

The order of this data package is as follows:

1. Chain-of-Custody/Lab Request
2. Copies of field COCs
3. Validation Report
4. Laboratory analysis

Comments:

American Radiation

Baton Rouge LA

Chain of Custody/Analysis Request

COC/Lab Request #:

2018-835

Page 1 of 1

Client Contact:

Lab Agreement #:

Site Name:

Los Alamos National Laboratory

Project Number: ADEP

Analysis Turnaround Time:

24 Hour -

☐

Other -

☐

7 Days -

☐

14 Days -

☐

21 Days -

☐

28 Days -

☒

WSP-LL-H-3

Rad Screening Info:

LOCATION:

NO

Lab Reporting Limit Type:

Method Detection Limit

Field Sample ID

Sample
DateSample
TimeSample
Matrix

CAMO-18-148073

Nov 8 2017

12:58

W

1

CAMO-18-148074

Nov 8 2017

12:58

W

1

CAMO-18-148111

Nov 8 2017

10:07

W

1

CAMO-18-148075

Nov 7 2017

11:33

W

1

CAMO-18-148076

Nov 7 2017

12:46

W

1

CASA-18-148007

Nov 6 2017

13:22

W

1

CASA-18-148008

Nov 6 2017

13:37

W

1

CASA-18-147999

Nov 6 2017

11:17

W

1

CAMO-18-148117

Nov 7 2017

12:21

W

1

CAMO-18-148580

Nov 7 2017

12:21

W

1

CAMO-18-148118

Nov 7 2017

10:45

W

1

Special Instructions:

Relinquished by: M-EBER

Print Name: MATT ENGLERT

Date/Time: 11-9-17 1500

Received by:

Print Name:

Date/Time:

Relinquished by:

Print Name:

Date/Time:

Received by:

Print Name:

Date/Time:

Relinquished by:

Print Name:

Date/Time:

Received by:

Print Name:

Date/Time:

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

EVENT NAME: Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1

SAMPLE ID: CASA-18-147999

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/6/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1117		MEDIA:	OK	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-36		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:	↓		SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / NO / (NA)

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	MSGP-Hg	500 ML POLY	1	HNO3	Y	NA
↓	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	2	HCL		
	WSP-8270C-SVOA	1 LITER AMBER GLASS	2	ICE		
	WSP-CN(T)	250 ML POLY	1	NAOH		
	WSP-GrossA/B	1 LITER POLY	1	HNO3		
	WSP-LL-H-3	1 LITER POLY	1	NONE		
	WSP-RAD	1 GAL POLY	1	HNO3		
↓	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4	↓	↓

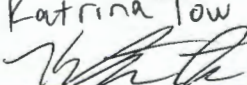
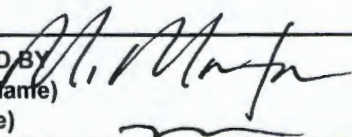
SAMPLE COMMENTS: Sampled 30 ft from running diesel generator

LOCATION COMMENTS: None

FIELD PARAMETERS:

Sample Time	1117	HH:MM	Discharge Rate	3.52	Dissolved Oxygen	5.70
Groundwater Elevation	5837.90		Oxidation-Reduction Potential	147.7	Period Purge Volume	NA
pH	7.32		Purge Volume	126.72	Specific Conductance	191.3
Temperature	20.6		Total Volume Pumped	177.84	Turbidity	0.37

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**EVENT ID:** 11552**EVENT NAME:** Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1**SAMPLE ID:** CASA-18-147999**WORK ORDER:****COLLECTED BY (PRINT):** D. Hughes

RELINQUISHED BY (Printed Name) (Signature)	Katrina Tow 	Date/Time 11/6/17 1415	RECEIVED BY (Printed Name) (Signature)	 11/6/17 1141
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

EVENT NAME: Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1

SAMPLE ID: CASA-18-148007

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/6/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1322		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-35a		FIELD PREP:	UF	
LOCATION TYPE:	OK		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / <u>NA</u>

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	MSGP-Hg	500 ML POLY	1	HNO3	Y	NA
	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	2	HCL		
	WSP-8270C-SVOA	1 LITER AMBER GLASS	2	ICE		
	WSP-CN(T)	250 ML POLY	1	NAOH		
	WSP-Gross/AB	1 LITER POLY	1	HNO3		
	WSP-LL-H-3	1 LITER POLY	1	NONE		
	WSP-RAD	1 GAL POLY	1	HNO3		
	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4		

SAMPLE COMMENTS: Sampled 30ft from running diesel generator

LOCATION COMMENTS: Windy

FIELD PARAMETERS:

Sample Time	1322	HH:MM	Discharge Rate	3.79	Dissolved Oxygen	5.00
Groundwater Elevation	5821.46	5820.61	Oxidation-Reduction Potential	286.9	Period Purge Volume	18.95
pH	8.20		Purge Volume	242.56	Specific Conductance	242.6
Temperature	23.7		Total Volume Pumped	799.69	Turbidity	0.53

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

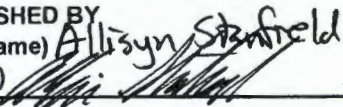
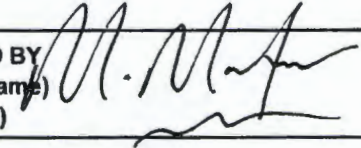

EVENT ID: 11552

EVENT NAME: Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1

SAMPLE ID: CASA-18-148007

WORK ORDER:

COLLECTED BY (PRINT): D. Jaramillo, T. Vander Vies

RELINQUISHED BY (Printed Name) Allisyn Stanfield (Signature) 	Date/Time 11/6/17 1425	RECEIVED BY (Printed Name) M. M.  (Signature) 	Date/Time 11/6/17 1425
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

EVENT NAME: Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1

SAMPLE ID: CASA-18-148008

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	11/6/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1337		MEDIA:	OK	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-35b		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / (NA)

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	MSGP-Hg	500 ML POLY	1	HNO3	Y	NA
	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	2	HCL		
	WSP-8270C-SVOA	1 LITER AMBER GLASS	2	ICE		
	WSP-CN(T)	250 ML POLY	1	NAOH		
	WSP-GrossAB	1 LITER POLY	1	HNO3		
	WSP-LL-H-3	1 LITER POLY	1	NONE		
	WSP-RAD	1 GAL POLY	1	HNO3		
	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4		

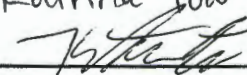
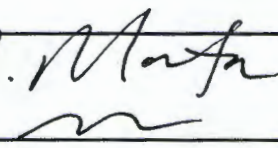
SAMPLE COMMENTS: sampled 30 ft from running diesel generator

LOCATION COMMENTS: ~~None~~ 10-15 mph winds while sampling
KT 11/6/17

FIELD PARAMETERS:

Sample Time	1337	HH:MM	Discharge Rate	3.12	Dissolved Oxygen	6.22
Groundwater Elevation	5832.19		Oxidation-Reduction Potential	129.2	Period Purge Volume	15.6
pH	7.55		Purge Volume	199.68	Specific Conductance	170.2
Temperature	21.5		Total Volume Pumped	268.32	Turbidity	0.28

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**EVENT ID:** 11552**EVENT NAME:** Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1**SAMPLE ID:** CASA-18-148008**WORK ORDER:****COLLECTED BY (PRINT):** D. Hughes

RELINQUISHED BY (Printed Name) (Signature)	Katrina Tow 	Date/Time 11/6/17 1415	RECEIVED BY (Printed Name) (Signature)	M. Manza 	Date/Time 11/6/17 1415
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

EVENT NAME: Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1

SAMPLE ID: CAMO-18-148073

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	<u>11/8/2017</u>	<u>OK</u>	FIELD MATRIX:	<u>WG</u>	<u>OK</u>
TIME COLLECTED (HH:MM):	<u>1258</u>		MEDIA:	<u>OK</u>	
PRS ID:	<u>OK</u>		SAMPLE TECH CODE:	<u>GSP</u>	
LOCATION ID:	<u>R-13</u>		FIELD PREP:	<u>UF</u>	
LOCATION TYPE:	<u>OK</u>		FIELD QC TYPE:	<u>REG</u>	
TOP DEPTH:			SAMPLE USAGE:	<u>INV</u>	
BOTTOM DEPTH:			EXCAVATED:		<u>YES / NO / NA</u>

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
<u>MA</u>	MSGP-Hg	500 ML POLY	1	HNO3	<u>Y</u>	<u>MA</u>
	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	2	HCL		
	WSP-8270C-SVOA	1 LITER AMBER GLASS	2	ICE		
	WSP-CN(T)	250 ML POLY	1	NAOH		
	WSP-GrossA/B	1 LITER POLY	1	HNO3		
	WSP-LL-H-3	1 LITER POLY	1	NONE		
	WSP-RAD	1 GAL POLY	1	HNO3		
	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4		

SAMPLE COMMENTS: Sampled SOA from running diesel generatorLOCATION COMMENTS: MA

FIELD PARAMETERS:

Sample Time	<u>1258</u>	HH:MM	Discharge Rate	<u>5.45</u>	Dissolved Oxygen	<u>6.40</u>
Groundwater Elevation	<u>5430.29</u>		Oxidation-Reduction Potential	<u>302.5</u>	Period Purge Volume	<u>MA</u>
pH	<u>8.35</u>		Purge Volume	<u>468.7</u>	Specific Conductance	<u>143.3</u>
Temperature	<u>21.4</u>		Total Volume Pumped	<u>572.25</u>	Turbidity	<u>0.14</u>

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**EVENT ID:** 11552**EVENT NAME:** Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1**SAMPLE ID:** CAMO-18-148073**WORK ORDER:**

COLLECTED BY (PRINT): T. Bonham

RELINQUISHED BY (Printed Name) <i>Tanner Bonham</i> (Signature) <i>[Signature]</i>	Date/Time <i>11/8/2017</i> <i>1355</i>	RECEIVED BY (Printed Name) <i>Sherwood</i> (Signature) <i>[Signature]</i>	Date/Time <i>11/8/17</i> <i>1355</i>
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

EVENT NAME: Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1

SAMPLE ID: CAMO-18-148074

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/8/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1007		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-15		FIELD PREP:	UF	
LOCATION TYPE:	OK		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	MSGP-Hg	500 ML POLY	1	HNO3	Y	NA
	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	2	HCL		
	WSP-8270C-SVOA	1 LITER AMBER GLASS	2	ICE		
	WSP-CN(T)	250 ML POLY	1	NAOH		
	WSP-Gross/AB	1 LITER POLY	1	HNO3		
	WSP-LL-H-3	1 LITER POLY	1	NONE		
	WSP-RAD	1 GAL POLY	1	HNO3		
	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4		

SAMPLE COMMENTS: Sampled SOA. from running diesel generator

LOCATION COMMENTS: NA

FIELD PARAMETERS:

Sample Time 1007 HH:MM

Discharge Rate 8.12

Dissolved Oxygen 6.75

Groundwater Elevation 5839.41

Oxidation-Reduction Potential 260.4

Period Purge Volume NA

pH 8.38

Purge Volume 194.88

Specific Conductance 153.9

Temperature 18.1

Total Volume Pumped 365.4

Turbidity 1.24

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

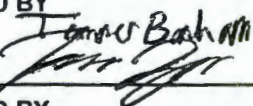
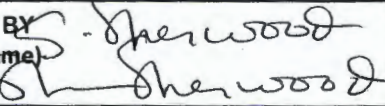
EVENT ID: 11552

EVENT NAME: Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1

SAMPLE ID: CAMO-18-148074

WORK ORDER:

COLLECTED BY (PRINT): T. Barham

RELINQUISHED BY (Printed Name) T. Barham (Signature) 	Date/Time 11/8/2017 1355	RECEIVED BY (Printed Name) S. Sherwood (Signature) 	Date/Time 11/8/17 1355
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/30/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

EVENT NAME: Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1

SAMPLE ID: CAMO-18-148075

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/7/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1133		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-33 S1		FIELD PREP:	UF	
LOCATION TYPE:	OK		FIELD QC TYPE:	REG	
TOP DEPTH:	↓		SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / NO / <u>NA</u>

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	MSGP-Hg	500 ML POLY	1	HNO3	Y	NA
↓	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	2	HCL	↓	↓
	WSP-8270C-SVOA	1 LITER AMBER GLASS	2	ICE		
	WSP-CN(T)	250 ML POLY	1	NAOH		
	WSP-GrossA/B	1 LITER POLY	1	HNO3		
	WSP-LL-H-3	1 LITER POLY	1	NONE		
	WSP-RAD	1 GAL POLY	1	HNO3		
↓	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4	↓	↓

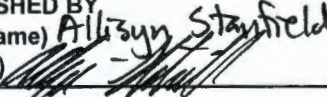
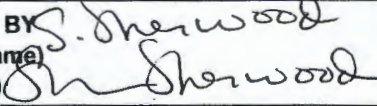
SAMPLE COMMENTS: Sampled 40 ft. from running diesel generator

LOCATION COMMENTS: Windy while sampling

FIELD PARAMETERS:

Sample Time	1133	HH:MM	Discharge Rate	3.15	Dissolved Oxygen	5.34
Groundwater Elevation	5858.56		Oxidation-Reduction Potential	242.2	Period Purge Volume	15.75
pH	7.63		Purge Volume	220.50	Specific Conductance	24142.9
Temperature	20.6		Total Volume Pumped	280.35	Turbidity	0.28

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**EVENT ID:** 11552**EVENT NAME:** Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1**SAMPLE ID:** CAMO-18-148075**WORK ORDER:****COLLECTED BY (PRINT):** T. Bonham, K. Tow

RELINQUISHED BY (Printed Name) Allisyn Stayfield (Signature) 	Date/Time 11/7/17 1335	RECEIVED BY S. Sherwood (Printed Name) (Signature) 	Date/Time 11/7/17 1335
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

EVENT NAME: Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1

SAMPLE ID: CAMO-18-148076

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/7/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1246		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-33 S2		FIELD PREP:	UF	
LOCATION TYPE:	OK		FIELD QC TYPE:	REG	
TOP DEPTH:	↓		SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / NO / <u>NA</u>

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	MSGP-Hg	500 ML POLY	1	HNO3	Y	NA
↓	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	2	HCL	↓	↓
	WSP-8270C-SVOA	1 LITER AMBER GLASS	2	ICE		
	WSP-CN(T)	250 ML POLY	1	NAOH		
	WSP-GrossA/B	1 LITER POLY	1	HNO3		
	WSP-LL-H-3	1 LITER POLY	1	NONE		
	WSP-RAD	1 GAL POLY	1	HNO3		
↓	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4	↓	↓

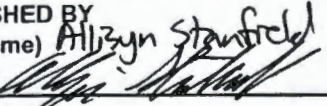
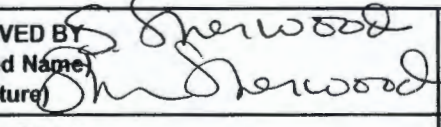
SAMPLE COMMENTS: Sampled 40ft. from running diesel generator

LOCATION COMMENTS: Breezy while sampling

FIELD PARAMETERS:

Sample Time	1246	HH:MM	Discharge Rate	2.91	Dissolved Oxygen	6.54
Groundwater Elevation	5826.52		Oxidation-Reduction Potential	245.8	Period Purge Volume	14.55
pH	7.76		Purge Volume	122.22	Specific Conductance	139.0
Temperature	20.8		Total Volume Pumped	180.42	Turbidity	0.36

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**EVENT ID:** 11552**EVENT NAME:** Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1**SAMPLE ID:** CAMO-18-148076**WORK ORDER:****COLLECTED BY (PRINT):** T. Bonham, K. Tow

RELINQUISHED BY (Printed Name) Allizyn Stanfield (Signature) 	Date/Time 11/7/17 1335	RECEIVED BY (Printed Name) S Sherwood (Signature) 	Date/Time 11/7/17 1335
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

EVENT NAME: Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1

SAMPLE ID: CAMO-18-148117

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	11-02-2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	12:21		MEDIA:	OK	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-46		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:	1		SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	MSGP-Hg	500 ML POLY	1	HNO3	Y	NA
	WSP-8082-PCB	1 LITER AMBER GLASS	3	ICE		
	WSP-8260B- VOA	40 ML SEPTUM AMBER GLASS	2	HCL		
	WSP-8270C- SVOA	1 LITER AMBER GLASS	2	ICE		
	WSP-CN(T)	250 ML POLY	1	NAOH		
	WSP-GrossA/B	1 LITER POLY	1	HNO3		
	WSP-LL-H-3	1 LITER POLY	1	NONE		
	WSP-RAD	1 GAL POLY	1	HNO3		
X	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4	X	

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

EVENT NAME: Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1

SAMPLE ID: CAMO-18-148117

WORK ORDER:

SAMPLE COMMENTS:

LOCATION COMMENTS: *Sampled \approx 50' from running diesel generator ; \approx 10 mph variable wind while sampling*
None

FIELD PARAMETERS:

Sample Time	<u>12:21</u>	HH:MM	Discharge Rate	<u>4.84</u>	Dissolved Oxygen	<u>6.72</u>
Groundwater Elevation	<u>5880.13</u>		Oxidation-Reduction Potential	<u>150.1</u>	Period Purge Volume	<u>24.20</u>
pH	<u>7.99</u>		Purge Volume	<u>154.88</u>	Specific Conductance	<u>620.1</u>
Temperature	<u>20.8</u>		Total Volume Pumped	<u>266.20</u>	Turbidity	<u>0.29</u>

COLLECTED BY (PRINT):

D. Jaramillo, T. Vander Vliet

RELINQUISHED BY (Printed Name) (Signature)	Date/Time <i>11-07-2017</i> <i>13:25</i>	RECEIVED BY (Printed Name) (Signature)	Date/Time <i>11/7/17</i> <i>13:25</i>
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

EVENT NAME: Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1

SAMPLE ID: CAMO-18-148118

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11-07-2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	10:45		MEDIA:	OK	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-60		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / (NA)

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	MSGP-Hg	500 ML POLY	1	HNO3	Y	NA
	WSP-8082-PCB	1 LITER AMBER GLASS	3	ICE		
	WSP-8260B- VOA	40 ML SEPTUM AMBER GLASS	2	HCL		
	WSP-8270C- SVOA	1 LITER AMBER GLASS	2	ICE		
	WSP-CN(T)	250 ML POLY	1	NAOH		
	WSP-GrossA/B	1 LITER POLY	1	HNO3		
	WSP-LL-H-3	1 LITER POLY	1	NONE		
	WSP-RAD	1 GAL POLY	1	HNO3		
	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4		

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

EVENT NAME: Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1

SAMPLE ID: CAMO-18-148118

WORK ORDER:

SAMPLE COMMENTS:

Sample ≈ 50 ft. from running diesel generator

LOCATION COMMENTS:

None

FIELD PARAMETERS:

Sample Time	<u>10:45</u>	HH:MM	Discharge Rate	<u>2.48</u>	Dissolved Oxygen	<u>5.97</u>
Groundwater Elevation	<u>5897.83</u>		Oxidation-Reduction Potential	<u>96.6</u>	Period Purge Volume	<u>12.40</u>
pH	<u>8.17</u>		Purge Volume	<u>121.12</u>	Specific Conductance	<u>124.4</u>
Temperature	<u>23.1</u>		Total Volume Pumped	<u>191.66</u>	Turbidity	<u>0.99</u>

COLLECTED BY (PRINT):

D. Saramillo T. Vander Vliet

RELINQUISHED BY (Printed Name) Darren Hughes (Signature) <i>[Signature]</i>	Date/Time 11-07-2017 13:25	RECEIVED BY (Printed Name) S. Sherwood (Signature) <i>[Signature]</i>	Date/Time 11/7/17 1325
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

EVENT NAME: Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1

SAMPLE ID: CAMO-18-148111

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/8/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1007		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-15		FIELD PREP:	UF	
LOCATION TYPE:	OK		FIELD QC TYPE:	FD	
TOP DEPTH:			SAMPLE USAGE:	QC	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	MSGP-Hg	500 ML POLY	1	HNO3	Y	NA
	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	2	HCL		
	WSP-8270C-SVOA	1 LITER AMBER GLASS	2	ICE		
	WSP-CN(T)	250 ML POLY	1	NAOH		
	WSP-GrossA/B	1 LITER POLY	1	HNO3		
	WSP-LL-H-3	1 LITER POLY	1	NONE		
	WSP-RAD	1 GAL POLY	1	HNO3		
	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4		

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

Sample Time	_____	HH:MM	Discharge Rate	11/8/2017	Dissolved Oxygen	_____
Groundwater Elevation	_____		Oxidation-Reduction Potential	_____	Period Purge Volume	_____
pH	_____		Purge Volume	_____	Specific Conductance	_____
Temperature	_____		Total Volume Pumped	_____	Turbidity	_____

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**EVENT ID:** 11552**EVENT NAME:** Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1**SAMPLE ID:** CAMO-18-148111**WORK ORDER:**

COLLECTED BY (PRINT): T. Banham

RELINQUISHED BY (Printed Name) <i>Tanner Banham</i> (Signature) <i>[Signature]</i>	Date/Time <i>11/8/2017</i> <i>1355</i>	RECEIVED BY <i>S. Sherwood</i> (Printed Name) <i>[Signature]</i> (Signature) <i>Sherwood</i>	Date/Time <i>11/8/17</i> <i>1355</i>
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/30/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

EVENT NAME: Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1

SAMPLE ID: CAMO-18-148580

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	11-07-2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	12:21		MEDIA:	OK	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-46		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	FD	
TOP DEPTH:	↓		SAMPLE USAGE:	QC	✓
BOTTOM DEPTH:	↓	✓	EXCAVATED:		YES / NO / (NA)

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	MSGP-Hg	500 ML POLY	1	HNO3	Y	NA
	WSP-8082-PCB	1 LITER AMBER GLASS	3	ICE		
	WSP-8260B- VOA	40 ML SEPTUM AMBER GLASS	2	HCL		
	WSP-8270C- SVOA	1 LITER AMBER GLASS	2	ICE		
	WSP-CN(T)	250 ML POLY	1	NAOH		
	WSP-GrossA/B	1 LITER POLY	1	HNO3		
	WSP-LL-H-3	1 LITER POLY	1	NONE		
	WSP-RAD	1 GAL POLY	1	HNO3		
✓	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4	↓	✓

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

EVENT NAME: Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1

SAMPLE ID: CAMO-18-148580

WORK ORDER:

SAMPLE COMMENTS:

Sampled ~50' from running diesel generator; ~10 mph variable wind while sampling

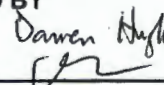
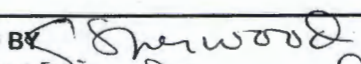
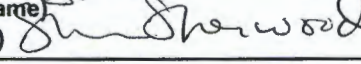
LOCATION COMMENTS:

None

FIELD PARAMETERS:

Sample Time	12:21	HH:MM	Discharge Rate	4.84	Dissolved Oxygen	6.72
Groundwater Elevation	5880.13		Oxidation-Reduction Potential	150.1	Period Purge Volume	120.1 DTH 24.20 11-07-17
pH	7.99		Purge Volume	154.88	Specific Conductance	24.20 DTH 120.1 11-07-17
Temperature	20.8		Total Volume Pumped	266.20	Turbidity	0.29

COLLECTED BY (PRINT): D. Jaramillo, T. VanderViz

RELINQUISHED BY (Printed Name) Darren Hughes (Signature) 	Date/Time 11-07-2017 13:25	RECEIVED BY  (Printed Name) Sherwood (Signature) 	Date/Time 11/7/17 13:25
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Samples collected from a WFO area?	YES	NO
COC: 2018-835 Field Test for Explosives Results	YES	NO
Spot test shows presence of explosives residues. If YES - Do not ship.		NA

TEST - Chemical Preservation	YES	NO
Samples are chemically preserved?		
Field Team Member Statement	YES	NO
Chemical preservation exceeds limits given 40 CFR 136, Table II - Required Containers, Preservation Techniques and Holding Times (footnote 3). If YES - Do not ship.		NA

TEST - Field Screen			YES	NO
The sample has field screening measurements of alpha activity and beta activity?				
Sample Activity (dpm/100cm ²)	Shipment Activity (dpm/g/100cm ²)	Sampled Location	YES	NO
Alpha detectable	Alpha >160,000	TA-1 and adjacent hillsides, TA-21, Acid Canyon, MDA Cat TA-50, Area G at TA-54, TA-48, or TA-49		
Alpha > 125	Alpha >1,250,000	other locations		
Beta > 1,500	Beta >15,000,000	any location		
The sample Alpha >16,000,000 dpm/g/100cm ² or Beta > 160,000,000 dpm/g/100cm ² . If YES - Do not ship.				
On the external surface of the sample container, alpha activity ≥ 24 dpm/cm ² , beta activity ≥ 240 dpm/cm ² , or surface activity ≥ 0.5 mR/hr. If YES - Do not ship.				
The sample is tentatively identified as DOT Hazard Class 7 (Radioactive). The shipment is labeled Radioactive Material, Excepted Package - Limited Quantity of Material - UN2910, based on field screening measurements of alpha and beta activity.				

TEST - Location		YES	NO
Prior analytical measurements of radioactive isotopes are available?			
Sample Activity (pCi/g)	Shipment Activity (pCi)	YES	NO
<ul style="list-style-type: none"> Am-241 > 27 Cs-137 > 270 Pu-238 > 27 Pu-239/240 > 27 Th-228 > 27 U-234 > 270 U-238 > 270 H-3 > 27,000,000 	<ul style="list-style-type: none"> Am-241 > 270,000 Cs-137 > 270,000 Pu-238 > 270,000 Pu-239/240 > 270,000 Th-228 > 270,000 U-234 > 1,600,000,000 U-238 > unlimited H-3 > 27,000,000,000 		
Am-241, Pu-238, Pu-239/240, or Th-228 > 27,000,000 pCi; or Cs-137 > 270,000,000 pCi or U-234 ≥ 160,000,000 pCi; or H-3 ≥ 1 Ci. If YES - Do not ship.			
The sample is tentatively identified as DOT Hazard Class 7 (Radioactive). The shipment is labeled Radioactive Material, Excepted Package - Limited Quantity of Material - UN2910, based on prior analytical measurements of radioactive isotopes.			

TEST - AK	YES	NO	NA
The shippers documented knowledge of the sample positively identifies appropriate labeling.			
The sample is tentatively identified as DOT Hazard Class 7 (Radioactive). The shipment is labeled Radioactive Material, Excepted Package - Limited Quantity of Material - UN2910, and the sample is submitted to ARS or RP for hazard classification analysis.			

HOLD SAMPLES FOR ANALYSIS
The samples are held per ER-SOP-10094, Rev. 1, 5.2.2 [7]

These samples do not meet the criteria for classification in any hazard class according to regulation OSHA 29 CFR 1910.1200. The sample(s) contained in this shipment have been assigned a tentative proper DOT shipping name, hazard class, identification number, and packing group, based on the shipper's knowledge of the sample:

Hazard Assessment Completed By:	Date/Time
(Printed Name) Matt Englert	11-9-17
(Signature) [Signature]	1500

Hazard Assessment Reviewed By:	Date/Time
(Printed Name) Renee Onstott	11/9/17
(Signature) [Signature]	1500

DATA VALIDATION REPORT

Chain Of Custody No. 2018-835

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
ARS1-17-03309	Generic:Low_Level_Tritium	3				
ARS1-17-03309	Generic:Low_Level_Tritium	4	1			
ARS1-17-03309	Generic:Low_Level_Tritium	2	1			

SDG	Analytical Method	Analysis Lot ID	Prep Lot ID	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks	Method Blanks	Matrix Spikes	Matrix Spike Dups	Analytical Spikes	Post-Digestion Spikes	Lab Control Samples	Lab Control Sample Dups	Blank Spike	Blank Spike Dups	Lab Duplicates	Storage Blanks	Preparation Blanks	Reagent Blanks
ARS1-17-03309	Generic:Low_Level_Tritium	ARS1-B17-	ARS1-B17-	9	2				1					1	1						

2. Distribution Of Analytes In EDD.

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
Generic:Low_Level_Tritium	RAD	CAMO-18-148073	ARS1-B17-02610-04	REG	1	0	0	0
Generic:Low_Level_Tritium	RAD	CAMO-18-148074	ARS1-B17-02610-05	REG	1	0	0	0
Generic:Low_Level_Tritium	RAD	CAMO-18-148075	ARS1-B17-02610-07	REG	1	0	0	0
Generic:Low_Level_Tritium	RAD	CAMO-18-148076	ARS1-B17-02610-08	REG	1	0	0	0
Generic:Low_Level_Tritium	RAD	CAMO-18-148111	ARS1-B17-02610-06	FD	1	0	0	0
Generic:Low_Level_Tritium	RAD	CAMO-18-148117	ARS1-B17-02610-12	REG	1	0	0	0
Generic:Low_Level_Tritium	RAD	CAMO-18-148118	ARS1-B17-02610-14	REG	1	0	0	0
Generic:Low_Level_Tritium	RAD	CAMO-18-148580	ARS1-B17-02610-13	FD	1	0	0	0
Generic:Low_Level_Tritium	RAD	CASA-18-147999	ARS1-B17-02610-11	REG	1	0	0	0
Generic:Low_Level_Tritium	RAD	CASA-18-148007	ARS1-B17-02610-09	REG	1	0	0	0
Generic:Low_Level_Tritium	RAD	CASA-18-148008	ARS1-B17-02610-10	REG	1	0	0	0
Generic:Low_Level_Tritium	RAD	LCS	ARS1-B17-02610-01	LCS	0	0	1	0
Generic:Low_Level_Tritium	RAD	LCSD	ARS1-B17-02610-02	LCSD	0	0	1	0
Generic:Low_Level_Tritium	RAD	MB	ARS1-B17-02610-03	MB	1	0	0	0

3. Are any analytes missing?

No.

DATA VALIDATION REPORT

4. Were any holding times exceeded?

No.

5. Any contaminants in blanks?

No.

6. Any surrogate recoveries outside the control limits?

No.

7. Any MS/MSD recoveries or RPDs outside the control limits?

No.

8. Any LCS/LCSD or BS/BSD recoveries or RPDs outside the control limits?

LCS Lab Sample	LCSD Lab	Analytical Method	Parameter Name	Lab Lot ID	Analysis	Sample Matrix	LCS Spike Recovery	LCSD Spike Recovery	Upper Limit	Lower Limit	Upper Rejection Limit	Lower Rejection Limit	RPD	RPD Limit
ARS1-B17-02610-01	ARS1-B17-02610-02	Generic:Low_Level_Tritium	Tritium	ARS1-B17-02610	01-11-2018	W	35.268	29.673	120.00	80.000		10	17.231	

9. Any Field Duplicate RPDs outside the desired limits?

No.

10. Any Lab Duplicate RPDs outside the desired limits?

No.

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

13. Display Flagged Data.

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Paramter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detect Flag	Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent	Analysis Lot ID	Validation Status Code	Use Flag
R-13	2018-835	CAMO-18-148073	REG	INIT	RAD	Generic:Low_Lev el_Tritiu	Tritium	U	U	R5	N	1.159	pCi/L	1.159	pCi/L	2.145	0.677	W	11/08/2017		ARS1-B17-02610	VAL	Y
R-15	2018-835	CAMO-18-148074	REG	INIT	RAD	Generic:Low_Lev el_Tritiu	Tritium		J-	R12a	Y	37.061	pCi/L	37.061	pCi/L	2.449	5.698	W	11/08/2017		ARS1-B17-02610	VAL	Y
R-33 S1	2018-835	CAMO-18-148075	REG	INIT	RAD	Generic:Low_Lev el_Tritiu	Tritium	U	U	R5	N	-0.093	pCi/L	-0.093	pCi/L	2.722	0.800	W	11/07/2017		ARS1-B17-02610	VAL	Y
R-33 S2	2018-835	CAMO-18-148076	REG	INIT	RAD	Generic:Low_Lev el_Tritiu	Tritium	U	U	R5	N	-0.308	pCi/L	-0.308	pCi/L	2.627	0.769	W	11/07/2017		ARS1-B17-02610	VAL	Y
R-15	2018-835	CAMO-18-148111	FD	INIT	RAD	Generic:Low_Lev el_Tritiu	Tritium		J-	R12a	Y	36.647	pCi/L	36.647	pCi/L	2.259	5.622	W	11/08/2017		ARS1-B17-02610	VAL	Y
R-46	2018-835	CAMO-18-148117	REG	INIT	RAD	Generic:Low_Lev el_Tritiu	Tritium	U	U	R5	N	-0.587	pCi/L	-0.587	pCi/L	2.678	0.782	W	11/07/2017		ARS1-B17-02610	VAL	Y
R-60	2018-835	CAMO-18-148118	REG	INIT	RAD	Generic:Low_Lev el_Tritiu	Tritium	U	U	R5	N	-1.069	pCi/L	-1.069	pCi/L	2.379	0.698	W	11/07/2017		ARS1-B17-02610	VAL	Y
R-46	2018-835	CAMO-18-148580	FD	INIT	RAD	Generic:Low_Lev el_Tritiu	Tritium	U	U	R5	N	-0.415	pCi/L	-0.415	pCi/L	2.337	0.683	W	11/07/2017		ARS1-B17-02610	VAL	Y
R-36	2018-835	CASA-18-147999	REG	INIT	RAD	Generic:Low_Lev el_Tritiu	Tritium		J-	R12a	Y	10.528	pCi/L	10.528	pCi/L	2.259	1.791	W	11/06/2017		ARS1-B17-02610	VAL	Y
R-35a	2018-835	CASA-18-148007	REG	INIT	RAD	Generic:Low_Lev el_Tritiu	Tritium	U	U	R5	N	-0.286	pCi/L	-0.286	pCi/L	2.294	0.672	W	11/06/2017		ARS1-B17-02610	VAL	Y
R-35b	2018-835	CASA-18-148008	REG	INIT	RAD	Generic:Low_Lev el_Tritiu	Tritium	U	U	R5	N	-1.574	pCi/L	-1.574	pCi/L	2.671	0.792	W	11/06/2017		ARS1-B17-02610	VAL	Y

Reason Code

Description

R12a

The LCS percent recovery was <the LAL but >10%. Follow the external laboratory limits located within the associated data package.

R5

Analyte is not detected because the amount reported is less than the MDC.

14. Usable Result Count.

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAMO-18-148073	R-13	REG	Generic:Low_Level_Tritium	0	1
CAMO-18-148074	R-15	REG	Generic:Low_Level_Tritium	0	1

DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAMO-18-148075	R-33 S1	REG	Generic:Low_Level_Tritium	0	1
CAMO-18-148076	R-33 S2	REG	Generic:Low_Level_Tritium	0	1
CAMO-18-148111	R-15	FD	Generic:Low_Level_Tritium	0	1
CAMO-18-148117	R-46	REG	Generic:Low_Level_Tritium	0	1
CAMO-18-148118	R-60	REG	Generic:Low_Level_Tritium	0	1
CAMO-18-148580	R-46	FD	Generic:Low_Level_Tritium	0	1
CASA-18-147999	R-36	REG	Generic:Low_Level_Tritium	0	1
CASA-18-148007	R-35a	REG	Generic:Low_Level_Tritium	0	1
CASA-18-148008	R-35b	REG	Generic:Low_Level_Tritium	0	1



ARS International, LLC

Laboratory Analysis Report

ARS1-17-03309

Prepared for:

Los Alamos National Laboratory

**Nita Patel
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Los Alamos, NM 87545**

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**Phone: 505-665-9273
Fax: 505-665-9972**


Project Manager Review

Notes: ARS International, LLC assumes no liability for the use or the interpretation of any analytical results provided other than the cost of the analysis itself. Reproduction of this report in less than full requires the written consent of the client.

Contact Person: Questions regarding this analytical report should be addressed to:

**Project Manager
ProjectManagers@amrad.com**

**Phone: 225.381.2991
Fax: 225.381.2996**



2609 North River Road • Port Allen, Louisiana 70767
1 (800) 401-4277 • FAX (225) 381-2996

ARS Sample Delivery Group: ARS1-17-03309

Client Sample ID: CAMO-18-148073

Sample Collection Date: 11/08/17

Sample Matrix: Aqueous

Percent Solids: N/A

Request or PO Number: 2018-835

ARS Sample ID: ARS1-17-03309-001

Date Received: 11/13/17

Report Date: 01/16/18

Radiochemistry

Analysis Description	Analysis Results	CSU +/-1s	MDC	DLC	CRDL	Qual	Analysis Units	Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Enriched H-3	1.159	0.677	2.145	1.039	3.221	U	pCi/L	ARS-040/	01/11/18 23:23	MMORGAN	N/A

Notes: American Radiation Services, Inc. assumes no liability for the use or interpretation of any analytical results provided other than the cost of the analysis itself. Reproduction of this report in less than full requires the written consent of the client.

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ARS Sample Delivery Group: ARS1-17-03309

Client Sample ID: CAMO-18-148074

Sample Collection Date: 11/08/17

Sample Matrix: Aqueous

Percent Solids: N/A

Request or PO Number: 2018-835

ARS Sample ID: ARS1-17-03309-002

Date Received: 11/13/17

Report Date: 01/16/18

Radiochemistry

Analysis Description	Analysis Results	CSU +/-1s	MDC	DLC	CRDL	Qual	Analysis Units	Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Enriched H-3	37.061	5.698	2.449	1.187	3.221		pCi/L	ARS-040/	01/12/18 5:05	MMORGAN	N/A

Notes: American Radiation Services, Inc. assumes no liability for the use or interpretation of any analytical results provided other than the cost of the analysis itself. Reproduction of this report in less than full requires the written consent of the client.

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ARS Sample Delivery Group: ARS1-17-03309

Client Sample ID: CAMO-18-148111

Sample Collection Date: 11/08/17

Sample Matrix: Aqueous

Percent Solids: N/A

Request or PO Number: 2018-835

ARS Sample ID: ARS1-17-03309-003

Date Received: 11/13/17

Report Date: 01/16/18

Radiochemistry

Analysis Description	Analysis Results	CSU +/-1s	MDC	DLC	CRDL	Qual	Analysis Units	Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Enriched H-3	36.647	5.622	2.259	1.095	3.221		pCi/L	ARS-040/	01/12/18 10:47	MMORGAN	N/A

Notes: American Radiation Services, Inc. assumes no liability for the use or interpretation of any analytical results provided other than the cost of the analysis itself. Reproduction of this report in less than full requires the written consent of the client.

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1 (800) 401-4277 • FAX (225) 381-2996

ARS Sample Delivery Group: ARS1-17-03309

Client Sample ID: CAMO-18-148075

Sample Collection Date: 11/07/17

Sample Matrix: Aqueous

Percent Solids: N/A

Request or PO Number: 2018-835

ARS Sample ID: ARS1-17-03309-004

Date Received: 11/13/17

Report Date: 01/16/18

Radiochemistry

Analysis Description	Analysis Results	CSU +/-1s	MDC	DLC	CRDL	Qual	Analysis Units	Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Enriched H-3	-0.093	0.800	2.722	1.319	3.221	U	pCi/L	ARS-040/	01/12/18 16:29	MMORGAN	N/A

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ARS Sample Delivery Group: ARS1-17-03309

Client Sample ID: CAMO-18-148076

Sample Collection Date: 11/07/17

Sample Matrix: Aqueous

Percent Solids: N/A

Request or PO Number: 2018-835

ARS Sample ID: ARS1-17-03309-005

Date Received: 11/13/17

Report Date: 01/16/18

Radiochemistry

Analysis Description	Analysis Results	CSU +/-1s	MDC	DLC	CRDL	Qual	Analysis Units	Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Enriched H-3	-0.308	0.769	2.627	1.273	3.221	U	pCi/L	ARS-040/	01/12/18 22:11	MMORGAN	N/A

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ARS Sample Delivery Group: ARS1-17-03309

Client Sample ID: CASA-18-148007

Sample Collection Date: 11/06/17

Sample Matrix: Aqueous

Percent Solids: N/A

Request or PO Number: 2018-835

ARS Sample ID: ARS1-17-03309-006

Date Received: 11/13/17

Report Date: 01/16/18

Radiochemistry

Analysis Description	Analysis Results	CSU +/-1s	MDC	DLC	CRDL	Qual	Analysis Units	Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Enriched H-3	-0.286	0.672	2.294	1.112	3.221	U	pCi/L	ARS-040/	01/13/18 3:52	MMORGAN	N/A

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ARS Sample Delivery Group: ARS1-17-03309

Client Sample ID: CASA-18-148008

Sample Collection Date: 11/06/17

Sample Matrix: Aqueous

Percent Solids: N/A

Request or PO Number: 2018-835

ARS Sample ID: ARS1-17-03309-007

Date Received: 11/13/17

Report Date: 01/16/18

Radiochemistry

Analysis Description	Analysis Results	CSU +/-1s	MDC	DLC	CRDL	Qual	Analysis Units	Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Enriched H-3	-1.574	0.792	2.671	1.294	3.221	U	pCi/L	ARS-040/	01/13/18 9:34	MMORGAN	N/A

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ARS Sample Delivery Group: ARS1-17-03309

Client Sample ID: CASA-18-147999

Sample Collection Date: 11/06/17

Sample Matrix: Aqueous

Percent Solids: N/A

Request or PO Number: 2018-835

ARS Sample ID: ARS1-17-03309-008

Date Received: 11/13/17

Report Date: 01/16/18

Radiochemistry

Analysis Description	Analysis Results	CSU +/-1s	MDC	DLC	CRDL	Qual	Analysis Units	Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Enriched H-3	10.528	1.791	2.259	1.094	3.221		pCi/L	ARS-040/	01/13/18 15:16	MMORGAN	N/A

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ARS Sample Delivery Group: ARS1-17-03309

Client Sample ID: CAMO-18-148117

Sample Collection Date: 11/07/17

Sample Matrix: Aqueous

Percent Solids: N/A

Request or PO Number: 2018-835

ARS Sample ID: ARS1-17-03309-009

Date Received: 11/13/17

Report Date: 01/16/18

Radiochemistry

Analysis Description	Analysis Results	CSU +/-1s	MDC	DLC	CRDL	Qual	Analysis Units	Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Enriched H-3	-0.587	0.782	2.678	1.298	3.221	U	pCi/L	ARS-040/	01/13/18 20:59	MMORGAN	N/A

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ARS Sample Delivery Group: ARS1-17-03309

Client Sample ID: CAMO-18-148580

Sample Collection Date: 11/07/17

Sample Matrix: Aqueous

Percent Solids: N/A

Request or PO Number: 2018-835

ARS Sample ID: ARS1-17-03309-010

Date Received: 11/13/17

Report Date: 01/16/18

Radiochemistry

Analysis Description	Analysis Results	CSU +/-1s	MDC	DLC	CRDL	Qual	Analysis Units	Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Enriched H-3	-0.415	0.683	2.337	1.132	3.221	U	pCi/L	ARS-040/	01/14/18 2:41	MMORGAN	N/A

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ARS Sample Delivery Group: ARS1-17-03309

Client Sample ID: CAMO-18-148118

Sample Collection Date: 11/07/17

Sample Matrix: Aqueous

Percent Solids: N/A

Request or PO Number: 2018-835

ARS Sample ID: ARS1-17-03309-011

Date Received: 11/13/17

Report Date: 01/16/18

Radiochemistry

Analysis Description	Analysis Results	CSU +/-1s	MDC	DLC	CRDL	Qual	Analysis Units	Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Enriched H-3	-1.069	0.698	2.379	1.153	3.221	U	pCi/L	ARS-040/	01/14/18 8:23	MMORGAN	N/A

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QC Results per Analytical Batch

Analytical Batch	ARS1-B17-02610
SDG	ARS1-17-03309
Analysis	Low Level Tritium by Electrolytic Enrichment
Analysis Test Method	ARS-040/
Analysis Code	LSC-LLH3-AQ
Report Units	pCi/L

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	Recovery (%):	> 80	< 120
Matrix Spike	Recovery (%):	> 60	< 140
Duplicate	Replicate Error Ratio (RER):	< 1	
	Duplicate Error Ratio (DER):	< 3	
	Relative Percent Difference (RPD %):	≤ 25	

Laboratory Control Sample			Analysis Date	01/11/18 06:17	Analysis Technician	MMORGAN	
Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (1s)	Expected Value	LCS Rec (%)	MDC
ARS1-B17-02610-01	LCS	ENRICHED H-3	35.268	5.431	33.134	106.4	2.449

Duplicate RER/DER/RPD			Analysis Date	01/11/18 11:59	Analysis Technician	MMORGAN	
Analyte	Results LCS	CSU LCS (1s)	Results LCSD	CSU LCSD (1s)	RER	DER	RPD
ENRICHED H-3	35.268	5.431	29.673	4.578	0.559	0.788	17.2

Method Blank			Analysis Date	01/11/18 17:41	Analysis Technician	MMORGAN	
Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (1s)	MDC	Qual	
ARS1-B17-02610-03	MBL	ENRICHED H-3	-0.063	0.697	2.371	U	

Notes: American Radiation Services, Inc. assumes no liability for the use or interpretation of any analytical results provided other than the cost of the analysis itself. Reproduction of this report in less than full requires the written consent of the client.

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Notes (Case Narrative):

General Comments:

- 1.0) Soil and Sludge analysis are reported on a wet basis or an as received basis unless otherwise indicated.
- 2.0) Modified analysis procedures are procedures that are modified to meet the certain specifications. An example may be the use of a water method to analyze a solid matrix due to the lack of an officially recognized procedure for the analysis of the solid matrix. Modified analyses are indicated by the subsequent addition of "m" to the procedure number (i.e. 900.0M).

Radiochemistry Comments:

- 1.0) All MDA/MDC values are calculated on a sample specific basis.
- 2.0) Data in this report are within the limits of uncertainty specified in the reference method unless otherwise specified.
- 3.0) Total activity is actually total gamma activity and is determined utilizing the prominent gamma emitters from the naturally occurring radioactive decay chains and other prominent radioactive nuclides. Total activity may be lower than the actual total activity due to the extent of secular equilibrium achieved in the various decay chains at the time of analysis. The total activity is not representative of nuclides that emit solely alpha or beta particles.
- 4.0) Ra-228 is determined via secular equilibrium with its daughter, Actinium 228 (Gamma Spectroscopy only).
- 5.0) U-238 is determined via secular equilibrium with its daughter, Thorium 234 (Gamma Spectroscopy only).
- 6.0) All gamma spectroscopy was performed utilizing high purity germanium detectors (HPGe).
- 7.0) ARS makes every attempt to match sample density to calibrated density; however, in some cases, it is not practical or possible to do so and data results may be affected (Gamma Spectroscopy only).
- 8.0) Gamma spectroscopy results are calculated values based on the ORTEC[®] GammaVision ENV32 Analysis Engine.
- 9.0) ACLASS DOD and ISO 17025 certification applies only to the following analytes and methods: Gross Alpha and Gross Beta (EPA 900, SM7110B&C, SW846 9310); Radium 226 (EPA 903, EPA 903.1, SM 7500 Ra-B, SW846 9315); Radium 228 (EPA 904, SM 7500 Ra-B SW846 9320); Iodine-131 (EPA 901.1); Uranium by ICPMS (EPA 200.8); Strontium 89/90 (EPA 905, Eichrom SRW01, HASL 300 Sr-03-RC); Tritium (EPA 906, EPA 906M); Gamma Emitters (EPA 901.1, SM7120B, HASL 300 Ga-01-R); Americium-241, Curium 242/244, Plutonium 239/240 and 241, Thorium 228/230/232, Uranium 234/233 and 238 (Eichrom ACW03 VBS); Lead 210 (HASL 300 Pb-01-RC, Eichrom OTW01); Polonium 210 (HASL 300 Po-01-RC, HASL 300 Po-02-RC); Technetium-99 (Eichrom TCW02, Eichrom TCS01M).

Definitions:

CRDL	Contract Required Detection Limit
CSU	Combined Standard Uncertainty
DLC	Decision Level Concentration (ANSI N42.23) or critical level
DO	Duplicate Original
DUP	Method Duplicate
LCS/LCSD	Laboratory Control Sample/Laboratory Control Sample Duplicate
MDA	Minimum Detectable Activity
MDC	(Minimum Detectable Concentration) minimum concentration of the analyte that ARS can detect utilizing the specific analysis
MBL	Method Blank
MS/MSD	Matrix Spike/Matrix Spike Duplicate
N/A	Not Applicable
NP	Not Provided
NR	Not Referenced
LOD	Limit of Detection
LOQ	Limit of Quantitation
MCL	Maximum Contaminant Level

Data Qualifiers:

B	The analyte is found in both the associated method blank and the sample. This flag indicates probable blank contamination.
D	Sample analysis accomplished through dilution.
J	The reported result is an estimated value above the limit of detection but outside of quantitation range (e.g., matrix interference was observed).
Q	One or more quality control criteria failed (e.g., LCS recovery, surrogate spike recovery, or CCV recovery).
U	Activity is below the MDC, MDA, MDL, or LOD
N	The analyte is a tentatively identified compound using mass spectrometry or any non-customer requested compounds that are tentatively identified.
*	LCS/LCSD or MS/MSD fails RPD criteria.
S	Spike
SC	Subcontracted out to another qualified laboratory
H	Holding time exceeded
E	Exceeds MCL
**	Reporting Limit is higher than MCL; Target cannot be detected

COC/Lab Request #:
2018-835
Page 1 of 1

Special Instructions:

15 of 15