

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:

[illegible]

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11162

EVENT NAME: Pajarito (TA-54) MY2017 Q3

SAMPLE ID: CAMO-17-130583

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	4/11/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	13:49	OK	MEDIA:	UA	
PRS ID:	NA	OK	SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-21	OK	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
N/A	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	2	HCL	Y	None
N/A	WSP-LL-H-3	1 LITER POLY	1	NONE	Y	None

SAMPLE COMMENTS: Samples collected with running generator 40' away.

LOCATION COMMENTS: Busty winds while samples retrieved.

None

FIELD PARAMETERS:

Dissolved Oxygen	6.34	mg/L	Flow (in gpm)	3.19	GPM	Oxidation-Reduction Potential	154.0	mV
pH	8.09	SU	Specific Conductance	124.7	uS/cm	Temperature	21.0	deg C
Turbidity	0.31	NTU						

COLLECTED BY (PRINT):

D. Hughes

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 4/11/17 1437	RECEIVED BY (Printed Name) (Signature)	Date/Time 4/11/17 1437
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 03/27/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11162

EVENT NAME: Pajarito (TA-54) MY2017 Q3

SAMPLE ID: CAPA-17-130706

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	04/10/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1217 1224 4/10/2017		MEDIA:	UA	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-20 S2		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	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	2	HCL	Y	NA
↓	WSP-LL-H-3	1 LITER POLY	1	NONE	↓	↓

SAMPLE COMMENTS: Sampled 50 ft. from running diesel generator

LOCATION COMMENTS: NA

FIELD PARAMETERS:

Dissolved Oxygen	2.59	mg/L	Flow (in gpm)	1.68	GPM	Oxidation-Reduction Potential	-38.6	mV
pH	7.96	SU	Specific Conductance	144.3	uS/cm	Temperature	19.4	deg C
Turbidity	0.72	NTU						

COLLECTED BY (PRINT): A. Stanfield

RELINQUISHED BY (Printed Name) (Signature)	A. Stanfield	Date/Time 04/10/2017 1305	RECEIVED BY (Printed Name) (Signature)	S. Sherwood	Date/Time 4/10/17 1305
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time

Report Date: 03/27/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11162

EVENT NAME: Pajarito (TA-54) MY2017 Q3

SAMPLE ID: CAPA-17-130719

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	04-07-2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	11:45	1	MEDIA:	UA	1
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-51 S1		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:	1		SAMPLE USAGE:	INV	1
BOTTOM DEPTH:	1	1	EXCAVATED:		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	2	HCL	Y	NA
1	WSP-LL-H-3	1 LITER POLY	1	NONE	1	1

SAMPLE COMMENTS:

Sampled ~ 40' from running diesel generator. Gusty (~15 mph) wind during sampling.

LOCATION COMMENTS:

FIELD PARAMETERS:

Dissolved Oxygen	7.54	mg/L	Flow (in gpm)	3.70	GPM	Oxidation-Reduction Potential	211.6	mV
pH	7.92	SU	Specific Conductance	120.2	uS/cm	Temperature	20.4	deg C
Turbidity	0.58	NTU						

COLLECTED BY (PRINT): D. Jaramillo, A. Vigil

RELINQUISHED BY (Printed Name) Andrew Vigil (Signature) <i>Andrew Vigil</i>	Date/Time 04/17/2017 1415	RECEIVED BY (Printed Name) K. Greene (Signature) <i>K. Greene</i>	Date/Time 4/17/17 2:15
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 03/27/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11162

EVENT NAME: Pajarito (TA-54) MY2017 Q3

SAMPLE ID: CAPA-17-130720

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	04-07-2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	13:29		MEDIA:	UA	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-51 S2		FIELD PREP:	UF	
LOCATION TYPE:	NA		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	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	2	HCL	Y	NA
L	WSP-LL-H-3	1 LITER POLY	1	NONE	NA 040717 Y	L

SAMPLE COMMENTS:

Sampled ~50' from running diesel generator

LOCATION COMMENTS:

None

FIELD PARAMETERS:

Dissolved Oxygen	<u>6.22</u>	mg/L	Flow (in gpm)	<u>3.75</u>	GPM	Oxidation-Reduction Potential	<u>251.6</u>	mV
pH	<u>8.16</u>	SU	Specific Conductance	<u>122.9</u>	uS/cm	Temperature	<u>21.8</u>	deg C
Turbidity	<u>0.31</u>	NTU						

COLLECTED BY (PRINT): A. Vigil, P. Jaramillo

RELINQUISHED BY (Printed Name) ANOREW VIGIL (Signature) <i>[Signature]</i>	Date/Time 04/17/2017 1415	RECEIVED BY (Printed Name) K. Greene (Signature) <i>[Signature]</i>	Date/Time 4/17/17 2:15
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 03/27/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11162

EVENT NAME: Pajarito (TA-54) MY2017 Q3

SAMPLE ID: CAPA-17-130725

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	4/7/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1115		MEDIA:	UA	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-54 S1		FIELD PREP:	UF	
LOCATION TYPE:	Mon		FIELD QC TYPE:	REG	
TOP DEPTH:	OK		SAMPLE USAGE:	INV	
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / NO / (NA)

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-LL-H-3	1 LITER POLY	1	NONE	Y	NA

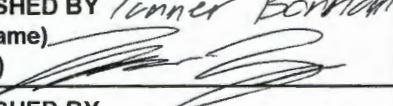
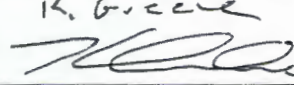
SAMPLE COMMENTS: Sampled 50 ft. from a running diesel generator

LOCATION COMMENTS: None

FIELD PARAMETERS:

Dissolved Oxygen	0.64	mg/L	Flow (in gpm)	3.06	GPM	Oxidation-Reduction Potential	-91.2	mV
pH	6.93	SU	Specific Conductance	140.9	uS/cm	Temperature	20.8	deg C
Turbidity	3.65	NTU						

COLLECTED BY (PRINT): T. Bonham

RELINQUISHED BY (Printed Name) (Signature)	Tanner Bonham 	Date/Time 04/07/2017 1350	RECEIVED BY (Printed Name) (Signature)	K. Greene 	Date/Time 4/7/17 1150
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time

Report Date: 03/27/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11162

EVENT NAME: Pajarito (TA-54) MY2017 Q3

SAMPLE ID: CAPA-17-130726

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	4/7/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1254		MEDIA:	UA	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-54 S2		FIELD PREP:	UF	
LOCATION TYPE:	Mon		FIELD QC TYPE:	REG	
TOP DEPTH:	OK		SAMPLE USAGE:	INV	
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / NO <u>NA</u>

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	2	HCL	Y	NA
↓	WSP-LL-H-3	1 LITER POLY	1	NONE	↓	↓

SAMPLE COMMENTS: Sampled 50 ft. from running diesel generator

LOCATION COMMENTS: Breezy while sampling

FIELD PARAMETERS:

Dissolved Oxygen	6.30	mg/L	Flow (in gpm)	3.16	GPM	Oxidation-Reduction Potential	73.4	mV
pH	8.28	SU	Specific Conductance	125.4	uS/cm	Temperature	21.5	deg C
Turbidity	5.2	NTU						

COLLECTED BY (PRINT): T. Bonham

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 4/7/2017 1350	RECEIVED BY (Printed Name) (Signature)	Date/Time 4/7/17 1150
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 03/27/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11162

EVENT NAME: Pajarito (TA-54) MY2017 Q3

SAMPLE ID: CAPA-17-130729

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	04/11/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1031		MEDIA:	UA	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-56 S1		FIELD PREP:	UF	
LOCATION TYPE:	OK		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / <u>NO</u> / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
MA	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	2	HCL	Y	MA
↓	WSP-LL-H-3	1 LITER POLY	1	NONE	↓	↓

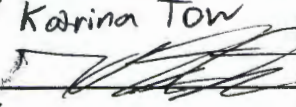
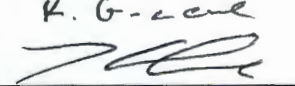
SAMPLE COMMENTS: Sampled SD H. from running diesel generator

LOCATION COMMENTS: MA

FIELD PARAMETERS:

Dissolved Oxygen	<u>6.61</u>	mg/L	Flow (in gpm)	<u>4.0</u>	GPM	Oxidation-Reduction Potential	<u>220.3</u>	mV
pH	<u>7.80</u>	SU	Specific Conductance	<u>148.6</u>	uS/cm	Temperature	<u>20.4</u>	deg C
Turbidity	<u>0.41</u>	NTU						

COLLECTED BY (PRINT): K. Tow

RELINQUISHED BY (Printed Name) (Signature)	Karina Tow 	Date/Time 04/11/2017 1425	RECEIVED BY (Printed Name) (Signature)	K. G. L. L. L. 	Date/Time 4/11/17 2:25
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time

Report Date: 03/27/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11162

EVENT NAME: Pajarito (TA-54) MY2017 Q3

SAMPLE ID: CAPA-17-130730

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	04/11/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1151		MEDIA:	UA	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-56 S2		FIELD PREP:	UF	
LOCATION TYPE:	OK		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / <u>NO</u> / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
MA	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	2	HCL	Y	NA
↓	WSP-LL-H-3	1 LITER POLY	1	NONE	↓	↓

SAMPLE COMMENTS: Sampled 50 ft. from running diesel generator

LOCATION COMMENTS: Windy while sampling

FIELD PARAMETERS:

Dissolved Oxygen	8.305.76 mg/L 4/11/17	Flow (in gpm)	4.0	GPM	Oxidation-Reduction Potential	213.0	mV
pH	8.30 SU	Specific Conductance	129.6	uS/cm	Temperature	21.0	deg C
Turbidity	0.53 NTU						

COLLECTED BY (PRINT): K. Tow

RELINQUISHED BY (Printed Name) (Signature)	Katrina Tow <i>[Signature]</i>	Date/Time 4/11/2017 1425	RECEIVED BY (Printed Name) (Signature)	S. Sherwood <i>[Signature]</i>	Date/Time 4/11/17 1425
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time

Report Date: 03/27/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11162

EVENT NAME: Pajarito (TA-54) MY2017 Q3

SAMPLE ID: CAPA-17-130761

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	4/7/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1254		MEDIA:	UA	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-54 S2		FIELD PREP:	UF	
LOCATION TYPE:	Mon		FIELD QC TYPE:	FD	
TOP DEPTH:	OK		SAMPLE USAGE:	QC	
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / NO (NA)

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-8260B- VOA	40 ML SEPTUM AMBER GLASS	2	HCL	Y	NA
↓	WSP-LL-H-3	1 LITER POLY	1	NONE	↓	↓

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

Dissolved Oxygen _____ mg/L Flow (in gpm) _____ GPM Oxidation-Reduction Potential _____ mV
pH _____ SU Specific Conductance _____ uS/cm Temperature _____ deg C
Turbidity _____ NTU

COLLECTED BY (PRINT): T. Bonham

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 04/07/2017 1350	RECEIVED BY (Printed Name) (Signature)	Date/Time 4/7/17 1:50
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 03/27/2017

DATA VALIDATION REPORT

Chain Of Custody No. 2017-1350

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
ARS1-17-01009	Generic:Low_Level_Tritium	5				
ARS1-17-01009	Generic:Low_Level_Tritium	1				
ARS1-17-01009	Generic:Low_Level_Tritium	3				

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
ARS1-17-01009	Generic:Low_Level_Tritium	ARS1-B17-	ARS1-B17-	9					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-17-130583	ARS1-B17-00943-12	REG	1	0	0	0
Generic:Low_Level_Tritium	RAD	CAPA-17-130706	ARS1-B17-00943-04	REG	1	0	0	0
Generic:Low_Level_Tritium	RAD	CAPA-17-130719	ARS1-B17-00943-05	REG	1	0	0	0
Generic:Low_Level_Tritium	RAD	CAPA-17-130720	ARS1-B17-00943-06	REG	1	0	0	0
Generic:Low_Level_Tritium	RAD	CAPA-17-130725	ARS1-B17-00943-07	REG	1	0	0	0
Generic:Low_Level_Tritium	RAD	CAPA-17-130726	ARS1-B17-00943-08	REG	1	0	0	0
Generic:Low_Level_Tritium	RAD	CAPA-17-130729	ARS1-B17-00943-09	REG	1	0	0	0
Generic:Low_Level_Tritium	RAD	CAPA-17-130730	ARS1-B17-00943-10	REG	1	0	0	0
Generic:Low_Level_Tritium	RAD	CAPA-17-130761	ARS1-B17-00943-11	REG	1	0	0	0
Generic:Low_Level_Tritium	RAD	LCS	ARS1-B17-00943-01	LCS	0	0	1	0
Generic:Low_Level_Tritium	RAD	LCSD	ARS1-B17-00943-02	LCSD	0	0	1	0
Generic:Low_Level_Tritium	RAD	MB	ARS1-B17-00943-03	MB	1	0	0	0

3. Are any analytes missing?

No.

4. Were any holding times exceeded?

DATA VALIDATION REPORT

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-B17-00943-01	ARS1-B17-00943-02	Generic:Low_Level_Tritium	Tritium	ARS1-B17-00943	06-07-2017	W	63.000	82.000	120.00	80.000		10	16.600	

9. Any Field Duplicate RPDs outside the desired limits?

No.

10. Any Lab Duplicate RPDs outside the desired limits?

No.

DATA VALIDATION REPORT

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	Parameter 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-21	2017-1350	CAMO-17-130583	REG	INIT	RAD	Generic:Low_Level_Tritium	Tritium	U	U	R5	N	0.311	pCi/L	0.311	pCi/L	2.879	0.855	W	04/11/2017		ARS1-B17-00943	VAL	Y
R-20 S2	2017-1350	CAPA-17-130706	REG	INIT	RAD	Generic:Low_Level_Tritium	Tritium	U	U	R5	N	-1.768	pCi/L	-1.768	pCi/L	2.974	0.883	W	04/10/2017		ARS1-B17-00943	VAL	Y
R-51 S1	2017-1350	CAPA-17-130719	REG	INIT	RAD	Generic:Low_Level_Tritium	Tritium	U	U	R5	N	0.173	pCi/L	0.173	pCi/L	2.557	0.757	W	04/07/2017		ARS1-B17-00943	VAL	Y
R-51 S2	2017-1350	CAPA-17-130720	REG	INIT	RAD	Generic:Low_Level_Tritium	Tritium	U	U	R5	N	-0.358	pCi/L	-0.358	pCi/L	2.867	0.840	W	04/07/2017		ARS1-B17-00943	VAL	Y
R-54 S1	2017-1350	CAPA-17-130725	REG	INIT	RAD	Generic:Low_Level_Tritium	Tritium	U	U	R5	N	-0.462	pCi/L	-0.462	pCi/L	3.258	0.954	W	04/07/2017		ARS1-B17-00943	VAL	Y
R-54 S2	2017-1350	CAPA-17-130726	REG	INIT	RAD	Generic:Low_Level_Tritium	Tritium	U	U	R5	N	-1.945	pCi/L	-1.945	pCi/L	2.583	0.780	W	04/07/2017		ARS1-B17-00943	VAL	Y
R-56 S1	2017-1350	CAPA-17-130729	REG	INIT	RAD	Generic:Low_Level_Tritium	Tritium	U	U	R5	N	-2.561	pCi/L	-2.561	pCi/L	4.055	1.208	W	04/11/2017		ARS1-B17-00943	VAL	Y
R-56 S2	2017-1350	CAPA-17-130730	REG	INIT	RAD	Generic:Low_Level_Tritium	Tritium	U	U	R5	N	-0.041	pCi/L	-0.041	pCi/L	3.001	0.884	W	04/11/2017		ARS1-B17-00943	VAL	Y
R-54 S2	2017-1350	CAPA-17-130761	REG	INIT	RAD	Generic:Low_Level_Tritium	Tritium	U	U	R5	N	-0.507	pCi/L	-0.507	pCi/L	3.000	0.878	W	04/07/2017		ARS1-B17-00943	VAL	Y

Reason Code

Description

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-17-130583	R-21	REG	Generic:Low_Level_Tritium	0	1
CAPA-17-130706	R-20 S2	REG	Generic:Low_Level_Tritium	0	1
CAPA-17-130719	R-51 S1	REG	Generic:Low_Level_Tritium	0	1
CAPA-17-130720	R-51 S2	REG	Generic:Low_Level_Tritium	0	1
CAPA-17-130725	R-54 S1	REG	Generic:Low_Level_Tritium	0	1
CAPA-17-130726	R-54 S2	REG	Generic:Low_Level_Tritium	0	1
CAPA-17-130729	R-56 S1	REG	Generic:Low_Level_Tritium	0	1

DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAPA-17-130730	R-56 S2	REG	Generic:Low_Level_Tritium	0	1
CAPA-17-130761	R-54 S2	REG	Generic:Low_Level_Tritium	0	1



ARS International, LLC

Laboratory Analysis Report

ARS1-17-01009

Prepared for:

Los Alamos National Laboratory

**Keith Greene
PO Box 1663
MS M992
Los Alamos, NM 87545**

kgreene@lanl.gov

**Phone: 505-665-9966
Fax: 505-665-9972**

Project Manager Review

Management 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

July 10, 2017

LANL
Keith Greene
PO Box 1663 MS M992
Los Alamos, NM 87545

LANL Request Number: **2017-1350**
ARS SDG: **ARS1-17-01009**
Project : **ADEP**

Dear Mr. Greene;

On April 13, 2017, ARS International received nine (9) water samples to be analyzed for Low Level Tritium.

Samples were counted using the appropriate counting equipment and QA/QC for this type of analysis. Results of the analysis and QA/QC are attached in the data package.

If you have any questions please do not hesitate to call at 225.381.2991 or email LANL@amrad.com.

Sincerely,

Susan Leese
Project Manager
ARS International



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**PROJECT SAMPLE IDENTIFICATION
CROSS-REFERENCE
TO ARS SAMPLE LABORATORY IDs
Subcontract (LANL Agreement Number) 250953**

Request Number	LANL PROJECT SAMPLE ID NUMBER	American Radiation Services SAMPLE ID NUMBER(S)
2017-1350	CAPA-17-130706	ARS1-17-01009-001
2017-1350	CAPA-17-130719	ARS1-17-01009-002
2017-1350	CAPA-17-130720	ARS1-17-01009-003
2017-1350	CAPA-17-130725	ARS1-17-01009-004
2017-1350	CAPA-17-130726	ARS1-17-01009-005
2017-1350	CAPA-17-130729	ARS1-17-01009-006
2017-1350	CAPA-17-130730	ARS1-17-01009-007
2017-1350	CAPA-17-130761	ARS1-17-01009-008
2017-1350	CAMO-17-130583	ARS1-17-01009-009

SAMPLE RECEIPT

The samples were received in good condition and was screened for radioactive contamination as per procedure ARS-062 "Sample Receiving". Samples were checked in with a 40-day turnaround, per latest contract modification.

ANALYTICAL METHODS

Tritium analyses were performed using ARS-040, "Tritium Assay in Water Samples Using Electrolytic Enrichment".

ANALYTICAL RESULTS

The MDCs for samples -004 and -006 are slightly above CRDL of 3.221 pCi/L. All other QC criteria were met.

American Radiation Services Project Manager/Laboratory Director's Comments:

"I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this sample data package and the computer-readable EDD, as applicable, submitted on diskette or by modem, has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature."



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1 (800) 401-4277 FAX (225) 381-2996

ARS Sample Delivery Group: ARS1-17-01009

Client Sample ID: CAPA-17-130706

Sample Collection Date: 04/10/17

Sample Matrix: Aqueous

Percent Solids: N/A

Request or PO Number: 2017-1350

ARS Sample ID: ARS1-17-01009-001

Date Received: 04/13/17

Report Date: 07/10/17

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	-1.768	0.883	2.974	1.442	3.221	U	pCi/L	ARS-040	06/07/17 16:10	SWHITE	N/A

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ARS Sample Delivery Group: ARS1-17-01009

Client Sample ID: CAPA-17-130719

Sample Collection Date: 04/07/17

Sample Matrix: Aqueous

Percent Solids: N/A

Request or PO Number: 2017-1350

ARS Sample ID: ARS1-17-01009-002

Date Received: 04/13/17

Report Date: 07/10/17

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	0.173	0.757	2.557	1.240	3.221	U	pCi/L	ARS-040	06/07/17 21:21	SWHITE	N/A

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ARS Sample Delivery Group: ARS1-17-01009

Client Sample ID: CAPA-17-130720

Sample Collection Date: 04/07/17

Sample Matrix: Aqueous

Percent Solids: N/A

Request or PO Number: 2017-1350

ARS Sample ID: ARS1-17-01009-003

Date Received: 04/13/17

Report Date: 07/10/17

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	-0.358	0.840	2.867	1.390	3.221	U	pCi/L	ARS-040	06/08/17 2:33	SWHITE	N/A

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ARS Sample Delivery Group: ARS1-17-01009

Client Sample ID: CAPA-17-130725

Sample Collection Date: 04/07/17

Sample Matrix: Aqueous

Percent Solids: N/A

Request or PO Number: 2017-1350

ARS Sample ID: ARS1-17-01009-004

Date Received: 04/13/17

Report Date: 07/10/17

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	-0.462	0.954	3.258	1.579	3.221	U	pCi/L	ARS-040	06/08/17 7:44	SWHITE	N/A

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ARS Sample Delivery Group: ARS1-17-01009

Client Sample ID: CAPA-17-130726

Sample Collection Date: 04/07/17

Sample Matrix: Aqueous

Percent Solids: N/A

Request or PO Number: 2017-1350

ARS Sample ID: ARS1-17-01009-005

Date Received: 04/13/17

Report Date: 07/10/17

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	-1.945	0.780	2.583	1.252	3.221	U	pCi/L	ARS-040	06/08/17 12:55	SWHITE	N/A

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ARS Sample Delivery Group: ARS1-17-01009

Client Sample ID: CAPA-17-130729

Sample Collection Date: 04/11/17

Sample Matrix: Aqueous

Percent Solids: N/A

Request or PO Number: 2017-1350

ARS Sample ID: ARS1-17-01009-006

Date Received: 04/13/17

Report Date: 07/10/17

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	-2.561	1.208	4.055	1.966	3.221	U	pCi/L	ARS-040	06/08/17 18:07	SWHITE	N/A

Project Manager Review

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ARS Sample Delivery Group: ARS1-17-01009

Client Sample ID: CAPA-17-130730

Sample Collection Date: 04/11/17

Sample Matrix: Aqueous

Percent Solids: N/A

Request or PO Number: 2017-1350

ARS Sample ID: ARS1-17-01009-007

Date Received: 04/13/17

Report Date: 07/10/17

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	-0.041	0.884	3.001	1.455	3.221	U	pCi/L	ARS-040	06/08/17 23:18	SWHITE	N/A

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ARS Sample Delivery Group: ARS1-17-01009

Client Sample ID: CAPA-17-130761

Sample Collection Date: 04/07/17

Sample Matrix: Aqueous

Percent Solids: N/A

Request or PO Number: 2017-1350

ARS Sample ID: ARS1-17-01009-008

Date Received: 04/13/17

Report Date: 07/10/17

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	-0.507	0.878	3.000	1.454	3.221	U	pCi/L	ARS-040	06/09/17 4:30	SWHITE	N/A

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ARS Sample Delivery Group: ARS1-17-01009

Client Sample ID: CAMO-17-130583

Sample Collection Date: 04/10/17

Sample Matrix: Aqueous

Percent Solids: N/A

Request or PO Number: 2017-1350

ARS Sample ID: ARS1-17-01009-009

Date Received: 04/13/17

Report Date: 07/10/17

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	0.311	0.855	2.879	1.395	3.221	U	pCi/L	ARS-040	06/09/17 9:41	SWHITE	N/A

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QC Results per Analytical Batch

Analytical Batch	ARS1-B17-00943
SDG	ARS1-17-01009
Analysis	Low Level Tritium by Electrolytic Enrichment
Analysis Test Method	ARS-040/
Analysis Code	LSC-A-022
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	06/07/17 05:47	Analysis Technician	SWHITE	
Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (1s)	Expected Value	LCS Rec (%)	MDC
ARS1-B17-00943-02	LCSD	ENRICHED H-3	26.272	4.106	32.065	81.9	2.566

Duplicate RER/DER/RPD			Analysis Date	06/07/17 05:47	Analysis Technician	SWHITE	
Analyte	Results LCS	CSU LCS (1s)	Results LCSD	CSU LCSD (1s)	RER	DER	RPD
ENRICHED H-3	22.245	3.526	26.272	4.106	0.528	0.744	16.6

Method Blank			Analysis Date	06/07/17 10:59	Analysis Technician	SWHITE	
Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (1s)	MDC	Qual	
ARS1-B17-00943-03	MBL	ENRICHED H-3	-1.843	0.920	3.100	U	


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Signature

Laboratory Management, ARS International

Title

7-17-17

Date

Notes (Case Narrative):

Comments:

- 1.0) All MDA/MDC values are calculated on a sample specific basis.
- 2.0) Soil and Sludge analysis are reported on a wet basis or an as received basis unless otherwise indicated.
- 3.0) Data in this report are within the limits of uncertainty specified in the reference method unless otherwise specified.
- 4.0) 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).
- 5.0) 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.
- 6.0) Ra-228 is determined via secular equilibrium with its daughter, Actinium 228 (Gamma Spectroscopy only).
- 7.0) U-238 is determined via secular equilibrium with its daughter, Thorium 234 (Gamma Spectroscopy only).
- 8.0) All gamma spectroscopy was performed utilizing high purity germanium detectors (HPGe).
- 9.0) 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).
- 10.0) Gamma spectroscopy results are calculated values based on the ORTEC® GammaVision ENV32 Analysis Engine.
- 11.0) 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).

Method References:

- 1.0) EPA 600/4-80-032; Prescribed Procedures for the Measurements of Radioactivity in Drinking Water, August 1980.
- 2.0) Standard Methods for the Examination of Water and Wastewater (On-Line Edition)
- 3.0) EPA SW-846; Test Methods for Evaluating Solid Waste, (On-Line edition)
- 4.0) EPA 600/4/79-020; Methods for Chemical Analysis of Water and Waste, March 1983.
- 5.0) HASL 300; The Procedures Manual of the Environmental Measurements Laboratory, Volume I, 28th Edition February, 1997.

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

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

LELAP Cert# 01949

NELAP Cert# E87558

ARS-059-010

Revision: 9.1

Revision Date: 03-14-2017

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