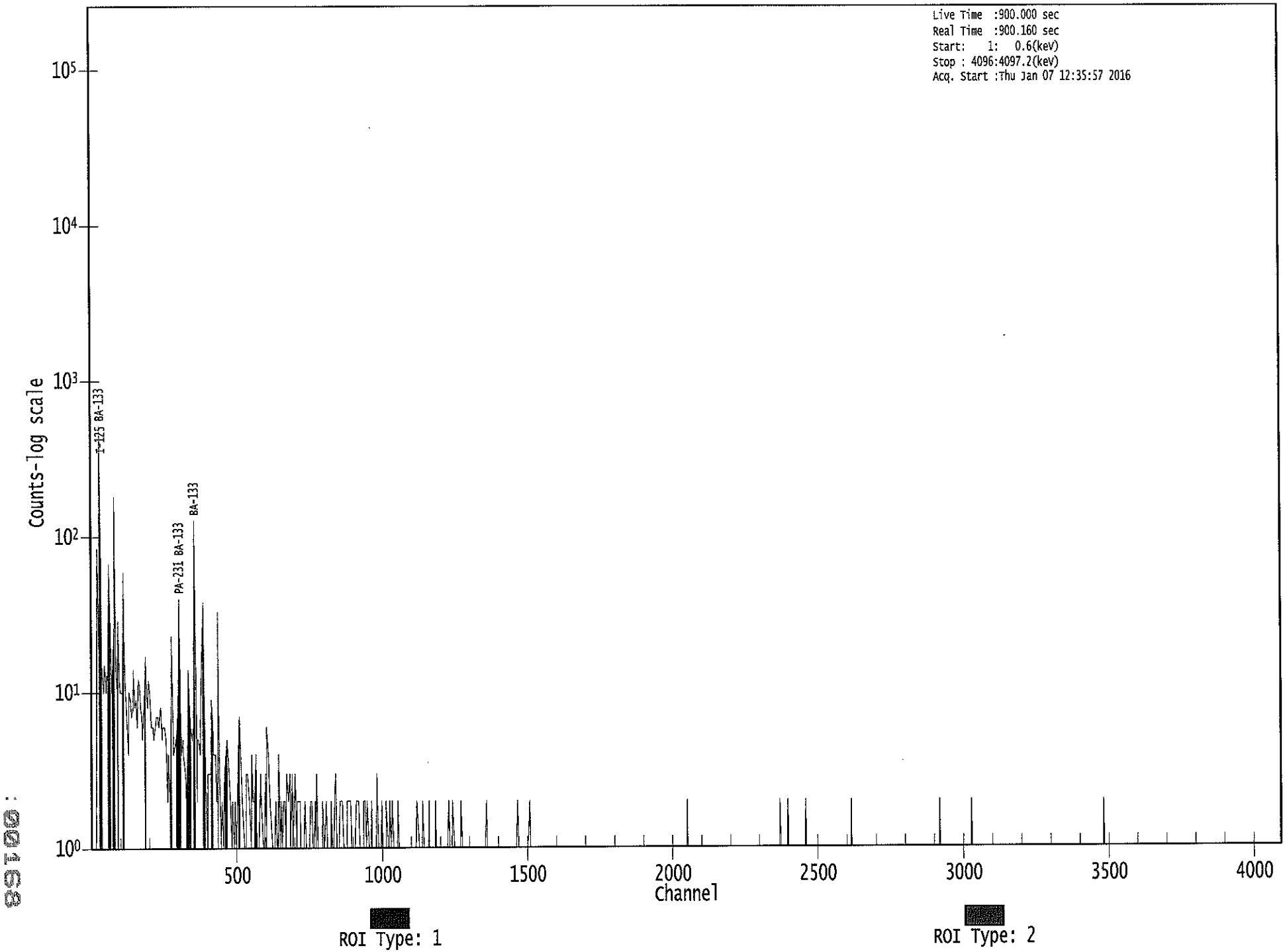
Analysis Report for 1512122-04

TBB-3S

	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	6.60E-12	6.60E-12	0.00E+00	0.00E+00
	CO-57	122.06		85.51	2.06E+01	2.06E+01	1.60E+01	9.29E+00
		136.48		10.60	1.97E+02		1.02E+02	8.85E+01
	NI-59	6.92		29.80	6.80E-11	6.80E-11	0.00E+00	0.00E+00
	MO-93	16.59		52.90	2.56E-05	2.56E-05	-6.47E-06	1.06E-05
		18.60		10.00	1.07E-03		-2.77E-04	4.93E-04
	NB-93M	16.57		9.43	1.42E-04	1.42E-04	-3.58E-05	5.89E-05
	CD-109	88.03		3.72	2.21E+02	2.21E+02	-1.92E+01	1.02E+02
	SN-113	255.12		1.93	1.09E+03	1.30E+01	-1.63E+01	4.82E+02
		391.69		61.90	1.30E+01		-4.41E+00	5.68E+00
	SN-119M	23.87		16.10	1.46E-02	1.46E-02	1.89E-02	7.00E-03
		25.10		22.70	1.54E-02		1.61E-02	7.31E-03
+	I-125	35.49	*	6.49	1.39E+00	1.39E+00	3.40E+00	6.73E-01
	I-129	29.78	*	57.00	5.50E-02	5.50E-02	5.65E-01	2.66E-02
		33.60		13.20	6.24E-01		-2.91E+00	3.04E-01
		39.58		7.52	1.17E+00		-1.96E-01	5.33E-01
+	BA-133	30.80	*	97.60	3.21E-02	3.21E-02	3.30E-01	1.55E-02
		302.84	*	17.80	2.47E+02		3.09E+02	1.18E+02
		356.01	*	60.00	2.14E+01		1.94E+02	9.61E+00
	CE-139	165.85		80.35	4.00E+01	4.00E+01	-1.56E+00	1.84E+01
	CE-144	133.54		10.80	2.01E+02	2.01E+02	8.30E+01	9.10E+01
	HG-203	279.19		77.30	3.21E+01	3.21E+01	-3.15E+00	1.46E+01
	PB-210	46.50		4.25	6.37E+00	6.37E+00	1.25E+00	2.90E+00
+	PA-231	9.28		42.00	3.55E-09	3.55E-09	0.00E+00	0.00E+00
		10.11		20.20	2.40E-08		0.00E+00	0.00E+00
		283.67		1.60	9.94E+02		-1.06E+01	4.30E+02
		302.67	*	2.30	1.91E+03		2.39E+03	9.13E+02
	TH-231	25.64		14.70	2.05E-02	2.05E-02	-4.09E-02	9.56E-03
		84.21		6.40	1.26E+02		-6.78E+02	5.88E+01
	PA-234M	9.89		89.00	4.04E-09	4.04E-09	0.00E+00	0.00E+00
		21.72		64.90	1.51E-03		3.07E-03	7.22E-04
		37.93		23.75	5.05E-01		3.65E-01	2.40E-01
		131.42		20.40	1.00E+02		1.18E+00	4.53E+01
	TH-234	63.29		3.80	9.14E+01	9.14E+01	4.57E+01	4.38E+01
	NP-237	29.37		14.00	2.61E-01	2.61E-01	1.47E+00	1.28E-01
		86.50		12.60	6.57E+01		1.54E+01	3.05E+01
	U-237	97.08		16.30	6.12E+01	4.48E+01	-5.85E+00	2.78E+01
		101.07		26.30	4.48E+01		-1.41E+01	2.04E+01
		114.00		12.30	2.26E+02		2.25E+02	1.07E+02
		208.01		22.00	1.11E+02		2.05E+01	4.88E+01
	AM-241	59.54		35.90	5.58E+00	5.58E+00	-4.05E-01	2.64E+00
	AM-243	74.67		66.00	6.18E+00	6.18E+00	1.25E+00	2.84E+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

0000031499.CNF



KB 1/7/16

Apex-Gamma

Analysis Report for 1512122-05
TBB-1D

GAMMA SPECTRUM ANALYSIS

Sample Identification	: 1512122-05
Sample Description	: TBB-1D
Sample Type	: RA RECOVERY
Sample Size	: 1.000E+00 units
Facility	: Countroom
Sample Taken On	: 1/7/2016 11:40:50AM
Acquisition Started	: 1/7/2016 12:02:24PM
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)	: 19 - 4096
Identification Energy Tolerance	: 1.000 keV
Energy Calibration Used Done On	: 10/25/2014
Efficiency Calibration Used Done On	: 11/9/2014
Efficiency Calibration Description	:
Sample Number	: 31491

PEAK ANALYSIS REPORT

Peak Analysis Performed on : 1/7/2016 12:17:27PM

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 1512122-05

TBB-1D

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
M	1	30.83	27 -	39	31.18	1.42E+03	79.99	1.63E+02	1.54
m	2	35.06	27 -	39	35.41	3.69E+02	46.32	1.09E+02	1.81
	3	53.17	50 -	56	53.52	5.21E+01	31.73	1.42E+02	3.16
M	4	61.78	58 -	69	62.13	1.09E+02	29.93	8.94E+01	1.43
m	5	65.52	58 -	69	65.87	6.76E+01	27.28	8.05E+01	1.44
	6	81.14	76 -	86	81.48	5.33E+02	64.75	2.75E+02	1.99
M	7	111.86	107 -	120	112.19	1.26E+02	33.35	1.08E+02	1.84
m	8	115.97	107 -	120	116.30	2.14E+01	26.15	1.08E+02	1.85
	9	276.40	273 -	280	276.68	4.23E+01	20.78	4.35E+01	1.32
M	10	302.89	297 -	309	303.16	8.75E+01	21.87	2.46E+01	1.74
m	11	306.84	297 -	309	307.11	1.32E+01	16.32	2.11E+01	1.75
	12	333.43	330 -	337	333.69	3.25E+01	26.15	9.29E+01	1.38
	13	338.07	337 -	341	338.33	1.83E+01	13.06	1.73E+01	1.29
M	14	356.00	350 -	363	356.25	4.06E+02	41.32	1.83E+01	1.68
m	15	360.41	350 -	363	360.66	1.02E+01	14.66	3.53E+01	1.97
M	16	383.73	381 -	390	383.97	8.38E+01	23.89	3.64E+01	1.81
m	17	386.84	381 -	390	387.07	1.44E+02	34.56	7.13E+01	1.82
	18	404.45	402 -	408	404.68	1.35E+01	9.62	7.00E+00	3.22
M	19	414.71	410 -	428	414.94	2.18E+01	14.28	0.00E+00	2.22
m	20	418.22	410 -	428	418.45	1.90E+01	13.56	0.00E+00	2.23
m	21	422.33	410 -	428	422.55	1.21E+01	10.20	0.00E+00	2.23
M	22	432.61	432 -	439	432.83	8.78E+00	4.58	5.62E-02	1.85
m	23	436.91	432 -	439	437.13	7.39E+01	18.28	2.92E+00	1.70
	24	467.24	462 -	473	467.45	1.68E+01	16.12	2.43E+01	2.41
	25	519.84	517 -	523	520.03	6.50E+00	6.65	3.00E+00	2.06
	26	583.65	580 -	587	583.82	8.20E+00	7.48	3.60E+00	1.54
	27	637.54	636 -	640	637.69	5.17E+00	5.50	1.67E+00	1.89
	28	644.25	641 -	647	644.40	6.25E+00	6.65	3.50E+00	2.51

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 : 1/7/2016 12:17:27PM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000031224.CNF

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
M	1	30.83	1.42E+03	79.99			1.42E+03	8.00E+01

Analysis Report for 1512122-05

TBB-1D

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
m	2	35.06	3.69E+02	46.32			3.69E+02	4.63E+01
	3	53.17	5.21E+01	31.73			5.21E+01	3.17E+01
M	4	61.78	1.09E+02	29.93			1.09E+02	2.99E+01
m	5	65.52	6.76E+01	27.28			6.76E+01	2.73E+01
	6	81.14	5.33E+02	64.75			5.33E+02	6.47E+01
M	7	111.86	1.26E+02	33.35			1.26E+02	3.33E+01
m	8	115.97	2.14E+01	26.15			2.14E+01	2.62E+01
	9	276.40	4.23E+01	20.78			4.23E+01	2.08E+01
M	10	302.89	8.75E+01	21.87			8.75E+01	2.19E+01
m	11	306.84	1.32E+01	16.32			1.32E+01	1.63E+01
	12	333.43	3.25E+01	26.15			3.25E+01	2.62E+01
	13	338.07	1.83E+01	13.06	1.33E+00	1.44E+00	1.70E+01	1.31E+01
M	14	356.00	4.06E+02	41.32			4.06E+02	4.13E+01
m	15	360.41	1.02E+01	14.66			1.02E+01	1.47E+01
M	16	383.73	8.38E+01	23.89			8.38E+01	2.39E+01
m	17	386.84	1.44E+02	34.56			1.44E+02	3.46E+01
	18	404.45	1.35E+01	9.62			1.35E+01	9.62E+00
M	19	414.71	2.18E+01	14.28			2.18E+01	1.43E+01
m	20	418.22	1.90E+01	13.56			1.90E+01	1.36E+01
m	21	422.33	1.21E+01	10.20			1.21E+01	1.02E+01
M	22	432.61	8.78E+00	4.58			8.78E+00	4.58E+00
m	23	436.91	7.39E+01	18.28			7.39E+01	1.83E+01
	24	467.24	1.68E+01	16.12			1.68E+01	1.61E+01
	25	519.84	6.50E+00	6.65			6.50E+00	6.65E+00
	26	583.65	8.20E+00	7.48	8.38E-01	1.08E+00	7.36E+00	7.56E+00
	27	637.54	5.17E+00	5.50			5.17E+00	5.50E+00
	28	644.25	6.25E+00	6.65			6.25E+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
I-125	0.97	35.49	*	6.49	6.47E+00	8.12E-01
BA-133	1.00	30.80	*	97.60	5.75E-01	3.25E-02

Analysis Report for 1512122-05

TBB-1D

Nuclide Name	Id Confidence	Energy (keV)		Yield(%)	Activity (pCi/units)	Activity Uncertainty
BA-133	1.00	302.84	*	17.80	3.45E+02	1.36E+02
		356.01	*	60.00	3.27E+02	4.54E+01
PA-231	1.00	9.28		42.00		
		10.11		20.20		
		283.67		1.60		
		302.67	*	2.30	2.67E+03	1.05E+03

* = Energy line found in the spectrum.
\- = Manually added nuclide.
? = Manually edited nuclide.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 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-125	0.971	6.47E+00	8.12E-01	
BA-133	1.000	5.75E-01	3.25E-02	
PA-231	1.000	2.67E+03	1.05E+03	

? = 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 1512122-05

TBB-1D

UNIDENTIFIED PEAKS

Peak Locate Performed on : 1/7/2016 12:17:27PM
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	53.17	5.78455E-02	30.47		
M	4	61.78	1.21658E-01	13.67	Sum	
m	5	65.52	7.50870E-02	20.18	Sum	
	6	81.14	5.91826E-01	6.08		
M	7	111.86	1.40535E-01	13.18		
m	8	115.97	2.37918E-02	61.07		
	9	276.40	4.69531E-02	24.59		
m	11	306.84	1.46834E-02	61.77		
	12	333.43	3.61392E-02	40.20	Sum	
	13	338.07	1.88877E-02	38.64	Sum	
m	15	360.41	1.13420E-02	71.82		
M	16	383.73	9.30639E-02	14.26		
m	17	386.84	1.60306E-01	11.98	Sum	
	18	404.45	1.50000E-02	35.62		
M	19	414.71	2.42580E-02	32.71		
m	20	418.22	2.10706E-02	35.77		
m	21	422.33	1.34001E-02	42.28		
M	22	432.61	9.75845E-03	26.09		
m	23	436.91	8.21612E-02	12.36		
	24	467.24	1.86973E-02	47.91		
	25	519.84	7.22222E-03	51.17		
	26	583.65	8.18036E-03	51.35		
	27	637.54	5.74074E-03	53.23		
	28	644.25	6.94444E-03	53.22		

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

Analysis Report for 1512122-05

TBB-1D

NUCLIDE MDA REPORT

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

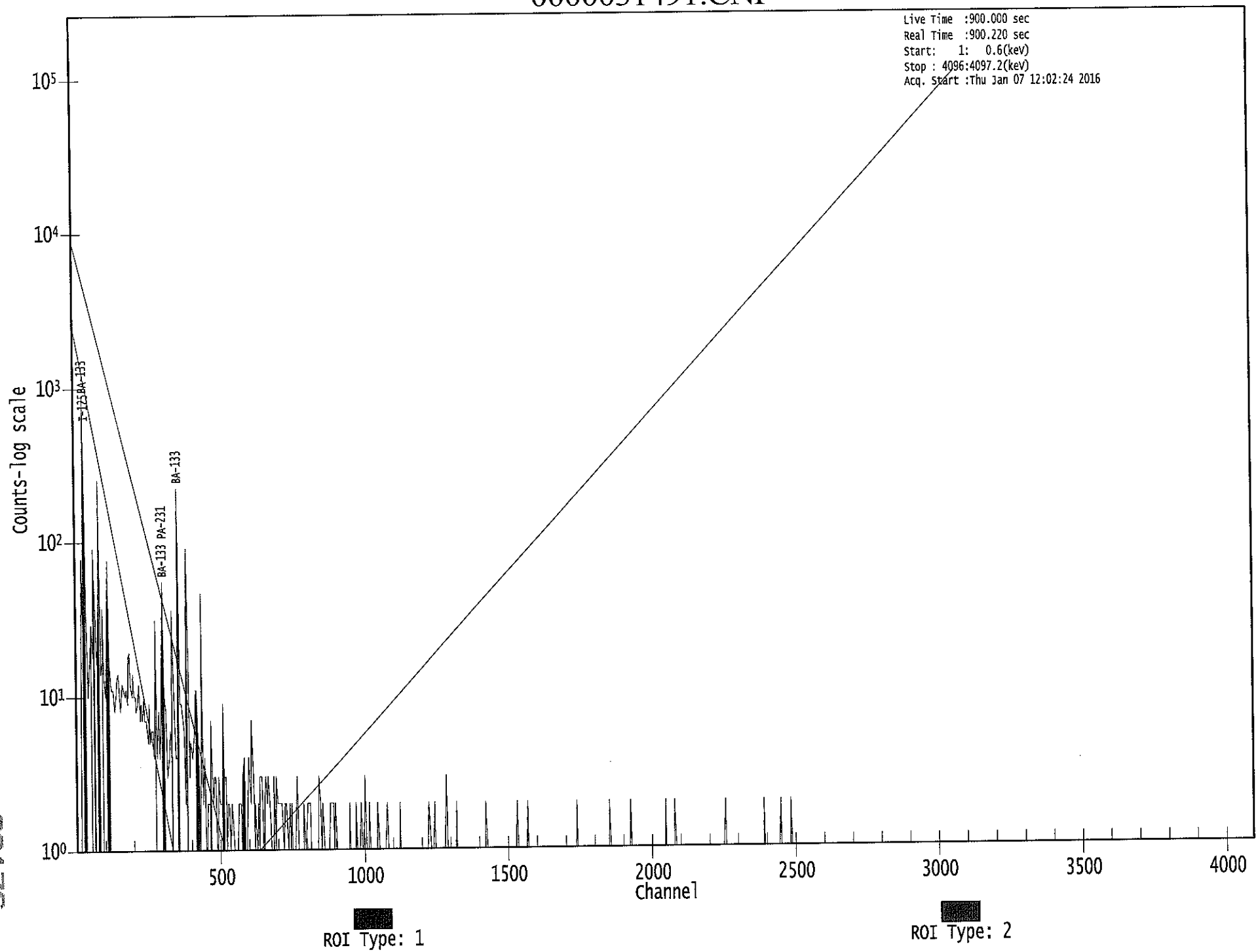
	Nuclide Name	Energy (keV)		Yield(%)	Line MDA (pCi/units)	Nuclide MDA (pCi/units)	Activity (pCi/units)	Dec. Level (pCi/units)
	FE-55	5.89		24.50	6.60E-12	6.60E-12	0.00E+00	0.00E+00
	CO-57	122.06		85.51	2.29E+01	2.29E+01	-4.54E+00	1.05E+01
		136.48		10.60	2.12E+02		8.78E+01	9.63E+01
	NI-59	6.92		29.80	6.80E-11	6.80E-11	0.00E+00	0.00E+00
	MO-93	16.59		52.90	2.93E-05	2.93E-05	-1.62E-05	1.25E-05
		18.60		10.00	1.33E-03		1.32E-05	6.23E-04
	NB-93M	16.57		9.43	1.62E-04	1.62E-04	-8.95E-05	6.90E-05
	CD-109	88.03		3.72	2.36E+02	2.36E+02	2.55E+01	1.09E+02
	SN-113	255.12		1.93	1.30E+03	1.81E+01	5.97E+02	5.85E+02
		391.69		61.90	1.81E+01		1.53E+01	8.26E+00
	SN-119M	23.87		16.10	1.57E-02	1.57E-02	1.23E-02	7.52E-03
		25.10		22.70	1.64E-02		7.88E-03	7.81E-03
+	I-125	35.49	*	6.49	1.59E+00	1.59E+00	6.47E+00	7.74E-01
	I-129	29.78		57.00	9.42E-02	9.42E-02	7.07E-01	4.64E-02
		33.60		13.20	8.25E-01		-4.20E+00	4.04E-01
		39.58		7.52	1.37E+00		-2.32E-01	6.34E-01
+	BA-133	30.80	*	97.60	3.76E-02	3.76E-02	5.75E-01	1.83E-02
		302.84	*	17.80	1.52E+02		3.45E+02	7.05E+01
		356.01	*	60.00	2.80E+01		3.27E+02	1.29E+01
	CE-139	165.85		80.35	4.18E+01	4.18E+01	1.36E+01	1.92E+01
	CE-144	133.54		10.80	1.95E+02	1.95E+02	-2.77E+01	8.81E+01
	HG-203	279.19		77.30	3.49E+01	3.49E+01	2.50E+01	1.60E+01
	PB-210	46.50		4.25	7.93E+00	7.93E+00	2.60E+00	3.68E+00
+	PA-231	9.28		42.00	3.55E-09	3.55E-09	0.00E+00	0.00E+00
		10.11		20.20	2.40E-08		0.00E+00	0.00E+00
		283.67		1.60	9.94E+02		-2.96E+02	4.30E+02
		302.67	*	2.30	1.17E+03		2.67E+03	5.46E+02
	TH-231	25.64		14.70	2.46E-02	2.46E-02	-4.09E-02	1.16E-02
		84.21		6.40	1.46E+02		-9.76E+02	6.88E+01
	PA-234M	9.89		89.00	4.04E-09	4.04E-09	0.00E+00	0.00E+00
		21.72		64.90	1.65E-03		3.54E-03	7.91E-04
		37.93		23.75	6.28E-01		7.01E-01	3.02E-01
		131.42		20.40	1.06E+02		-4.01E+01	4.82E+01
	TH-234	63.29		3.80	1.07E+02	1.07E+02	7.24E+01	5.15E+01
	NP-237	29.37		14.00	3.40E-01	3.40E-01	2.55E+00	1.68E-01
		86.50		12.60	6.46E+01		7.06E+00	2.99E+01
	U-237	97.08		16.30	6.82E+01	4.69E+01	-3.45E+01	3.13E+01
		101.07		26.30	4.69E+01		3.52E-01	2.15E+01
		114.00		12.30	2.82E+02		3.80E+02	1.35E+02
		208.01		22.00	1.55E+02		9.51E+01	7.08E+01
	AM-241	59.54		35.90	6.86E+00	6.86E+00	4.97E+00	3.28E+00
	AM-243	74.67		66.00	7.56E+00	7.56E+00	1.66E-01	3.53E+00

Analysis Report for 1512122-05

TBB-1D

+ = 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

0000031491.CNF



Apex-Gamma

Analysis Report for 1512122-06
TBB-1S

GAMMA SPECTRUM ANALYSIS

Sample Identification	: 1512122-06
Sample Description	: TBB-1S
Sample Type	: RA RECOVERY
Sample Size	: 1.000E+00 units
Facility	: Countroom
Sample Taken On	: 1/7/2016 11:41:03AM
Acquisition Started	: 1/7/2016 12:02:30PM
Procedure	: BAFIL
Operator	: Administrator
Detector Name	: GE2
Geometry	: BAFIL
Live Time	: 900.0 seconds
Real Time	: 900.3 seconds
Dead Time	: 0.03 %
Peak Locate Threshold	: 2.50
Peak Locate Range (in channels)	: 1 - 4096
Peak Area Range (in channels)	: 5 - 4096
Identification Energy Tolerance	: 1.000 keV
Energy Calibration Used Done On	: 11/2/2014
Efficiency Calibration Used Done On	: 11/9/2014
Efficiency Calibration Description	:
Sample Number	: 31492

PEAK ANALYSIS REPORT

Peak Analysis Performed on : 1/7/2016 12:17:39PM

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 1512122-06

TBB-1S

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
	1	20.85	19 -	24	20.97	4.44E+01	49.68	4.61E+02	1.94
	2	30.95	28 -	33	31.06	1.81E+03	101.05	5.96E+02	1.27
	3	35.45	35 -	41	35.57	3.46E+02	77.21	3.04E+02	2.35
	4	52.87	50 -	56	52.97	3.69E+01	31.35	1.54E+02	1.90
	5	61.68	58 -	64	61.78	1.55E+02	46.20	3.10E+02	1.30
	6	66.23	66 -	68	66.32	2.82E+01	25.18	1.44E+02	1.96
	7	81.11	77 -	85	81.19	7.38E+02	67.27	2.40E+02	1.46
M	8	112.07	108 -	119	112.13	1.43E+02	33.34	1.17E+02	1.56
m	9	116.32	108 -	119	116.38	2.70E+01	25.91	9.35E+01	1.57
	10	187.83	181 -	194	187.86	4.47E+01	46.16	2.17E+02	1.24
	11	257.06	251 -	264	257.05	3.03E+01	28.55	7.74E+01	11.88
	12	276.69	272 -	282	276.67	7.44E+01	24.24	3.92E+01	1.90
M	13	302.84	299 -	310	302.80	1.42E+02	26.37	3.50E+01	1.55
m	14	307.16	299 -	310	307.12	1.93E+01	15.73	3.50E+01	1.67
M	15	333.93	329 -	346	333.87	5.17E+01	18.49	1.81E+01	1.55
m	16	338.09	329 -	346	338.03	2.00E+01	13.49	2.47E+01	1.56
	17	356.04	352 -	360	355.97	4.82E+02	49.69	7.73E+01	1.41
M	18	383.76	380 -	389	383.68	8.77E+01	23.81	2.70E+01	2.15
m	19	386.96	380 -	389	386.87	1.39E+02	31.27	4.42E+01	1.60
	20	391.27	390 -	395	391.19	4.98E+01	19.34	2.44E+01	1.62
	21	415.18	411 -	419	415.08	1.89E+01	23.32	7.23E+01	1.67
	22	436.87	434 -	439	436.76	9.16E+01	20.27	8.72E+00	1.98
	23	522.53	519 -	525	522.38	8.00E+00	5.66	0.00E+00	1.16
	24	677.62	675 -	680	677.40	5.00E+00	4.47	0.00E+00	1.00
	25	690.10	686 -	694	689.87	8.10E+00	7.76	3.80E+00	1.50
	26	910.91	907 -	913	910.58	1.20E+01	6.93	0.00E+00	1.50
	27	932.12	928 -	934	931.79	5.43E+00	6.34	3.14E+00	1.32

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 : 1/7/2016 12:17:39PM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000031225.CNF

Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
1	20.85	4.44E+01	49.68			4.44E+01	4.97E+01
2	30.95	1.81E+03	101.05			1.81E+03	1.01E+02

Analysis Report for 1512122-06

TBB-1S

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
	3	35.45	3.46E+02	77.21			3.46E+02	7.72E+01
	4	52.87	3.69E+01	31.35	9.74E-01	1.91E+00	3.60E+01	3.14E+01
	5	61.68	1.55E+02	46.20			1.55E+02	4.62E+01
	6	66.23	2.82E+01	25.18			2.82E+01	2.52E+01
	7	81.11	7.38E+02	67.27			7.38E+02	6.73E+01
M	8	112.07	1.43E+02	33.34			1.43E+02	3.33E+01
m	9	116.32	2.70E+01	25.91			2.70E+01	2.59E+01
	10	187.83	4.47E+01	46.16			4.47E+01	4.62E+01
	11	257.06	3.03E+01	28.55			3.03E+01	2.85E+01
	12	276.69	7.44E+01	24.24			7.44E+01	2.42E+01
M	13	302.84	1.42E+02	26.37			1.42E+02	2.64E+01
m	14	307.16	1.93E+01	15.73			1.93E+01	1.57E+01
M	15	333.93	5.17E+01	18.49			5.17E+01	1.85E+01
m	16	338.09	2.00E+01	13.49			2.00E+01	1.35E+01
	17	356.04	4.82E+02	49.69			4.82E+02	4.97E+01
M	18	383.76	8.77E+01	23.81			8.77E+01	2.38E+01
m	19	386.96	1.39E+02	31.27			1.39E+02	3.13E+01
	20	391.27	4.98E+01	19.34			4.98E+01	1.93E+01
	21	415.18	1.89E+01	23.32			1.89E+01	2.33E+01
	22	436.87	9.16E+01	20.27			9.16E+01	2.03E+01
	23	522.53	8.00E+00	5.66			8.00E+00	5.66E+00
	24	677.62	5.00E+00	4.47			5.00E+00	4.47E+00
	25	690.10	8.10E+00	7.76			8.10E+00	7.76E+00
	26	910.91	1.20E+01	6.93	7.49E-01	8.81E-01	1.13E+01	6.98E+00
	27	932.12	5.43E+00	6.34			5.43E+00	6.34E+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	0.93	255.12		1.93		
		391.69	*	61.90	3.45E+01	1.37E+01
I-125	1.00	35.49	*	6.49	3.85E+01	8.59E+00
BA-133	0.99	30.80	*	97.60	6.59E+00	3.69E-01

Analysis Report for 1512122-06
TBB-1S

Nuclide Name	Id Confidence	Energy (keV)		Yield(%)	Activity (pCi/units)	Activity Uncertainty
BA-133	0.99	302.84	*	17.80	4.71E+02	1.45E+02
		356.01	*	60.00	3.96E+02	5.62E+01

* = Energy line found in the spectrum.
\- = Manually added nuclide.
? = Manually edited nuclide.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 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	0.934	3.45E+01	1.37E+01	
I-125	1.000	3.85E+01	8.59E+00	
BA-133	0.998	6.61E+00	3.69E-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 1512122-06

TBB-1S

UNIDENTIFIED PEAKS

Peak Locate Performed on : 1/7/2016 12:17:39PM
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	20.85	4.93455E-02	55.93	Tol.	PA-234M
	4	52.87	3.99606E-02	43.66		
	5	61.68	1.72479E-01	14.88	Sum	
	6	66.23	3.13241E-02	44.66	Sum	
	7	81.11	8.19970E-01	4.56		
M	8	112.07	1.59127E-01	11.64		
m	9	116.32	3.00292E-02	47.94		
	10	187.83	4.96805E-02	51.62		
	11	257.06	3.36473E-02	47.14		
	12	276.69	8.26832E-02	16.29		
m	14	307.16	2.14450E-02	40.76		
M	15	333.93	5.74370E-02	17.89	Sum	
m	16	338.09	2.22186E-02	33.73	Sum	
M	18	383.76	9.74003E-02	13.58		
m	19	386.96	1.54127E-01	11.27	Sum	
	21	415.18	2.09596E-02	61.82		
	22	436.87	1.01823E-01	11.06		
	23	522.53	8.88889E-03	35.36		
	24	677.62	5.55556E-03	44.72		
	25	690.10	9.00000E-03	47.91		
	26	910.91	1.25015E-02	31.04		
	27	932.12	6.03175E-03	58.43		

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

Analysis Report for 1512122-06

TBB-1S

NUCLIDE MDA REPORT

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

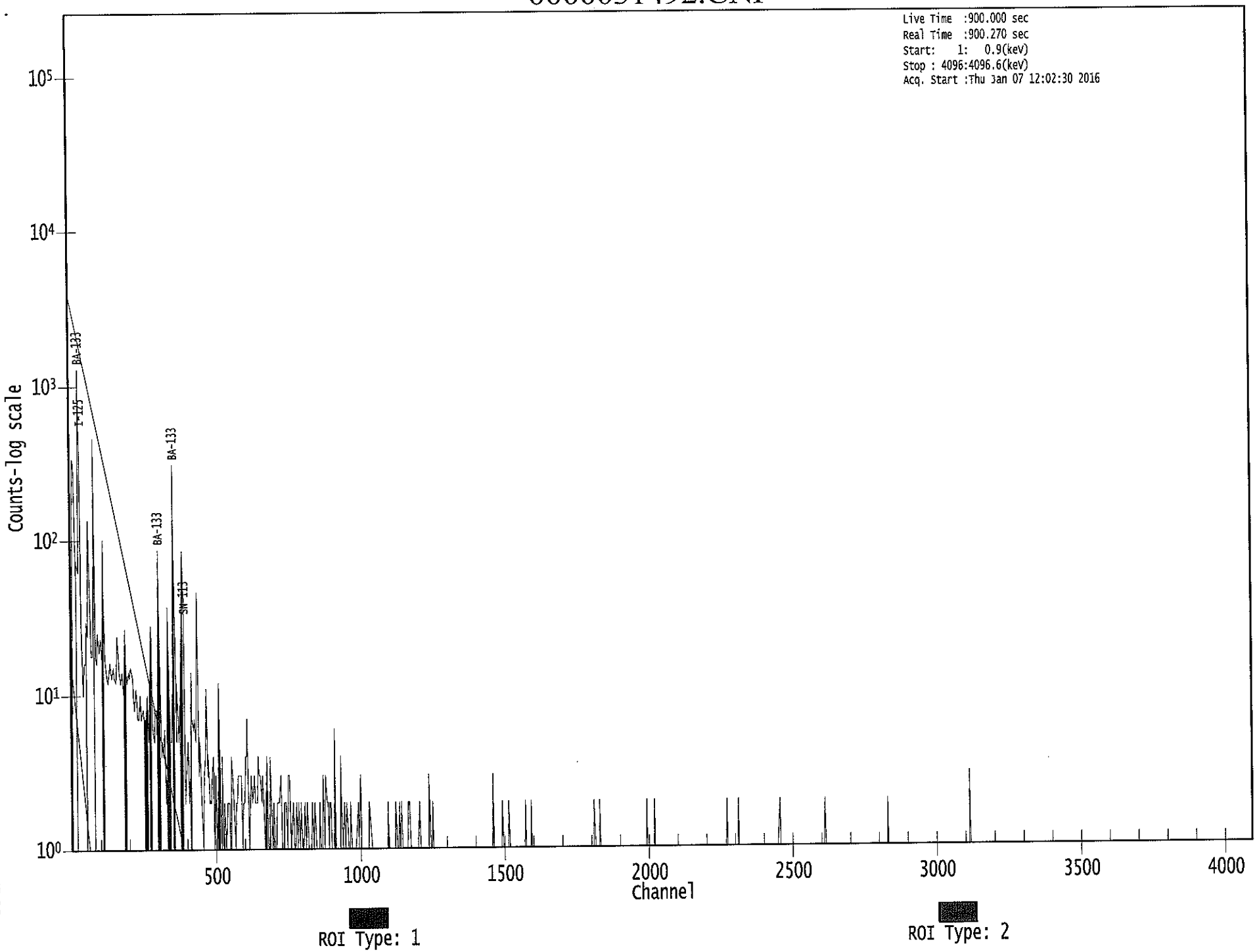
	Nuclide Name	Energy (keV)		Yield(%)	Line MDA (pCi/units)	Nuclide MDA (pCi/units)	Activity (pCi/units)	Dec. Level (pCi/units)
	FE-55	5.89		24.50	1.01E-06	1.01E-06	-6.03E-06	4.46E-07
	CO-57	122.06		85.51	1.83E+01	1.83E+01	8.15E+00	8.45E+00
		136.48		10.60	1.78E+02		-6.49E+01	8.24E+01
	NI-59	6.92		29.80	9.71E-06	9.71E-06	-2.98E-05	4.63E-06
	MO-93	16.59		52.90	7.40E-03	7.40E-03	2.62E-03	3.52E-03
		18.60		10.00	8.80E-02		-8.42E-02	4.19E-02
	NB-93M	16.57		9.43	4.12E-02	4.12E-02	1.45E-02	1.96E-02
	CD-109	88.03		3.72	2.03E+02	2.03E+02	-1.98E+02	9.33E+01
+	SN-113	255.12		1.93	8.43E+02	1.69E+01	-4.47E+02	3.75E+02
		391.69	*	61.90	1.69E+01		3.45E+01	7.53E+00
	SN-119M	23.87		16.10	2.57E-01	2.51E-01	-7.83E-02	1.22E-01
		25.10		22.70	2.51E-01		-5.13E-02	1.19E-01
+	I-125	35.49	*	6.49	1.27E+01	1.27E+01	3.85E+01	6.19E+00
	I-129	29.78		57.00	9.61E-01	9.61E-01	5.18E+00	4.74E-01
		33.60		13.20	3.73E+00		-2.15E+01	1.81E+00
		39.58		7.52	4.10E+00		-5.70E-01	1.83E+00
+	BA-133	30.80	*	97.60	3.37E-01	3.37E-01	6.59E+00	1.64E-01
		302.84	*	17.80	1.40E+02		4.71E+02	6.54E+01
		356.01	*	60.00	3.36E+01		3.96E+02	1.57E+01
	CE-139	165.85		80.35	2.76E+01	2.76E+01	3.76E+00	1.28E+01
	CE-144	133.54		10.80	1.79E+02	1.79E+02	1.07E+02	8.34E+01
	HG-203	279.19		77.30	2.80E+01	2.80E+01	1.79E+00	1.29E+01
	PB-210	46.50		4.25	1.85E+01	1.85E+01	9.56E+00	8.45E+00
	PA-231	9.28		42.00	2.22E-04	2.22E-04	3.68E-04	1.09E-04
		10.11		20.20	1.07E-03		3.97E-03	5.24E-04
		283.67		1.60	7.59E+02		1.95E+01	3.27E+02
		302.67		2.30	1.56E+03		3.53E+03	7.45E+02
	TH-231	25.64		14.70	4.70E-01	4.70E-01	-2.20E-01	2.24E-01
		84.21		6.40	1.03E+02		-6.62E+02	4.74E+01
	PA-234M	9.89		89.00	2.01E-04	2.01E-04	7.48E-04	9.87E-05
		21.72		64.90	4.17E-02		2.83E-02	1.99E-02
		37.93		23.75	1.62E+00		-3.39E+00	7.50E-01
		131.42		20.40	8.47E+01		-2.86E+01	3.92E+01
	TH-234	63.29		3.80	1.49E+02	1.49E+02	2.60E+02	7.14E+01
	NP-237	29.37		14.00	1.77E+00	1.77E+00	-3.24E+01	8.58E-01
		86.50		12.60	5.84E+01		-6.17E+01	2.69E+01
	U-237	97.08		16.30	6.91E+01	5.32E+01	-2.21E+01	3.22E+01
		101.07		26.30	5.32E+01		2.61E+01	2.50E+01
		114.00		12.30	2.20E+02		3.72E+02	1.06E+02
		208.01		22.00	9.77E+01		-7.22E+01	4.46E+01
	AM-241	59.54		35.90	9.01E+00	9.01E+00	-2.87E+01	4.25E+00
	AM-243	74.67		66.00	6.68E+00	6.68E+00	1.19E+00	3.05E+00

Analysis Report for 1512122-06

TBB-1S

+ = 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

0000031492.CNF



Apex-Gamma

Analysis Report for 1512122-07
TBA-1D

GAMMA SPECTRUM ANALYSIS

Sample Identification	: 1512122-07
Sample Description	: TBA-1D
Sample Type	: RA RECOVERY
Sample Size	: 1.000E+00 units
Facility	: Countroom
Sample Taken On	: 1/7/2016 11:41:14AM
Acquisition Started	: 1/7/2016 12:02:39PM
Procedure	: BAFIL
Operator	: Administrator
Detector Name	: GE3
Geometry	: BAFIL
Live Time	: 900.0 seconds
Real Time	: 904.3 seconds
Dead Time	: 0.48 %
Peak Locate Threshold	: 2.50
Peak Locate Range (in channels)	: 1 - 4096
Peak Area Range (in channels)	: 9 - 4096
Identification Energy Tolerance	: 1.000 keV
Energy Calibration Used Done On	: 10/25/2014
Efficiency Calibration Used Done On	: 11/9/2014
Efficiency Calibration Description	:
Sample Number	: 31493

PEAK ANALYSIS REPORT

Peak Analysis Performed on : 1/7/2016 12:17:49PM

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 1512122-07

TBA-1D

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
M	1	21.23	18 -	41	21.47	1.10E+02	34.55	1.65E+02	1.95
m	2	26.41	18 -	41	26.65	5.19E+01	33.50	1.62E+02	2.05
m	3	30.99	18 -	41	31.23	1.89E+03	88.97	1.15E+02	1.65
m	4	35.33	18 -	41	35.56	4.83E+02	49.87	9.58E+01	1.71
M	5	53.06	49 -	70	53.28	4.27E+01	38.44	2.24E+02	2.36
m	6	62.10	49 -	70	62.32	2.34E+02	44.61	2.10E+02	1.91
m	7	66.06	49 -	70	66.28	1.04E+02	45.84	2.64E+02	2.40
	8	81.36	77 -	86	81.57	7.72E+02	68.93	2.31E+02	2.00
M	9	112.09	108 -	122	112.29	1.69E+02	34.29	8.99E+01	1.90
m	10	116.48	108 -	122	116.67	4.30E+01	26.23	7.29E+01	1.91
	11	276.41	273 -	281	276.52	6.28E+01	28.01	8.43E+01	1.51
M	12	303.10	293 -	310	303.20	1.23E+02	24.67	2.91E+01	1.59
m	13	307.28	293 -	310	307.37	1.45E+01	20.17	4.95E+01	2.15
	14	333.45	328 -	336	333.53	7.20E+01	27.50	7.20E+01	1.86
	15	356.34	350 -	361	356.41	4.32E+02	45.43	4.23E+01	1.96
M	16	384.45	381 -	394	384.51	1.13E+02	31.00	1.78E+01	2.47
m	17	387.28	381 -	394	387.33	1.85E+02	34.64	1.14E+01	1.99
m	18	391.64	381 -	394	391.69	3.20E+01	15.62	6.59E+00	2.00
M	19	414.98	411 -	425	415.02	3.65E+01	16.77	1.62E+01	2.26
m	20	418.36	411 -	425	418.39	2.26E+01	17.47	1.84E+01	2.26
	21	437.24	432 -	441	437.26	7.76E+01	20.37	1.48E+01	1.80
	22	468.37	465 -	471	468.38	1.81E+01	13.01	1.79E+01	1.85
	23	593.65	591 -	595	593.60	5.00E+00	4.47	0.00E+00	1.70

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 : 1/7/2016 12:17:49PM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000031226.CNF

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
M	1	21.23	1.10E+02	34.55			1.10E+02	3.46E+01
m	2	26.41	5.19E+01	33.50			5.19E+01	3.35E+01
m	3	30.99	1.89E+03	88.97			1.89E+03	8.90E+01
m	4	35.33	4.83E+02	49.87			4.83E+02	4.99E+01
M	5	53.06	4.27E+01	38.44			4.27E+01	3.84E+01
m	6	62.10	2.34E+02	44.61			2.34E+02	4.46E+01

Analysis Report for 1512122-07

TBA-1D

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
m	7	66.06	1.04E+02	45.84			1.04E+02	4.58E+01
	8	81.36	7.72E+02	68.93			7.72E+02	6.89E+01
M	9	112.09	1.69E+02	34.29			1.69E+02	3.43E+01
m	10	116.48	4.30E+01	26.23			4.30E+01	2.62E+01
	11	276.41	6.28E+01	28.01			6.28E+01	2.80E+01
M	12	303.10	1.23E+02	24.67			1.23E+02	2.47E+01
m	13	307.28	1.45E+01	20.17			1.45E+01	2.02E+01
	14	333.45	7.20E+01	27.50			7.20E+01	2.75E+01
	15	356.34	4.32E+02	45.43			4.32E+02	4.54E+01
M	16	384.45	1.13E+02	31.00			1.13E+02	3.10E+01
m	17	387.28	1.85E+02	34.64			1.85E+02	3.46E+01
m	18	391.64	3.20E+01	15.62			3.20E+01	1.56E+01
M	19	414.98	3.65E+01	16.77			3.65E+01	1.68E+01
m	20	418.36	2.26E+01	17.47			2.26E+01	1.75E+01
	21	437.24	7.76E+01	20.37			7.76E+01	2.04E+01
	22	468.37	1.81E+01	13.01			1.81E+01	1.30E+01
	23	593.65	5.00E+00	4.47			5.00E+00	4.47E+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	0.96	255.12		1.93		
		391.69	*	61.90	2.44E+01	1.21E+01
I-125	0.99	35.49	*	6.49	1.50E+01	1.55E+00
BA-133	0.99	30.80	*	97.60	1.52E+00	7.13E-02
		302.84	*	17.80	5.39E+02	2.20E+02
		356.01	*	60.00	4.21E+02	6.15E+01
TH-231	0.91	25.64	*	14.70	7.92E-02	5.11E-02
		84.21		6.40		

Analysis Report for 1512122-07

TBA-1D

* = Energy line found in the spectrum.
\- = Manually added nuclide.
? = Manually edited nuclide.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 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	0.965	2.44E+01	1.21E+01	
I-125	0.996	1.50E+01	1.55E+00	
BA-133	0.990	1.52E+00	7.13E-02	
TH-231	0.916	7.92E-02	5.11E-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 1512122-07

TBA-1D

UNIDENTIFIED PEAKS

Peak Locate Performed on : 1/7/2016 12:17:49PM
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	21.23	1.22681E-01	15.65		
M	5	53.06	4.74050E-02	45.05	Sum	
m	6	62.10	2.60047E-01	9.53	Sum	
m	7	66.06	1.15091E-01	22.13	Sum	
	8	81.36	8.58118E-01	4.46		
M	9	112.09	1.87851E-01	10.14		
m	10	116.48	4.77876E-02	30.49		
	11	276.41	6.98095E-02	22.29		
m	13	307.28	1.61049E-02	69.59		
	14	333.45	8.00000E-02	19.09	Sum	
M	16	384.45	1.25636E-01	13.71		
m	17	387.28	2.06050E-01	9.34	Sum	
M	19	414.98	4.05361E-02	22.98		
m	20	418.36	2.51640E-02	38.57	Sum	
	21	437.24	8.62353E-02	13.12		
	22	468.37	2.00617E-02	36.03		
	23	593.65	5.55556E-03	44.72		

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

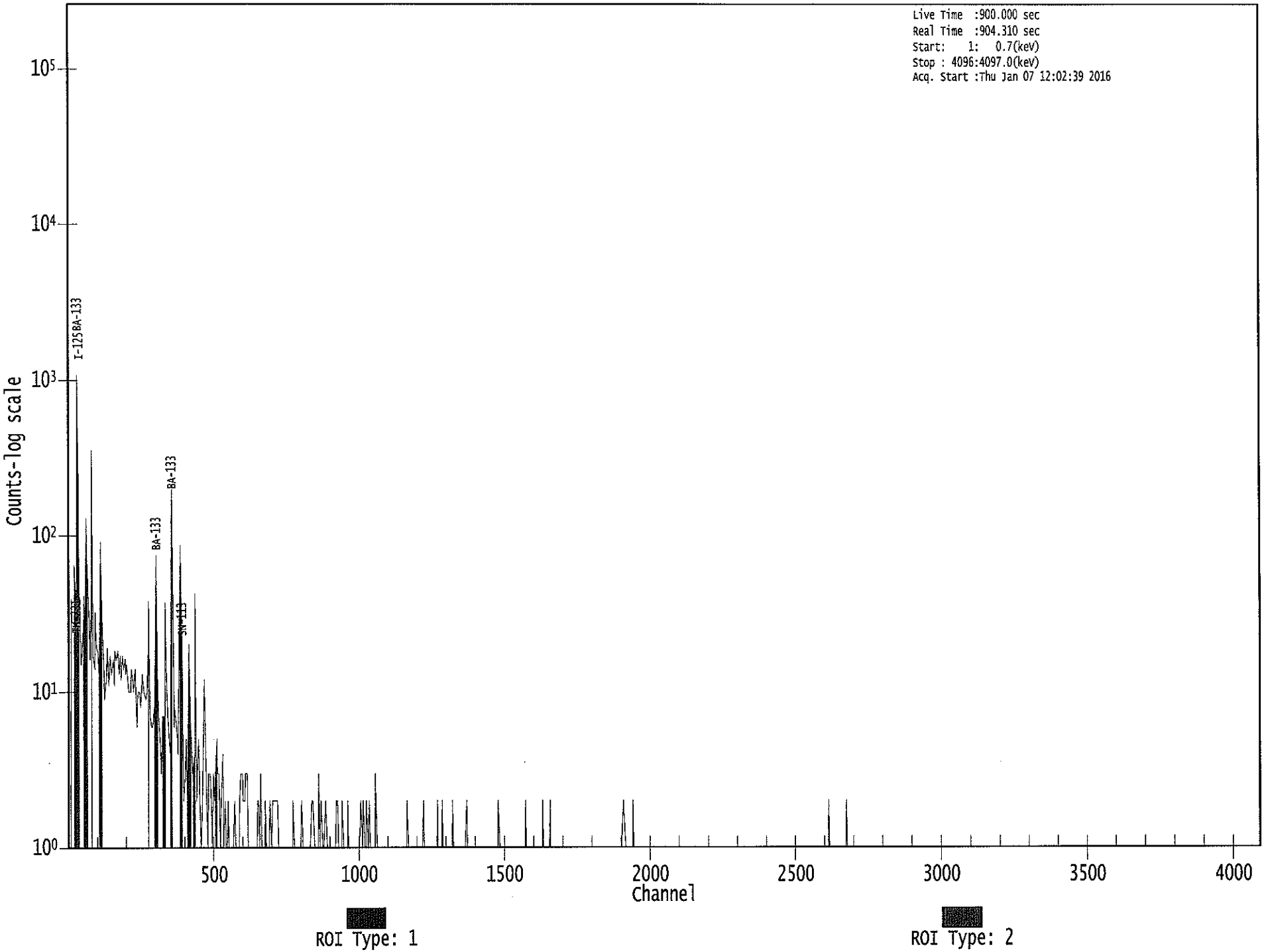
Analysis Report for 1512122-07

TBA-1D

	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	1.53E-10	1.53E-10	0.00E+00	0.00E+00
	CO-57	122.06		85.51	2.17E+01	2.17E+01	-9.35E-01	9.94E+00
		136.48		10.60	2.46E+02		-1.28E+01	1.14E+02
	NI-59	6.92		29.80	3.11E-09	3.11E-09	-1.61E-08	9.85E-10
	MO-93	16.59		52.90	2.62E-04	2.62E-04	4.32E-05	1.22E-04
		18.60		10.00	5.71E-03		-3.01E-03	2.72E-03
	NB-93M	16.57		9.43	1.45E-03	1.45E-03	2.40E-04	6.77E-04
	CD-109	88.03		3.72	2.21E+02	2.21E+02	-9.68E+00	1.02E+02
+	SN-113	255.12		1.93	1.55E+03	2.02E+01	-8.55E+02	7.08E+02
		391.69	*	61.90	2.02E+01		2.44E+01	9.07E+00
	SN-119M	23.87		16.10	3.53E-02	3.34E-02	-2.20E-02	1.69E-02
		25.10		22.70	3.34E-02		-8.06E-02	1.58E-02
+	I-125	35.49	*	6.49	4.31E+00	4.31E+00	1.50E+01	2.11E+00
	I-129	29.78		57.00	2.09E-01	2.09E-01	1.80E+00	1.03E-01
		33.60		13.20	1.68E+00		-7.35E+00	8.28E-01
		39.58		7.52	2.36E+00		-2.35E+00	1.10E+00
+	BA-133	30.80	*	97.60	1.11E-01	1.11E-01	1.52E+00	5.46E-02
		302.84	*	17.80	2.33E+02		5.39E+02	1.11E+02
		356.01	*	60.00	3.20E+01		4.21E+02	1.47E+01
	CE-139	165.85		80.35	3.96E+01	3.96E+01	-7.33E+00	1.83E+01
	CE-144	133.54		10.80	2.26E+02	2.26E+02	2.41E+01	1.05E+02
	HG-203	279.19		77.30	5.32E+01	5.32E+01	6.33E+01	2.51E+01
	PB-210	46.50		4.25	1.19E+01	1.19E+01	-1.51E+00	5.55E+00
	PA-231	9.28		42.00	6.11E-07	6.11E-07	3.94E-07	2.88E-07
		10.11		20.20	3.56E-06		2.30E-06	1.68E-06
		283.67		1.60	1.58E+03		1.53E+02	7.19E+02
		302.67		2.30	1.97E+03		2.75E+03	9.39E+02
+	TH-231	25.64	*	14.70	2.14E-01	2.14E-01	7.92E-02	1.05E-01
		84.21		6.40	3.10E+02		9.64E+02	1.51E+02
	PA-234M	9.89		89.00	6.22E-07	6.22E-07	4.01E-07	2.93E-07
		21.72		64.90	4.32E-03		6.94E-03	2.07E-03
		37.93		23.75	1.20E+00		2.40E+00	5.80E-01
		131.42		20.40	1.10E+02		-3.40E+01	5.05E+01
	TH-234	63.29		3.80	1.42E+02	1.42E+02	1.29E+02	6.91E+01
	NP-237	29.37		14.00	7.66E-01	7.66E-01	6.60E+00	3.78E-01
		86.50		12.60	6.60E+01		1.02E+01	3.06E+01
	U-237	97.08		16.30	8.27E+01	5.58E+01	-1.07E+01	3.87E+01
		101.07		26.30	5.58E+01		9.59E-01	2.61E+01
		114.00		12.30	2.87E+02		4.64E+02	1.38E+02
		208.01		22.00	1.72E+02		-3.15E+00	7.96E+01
	AM-241	59.54		35.90	9.29E+00	9.29E+00	-3.88E+00	4.47E+00
	AM-243	74.67		66.00	8.27E+00	8.27E+00	-2.82E+00	3.88E+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

0000031493.CNF



VLP 1/7/16

Apex-Gamma

Analysis Report for 1512122-08
TBB-3D

GAMMA SPECTRUM ANALYSIS

Sample Identification	: 1512122-08
Sample Description	: TBB-3D
Sample Type	: RA RECOVERY
Sample Size	: 1.000E+00 units
Facility	: Countroom
Sample Taken On	: 1/7/2016 12:21:41PM
Acquisition Started	: 1/7/2016 12:36:07PM
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)	: 7 - 4096
Identification Energy Tolerance	: 1.000 keV
Energy Calibration Used Done On	: 11/2/2014
Efficiency Calibration Used Done On	: 11/9/2014
Efficiency Calibration Description	:
Sample Number	: 31500

PEAK ANALYSIS REPORT

Peak Analysis Performed on : 1/7/2016 12:51:12PM

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 1512122-08

TBB-3D

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
	1	20.29	18 -	23	20.41	6.36E+01	45.07	3.53E+02	1.29
M	2	31.01	27 -	43	31.12	7.95E+02	63.21	1.96E+02	1.46
m	3	34.82	27 -	43	34.93	1.67E+02	36.99	8.51E+01	1.46
	4	52.95	49 -	58	53.06	4.68E+01	31.42	1.12E+02	3.80
	5	61.81	59 -	64	61.91	8.76E+01	29.36	1.03E+02	1.39
	6	81.17	77 -	85	81.26	3.16E+02	47.80	1.56E+02	1.49
	7	112.16	107 -	118	112.22	8.53E+01	40.45	1.61E+02	1.29
	8	160.03	157 -	162	160.07	2.56E+01	16.34	3.28E+01	1.03
	9	240.83	237 -	243	240.82	1.69E+01	16.58	3.63E+01	1.88
	10	275.84	272 -	280	275.82	5.13E+01	19.43	2.53E+01	2.35
M	11	303.01	299 -	309	302.97	6.71E+01	18.86	1.67E+01	1.51
m	12	306.92	299 -	309	306.88	8.62E+00	9.79	1.07E+01	1.51
	13	333.92	330 -	338	333.87	2.42E+01	19.76	4.56E+01	1.64
	14	356.08	352 -	359	356.02	1.90E+02	32.68	5.07E+01	1.39
	15	385.25	380 -	390	385.17	9.77E+01	31.17	7.87E+01	4.49
M	16	414.78	412 -	420	414.68	1.06E+01	10.16	1.35E+01	1.82
m	17	418.18	412 -	420	418.08	7.73E+00	10.92	1.13E+01	1.83
	18	436.71	432 -	440	436.60	2.76E+01	19.35	4.08E+01	1.44
	19	450.19	447 -	452	450.08	9.50E+00	7.28	3.00E+00	1.77
	20	457.92	456 -	460	457.80	5.43E+00	5.85	3.14E+00	2.72
	21	466.97	463 -	470	466.85	9.14E+00	7.75	3.73E+00	4.72
	22	474.13	471 -	476	474.00	1.00E+01	6.32	0.00E+00	1.77
	23	559.18	556 -	561	559.01	7.61E+00	6.71	2.78E+00	1.74
	24	569.06	566 -	572	568.89	1.10E+01	8.02	4.00E+00	1.93
	25	776.64	773 -	779	776.38	8.00E+00	5.66	0.00E+00	3.31
	26	910.53	907 -	913	910.20	7.44E+00	6.95	3.11E+00	2.49

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 : 1/7/2016 12:51:12PM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000031225.CNF

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
	1	20.29	6.36E+01	45.07			6.36E+01	4.51E+01
M	2	31.01	7.95E+02	63.21			7.95E+02	6.32E+01
m	3	34.82	1.67E+02	36.99			1.67E+02	3.70E+01

Analysis Report for 1512122-08

TBB-3D

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
	4	52.95	4.68E+01	31.42	9.74E-01	1.91E+00	4.59E+01	3.15E+01
	5	61.81	8.76E+01	29.36			8.76E+01	2.94E+01
	6	81.17	3.16E+02	47.80			3.16E+02	4.78E+01
	7	112.16	8.53E+01	40.45			8.53E+01	4.04E+01
	8	160.03	2.56E+01	16.34			2.56E+01	1.63E+01
	9	240.83	1.69E+01	16.58			1.69E+01	1.66E+01
	10	275.84	5.13E+01	19.43			5.13E+01	1.94E+01
M	11	303.01	6.71E+01	18.86			6.71E+01	1.89E+01
m	12	306.92	8.62E+00	9.79			8.62E+00	9.79E+00
	13	333.92	2.42E+01	19.76			2.42E+01	1.98E+01
	14	356.08	1.90E+02	32.68			1.90E+02	3.27E+01
	15	385.25	9.77E+01	31.17			9.77E+01	3.12E+01
M	16	414.78	1.06E+01	10.16			1.06E+01	1.02E+01
m	17	418.18	7.73E+00	10.92			7.73E+00	1.09E+01
	18	436.71	2.76E+01	19.35			2.76E+01	1.93E+01
	19	450.19	9.50E+00	7.28			9.50E+00	7.28E+00
	20	457.92	5.43E+00	5.85			5.43E+00	5.85E+00
	21	466.97	9.14E+00	7.75			9.14E+00	7.75E+00
	22	474.13	1.00E+01	6.32			1.00E+01	6.32E+00
	23	559.18	7.61E+00	6.71			7.61E+00	6.71E+00
	24	569.06	1.10E+01	8.02			1.10E+01	8.02E+00
	25	776.64	8.00E+00	5.66			8.00E+00	5.66E+00
	26	910.53	7.44E+00	6.95	7.49E-01	8.81E-01	6.70E+00	7.00E+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-125	0.93	35.49	*	6.49	1.70E+01	3.76E+00
BA-133	0.99	30.80	*	97.60	2.93E+00	2.33E-01
		302.84	*	17.80	2.23E+02	8.29E+01
		356.01	*	60.00	1.56E+02	3.08E+01

Analysis Report for 1512122-08

TBB-3D

* = Energy line found in the spectrum.
\- = Manually added nuclide.
? = Manually edited nuclide.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 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-125	0.931	1.70E+01	3.76E+00	
BA-133	0.995	2.94E+00	2.33E-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 1512122-08

TBB-3D

UNIDENTIFIED PEAKS

Peak Locate Performed on : 1/7/2016 12:51:12PM
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	20.29	7.07153E-02	35.41		
	4	52.95	5.09457E-02	34.32		
	5	61.81	9.73861E-02	16.75	Sum	
	6	81.17	3.51230E-01	7.56		
	7	112.16	9.47925E-02	23.71		
	8	160.03	2.84524E-02	31.91		
	9	240.83	1.87302E-02	49.16		
	10	275.84	5.70486E-02	18.92		
m	12	306.92	9.57618E-03	56.77		
	13	333.92	2.69031E-02	40.81	Sum	
	15	385.25	1.08508E-01	15.96		
M	16	414.78	1.17686E-02	47.97		
m	17	418.18	8.59309E-03	70.60		
	18	436.71	3.06597E-02	35.05		
	19	450.19	1.05556E-02	38.32		
	20	457.92	6.03175E-03	53.90		
	21	466.97	1.01515E-02	42.39		
	22	474.13	1.11111E-02	31.62		
	23	559.18	8.45679E-03	44.07		
	24	569.06	1.22222E-02	36.43		
	25	776.64	8.88889E-03	35.36		
	26	910.53	7.43974E-03	52.29		

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

Analysis Report for 1512122-08

TBB-3D

NUCLIDE MDA REPORT

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

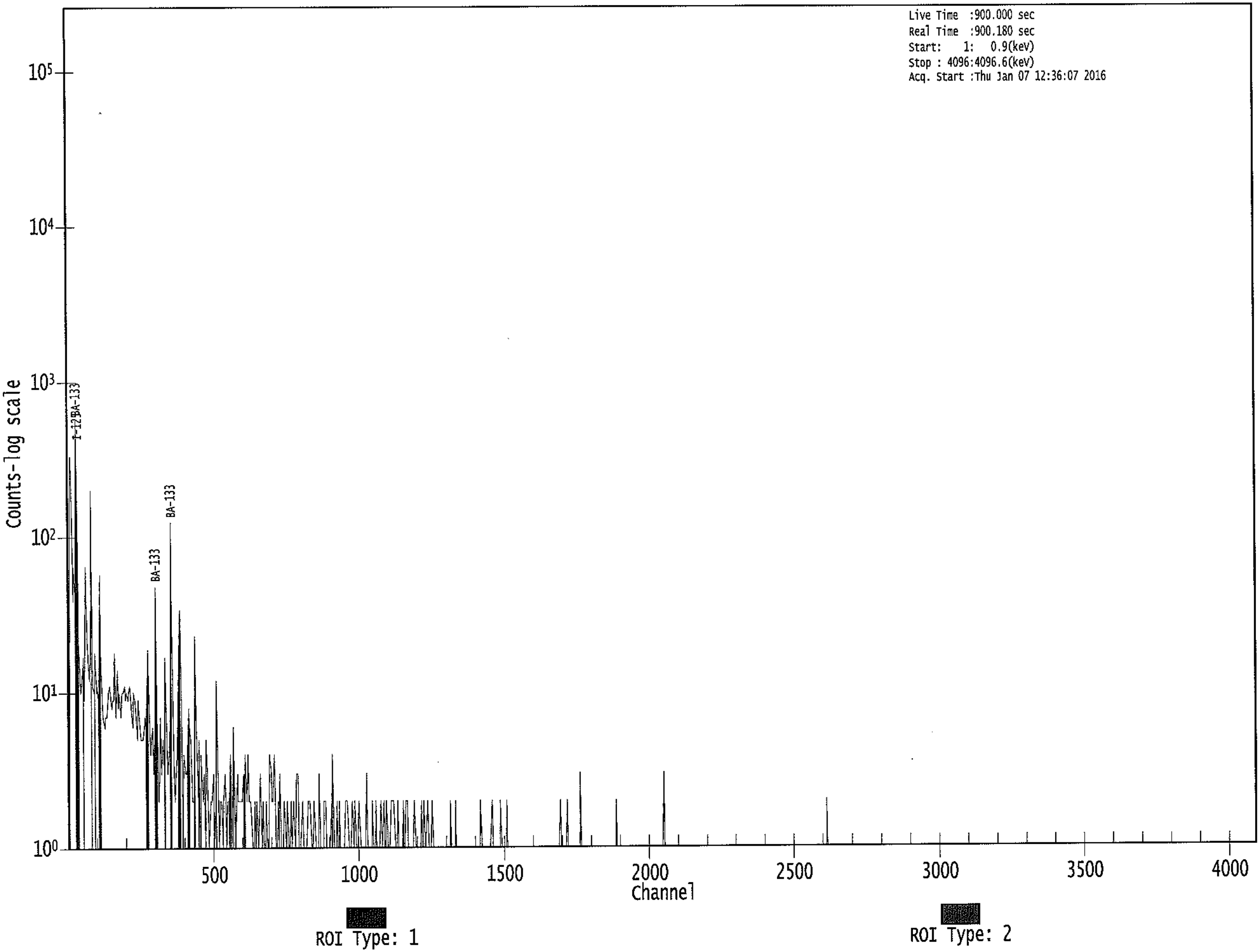
	Nuclide Name	Energy (keV)		Yield(%)	Line MDA (pCi/units)	Nuclide MDA (pCi/units)	Activity (pCi/units)	Dec. Level (pCi/units)
	FE-55	5.89		24.50	8.07E-07	8.07E-07	-4.11E-06	3.45E-07
	CO-57	122.06		85.51	1.26E+01	1.26E+01	-3.50E+00	5.62E+00
		136.48		10.60	1.17E+02		-7.64E+01	5.21E+01
	NI-59	6.92		29.80	9.09E-06	9.09E-06	-2.44E-05	4.32E-06
	MO-93	16.59		52.90	6.34E-03	6.34E-03	-2.70E-03	2.99E-03
		18.60		10.00	8.43E-02		-6.04E-02	4.00E-02
	NB-93M	16.57		9.43	3.53E-02	3.53E-02	-1.50E-02	1.66E-02
	CD-109	88.03		3.72	1.72E+02	1.72E+02	-8.62E+01	7.79E+01
	SN-113	255.12		1.93	7.12E+02	1.43E+01	-3.43E+02	3.09E+02
		391.69		61.90	1.43E+01		8.24E+00	6.22E+00
	SN-119M	23.87		16.10	2.39E-01	2.39E-01	-8.26E-03	1.13E-01
		25.10		22.70	2.48E-01		1.09E-01	1.18E-01
+	I-125	35.49	*	6.49	1.37E+01	1.37E+01	1.70E+01	6.71E+00
	I-129	29.78		57.00	6.52E-01	6.52E-01	2.28E+00	3.19E-01
		33.60		13.20	2.79E+00		-6.92E+00	1.34E+00
		39.58		7.52	3.68E+00		-4.92E-01	1.62E+00
+	BA-133	30.80	*	97.60	5.05E-01	5.05E-01	2.93E+00	2.48E-01
		302.84	*	17.80	9.45E+01		2.23E+02	4.27E+01
		356.01	*	60.00	2.60E+01		1.56E+02	1.19E+01
	CE-139	165.85		80.35	2.14E+01	2.14E+01	-1.56E+00	9.64E+00
	CE-144	133.54		10.80	1.20E+02	1.20E+02	6.88E+01	5.40E+01
	HG-203	279.19		77.30	2.04E+01	2.04E+01	-1.31E+01	9.10E+00
	PB-210	46.50		4.25	1.55E+01	1.55E+01	3.49E+00	6.95E+00
	PA-231	9.28		42.00	2.16E-04	2.16E-04	3.98E-04	1.06E-04
		10.11		20.20	1.04E-03		3.95E-03	5.07E-04
		283.67		1.60	8.08E+02		1.95E+02	3.51E+02
		302.67		2.30	1.13E+03		1.57E+03	5.28E+02
	TH-231	25.64		14.70	4.37E-01	4.37E-01	1.21E-01	2.07E-01
		84.21		6.40	8.52E+01		-2.89E+02	3.84E+01
	PA-234M	9.89		89.00	1.95E-04	1.95E-04	7.44E-04	9.55E-05
		21.72		64.90	3.75E-02		1.75E-02	1.78E-02
		37.93		23.75	1.33E+00		-6.40E-01	6.07E-01
		131.42		20.40	6.34E+01		7.42E+00	2.85E+01
	TH-234	63.29		3.80	1.08E+02	1.08E+02	1.31E+02	5.13E+01
	NP-237	29.37		14.00	1.31E+00	1.31E+00	-1.38E+01	6.29E-01
		86.50		12.60	5.12E+01		-1.62E+01	2.33E+01
	U-237	97.08		16.30	4.35E+01	3.87E+01	-4.13E+01	1.94E+01
		101.07		26.30	3.87E+01		3.99E+01	1.78E+01
		114.00		12.30	1.57E+02		1.68E+02	7.41E+01
		208.01		22.00	9.28E+01		2.57E+01	4.22E+01
	AM-241	59.54		35.90	5.78E+00	5.78E+00	-1.26E+01	2.64E+00
	AM-243	74.67		66.00	6.26E+00	6.26E+00	1.68E+00	2.84E+00

Analysis Report for 1512122-08

TBB-3D

+ = 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

0000031500.CNF



VLB 1/7/16

Apex-Gamma

Analysis Report for 1512122-09
TBB-2D

GAMMA SPECTRUM ANALYSIS

Sample Identification	: 1512122-09
Sample Description	: TBB-2D
Sample Type	: RA RECOVERY
Sample Size	: 1.000E+00 units
Facility	: Countroom
Sample Taken On	: 1/7/2016 11:58:50AM
Acquisition Started	: 1/7/2016 12:19:07PM
Procedure	: BAFIL
Operator	: Administrator
Detector Name	: GE1
Geometry	: BAFIL
Live Time	: 900.0 seconds
Real Time	: 900.2 seconds
Dead Time	: 0.03 %
Peak Locate Threshold	: 2.50
Peak Locate Range (in channels)	: 1 - 4096
Peak Area Range (in channels)	: 19 - 4096
Identification Energy Tolerance	: 1.000 keV
Energy Calibration Used Done On	: 10/25/2014
Efficiency Calibration Used Done On	: 11/9/2014
Efficiency Calibration Description	:
Sample Number	: 31495

PEAK ANALYSIS REPORT

Peak Analysis Performed on : 1/7/2016 12:34:11PM

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 1512122-09

TBB-2D

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
M	1	30.79	26 -	39	31.14	1.59E+03	84.20	1.37E+02	1.64
m	2	35.03	26 -	39	35.39	3.62E+02	48.72	1.16E+02	1.66
	3	52.52	50 -	55	52.87	4.36E+01	27.07	1.13E+02	1.39
M	4	61.89	58 -	74	62.24	2.11E+02	40.82	1.67E+02	1.91
m	5	65.76	58 -	74	66.10	8.35E+01	38.13	1.58E+02	1.92
m	6	69.73	58 -	74	70.08	2.87E+01	32.47	1.53E+02	1.93
	7	81.11	76 -	87	81.45	6.71E+02	69.20	2.60E+02	1.95
M	8	111.85	108 -	120	112.18	1.50E+02	33.83	1.23E+02	1.71
m	9	116.21	108 -	120	116.54	2.47E+01	29.56	1.62E+02	1.85
	10	142.61	139 -	146	142.93	2.45E+01	31.05	1.45E+02	4.11
	11	223.14	220 -	228	223.43	2.54E+01	26.25	9.13E+01	3.68
	12	276.33	273 -	279	276.61	5.00E+01	20.76	4.20E+01	1.21
M	13	302.83	299 -	310	303.09	1.14E+02	24.99	4.66E+01	1.61
m	14	306.66	299 -	310	306.93	3.44E+01	20.31	3.57E+01	1.75
M	15	331.74	328 -	344	332.00	1.58E+01	17.87	1.62E+01	1.61
m	16	337.44	328 -	344	337.70	2.23E+01	14.73	9.21E+00	1.95
	17	356.14	352 -	361	356.38	4.37E+02	48.34	8.18E+01	1.97
	18	369.49	367 -	374	369.73	1.53E+01	14.42	2.54E+01	1.52
M	19	383.96	380 -	394	384.20	1.00E+02	31.57	1.22E+01	2.40
m	20	386.88	380 -	394	387.11	1.85E+02	33.09	8.65E+00	1.99
m	21	391.19	380 -	394	391.43	4.81E+01	20.61	7.54E+00	2.30
M	22	414.88	409 -	425	415.11	3.60E+01	16.88	2.93E+01	2.02
m	23	421.42	409 -	425	421.65	8.61E+00	13.75	1.95E+01	2.03
	24	437.12	434 -	441	437.34	1.04E+02	20.40	0.00E+00	1.49
	25	468.33	464 -	474	468.54	3.35E+01	14.71	1.10E+01	1.94
	26	494.74	492 -	497	494.94	5.50E+00	6.08	3.00E+00	2.37
	27	584.00	580 -	587	584.17	1.20E+01	6.93	0.00E+00	2.48

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 : 1/7/2016 12:34:11PM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000031224.CNF

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
M	1	30.79	1.59E+03	84.20			1.59E+03	8.42E+01
m	2	35.03	3.62E+02	48.72			3.62E+02	4.87E+01

Analysis Report for 1512122-09

TBB-2D

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
	3	52.52	4.36E+01	27.07			4.36E+01	2.71E+01
M	4	61.89	2.11E+02	40.82			2.11E+02	4.08E+01
m	5	65.76	8.35E+01	38.13			8.35E+01	3.81E+01
m	6	69.73	2.87E+01	32.47			2.87E+01	3.25E+01
	7	81.11	6.71E+02	69.20			6.71E+02	6.92E+01
M	8	111.85	1.50E+02	33.83			1.50E+02	3.38E+01
m	9	116.21	2.47E+01	29.56			2.47E+01	2.96E+01
	10	142.61	2.45E+01	31.05			2.45E+01	3.10E+01
	11	223.14	2.54E+01	26.25			2.54E+01	2.62E+01
	12	276.33	5.00E+01	20.76			5.00E+01	2.08E+01
M	13	302.83	1.14E+02	24.99			1.14E+02	2.50E+01
m	14	306.66	3.44E+01	20.31			3.44E+01	2.03E+01
M	15	331.74	1.58E+01	17.87			1.58E+01	1.79E+01
m	16	337.44	2.23E+01	14.73			2.23E+01	1.47E+01
	17	356.14	4.37E+02	48.34			4.37E+02	4.83E+01
	18	369.49	1.53E+01	14.42			1.53E+01	1.44E+01
M	19	383.96	1.00E+02	31.57			1.00E+02	3.16E+01
m	20	386.88	1.85E+02	33.09			1.85E+02	3.31E+01
m	21	391.19	4.81E+01	20.61			4.81E+01	2.06E+01
M	22	414.88	3.60E+01	16.88			3.60E+01	1.69E+01
m	23	421.42	8.61E+00	13.75			8.61E+00	1.37E+01
	24	437.12	1.04E+02	20.40			1.04E+02	2.04E+01
	25	468.33	3.35E+01	14.71			3.35E+01	1.47E+01
	26	494.74	5.50E+00	6.08			5.50E+00	6.08E+00
	27	584.00	1.20E+01	6.93	8.38E-01	1.08E+00	1.12E+01	7.01E+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	0.93	255.12		1.93		
		391.69	*	61.90	2.86E+01	1.24E+01
I-125	0.96	35.49	*	6.49	6.31E+00	8.49E-01
BA-133	0.99	30.80	*	97.60	6.37E-01	3.38E-02

Analysis Report for 1512122-09

TBB-2D

Nuclide Name	Id Confidence	Energy (keV)		Yield(%)	Activity (pCi/units)	Activity Uncertainty
BA-133	0.99	302.84	*	17.80	4.52E+02	1.69E+02
		356.01	*	60.00	3.52E+02	5.12E+01
PA-231	1.00	9.28		42.00		
		10.11		20.20		
		283.67		1.60		
		302.67	*	2.30	3.50E+03	1.31E+03

* = Energy line found in the spectrum.
\- = Manually added nuclide.
? = Manually edited nuclide.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 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	0.932	2.86E+01	1.24E+01	
I-125	0.967	6.31E+00	8.49E-01	
BA-133	0.999	6.37E-01	3.38E-02	
PA-231	1.000	3.49E+03	1.31E+03	

? = 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 1512122-09

TBB-2D

UNIDENTIFIED PEAKS

Peak Locate Performed on : 1/7/2016 12:34:11PM
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	52.52	4.84667E-02	31.03		
M	4	61.89	2.34899E-01	9.65	Sum	
m	5	65.76	9.27423E-02	22.84	Sum	
m	6	69.73	3.19182E-02	56.51	Sum	
	7	81.11	7.45406E-01	5.16		
M	8	111.85	1.67178E-01	11.24		
m	9	116.21	2.74261E-02	59.89		
	10	142.61	2.72509E-02	63.30		
	11	223.14	2.81768E-02	51.75		
	12	276.33	5.55556E-02	20.76		
m	14	306.66	3.82622E-02	29.49		
M	15	331.74	1.75643E-02	56.51		
m	16	337.44	2.48178E-02	32.98	Sum	
	18	369.49	1.70238E-02	47.07		
M	19	383.96	1.11401E-01	15.74		
m	20	386.88	2.05083E-01	8.96	Sum	
M	22	414.88	3.99957E-02	23.45		
m	23	421.42	9.56166E-03	79.88	Sum	
	24	437.12	1.15556E-01	9.81		
	25	468.33	3.72222E-02	21.96		
	26	494.74	6.11111E-03	55.30		
	27	584.00	1.24026E-02	31.41		

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

Analysis Report for 1512122-09

TBB-2D

NUCLIDE MDA REPORT

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

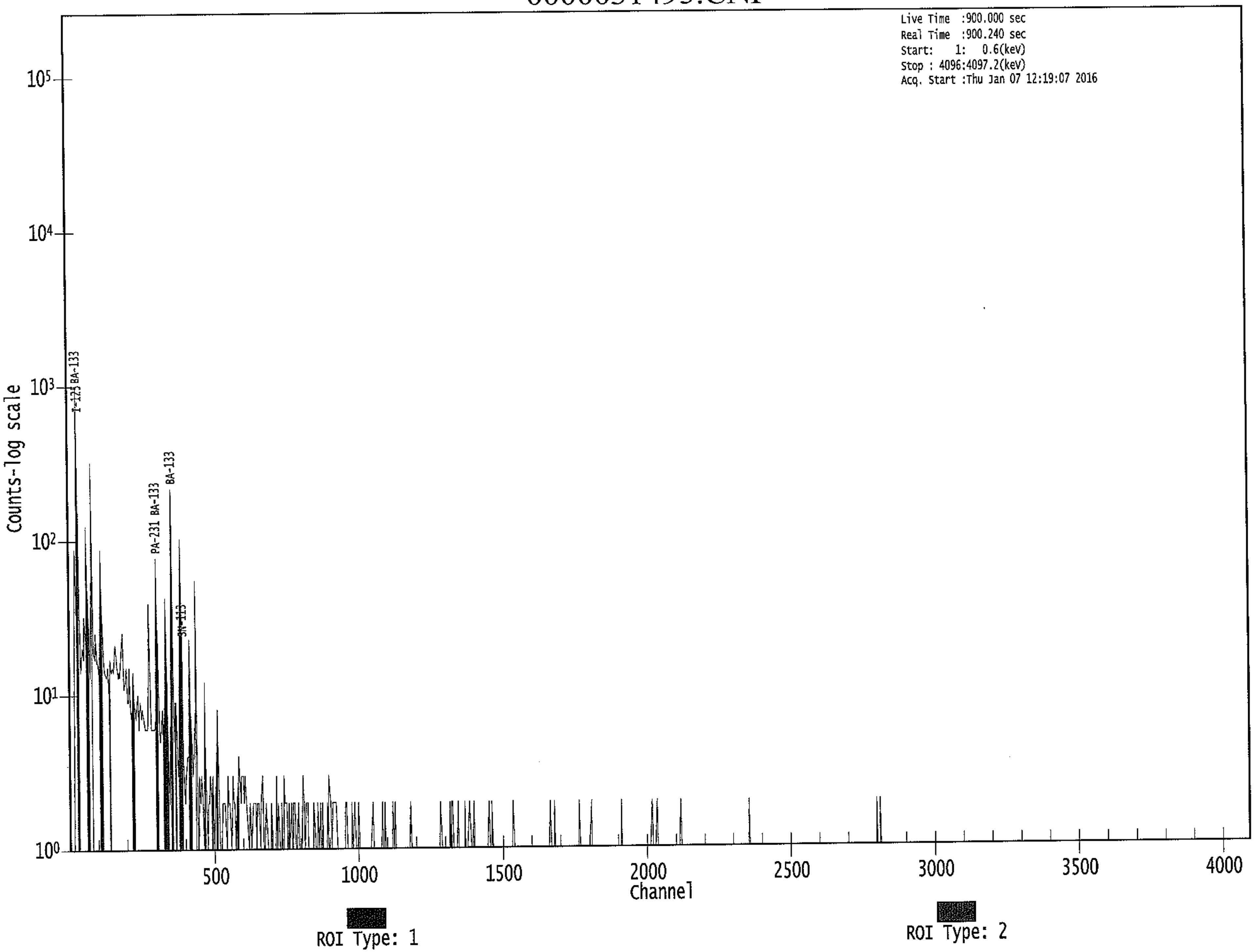
	Nuclide Name	Energy (keV)		Yield(%)	Line MDA (pCi/units)	Nuclide MDA (pCi/units)	Activity (pCi/units)	Dec. Level (pCi/units)
	FE-55	5.89		24.50	6.60E-12	6.60E-12	0.00E+00	0.00E+00
	CO-57	122.06		85.51	2.71E+01	2.71E+01	-6.32E+00	1.26E+01
		136.48		10.60	2.58E+02		2.05E+01	1.19E+02
	NI-59	6.92		29.80	6.80E-11	6.80E-11	0.00E+00	0.00E+00
	MO-93	16.59		52.90	2.56E-05	2.56E-05	-3.56E-05	1.06E-05
		18.60		10.00	1.45E-03		9.54E-05	6.83E-04
	NB-93M	16.57		9.43	1.42E-04	1.42E-04	-1.97E-04	5.89E-05
	CD-109	88.03		3.72	2.46E+02	2.46E+02	6.30E+01	1.14E+02
+	SN-113	255.12		1.93	1.28E+03	1.49E+01	-1.87E+02	5.75E+02
		391.69	*	61.90	1.49E+01		2.86E+01	6.63E+00
	SN-119M	23.87		16.10	1.64E-02	1.64E-02	1.82E-02	7.87E-03
		25.10		22.70	1.67E-02		1.39E-02	7.96E-03
+	I-125	35.49	*	6.49	1.58E+00	1.58E+00	6.31E+00	7.68E-01
	I-129	29.78		57.00	9.95E-02	9.95E-02	7.78E-01	4.91E-02
		33.60		13.20	8.69E-01		-5.04E+00	4.26E-01
		39.58		7.52	1.47E+00		3.39E-01	6.82E-01
+	BA-133	30.80	*	97.60	3.68E-02	3.68E-02	6.37E-01	1.78E-02
		302.84	*	17.80	1.88E+02		4.52E+02	8.84E+01
		356.01	*	60.00	3.43E+01		3.52E+02	1.61E+01
	CE-139	165.85		80.35	4.55E+01	4.55E+01	9.95E+00	2.11E+01
	CE-144	133.54		10.80	2.57E+02	2.57E+02	9.60E+01	1.19E+02
	HG-203	279.19		77.30	3.74E+01	3.74E+01	-1.57E+00	1.73E+01
	PB-210	46.50		4.25	9.05E+00	9.05E+00	8.88E+00	4.25E+00
+	PA-231	9.28		42.00	3.55E-09	3.55E-09	0.00E+00	0.00E+00
		10.11		20.20	2.40E-08		0.00E+00	0.00E+00
		283.67		1.60	1.28E+03		5.65E+02	5.75E+02
		302.67	*	2.30	1.45E+03		3.50E+03	6.84E+02
	TH-231	25.64		14.70	2.52E-02	2.52E-02	-2.06E-02	1.19E-02
		84.21		6.40	1.41E+02		-1.25E+03	6.61E+01
	PA-234M	9.89		89.00	4.04E-09	4.04E-09	0.00E+00	0.00E+00
		21.72		64.90	1.80E-03		4.46E-03	8.68E-04
		37.93		23.75	6.70E-01		7.94E-01	3.23E-01
		131.42		20.40	1.19E+02		-7.88E+01	5.48E+01
	TH-234	63.29		3.80	1.22E+02	1.22E+02	1.52E+02	5.88E+01
	NP-237	29.37		14.00	3.59E-01	3.59E-01	2.81E+00	1.77E-01
		86.50		12.60	7.15E+01		8.83E+00	3.34E+01
	U-237	97.08		16.30	7.89E+01	5.93E+01	-1.88E+01	3.67E+01
		101.07		26.30	5.93E+01		3.63E+01	2.77E+01
		114.00		12.30	3.00E+02		1.90E+02	1.44E+02
		208.01		22.00	1.62E+02		7.22E+00	7.43E+01
	AM-241	59.54		35.90	7.65E+00	7.65E+00	3.33E+00	3.68E+00
	AM-243	74.67		66.00	7.08E+00	7.08E+00	-5.74E+00	3.29E+00

Analysis Report for 1512122-09

TBB-2D

+ = 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

0000031495.CNF



KB 1/7/16

Apex-Gamma

Analysis Report for 1512122-10
TBB-2M

GAMMA SPECTRUM ANALYSIS

Sample Identification	: 1512122-10
Sample Description	: TBB-2M
Sample Type	: RA RECOVERY
Sample Size	: 1.000E+00 units
Facility	: Countroom
Sample Taken On	: 1/7/2016 11:59:03AM
Acquisition Started	: 1/7/2016 12:19:18PM
Procedure	: BAFIL
Operator	: Administrator
Detector Name	: GE2
Geometry	: BAFIL
Live Time	: 900.0 seconds
Real Time	: 900.2 seconds
Dead Time	: 0.03 %
Peak Locate Threshold	: 2.50
Peak Locate Range (in channels)	: 1 - 4096
Peak Area Range (in channels)	: 5 - 4096
Identification Energy Tolerance	: 1.000 keV
Energy Calibration Used Done On	: 11/2/2014
Efficiency Calibration Used Done On	: 11/9/2014
Efficiency Calibration Description	:
Sample Number	: 31496

PEAK ANALYSIS REPORT

Peak Analysis Performed on : 1/7/2016 12:34:23PM

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 1512122-10

TBB-2M

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
	1	20.96	18 -	23	21.08	8.74E+01	45.98	3.51E+02	2.09
M	2	30.96	27 -	39	31.07	1.44E+03	80.47	2.08E+02	1.45
m	3	35.19	27 -	39	35.30	4.00E+02	51.48	1.60E+02	1.61
	4	53.34	51 -	56	53.44	3.45E+01	27.20	1.21E+02	1.79
	5	62.01	58 -	64	62.11	8.08E+01	42.20	3.06E+02	1.26
	6	66.33	66 -	69	66.42	3.56E+01	26.53	1.05E+02	1.95
	7	81.11	77 -	84	81.20	6.16E+02	60.73	2.03E+02	1.57
	8	111.81	109 -	114	111.88	1.01E+02	33.33	1.41E+02	1.25
	9	116.92	116 -	120	116.98	2.19E+01	24.84	1.02E+02	2.57
	10	160.59	157 -	164	160.63	2.53E+01	27.35	1.07E+02	1.30
	11	239.84	238 -	242	239.84	1.15E+01	14.27	3.50E+01	2.66
	12	276.18	272 -	280	276.16	5.09E+01	24.15	5.81E+01	1.52
	13	289.40	285 -	292	289.37	1.39E+01	16.37	3.42E+01	3.96
	14	302.86	299 -	305	302.82	1.32E+02	26.50	3.13E+01	1.34
	15	334.73	330 -	340	334.68	6.06E+01	24.74	4.88E+01	1.93
	16	356.06	352 -	359	355.99	3.77E+02	44.54	7.73E+01	1.40
M	17	384.23	380 -	395	384.15	7.61E+01	23.52	1.21E+01	1.62
m	18	390.94	380 -	395	390.85	2.86E+01	14.46	5.94E+00	1.63
	19	415.75	412 -	421	415.66	2.96E+01	21.00	4.89E+01	2.15
	20	437.13	434 -	441	437.02	8.70E+01	19.80	5.91E+00	1.66
	21	570.52	568 -	572	570.34	4.83E+00	5.50	2.33E+00	1.44
	22	623.40	620 -	627	623.20	6.00E+00	8.49	8.00E+00	2.81
	23	1391.30	1387 -	1393	1390.80	5.00E+00	4.47	0.00E+00	2.75

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 : 1/7/2016 12:34:23PM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000031225.CNF

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
	1	20.96	8.74E+01	45.98			8.74E+01	4.60E+01
M	2	30.96	1.44E+03	80.47			1.44E+03	8.05E+01
m	3	35.19	4.00E+02	51.48			4.00E+02	5.15E+01
	4	53.34	3.45E+01	27.20	9.74E-01	1.91E+00	3.35E+01	2.73E+01
	5	62.01	8.08E+01	42.20			8.08E+01	4.22E+01
	6	66.33	3.56E+01	26.53			3.56E+01	2.65E+01

Analysis Report for 1512122-10

TBB-2M

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
	7	81.11	6.16E+02	60.73			6.16E+02	6.07E+01
	8	111.81	1.01E+02	33.33			1.01E+02	3.33E+01
	9	116.92	2.19E+01	24.84			2.19E+01	2.48E+01
	10	160.59	2.53E+01	27.35			2.53E+01	2.73E+01
	11	239.84	1.15E+01	14.27			1.15E+01	1.43E+01
	12	276.18	5.09E+01	24.15			5.09E+01	2.42E+01
	13	289.40	1.39E+01	16.37			1.39E+01	1.64E+01
	14	302.86	1.32E+02	26.50			1.32E+02	2.65E+01
	15	334.73	6.06E+01	24.74			6.06E+01	2.47E+01
	16	356.06	3.77E+02	44.54			3.77E+02	4.45E+01
M	17	384.23	7.61E+01	23.52			7.61E+01	2.35E+01
m	18	390.94	2.86E+01	14.46			2.86E+01	1.45E+01
	19	415.75	2.96E+01	21.00			2.96E+01	2.10E+01
	20	437.13	8.70E+01	19.80			8.70E+01	1.98E+01
	21	570.52	4.83E+00	5.50			4.83E+00	5.50E+00
	22	623.40	6.00E+00	8.49			6.00E+00	8.49E+00
	23	1391.30	5.00E+00	4.47			5.00E+00	4.47E+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	0.87	255.12		1.93		
		391.69	*	61.90	1.98E+01	1.02E+01
I-125	0.98	35.49	*	6.49	4.28E+01	5.51E+00
BA-133	0.99	30.80	*	97.60	5.25E+00	2.94E-01
		302.84	*	17.80	4.40E+02	1.39E+02
		356.01	*	60.00	3.10E+02	4.75E+01

Analysis Report for 1512122-10

TBB-2M

* = Energy line found in the spectrum.
\- = Manually added nuclide.
? = Manually edited nuclide.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 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	0.877	1.98E+01	1.02E+01	
I-125	0.986	4.28E+01	5.51E+00	
BA-133	0.998	5.27E+00	2.94E-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 1512122-10

TBB-2M

UNIDENTIFIED PEAKS

Peak Locate Performed on : 1/7/2016 12:34:23PM
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	20.96	9.70596E-02	26.32		
	4	53.34	3.72101E-02	40.71		
	5	62.01	8.97531E-02	26.12	Sum	
	6	66.33	3.95960E-02	37.23	Sum	
	7	81.11	6.84948E-01	4.93		
	8	111.81	1.12655E-01	16.44		
	9	116.92	2.43227E-02	56.74		
	10	160.59	2.80661E-02	54.14		
	11	239.84	1.27778E-02	62.02		
	12	276.18	5.66042E-02	23.70		
	13	289.40	1.54301E-02	58.94		
	15	334.73	6.73137E-02	20.42	Sum	
M	17	384.23	8.46044E-02	15.44		
	19	415.75	3.28395E-02	35.53		
	20	437.13	9.67161E-02	11.37		
	21	570.52	5.37037E-03	56.90		
	22	623.40	6.66667E-03	70.71		
	23	1391.30	5.55556E-03	44.72		

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

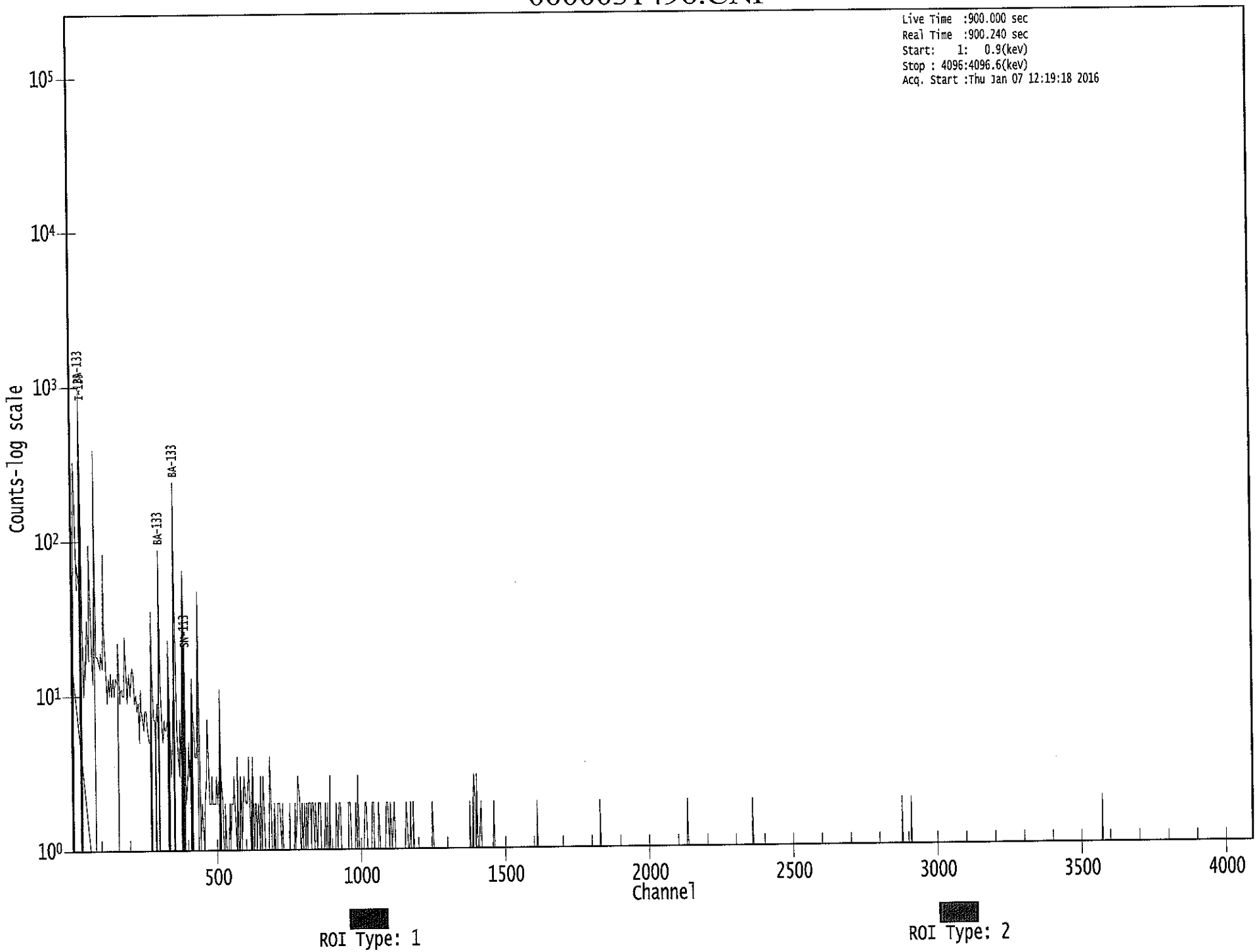
Analysis Report for 1512122-10

TBB-2M

	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	1.01E-06	1.01E-06	-5.38E-06	4.46E-07
	CO-57	122.06		85.51	1.56E+01	1.56E+01	1.01E+00	7.12E+00
		136.48		10.60	1.68E+02		6.09E+01	7.77E+01
	NI-59	6.92		29.80	9.12E-06	9.12E-06	-1.98E-05	4.33E-06
	MO-93	16.59		52.90	6.21E-03	6.21E-03	4.35E-04	2.92E-03
		18.60		10.00	8.22E-02		-9.94E-02	3.89E-02
	NB-93M	16.57		9.43	3.45E-02	3.45E-02	2.42E-03	1.62E-02
	CD-109	88.03		3.72	2.48E+02	2.48E+02	1.82E+01	1.16E+02
+	SN-113	255.12		1.93	8.92E+02	2.05E+01	-2.29E+02	4.00E+02
		391.69	*	61.90	2.05E+01		1.98E+01	9.33E+00
	SN-119M	23.87		16.10	2.49E-01	2.46E-01	7.37E-02	1.18E-01
		25.10		22.70	2.46E-01		6.38E-02	1.17E-01
+	I-125	35.49	*	6.49	1.19E+01	1.19E+01	4.28E+01	5.80E+00
	I-129	29.78		57.00	8.40E-01	8.40E-01	3.90E+00	4.13E-01
		33.60		13.20	3.60E+00		-1.53E+01	1.74E+00
		39.58		7.52	4.95E+00		-1.11E+00	2.26E+00
+	BA-133	30.80	*	97.60	4.10E-01	4.10E-01	5.25E+00	2.00E-01
		302.84	*	17.80	8.08E+01		4.40E+02	3.59E+01
		356.01	*	60.00	3.16E+01		3.10E+02	1.47E+01
	CE-139	165.85		80.35	2.33E+01	2.33E+01	-1.88E+00	1.06E+01
	CE-144	133.54		10.80	1.64E+02	1.64E+02	6.31E+01	7.56E+01
	HG-203	279.19		77.30	2.33E+01	2.33E+01	-9.79E+00	1.06E+01
	PB-210	46.50		4.25	1.94E+01	1.94E+01	5.30E+00	8.90E+00
	PA-231	9.28		42.00	2.08E-04	2.08E-04	3.03E-04	1.02E-04
		10.11		20.20	1.01E-03		3.35E-03	4.95E-04
		283.67		1.60	8.96E+02		3.69E+02	3.95E+02
		302.67		2.30	1.49E+03		3.06E+03	7.10E+02
	TH-231	25.64		14.70	4.44E-01	4.44E-01	1.24E-01	2.11E-01
		84.21		6.40	1.03E+02		-5.96E+02	4.74E+01
	PA-234M	9.89		89.00	1.90E-04	1.90E-04	6.32E-04	9.32E-05
		21.72		64.90	4.14E-02		3.78E-02	1.98E-02
		37.93		23.75	1.79E+00		-2.67E+00	8.36E-01
		131.42		20.40	8.00E+01		-1.31E+00	3.68E+01
	TH-234	63.29		3.80	1.34E+02	1.34E+02	1.73E+02	6.38E+01
	NP-237	29.37		14.00	1.56E+00	1.56E+00	-2.49E+01	7.56E-01
		86.50		12.60	7.00E+01		-8.68E+00	3.28E+01
	U-237	97.08		16.30	5.90E+01	4.44E+01	-4.44E+01	2.72E+01
		101.07		26.30	4.44E+01		-5.65E+00	2.06E+01
		114.00		12.30	1.91E+02		1.71E+02	9.13E+01
		208.01		22.00	1.10E+02		1.25E+01	5.07E+01
	AM-241	59.54		35.90	7.23E+00	7.23E+00	-2.45E+01	3.36E+00
	AM-243	74.67		66.00	5.91E+00	5.91E+00	3.01E-01	2.67E+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

0000031496.CNF



Apex-Gamma

Analysis Report for 1512122-11
MC-1

GAMMA SPECTRUM ANALYSIS

Sample Identification	: 1512122-11
Sample Description	: MC-1
Sample Type	: RA RECOVERY
Sample Size	: 1.000E+00 units
Facility	: Countroom
Sample Taken On	: 1/7/2016 11:59:14AM
Acquisition Started	: 1/7/2016 12:19:28PM
Procedure	: BAFIL
Operator	: Administrator
Detector Name	: GE3
Geometry	: BAFIL
Live Time	: 900.0 seconds
Real Time	: 904.1 seconds
Dead Time	: 0.46 %
Peak Locate Threshold	: 2.50
Peak Locate Range (in channels)	: 1 - 4096
Peak Area Range (in channels)	: 9 - 4096
Identification Energy Tolerance	: 1.000 keV
Energy Calibration Used Done On	: 10/25/2014
Efficiency Calibration Used Done On	: 11/9/2014
Efficiency Calibration Description	:
Sample Number	: 31497

PEAK ANALYSIS REPORT

Peak Analysis Performed on : 1/7/2016 12:34:34PM

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 1512122-11

MC-1

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
M	1	21.07	18 -	40	21.31	1.20E+02	34.51	1.50E+02	1.84
m	2	24.76	18 -	40	25.00	1.99E+01	23.07	1.00E+02	1.40
m	3	30.98	18 -	40	31.22	1.85E+03	88.96	1.27E+02	1.61
m	4	35.30	18 -	40	35.54	4.68E+02	50.54	1.29E+02	1.72
	5	53.13	50 -	57	53.35	5.10E+01	43.59	2.80E+02	2.39
M	6	62.07	58 -	75	62.29	2.48E+02	43.14	1.80E+02	2.08
m	7	66.19	58 -	75	66.41	1.03E+02	43.66	1.91E+02	2.18
	8	81.18	76 -	86	81.40	7.88E+02	72.49	2.81E+02	1.96
m	9	98.64	90 -	104	98.85	2.14E+01	22.27	7.88E+01	1.70
M	10	112.02	109 -	127	112.22	2.29E+02	37.04	1.05E+02	2.05
m	11	116.27	109 -	127	116.46	5.86E+01	32.06	8.62E+01	2.09
	12	142.69	139 -	147	142.87	4.95E+01	33.22	1.39E+02	2.12
	13	208.76	204 -	213	208.90	4.20E+01	32.14	1.20E+02	3.82
	14	276.80	273 -	280	276.91	5.21E+01	24.33	6.37E+01	1.24
M	15	303.14	297 -	315	303.23	1.36E+02	26.15	4.26E+01	1.60
m	16	307.53	297 -	315	307.63	2.96E+01	22.54	3.87E+01	2.16
m	17	311.28	297 -	315	311.37	1.53E+01	18.65	3.34E+01	2.16
M	18	334.04	331 -	341	334.12	5.65E+01	19.16	3.00E+01	1.78
m	19	338.30	331 -	341	338.38	1.69E+01	19.47	4.20E+01	2.19
m	20	356.45	350 -	361	356.52	4.25E+02	42.48	2.73E+01	1.75
M	21	384.27	381 -	395	384.32	1.20E+02	30.36	2.90E+01	2.35
m	22	387.39	381 -	395	387.44	1.89E+02	30.88	1.33E+01	1.80
m	23	391.64	381 -	395	391.69	5.01E+01	24.85	9.33E+00	2.39
M	24	415.13	411 -	425	415.17	3.67E+01	17.97	2.71E+01	2.41
m	25	418.91	411 -	425	418.95	2.04E+01	16.58	3.77E+01	2.06
	26	437.18	432 -	442	437.21	1.11E+02	23.81	1.67E+01	2.04
	27	467.62	464 -	471	467.63	1.07E+01	13.71	2.46E+01	1.30
	28	551.83	550 -	554	551.80	5.00E+00	4.47	0.00E+00	2.75
	29	609.78	606 -	613	609.72	1.09E+01	8.25	4.15E+00	2.65

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 : 1/7/2016 12:34:34PM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000031226.CNF

Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.

Analysis Report for 1512122-11

MC-1

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
M	1	21.07	1.20E+02	34.51			1.20E+02	3.45E+01
m	2	24.76	1.99E+01	23.07			1.99E+01	2.31E+01
m	3	30.98	1.85E+03	88.96			1.85E+03	8.90E+01
m	4	35.30	4.68E+02	50.54			4.68E+02	5.05E+01
	5	53.13	5.10E+01	43.59			5.10E+01	4.36E+01
M	6	62.07	2.48E+02	43.14			2.48E+02	4.31E+01
m	7	66.19	1.03E+02	43.66			1.03E+02	4.37E+01
	8	81.18	7.88E+02	72.49			7.88E+02	7.25E+01
m	9	98.64	2.14E+01	22.27			2.14E+01	2.23E+01
M	10	112.02	2.29E+02	37.04			2.29E+02	3.70E+01
m	11	116.27	5.86E+01	32.06			5.86E+01	3.21E+01
	12	142.69	4.95E+01	33.22			4.95E+01	3.32E+01
	13	208.76	4.20E+01	32.14			4.20E+01	3.21E+01
	14	276.80	5.21E+01	24.33			5.21E+01	2.43E+01
M	15	303.14	1.36E+02	26.15			1.36E+02	2.62E+01
m	16	307.53	2.96E+01	22.54			2.96E+01	2.25E+01
m	17	311.28	1.53E+01	18.65			1.53E+01	1.87E+01
M	18	334.04	5.65E+01	19.16			5.65E+01	1.92E+01
m	19	338.30	1.69E+01	19.47			1.69E+01	1.95E+01
m	20	356.45	4.25E+02	42.48			4.25E+02	4.25E+01
M	21	384.27	1.20E+02	30.36			1.20E+02	3.04E+01
m	22	387.39	1.89E+02	30.88			1.89E+02	3.09E+01
m	23	391.64	5.01E+01	24.85			5.01E+01	2.48E+01
M	24	415.13	3.67E+01	17.97			3.67E+01	1.80E+01
m	25	418.91	2.04E+01	16.58			2.04E+01	1.66E+01
	26	437.18	1.11E+02	23.81			1.11E+02	2.38E+01
	27	467.62	1.07E+01	13.71			1.07E+01	1.37E+01
	28	551.83	5.00E+00	4.47			5.00E+00	4.47E+00
	29	609.78	1.09E+01	8.25	2.45E+00	1.20E+00	8.47E+00	8.33E+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

Analysis Report for 1512122-11
MC-1

Nuclide Name	Id Confidence	Energy (keV)		Yield(%)	Activity (pCi/units)	Activity Uncertainty
SN-113	0.96	255.12		1.93		
		391.69	*	61.90	3.82E+01	1.92E+01
I-125	0.99	35.49	*	6.49	1.45E+01	1.57E+00
BA-133	0.98	30.80	*	97.60	1.48E+00	7.12E-02
		302.84	*	17.80	5.94E+02	2.41E+02
		356.01	*	60.00	4.13E+02	5.89E+01
TH-231	0.89	25.64	*	14.70	1.79E-02	2.07E-02
		84.21		6.40		

* = Energy line found in the spectrum.
\- = Manually added nuclide.
? = Manually edited nuclide.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 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	0.965	3.82E+01	1.92E+01	
I-125	0.994	1.45E+01	1.57E+00	
BA-133	0.985	1.48E+00	7.12E-02	
TH-231	0.896	1.79E-02	2.07E-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 1512122-11

MC-1

UNIDENTIFIED PEAKS

Peak Locate Performed on : 1/7/2016 12:34:34PM
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	21.07	1.33158E-01	14.40	Tol.	PA-234M
	5	53.13	5.66230E-02	42.77		
M	6	62.07	2.75343E-01	8.70	Sum	
m	7	66.19	1.14573E-01	21.17	Sum	
	8	81.18	8.75188E-01	4.60		
m	9	98.64	2.38183E-02	51.95		
M	10	112.02	2.53970E-01	8.10		
m	11	116.27	6.50680E-02	27.38		
	12	142.69	5.50467E-02	33.53		
	13	208.76	4.66340E-02	38.29	Tol.	U-237
	14	276.80	5.79365E-02	23.33		
m	16	307.53	3.29195E-02	38.04		
m	17	311.28	1.70152E-02	60.91		
M	18	334.04	6.27240E-02	16.97	Sum	
m	19	338.30	1.87674E-02	57.63	Sum	
M	21	384.27	1.33766E-01	12.61		
m	22	387.39	2.09871E-01	8.17	Sum	
M	24	415.13	4.07671E-02	24.48		
m	25	418.91	2.26448E-02	40.68		
	26	437.18	1.22918E-01	10.76		
	27	467.62	1.18841E-02	64.10		
	28	551.83	5.55556E-03	44.72		
	29	609.78	9.41053E-03	49.20		

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

Analysis Report for 1512122-11

MC-1

NUCLIDE MDA REPORT

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

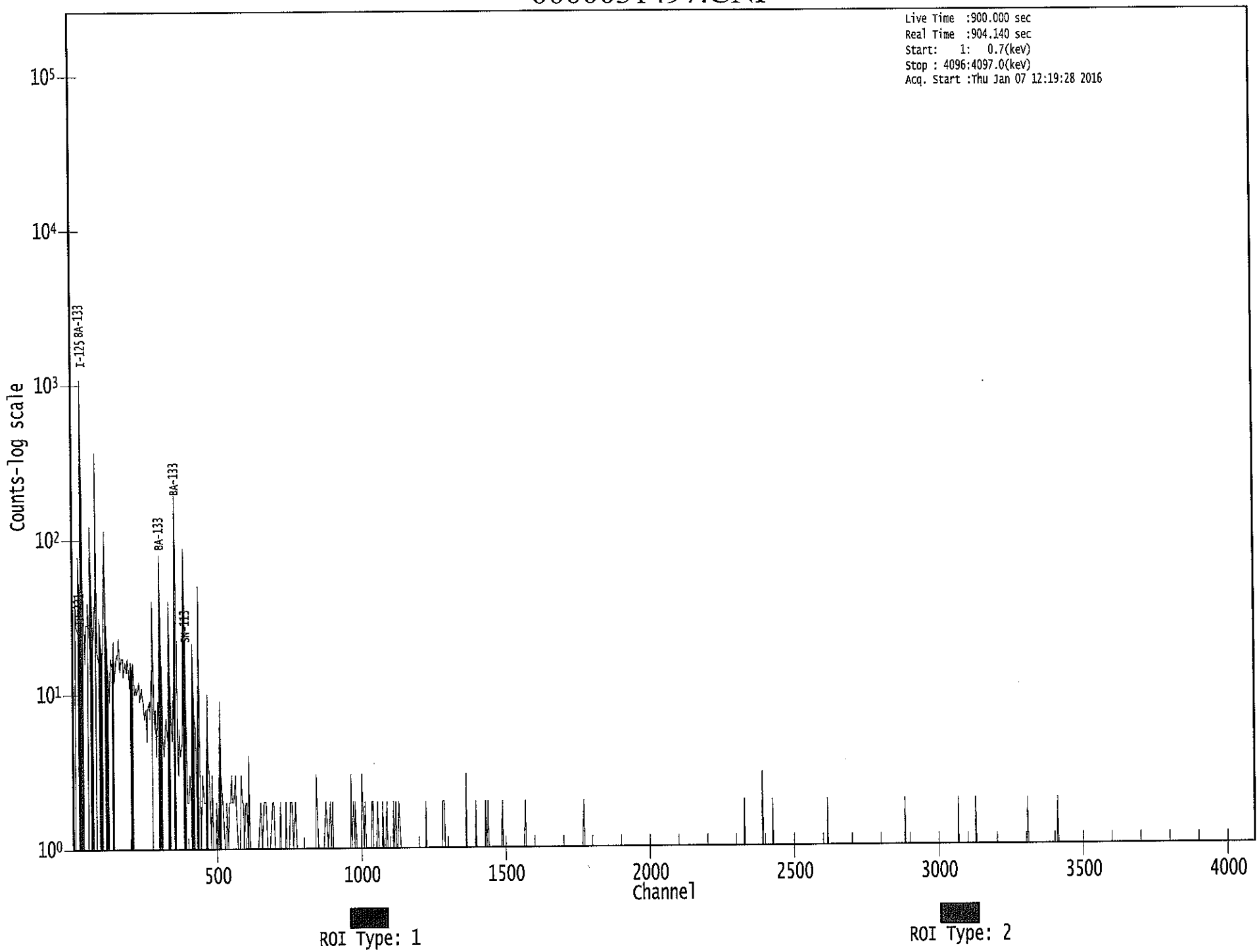
	Nuclide Name	Energy (keV)		Yield(%)	Line MDA (pCi/units)	Nuclide MDA (pCi/units)	Activity (pCi/units)	Dec. Level (pCi/units)
	FE-55	5.89		24.50	1.53E-10	1.53E-10	0.00E+00	0.00E+00
	CO-57	122.06		85.51	2.40E+01	2.40E+01	8.23E+00	1.11E+01
		136.48		10.60	2.48E+02		6.59E+00	1.15E+02
	NI-59	6.92		29.80	3.11E-09	3.11E-09	-1.23E-08	9.85E-10
	MO-93	16.59		52.90	2.62E-04	2.62E-04	3.53E-05	1.22E-04
		18.60		10.00	5.88E-03		3.03E-03	2.80E-03
	NB-93M	16.57		9.43	1.45E-03	1.45E-03	1.96E-04	6.77E-04
	CD-109	88.03		3.72	2.24E+02	2.24E+02	2.01E+01	1.03E+02
+	SN-113	255.12		1.93	1.43E+03	2.57E+01	-1.78E+02	6.51E+02
		391.69	*	61.90	2.57E+01		3.82E+01	1.18E+01
	SN-119M	23.87		16.10	3.15E-02	3.15E-02	-7.43E-02	1.49E-02
		25.10		22.70	3.40E-02		-4.18E-02	1.61E-02
+	I-125	35.49	*	6.49	4.35E+00	4.35E+00	1.45E+01	2.13E+00
	I-129	29.78		57.00	2.09E-01	2.09E-01	1.75E+00	1.03E-01
		33.60		13.20	1.67E+00		-7.87E+00	8.20E-01
		39.58		7.52	2.36E+00		3.13E-01	1.10E+00
+	BA-133	30.80	*	97.60	1.12E-01	1.12E-01	1.48E+00	5.50E-02
		302.84	*	17.80	2.93E+02		5.94E+02	1.40E+02
		356.01	*	60.00	3.66E+01		4.13E+02	1.70E+01
	CE-139	165.85		80.35	4.28E+01	4.28E+01	-1.16E+01	1.99E+01
	CE-144	133.54		10.80	2.46E+02	2.46E+02	2.20E+01	1.14E+02
	HG-203	279.19		77.30	5.04E+01	5.04E+01	-3.21E+00	2.37E+01
	PB-210	46.50		4.25	1.44E+01	1.44E+01	4.10E+00	6.82E+00
	PA-231	9.28		42.00	6.55E-07	6.55E-07	6.71E-07	3.10E-07
		10.11		20.20	3.83E-06		3.92E-06	1.81E-06
		283.67		1.60	1.49E+03		-4.08E+02	6.75E+02
		302.67		2.30	2.05E+03		2.76E+03	9.81E+02
+	TH-231	25.64	*	14.70	1.25E-01	1.25E-01	1.79E-02	6.15E-02
		84.21		6.40	3.14E+02		9.97E+02	1.53E+02
	PA-234M	9.89		89.00	6.68E-07	6.68E-07	6.84E-07	3.16E-07
		21.72		64.90	4.19E-03		4.45E-03	2.01E-03
		37.93		23.75	1.16E+00		1.73E+00	5.63E-01
		131.42		20.40	1.25E+02		1.65E+01	5.83E+01
	TH-234	63.29		3.80	1.41E+02	1.41E+02	1.34E+02	6.85E+01
	NP-237	29.37		14.00	7.63E-01	7.63E-01	6.39E+00	3.77E-01
		86.50		12.60	6.90E+01		5.58E+00	3.22E+01
	U-237	97.08		16.30	8.32E+01	6.02E+01	-2.11E+01	3.90E+01
		101.07		26.30	6.02E+01		4.19E+01	2.83E+01
		114.00		12.30	3.10E+02		6.14E+02	1.50E+02
		208.01		22.00	2.07E+02		1.64E+02	9.72E+01
	AM-241	59.54		35.90	9.13E+00	9.13E+00	-8.59E-01	4.40E+00
	AM-243	74.67		66.00	8.85E+00	8.85E+00	-3.04E+00	4.17E+00

Analysis Report for 1512122-11

MC-1

+ = 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

0000031497.CNF



JCB 1/7/16

Apex-Gamma

Analysis Report for 1512122-12
BC-1

GAMMA SPECTRUM ANALYSIS

Sample Identification	: 1512122-12
Sample Description	: BC-1
Sample Type	: RA RECOVERY
Sample Size	: 1.000E+00 units
Facility	: Countroom
Sample Taken On	: 1/7/2016 11:59:24AM
Acquisition Started	: 1/7/2016 12:19:37PM
Procedure	: BAFIL
Operator	: Administrator
Detector Name	: GE4
Geometry	: BAFIL
Live Time	: 900.0 seconds
Real Time	: 944.1 seconds
Dead Time	: 4.67 %
Peak Locate Threshold	: 2.50
Peak Locate Range (in channels)	: 1 - 4096
Peak Area Range (in channels)	: 15 - 4096
Identification Energy Tolerance	: 1.000 keV
Energy Calibration Used Done On	: 10/25/2014
Efficiency Calibration Used Done On	: 11/9/2014
Efficiency Calibration Description	:
Sample Number	: 31498

PEAK ANALYSIS REPORT

Peak Analysis Performed on : 1/7/2016 12:35:23PM

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 1512122-12

BC-1

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	31.55	24 -	37	30.80	1.80E+03	105.39	4.32E+02	2.27
2	53.43	51 -	55	52.69	1.99E+01	20.73	7.82E+01	1.98
3	62.89	56 -	68	62.15	1.58E+02	52.28	2.49E+02	7.19
4	80.94	74 -	83	80.21	5.45E+02	60.51	2.15E+02	2.27
5	112.01	103 -	118	111.29	1.44E+02	43.08	1.28E+02	3.10
6	266.74	263 -	270	266.09	1.20E+01	14.00	2.59E+01	4.86
7	276.69	271 -	282	276.05	5.75E+01	25.69	5.30E+01	2.74
8	303.25	300 -	305	302.61	9.38E+01	22.65	2.85E+01	1.63
9	356.39	350 -	361	355.78	2.31E+02	35.50	4.17E+01	2.18
10	387.11	379 -	396	386.52	1.03E+02	30.08	4.35E+01	8.68
11	406.75	401 -	410	406.16	9.68E+00	11.96	1.46E+01	1.05
12	415.59	411 -	418	415.01	1.81E+01	9.80	3.85E+00	1.51
13	422.42	419 -	424	421.83	6.00E+00	4.90	0.00E+00	1.98
14	437.18	431 -	441	436.61	2.25E+01	14.52	1.50E+01	2.23
15	511.17	506 -	515	510.63	2.40E+01	9.80	0.00E+00	3.89
16	525.33	522 -	527	524.80	5.00E+00	4.47	0.00E+00	1.16
17	671.16	667 -	675	670.70	1.22E+01	8.73	3.57E+00	1.38

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 : 1/7/2016 12:35:23PM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000031227.CNF

Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
1	31.55	1.80E+03	105.39			1.80E+03	1.05E+02
2	53.43	1.99E+01	20.73			1.99E+01	2.07E+01
3	62.89	1.58E+02	52.28	1.02E+01	1.97E+00	1.47E+02	5.23E+01
4	80.94	5.45E+02	60.51			5.45E+02	6.05E+01
5	112.01	1.44E+02	43.08			1.44E+02	4.31E+01
6	266.74	1.20E+01	14.00			1.20E+01	1.40E+01
7	276.69	5.75E+01	25.69			5.75E+01	2.57E+01
8	303.25	9.38E+01	22.65			9.38E+01	2.26E+01
9	356.39	2.31E+02	35.50			2.31E+02	3.55E+01
10	387.11	1.03E+02	30.08			1.03E+02	3.01E+01
11	406.75	9.68E+00	11.96			9.68E+00	1.20E+01
12	415.59	1.81E+01	9.80			1.81E+01	9.80E+00

Analysis Report for 1512122-12

BC-1

Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
13	422.42	6.00E+00	4.90			6.00E+00	4.90E+00
14	437.18	2.25E+01	14.52			2.25E+01	1.45E+01
15	511.17	2.40E+01	9.80	1.17E+01	1.51E+00	1.23E+01	9.91E+00
16	525.33	5.00E+00	4.47			5.00E+00	4.47E+00
17	671.16	1.22E+01	8.73			1.22E+01	8.73E+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
BA-133	0.94	30.80	*	97.60	8.49E+01	5.24E+00
		302.84	*	17.80	4.62E+02	1.81E+02
		356.01	*	60.00	3.63E+02	7.31E+01
PA-231	0.99	9.28		42.00		
		10.11		20.20		
		283.67		1.60		
		302.67	*	2.30	3.58E+03	1.40E+03
TH-234	0.97	63.29	*	3.80	6.45E+02	2.33E+02

* = Energy line found in the spectrum.
\- = Manually added nuclide.
? = Manually edited nuclide.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000sigma

Analysis Report for 1512122-12

BC-1

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/units)	Wt mean Activity Uncertainty	Comments
BA-133	0.941	8.63E+01	5.23E+00	
PA-231	0.996	2.91E+03	1.40E+03	
TH-234	0.974	6.45E+02	2.33E+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 1512122-12

BC-1

UNIDENTIFIED PEAKS

Peak Locate Performed on : 1/7/2016 12:35:23PM
Peak Locate From Channel : 1
Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
2	53.43	2.21186E-02	52.07		
4	80.94	6.05959E-01	5.55		
5	112.01	1.60102E-01	14.95		
6	266.74	1.33778E-02	58.14		
7	276.69	6.38624E-02	22.35		
10	387.11	1.14720E-01	14.57	Sum	
11	406.75	1.07516E-02	61.79		
12	415.59	2.00833E-02	27.10		
13	422.42	6.66667E-03	40.82		
14	437.18	2.50000E-02	32.26		
15	511.17	1.36159E-02	40.45		
16	525.33	5.55556E-03	44.72		
17	671.16	1.35714E-02	35.75		

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)
FE-55	5.89	24.50	5.43E-03	5.43E-03	0.00E+00	0.00E+00
CO-57	122.06	85.51	1.60E+01	1.60E+01	-1.25E+01	7.32E+00
	136.48	10.60	1.68E+02		-2.15E+01	7.78E+01

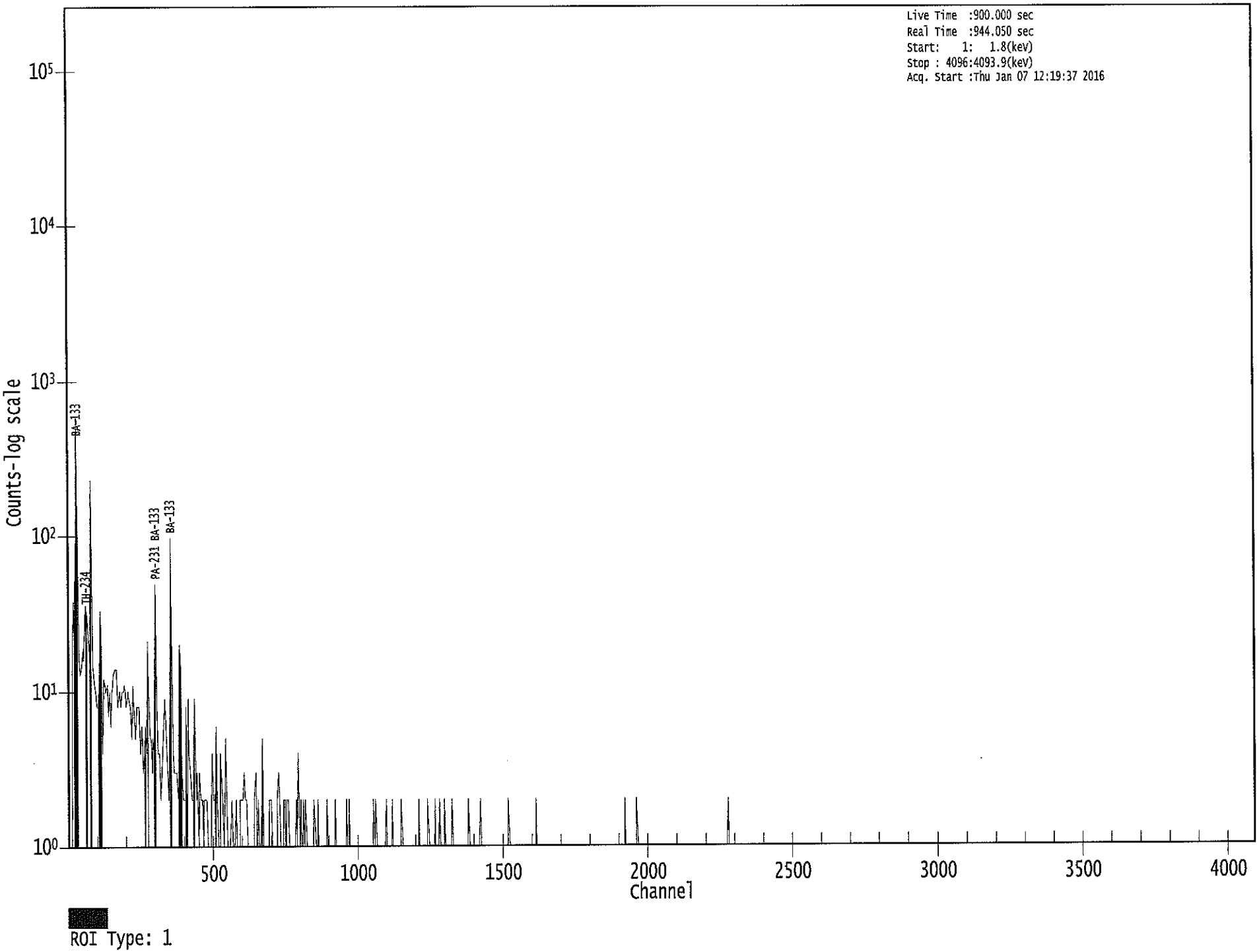
Analysis Report for 1512122-12

BC-1

	Nuclide Name	Energy (keV)		Yield(%)	Line MDA (pCi/units)	Nuclide MDA (pCi/units)	Activity (pCi/units)	Dec. Level (pCi/units)
	NI-59	6.92		29.80	7.53E-03	7.53E-03	0.00E+00	0.00E+00
	MO-93	16.59		52.90	1.08E+00	1.08E+00	1.53E+00	5.14E-01
		18.60		10.00	8.69E+00		1.33E+01	4.16E+00
	NB-93M	16.57		9.43	6.04E+00	6.04E+00	8.57E+00	2.87E+00
	CD-109	88.03		3.72	3.18E+02	3.18E+02	-1.52E+03	1.49E+02
	SN-113	255.12		1.93	1.13E+03	5.85E+01	-1.24E+02	5.08E+02
		391.69		61.90	5.85E+01		1.12E+01	2.71E+01
	SN-119M	23.87		16.10	1.16E+01	1.02E+01	1.96E+00	5.59E+00
		25.10		22.70	1.02E+01		-1.18E+00	4.95E+00
	I-125	35.49		6.49	1.32E+02	1.32E+02	-8.94E+00	6.46E+01
	I-129	29.78		57.00	1.38E+01	1.38E+01	8.48E+01	6.81E+00
		33.60		13.20	7.96E+01		6.39E+02	3.93E+01
		39.58		7.52	7.24E+01		-1.23E+02	3.49E+01
+	BA-133	30.80	*	97.60	4.97E+00	4.97E+00	8.49E+01	2.42E+00
		302.84	*	17.80	1.09E+02		4.62E+02	4.76E+01
		356.01	*	60.00	5.15E+01		3.63E+02	2.36E+01
	CE-139	165.85		80.35	3.15E+01	3.15E+01	2.23E+01	1.48E+01
	CE-144	133.54		10.80	1.73E+02	1.73E+02	3.60E+01	8.09E+01
	HG-203	279.19		77.30	4.55E+01	4.55E+01	4.05E+01	2.13E+01
	PB-210	46.50		4.25	1.09E+02	1.09E+02	-1.96E+01	5.13E+01
+	PA-231	9.28		42.00	1.32E-02	1.32E-02	0.00E+00	0.00E+00
		10.11		20.20	3.53E-02		0.00E+00	0.00E+00
		283.67		1.60	1.51E+03		4.16E+02	6.86E+02
		302.67	*	2.30	8.40E+02		3.58E+03	3.68E+02
	TH-231	25.64		14.70	2.23E+01	2.23E+01	-4.66E+00	1.09E+01
		84.21		6.40	4.75E+02		-3.35E+02	2.32E+02
	PA-234M	9.89		89.00	7.52E-03	7.52E-03	0.00E+00	0.00E+00
		21.72		64.90	2.12E+00		1.20E+00	1.02E+00
		37.93		23.75	2.80E+01		-1.70E+01	1.36E+01
		131.42		20.40	9.33E+01		4.08E+01	4.36E+01
+	TH-234	63.29	*	3.80	3.45E+02	3.45E+02	6.45E+02	1.67E+02
	NP-237	29.37		14.00	5.45E+01	5.45E+01	3.35E+02	2.69E+01
		86.50		12.60	1.19E+02		-3.73E+02	5.67E+01
	U-237	97.08		16.30	7.92E+01	4.72E+01	3.79E+01	3.70E+01
		101.07		26.30	4.72E+01		-6.48E+00	2.19E+01
		114.00		12.30	1.91E+02		3.39E+02	9.13E+01
		208.01		22.00	1.21E+02		2.26E+01	5.62E+01
	AM-241	59.54		35.90	2.81E+01	2.81E+01	6.87E+00	1.35E+01
	AM-243	74.67		66.00	1.92E+01	1.92E+01	1.42E+00	9.18E+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

0000031498.CNF



SECTION XI

ANALYTICAL DATA (TOTAL DISSOLVED SOLIDS)

Eberline Analytical
Oak Ridge Laboratory

Aliquot Worksheet

Printed: 12/30/2015 2:29 PM

Work Order	Run	Analysis Code	Rpt Units	Lab Deadline	Technician
15-12122	1	TDS	liters	1/13/2016	JPACHELLA

Lab Fraction	Michael Pisani & Associates, Inc. Client ID	Sample Type	Muffle Data	Dilution Data			Aliquot Data		MS Aliquot Data		H-3 Solids Only	
			Ratio Post/Pre	No of Dils	Dil Factor	Ratio	Aliquot	Net Equiv	Aliquot	Net Equiv	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	TBB-3S	DUP					1.0000E-01	1.0000E-01				
04	TBB-3S	DO					1.0000E-01	1.0000E-01				
05	TBB-1D	TRG					1.0000E-01	1.0000E-01				
06	TBB-1S	TRG					1.0000E-01	1.0000E-01				
07	TBA-1D	TRG					1.0000E-01	1.0000E-01				
08	TBB-3D	TRG					1.0000E-01	1.0000E-01				
09	TBB-2D	TRG					1.0000E-01	1.0000E-01				
10	TBB-2M	TRG					1.0000E-01	1.0000E-01				
11	MC-1	TRG					1.0000E-01	1.0000E-01				
12	BC-1	TRG					1.0000E-01	1.0000E-01				

Comments	

Technician: Jpachella Date: 12/30/15

TDS / TSS Worksheet

Work Order	Run	Analysis Code	Technician
15-12122	1	TDS	MHIGHTOWER

TRetec	Michael Pisani & Associates, Inc.		Filter Data			TDS/TSS	Maximum Aliq
Fraction	Client ID	Aliquot ml	Filter Tare (g)	Filter Final (g)	Filter Net (g)	(mg/L)	(mL)
04	TBB-3S	100.0000	110.0606	110.2511	0.1905	1905.0000	52.49
05	TBB-1D	100.0000	108.3069	108.5034	0.1965	1965.0000	50.89
06	TBB-1S	100.0000	108.0173	110.6995	2.6822	26822.0000	3.73
07	TBA-1D	100.0000	110.5695	110.7047	0.1352	1352.0000	73.96
08	TBB-3D	100.0000	110.7213	110.8639	0.1426	1426.0000	70.13
09	TBB-2D	100.0000	105.9668	106.1603	0.1935	1935.0000	51.68
10	TBB-2M	100.0000	101.4141	102.1963	0.7822	7822.0000	12.78
11	MC-1	100.0000	109.8128	109.9792	0.1664	1664.0000	60.10
12	BC-1	100.0000	96.8532	96.9116	0.0584	584.0000	171.23

Technician: MH Date: 12/31/15