

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:

Validation report not required for University of Illinois samples.

Revised data begins page 27.

University of Illinois Urbana IL						Chain of Custody/Analysis Request																		COC/Lab Request #: 2017-650-1 Page 1 of 1							
Client Contact:						Lab Agreement #:				Site Name: Los Alamos National Laboratory																					
						Project Number:				<div style="writing-mode: vertical-rl; transform: rotate(180deg);">WSP-CR52/63</div>																		Rad Screening Info:			
						Analysis Turnaround Time:																									
						24 Hour - <input type="checkbox"/> Other - <input type="checkbox"/>																									
						7 Days - <input type="checkbox"/>																									
						14 Days - <input type="checkbox"/>																									
						21 Days - <input type="checkbox"/>																									
						28 Days - <input checked="" type="checkbox"/>																						Lab Reporting Limit Type:			
																												Sample Quantitation Limit			
Field Sample ID						Sample Date	Sample Time	Sample Matrix																							
CAMO-17-127242	Nov 8 2016	10:34	W	1																											
CAMO-17-127214	Nov 8 2016	10:34	W	1																											
CAMO-17-127243	Nov 8 2016	13:34	W	1																											
CAMO-17-127244	Nov 15 2016	10:47	W	1																											
CAMO-17-127215	Nov 15 2016	10:47	W	1																											
CAMO-17-127245	Nov 7 2016	12:07	W	1																											
CAMO-17-127247	Nov 15 2016	12:34	W	1																											
CAMO-17-127249	Nov 14 2016	12:33	W	1																											
CAMO-17-127250	Nov 14 2016	14:03	W	1																											
CAMO-17-127252	Nov 7 2016	11:49	W	1																											
CAMO-17-127253	Nov 7 2016	14:05	W	1																											
CAMO-17-127254	Nov 17 2016	10:53	W	1																											
CAMO-17-127255	Nov 17 2016	12:57	W	1																											
CAMO-17-127257	Nov 18 2016	12:16	W	1																											
CAMO-17-127258	Nov 18 2016	15:05	W	1																											
CAMO-17-127260	Nov 16 2016	12:46	W	1																											
CAMO-17-127261	Nov 21 2016	10:47	W	1																											
Special Instructions:																															
Relinquished by: [Signature]						Print Name: Melissa Montoya				Date/Time: 11/7/16 3:00				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: 11014

EVENT NAME: Mort/Sandia_Mort MY2017 Q1

SAMPLE ID: CAMO-17-127214

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/8/2016	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1034		MEDIA:	UA	↓
PRS ID:	NA		SAMPLE TECH CODE:	UA	RSP
LOCATION ID:	MCOI-5		FIELD PREP:	F	OK
LOCATION TYPE:	NA		FIELD QC TYPE:	FD	↓
TOP DEPTH:	↓		SAMPLE USAGE:	QC	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / NO / <u>NA</u>

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-All Metals	1 LITER POLY	1	HNO3 ICE	Y	NA
↓	WSP-CR52/53	1 LITER POLY	1	ICE		↓
	WSP- GENINORG+PerChlorat e	1 LITER POLY	1	ICE		↓
	WSP-N15/O18- NO3	40 ML SEPTUM AMBER GLASS	2	ICE		↓
↓	WSP- NH3+NO3/NO2	500 ML AMBER GLASS	1	H2SO4	↓	↓

SAMPLE COMMENTS: None

LOCATION COMMENTS: None

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): A. Stanfield & D. Hughes

RELINQUISHED BY (Printed Name) (Signature)	Katrina Tow <i>[Signature]</i>	Date/Time 11/8/2016 1530	RECEIVED BY (Printed Name) (Signature)	K. G. <i>[Signature]</i>	Date/Time 11/8/16 3:30
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11014

EVENT NAME: Mort/Sandia_Mort MY2017 Q1

SAMPLE ID: CAMO-17-127215

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	11/15/2016	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1047	↓	MEDIA:	UA	↓
PRS ID:	OK	↓	SAMPLE TECH CODE:	UA	GSP
LOCATION ID:	R-1	↓	FIELD PREP:	F	OK
LOCATION TYPE:	OK	↓	FIELD QC TYPE:	FD	↓
TOP DEPTH:	↓	↓	SAMPLE USAGE:	QC	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / <u>NO</u> / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-All Metals	1 LITER POLY	1	HNO3 ICE	Y	NA
↓	WSP-CR52/53	1 LITER POLY	1	ICE	↓	↓
	WSP- GENINORG+PerChlorat e	1 LITER POLY	1	ICE	↓	↓
	WSP-N15/O18- NO3	40 ML SEPTUM AMBER GLASS	2	ICE	↓	↓
↓	WSP- NH3+NO3/NO2	500 ML AMBER GLASS	1	H2SO4	↓	↓

SAMPLE COMMENTS:

LOCATION COMMENTS:

WS 11/15/16

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): D Hughes / S. Kessler

RELINQUISHED BY (Printed Name) W Sanchez (Signature) <i>Wayne Sanchez</i>	Date/Time 11/15/16 1345	RECEIVED BY (Printed Name) K. Greene (Signature) <i>K. Greene</i>	Date/Time 11/15/16 1:45
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11014

EVENT NAME: Mort/Sandia_Mort MY2017 Q1

SAMPLE ID: CAMO-17-127242

WORK ORDER: NA

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/8/2016	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1034		MEDIA:	UA	↓
PRS ID:	NA		SAMPLE TECH CODE:	UA	RSP
LOCATION ID:	MCOI-5		FIELD PREP:	F	OK
LOCATION TYPE:	MON		FIELD QC TYPE:	REG	↓
TOP DEPTH:	NA		SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / NO / <u>NA</u>

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-All Metals	1 LITER POLY	1	HNO3 ICE	Y	NA
↓	WSP-CR52/53	1 LITER POLY	1	ICE	↓	↓
↓	WSP- GENINORG+PerChlorate	1 LITER POLY	1	ICE	↓	↓
↓	WSP-N15/O18- NO3	40 ML SEPTUM AMBER GLASS	2	ICE	↓	↓
↓	WSP- NH3+NO3/NO2	500 ML AMBER GLASS	1	H2SO4	↓	↓

SAMPLE COMMENTS: None

LOCATION COMMENTS: None

FIELD PARAMETERS:

KT 11/8/16

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): A. Stanfield + D. Hughes

RELINQUISHED BY (Printed Name) (Signature)	Katrina Tow <i>[Signature]</i>	Date/Time 11/8/2016 1530	RECEIVED BY (Printed Name) (Signature)	K. Green <i>[Signature]</i>	Date/Time 11/8/16 3:30
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11014

EVENT NAME: Mort/Sandia_Mort MY2017 Q1

SAMPLE ID: CAMO-17-127243

WORK ORDER: NA

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/8/2016	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1334		MEDIA:	UA	↓
PRS ID:	NA		SAMPLE TECH CODE:	UA	GSP
LOCATION ID:	MCOI-6		FIELD PREP:	F	OK
LOCATION TYPE:	MON		FIELD QC TYPE:	REG	↓
TOP DEPTH:	NA		SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / NO / (NA)

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-All Metals	1 LITER POLY	1	HNO3 ICE	Y	NA
↓	WSP-CR52/53	1 LITER POLY	1	ICE	↓	↓
↓	WSP- GENINORG+PerChlorat e	1 LITER POLY	1	ICE	↓	↓
↓	WSP-N15/O18- NO3	40 ML SEPTUM AMBER GLASS	2	ICE	↓	↓
↓	WSP- NH3+NO3/NO2	500 ML AMBER GLASS	1	H2SO4	↓	↓

SAMPLE COMMENTS: None

LOCATION COMMENTS: None

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): A. Stanfield & D. Hughes

RELINQUISHED BY (Printed Name) (Signature)	Katrina Tow <i>Katrina Tow</i>	Date/Time 11/8/2016 1530	RECEIVED BY (Printed Name) (Signature)	K. Brown <i>K. Brown</i>	Date/Time 11/8/16 3:30
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11014

EVENT NAME: Mort/Sandia_Mort MY2017 Q1

SAMPLE ID: CAMO-17-127244

WORK ORDER: NA

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/15/16	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1047		MEDIA:	UA	↓
PRS ID:	OK		SAMPLE TECH CODE:	UA	GSP
LOCATION ID:	R-1		FIELD PREP:	F	OK
LOCATION TYPE:	MON		FIELD QC TYPE:	REG	↓
TOP DEPTH:	OK		SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / <u>NO</u> / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-All Metals	1 LITER POLY	1	HNO3 ICE	Y	NA
↓	WSP-CR52/53	1 LITER POLY	1	ICE	↓	↓
	WSP- GENINORG+PerChlorat e	1 LITER POLY	1	ICE	↓	↓
	WSP-N15/O18- NO3	40 ML SEPTUM AMBER GLASS	2	ICE	↓	↓
	WSP- NH3+NO3/NO2	500 ML AMBER GLASS	1	H2SO4	↓	↓

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): D. Hughes / S. Koslov

RELINQUISHED BY (Printed Name) W. Sanchez (Signature) <i>W. Sanchez</i>	Date/Time 11/15/16 1345	RECEIVED BY (Printed Name) K. Greene (Signature) <i>K. Greene</i>	Date/Time 11/15/16 1345
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11014

EVENT NAME: Mort/Sandia_Mort MY2017 Q1

SAMPLE ID: CAMO-17-127245

WORK ORDER: NA

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/07/2016	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1207	OK	MEDIA:	UA	↓
PRS ID:	NA	↓	SAMPLE TECH CODE:	UA	CSP
LOCATION ID:	R-13	↓	FIELD PREP:	F	OK
LOCATION TYPE:	MON	↓	FIELD QC TYPE:	REG	↓
TOP DEPTH:	NA	↓	SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-All Metals	1 LITER POLY	1	HNO3 ICE	Y	NA
↓	WSP-CR52/53	1 LITER POLY	1	ICE	↓	↓
↓	WSP- GENINORG+PerChlorat e	1 LITER POLY	1	ICE	↓	↓
↓	WSP-N15/O18- NO3	40 ML SEPTUM AMBER GLASS	2	ICE	↓	↓
↓	WSP- NH3+NO3/NO2	500 ML AMBER GLASS	1	H2SO4	↓	↓

SAMPLE COMMENTS: none

LOCATION COMMENTS: Samples SOFt Com running, diesel generator

FIELD PARAMETERS:

Dissolved Oxygen	6.18	mg/L	Flow (in gpm)	5.76	GPM	Oxidation-Reduction Potential	187.7	mV
pH	8.06	SU	Specific Conductance	144.6	uS/cm	Temperature	21.3	deg C
Turbidity	0.34	NTU						

COLLECTED BY (PRINT): A Vigil

RELINQUISHED BY (Printed Name) Daniel Jaramila (Signature)	Date/Time 11/7/16 13:27	RECEIVED BY (Printed Name) S. Sherwood (Signature)	Date/Time 11/7/16 13:27
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11014

EVENT NAME: Mort/Sandia_Mort MY2017 Q1

SAMPLE ID: CAMO-17-127247

WORK ORDER: NA

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/15/16	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1234		MEDIA:	UA	↓
PRS ID:	OK		SAMPLE TECH CODE:	UA	GSP
LOCATION ID:	R-15		FIELD PREP:	F	OK
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-All Metals	1 LITER POLY	1	HNO3 ICE	Y	NA
↓	WSP-CR52/53	1 LITER POLY	1	ICE	↓	↓
	WSP- GENINORG+PerChlorat e	1 LITER POLY	1	ICE	↓	↓
	WSP-N15/O18- NO3	40 ML SEPTUM AMBER GLASS	2	ICE	↓	↓
	WSP- NH3+NO3/NO2	500 ML AMBER GLASS	1	H2SO4	↓	↓

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): Hughes / S. Kosler

RELINQUISHED BY (Printed Name) Wayne Sanchez (Signature) <i>Wayne Sanchez</i>	Date/Time 11/15/16 1345	RECEIVED BY (Printed Name) K. G. ... (Signature) <i>[Signature]</i>	Date/Time 11/15/16 1:45
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11014

EVENT NAME: Mort/Sandia_Mort MY2017 Q1

SAMPLE ID: CAMO-17-127249

WORK ORDER: NA

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11-14-2016	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1233		MEDIA:	UA	↓
PRS ID:	OK		SAMPLE TECH CODE:	UA	GSP
LOCATION ID:	R-33 S1		FIELD PREP:	F	OK
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
MA	WSP-All Metals	1 LITER POLY	1	HNO3 ICE	Y	MA
↓	WSP-CR52/53	1 LITER POLY	1	ICE	↓	↓
↓	WSP- GENINORG+PerChlorat e	1 LITER POLY	1	ICE	↓	↓
↓	WSP-N15/O18- NO3	40 ML SEPTUM AMBER GLASS	2	ICE	↓	↓
↓	WSP- NH3+NO3/NO2	500 ML AMBER GLASS	1	H2SO4	↓	↓

SAMPLE COMMENTS: 5.

LOCATION COMMENTS:

FIELD PARAMETERS:

Dissolved Oxygen _____ mg/L 11-14-2016 75 Flow (in gpm) _____ GPM Oxidation-Reduction Potential _____ mV
pH _____ SU Specific Conductance _____ uS/cm Temperature _____ deg C
Turbidity _____ NTU

COLLECTED BY (PRINT): A. Vigil

RELINQUISHED BY (Printed Name) (Signature)	Tanner Barthom 11-14-2016 1500	RECEIVED BY (Printed Name) (Signature)	Sherwood 11/14/16 1500
RELINQUISHED BY (Printed Name) (Signature)		RECEIVED BY (Printed Name) (Signature)	

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11014

EVENT NAME: Mort/Sandia_Mort MY2017 Q1

SAMPLE ID: CAMO-17-127250

WORK ORDER: NA

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11-14-2016	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1403		MEDIA:	UA	↓
PRS ID:	OK		SAMPLE TECH CODE:	UA	GSP
LOCATION ID:	R-33 S2		FIELD PREP:	F	OK
LOCATION TYPE:	MON		FIELD QC TYPE:	REG	↓
TOP DEPTH:	OK		SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / <input checked="" type="radio"/> NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-All Metals	1 LITER POLY	1	HNO3 ICE	Y	NA
	WSP-CR52/53	1 LITER POLY	1	ICE	↓	↓
	WSP- GENINORG+PerChlorat e	1 LITER POLY	1	ICE	↓	↓
	WSP-N15/O18- NO3	40 ML SEPTUM AMBER GLASS	2	ICE	↓	↓
↓	WSP- NH3+NO3/NO2	500 ML AMBER GLASS	1	H2SO4	↓	↓

SAMPLE COMMENTS:

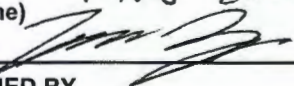
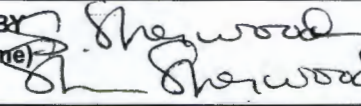
LOCATION COMMENTS:

FIELD PARAMETERS:

11-14-2016 JB

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): A. Vigil

RELINQUISHED BY (Printed Name) (Signature)	Tanner Barkham 	Date/Time 11-14-2016 1500	RECEIVED BY (Printed Name) (Signature)	Shenwood 	Date/Time 11/14/16 1500
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11014

EVENT NAME: Mort/Sandia_Mort MY2017 Q1

SAMPLE ID: CAMO-17-127252

WORK ORDER: NA

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/07/2016	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	149		MEDIA:	UA	↓
PRS ID:	NA		SAMPLE TECH CODE:	UA	GSP
LOCATION ID:	R-44 S1		FIELD PREP:	F	OK
LOCATION TYPE:	MON		FIELD QC TYPE:	REG	↓
TOP DEPTH:	NA		SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / NO / <u>NA</u>

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-All Metals	1 LITER POLY	1	HNO3 ICE	Y	NA
	WSP-CR52/53	1 LITER POLY	1	ICE	↓	↓
	WSP- GENINORG+PerChlorat e	1 LITER POLY	1	ICE	↓	↓
	WSP-N15/O18- NO3	40 ML SEPTUM AMBER GLASS	2	ICE	↓	↓
↓	WSP- NH3+NO3/NO2	500 ML AMBER GLASS	1	H2SO4	↓	↓

SAMPLE COMMENTS: NMED COLLECTED SPLIT SAMPLES FOR METALS & PHARMA.

LOCATION COMMENTS: SAMPLES COLLECTED 40' FROM RUNNING DIESEL GENERATOR

FIELD PARAMETERS:

Dissolved Oxygen	<u>7.08</u>	mg/L	Flow (in gpm)	<u>3.26</u>	GPM	Oxidation-Reduction Potential	<u>183.6</u>	mV
pH	<u>7.65</u>	SU	Specific Conductance	<u>135.3</u>	uS/cm	Temperature	<u>20.4</u>	deg C
Turbidity	<u>0.15</u>	NTU						

COLLECTED BY (PRINT): A STANFICED

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 11-7-16 1505	RECEIVED BY (Printed Name) (Signature)	Date/Time 11/7/16 1505
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11014

EVENT NAME: Mort/Sandia_Mort MY2017 Q1

SAMPLE ID: CAMO-17-127253

WORK ORDER: NA

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/02/2016	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1405	/	MEDIA:	UA	↓
PRS ID:	NA		SAMPLE TECH CODE:	UA	GSP
LOCATION ID:	R-44 S2		FIELD PREP:	F	OK
LOCATION TYPE:	MON		FIELD QC TYPE:	REG	↓
TOP DEPTH:	NA		SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	↓		EXCAVATED:		YES / NO / (NA)

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-All Metals	1 LITER POLY	1	HNO3 ICE	Y	NA
↓	WSP-CR52/53	1 LITER POLY	1	ICE	↓	↓
	WSP- GENINORG+PerChlorate	1 LITER POLY	1	ICE	↓	↓
	WSP-N15/O18- NO3	40 ML SEPTUM AMBER GLASS	2	ICE	↓	↓
↓	WSP- NH3+NO3/NO2	500 ML AMBER GLASS	1	H2SO4	↓	↓

SAMPLE COMMENTS: NONE

LOCATION COMMENTS: NONE

FIELD PARAMETERS:

Dissolved Oxygen	6.82	mg/L	Flow (in gpm)	3.5	GPM	Oxidation-Reduction Potential	169.1	mV
pH	7.76	SU	Specific Conductance	145.7	uS/cm	Temperature	20.7	deg C
Turbidity	4.1	NTU						

COLLECTED BY (PRINT): K TAN

RELINQUISHED BY (Printed Name) (Signature)	DAVE ANDERSEN <i>[Signature]</i>	Date/Time 11-7-16 15:05	RECEIVED BY (Printed Name) (Signature)	S. Sherwood <i>[Signature]</i>	Date/Time 11-7-16 15:05
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11014

EVENT NAME: Mort/Sandia_Mort MY2017 Q1

SAMPLE ID: CAMO-17-127254

WORK ORDER: NA

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11-17-2016	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	10:53		MEDIA:	UA	↓
PRS ID:	NA		SAMPLE TECH CODE:	UA	GSP
LOCATION ID:	R-45 S1		FIELD PREP:	F	OK
LOCATION TYPE:	MON		FIELD QC TYPE:	REG	↓
TOP DEPTH:	NA		SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	↓	✓	EXCAVATED:		YES / NO / (NA)

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-All Metals	1 LITER POLY	1	HNO3 ICE	Y	NA
↓	WSP-CR52/53	1 LITER POLY	1	ICE	↓	↓
↓	WSP- GENINORG+PerChlorat e	1 LITER POLY	1	ICE	↓	↓
↓	WSP-N15/O18- NO3	40 ML SEPTUM AMBER GLASS	2	ICE	↓	↓
↓	WSP- NH3+NO3/NO2	500 ML AMBER GLASS	1	H2SO4	↓	↓

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): D. Jarama Mo

RELINQUISHED BY (Printed Name) <i>Damen Hughes</i> (Signature) <i>[Signature]</i>	Date/Time 11-17-2016 13:55	RECEIVED BY <i>[Signature]</i> (Printed Name) <i>[Signature]</i> (Signature)	Date/Time 11/17/16 13:55
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 11/02/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11014

EVENT NAME: Mort/Sandia_Mort MY2017 Q1

SAMPLE ID: CAMO-17-127255

WORK ORDER: NA

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11-17-2016	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	12:57		MEDIA:	UA	L
PRS ID:	NA		SAMPLE TECH CODE:	UA	GSP
LOCATION ID:	R-45 S2		FIELD PREP:	F	OK
LOCATION TYPE:	MON		FIELD QC TYPE:	REG	L
TOP DEPTH:	NA		SAMPLE USAGE:	INV	L
BOTTOM DEPTH:	L		EXCAVATED:		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-All Metals	1 LITER POLY	1	HNO3 ICE	Y	NA
L	WSP-CR52/53	1 LITER POLY	1	ICE	L	
	WSP- GENINORG+PerChlorate	1 LITER POLY	1	ICE	L	
	WSP-N15/O18- NO3	40 ML SEPTUM AMBER GLASS	2	ICE	L	
Y	WSP- NH3+NO3/NO2	500 ML AMBER GLASS	1	H2SO4	L	L

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): D. Jaramilla

RELINQUISHED BY (Printed Name) <i>Darren Hughes</i> (Signature) <i>[Signature]</i>	Date/Time 11-17-2016 13:55	RECEIVED BY (Printed Name) <i>[Signature]</i> (Signature) <i>[Signature]</i>	Date/Time 11/17/16 13:55
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 11/02/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11014

EVENT NAME: Mort/Sandia_Mort MY2017 Q1

SAMPLE ID: CAMO-17-127257

WORK ORDER: NA

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/18/2016	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1216		MEDIA:	UA	↓
PRS ID:	NA		SAMPLE TECH CODE:	UA	GSP
LOCATION ID:	R-50 S1		FIELD PREP:	F	OK
LOCATION TYPE:	MON		FIELD QC TYPE:	REG	↓
TOP DEPTH:	NA		SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	↓		EXCAVATED:		YES / NO / <u>NA</u>

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-All Metals	1 LITER POLY	1	HNO3 ICE	Y	NA
	WSP-CR52/53	1 LITER POLY	1	ICE		
	WSP- GENINORG+PerChlorat e	1 LITER POLY	1	ICE		
	WSP-N15/O18- NO3	40 ML SEPTUM AMBER GLASS	2	ICE		
	WSP- NH3+NO3/NO2	500 ML AMBER GLASS	1	H2SO4		

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 BOMHAM

RELINQUISHED BY (Printed Name) <u>DAME ANDERSON</u> (Signature) <u>[Signature]</u>	Date/Time <u>11-18-16</u> <u>1600</u>	RECEIVED BY (Printed Name) <u>Shenwood</u> (Signature) <u>[Signature]</u>	Date/Time <u>11/18/16</u> <u>1600</u>
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11014

EVENT NAME: Mort/Sandia_Mort MY2017 Q1

SAMPLE ID: CAMO-17-127258

WORK ORDER: NA

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/18/16	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1505		MEDIA:	UA	↓
PRS ID:	NA		SAMPLE TECH CODE:	UA	GSP
LOCATION ID:	R-50 S2		FIELD PREP:	F	OK
LOCATION TYPE:	MON		FIELD QC TYPE:	REG	↓
TOP DEPTH:	NA		SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:			EXCAVATED:		YES / NO / (NA)

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-All Metals	1 LITER POLY	1	HNO3 ICE	Y	NA
	WSP-CR52/53	1 LITER POLY	1	ICE		
	WSP- GENINORG+PerChlorat e	1 LITER POLY	1	ICE		
	WSP-N15/O18- NO3	40 ML SEPTUM AMBER GLASS	2	ICE		
	WSP- NH3+NO3/NO2	500 ML AMBER GLASS	1	H2SO4		

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): W SANCHEZ

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 11-18-16 1600	RECEIVED BY (Printed Name) (Signature)	Date/Time 11/18/16 1600
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11014

EVENT NAME: Mort/Sandia_Mort MY2017 Q1

SAMPLE ID: CAMO-17-127260

WORK ORDER: NA

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	11/16/16	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1246		MEDIA:	UA	L
PRS ID:	OK		SAMPLE TECH CODE:	UA	GSP
LOCATION ID:	R-62		FIELD PREP:	F	OK
LOCATION TYPE:	MON		FIELD QC TYPE:	REG	
TOP DEPTH:	OK		SAMPLE USAGE:	INV	
BOTTOM DEPTH:	↓		EXCAVATED:		YES / <u>NO</u> NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-All Metals	1 LITER POLY	1	HNO3 ICE	Y	NA
	WSP-CR52/53	1 LITER POLY	1	ICE		
	WSP- GENINORG+PerChlorat e	1 LITER POLY	1	ICE		
	WSP-N15/O18- NO3	40 ML SEPTUM AMBER GLASS	2	ICE		
	WSP- NH3+NO3/NO2	500 ML AMBER GLASS	1	H2SO4		

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):

S. Kosler / D. Jaramillo

RELINQUISHED BY (Printed Name) W Sanchez (Signature) <i>Wayne Sanchez</i>	Date/Time 11/16/16 1555	RECEIVED BY (Printed Name) S. Sherwood (Signature) <i>S. Sherwood</i>	Date/Time 11/16/16 1555
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11014

EVENT NAME: Mort/Sandia_Mort MY2017 Q1

SAMPLE ID: CAMO-17-127261

WORK ORDER: NA

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/21/16	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1047		MEDIA:	UA	↓
PRS ID:	OK		SAMPLE TECH CODE:	UA	GSP
LOCATION ID:	SIMR-2		FIELD PREP:	F	OK
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-All Metals	1 LITER POLY	1	HNO3 ICE	Y	NA
↓	WSP-CR52/53	1 LITER POLY	1	ICE	↓	↓
↓	WSP- GENINORG+PerChlorat e	1 LITER POLY	1	ICE	↓	↓
↓	WSP-N15/O18- NO3	40 ML SEPTUM AMBER GLASS	2	ICE	↓	↓
✓	WSP- NH3+NO3/NO2	500 ML AMBER GLASS	1	H2SO4	↓	↓

SAMPLE COMMENTS: Sampled 40 ft from a running diesel generator

LOCATION COMMENTS: None

FIELD PARAMETERS:

Dissolved Oxygen	7.50	mg/L	Flow (in gpm)	3.67	GPM	Oxidation-Reduction Potential	2000	mV
pH	7.72	SU	Specific Conductance	131.3	uS/cm	Temperature	17.6	deg C
Turbidity	9.4	NTU						

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

RELINQUISHED BY (Printed Name) Allizyn Stanfield (Signature)	Date/Time 11/21/16 1215	RECEIVED BY (Printed Name) K. Green (Signature)	Date/Time 11/21/16 1215
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

Department of Geology

School of Earth, Society, & Environment
156 Computing Applications Building
605 E. Springfield Avenue
Champaign, IL 61820



14 April, 2017

Ms. Susan Leese
ARS International, LLC
2609 North River Road
Port Allen, LA 70767-3469
225.381.2991 sleese@amrad.com

Subject: Cr stable isotope results

Dear Susan:

Please find below tabulated results from Cr stable isotope analysis of water samples from Los Alamos National Laboratory (LANL). The samples were analyzed on April 13th and 14th, 2017 and results were reported via EDD, on April 14th.

<i>COC #</i>	Sample ID	$\delta^{53}\text{Cr}^1$ (per mil)	Duplicate $\delta^{53}\text{Cr}^1$ (per mil)
2017-650-1	CAMO-17-127242	1.64	
2017-650-1	CAMO-17-127214	1.59	
2017-650-1	CAMO-17-127243	1.14	
2017-650-1	CAMO-17-127244	1.15	
2017-650-1	CAMO-17-127215	1.04	
2017-650-1	CAMO-17-127245	1.03	
2017-650-1	CAMO-17-127247	0.84	
2017-650-1	CAMO-17-127249	1.43	
2017-650-1	CAMO-17-127250	1.24	
2017-650-1	CAMO-17-127252	Reprep ³	
2017-650-1	CAMO-17-127253	1.13	
2017-650-1	CAMO-17-127254	0.98	
2017-650-1	CAMO-17-127255	1.23	1.25
2017-650-1	CAMO-17-127257	0.93	
2017-650-1	CAMO-17-127258	0.92	
2017-650-1	CAMO-17-127260	0.90	
2017-650-1	CAMO-17-127261	0.97	
2017-649	CASA-17-127290	1.20	
2017-649	CASA-17-127291	1.80	
2017-649	CASA-17-127292	Reprep ³	
2017-649	CASA-17-127293	0.93	
2017-649	CASA-17-127268	0.94	
2017-649	CASA-17-127294	0.91	0.87
2017-649	CASA-17-127295	1.28	
2017-649	CASA-17-127296	1.84	
2017-649	CASA-17-127307	0.12	
2017-649	CASA-17-127308	1.12	

¹Parts per thousand deviation of the measured $^{53}\text{Cr}/^{52}\text{Cr}$ ratio from that of the NIST SRM-979 standard.

²Not analyzed; insufficient Cr(VI) was present in the sample to allow accurate isotope ratio analysis.

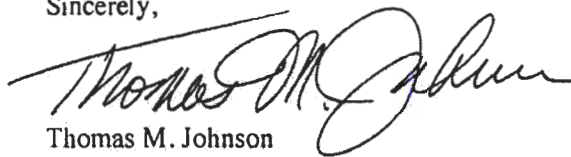
³Reanalysis in progress; sample must be prepared again.

The analytical methods used for these samples are identical to those used for LANL water analyses for the past several years, and are described in the article: Reinhard, C.T., et al., 2014. The isotopic composition of authigenic chromium in anoxic marine sediments: A case study from the Cariaco Basin. *Earth and Planetary Science Letters* vol. 407, pp. 9-18. Nominal precision is ± 0.2 per mil, though actual reproducibility is generally better than that.

A raw data table is attached. Analyses identified as "979" are NIST SRM-979. Analyses identified as "3112a" are NIST SRM-3112a, which has a published value of -0.07 per mil. The SRM-3112a standard solutions were processed through the sample preparation procedure with the reported samples. Sample results are normalized to the mean value of SRM-979 for the analytical session.

Chain of Custody (COC) forms are also attached. Some samples, as indicated above, were not analyzed. Where indicated, very little Cr was recovered by our sample preparation method. We assume this is because actual concentrations were much lower than expected. Other possible causes are: 1) The samples were acidified or 2) Other dissolved components in the sample (e.g., organic compounds) interfered with our anion exchange process. In some cases, sufficient Cr is present but samples must be prepared a second time to attain an acceptable ratio of double spike to sample Cr.

Sincerely,

A handwritten signature in black ink, appearing to read "Thomas M. Johnson", written in a cursive style.

Thomas M. Johnson
Professor of Geology

Smpl ID	52 Int (V)	std err	Raw 50/52	std err	Raw 53/52	std err	Raw 54/52	std err	Raw 56/54	std err	Raw 51/52
'979_125ppb' run	1.98E+00	{ 1.16E-03 }	6.05E-01	{ 2.88E-05 }	1.18E-01	{ 2.49E-06 }	5.13E-01	{ 3.31E-05 }	4.44E-03	{ 0.00E+00 }	1.53E-05
'979_125ppb' run	1.94E+00	{ 8.47E-03 }	6.05E-01	{ 4.87E-05 }	1.18E-01	{ 2.23E-06 }	5.13E-01	{ 4.46E-05 }	4.40E-03	{ 2.91E-11 }	9.71E-06
'979_125ppb' run	1.96E+00	{ 7.16E-03 }	6.05E-01	{ 5.36E-05 }	1.18E-01	{ 2.32E-06 }	5.13E-01	{ 4.68E-05 }	4.29E-03	{ 0.00E+00 }	1.29E-05
'979_125ppb' run	1.97E+00	{ 6.85E-03 }	6.05E-01	{ 4.13E-05 }	1.18E-01	{ 2.54E-06 }	5.13E-01	{ 3.35E-05 }	4.43E-03	{ 0.00E+00 }	1.12E-05
'3112a_125ppb' r	2.68E+00	{ 1.26E-03 }	6.57E-01	{ 8.36E-06 }	1.18E-01	{ 1.57E-06 }	5.59E-01	{ 6.88E-06 }	1.46E-02	{ 5.89E-11 }	6.48E-04
'3112a_125ppb' r	2.64E+00	{ 7.68E-03 }	6.57E-01	{ 1.87E-05 }	1.18E-01	{ 2.21E-06 }	5.59E-01	{ 1.49E-05 }	1.46E-02	{ 5.59E-11 }	6.49E-04
'979_75ppb' run c	8.89E-01	{ 3.24E-03 }	5.98E-01	{ 7.48E-05 }	1.18E-01	{ 2.71E-06 }	5.08E-01	{ 5.92E-05 }	1.29E-02	{ 0.00E+00 }	1.82E-05
'979_75ppb' run c	9.03E-01	{ 7.72E-04 }	5.98E-01	{ 2.45E-05 }	1.18E-01	{ 4.04E-06 }	5.07E-01	{ 1.86E-05 }	1.36E-02	{ 6.90E-11 }	1.12E-05
'979_125ppb' run	1.96E+00	{ 6.99E-03 }	6.04E-01	{ 2.24E-05 }	1.18E-01	{ 2.47E-06 }	5.13E-01	{ 5.41E-05 }	4.43E-03	{ 0.00E+00 }	1.23E-05
'979_125ppb' run	1.96E+00	{ 3.95E-03 }	6.04E-01	{ 1.77E-05 }	1.18E-01	{ 2.60E-06 }	5.13E-01	{ 1.42E-05 }	4.38E-03	{ 1.17E-11 }	1.14E-05
'979_125ppb' run	1.96E+00	{ 1.38E-03 }	6.04E-01	{ 3.47E-05 }	1.18E-01	{ 2.18E-06 }	5.13E-01	{ 3.18E-05 }	4.50E-03	{ 0.00E+00 }	1.45E-05
979_125ppb'	1.97E+00	{ 2.99E-03 }	6.04E-01	{ 2.82E-05 }	1.18E-01	{ 1.84E-06 }	5.13E-01	{ 2.59E-05 }	4.35E-03	{ 0.00E+00 }	9.62E-06
Proc_3112a_1'	1.15E+00	{ 1.75E-03 }	6.02E-01	{ 1.03E-05 }	1.18E-01	{ 3.28E-06 }	5.11E-01	{ 9.17E-06 }	3.31E-02	{ 1.92E-10 }	6.66E-05
979_125ppb'	1.97E+00	{ 3.95E-03 }	6.05E-01	{ 4.60E-05 }	1.18E-01	{ 1.99E-06 }	5.14E-01	{ 3.76E-05 }	5.24E-03	{ 0.00E+00 }	1.17E-05
Proc_3112a_1'	1.16E+00	{ 5.51E-04 }	6.02E-01	{ 1.30E-05 }	1.18E-01	{ 2.78E-06 }	5.11E-01	{ 8.31E-06 }	3.25E-02	{ 0.00E+00 }	6.80E-05
Proc_3112a_2'	1.73E+00	{ 6.89E-04 }	5.90E-01	{ 7.24E-06 }	1.18E-01	{ 2.50E-06 }	5.01E-01	{ 5.52E-06 }	4.75E-02	{ 0.00E+00 }	5.95E-05
979_Underspiked'	2.14E+00	{ 1.36E-03 }	2.89E-01	{ 8.17E-06 }	1.17E-01	{ 2.28E-06 }	2.40E-01	{ 6.39E-06 }	3.37E-02	{ 2.10E-10 }	1.82E-05
979_125ppb'	1.99E+00	{ 5.34E-03 }	6.05E-01	{ 1.49E-05 }	1.18E-01	{ 2.15E-06 }	5.14E-01	{ 2.55E-05 }	4.22E-03	{ 2.67E-11 }	1.24E-05
127242'	1.15E+00	{ 2.55E-03 }	5.53E-01	{ 8.64E-06 }	1.18E-01	{ 3.33E-06 }	4.70E-01	{ 7.64E-06 }	1.22E-02	{ 6.14E-12 }	9.84E-04
127214'	1.34E+00	{ 3.68E-03 }	5.71E-01	{ 1.08E-05 }	1.18E-01	{ 3.30E-06 }	4.86E-01	{ 1.02E-05 }	1.95E-02	{ 1.07E-10 }	5.11E-03
127243'	2.15E+00	{ 1.43E-03 }	5.93E-01	{ 8.24E-06 }	1.18E-01	{ 2.09E-06 }	5.05E-01	{ 5.84E-06 }	4.05E-02	{ 9.44E-11 }	7.40E-04
127244'	1.51E+00	{ 9.37E-04 }	5.82E-01	{ 1.04E-05 }	1.18E-01	{ 2.97E-06 }	4.95E-01	{ 1.07E-05 }	1.67E-02	{ 0.00E+00 }	1.95E-02
127215'	1.56E+00	{ 1.20E-03 }	5.51E-01	{ 7.49E-06 }	1.18E-01	{ 2.51E-06 }	4.70E-01	{ 6.97E-06 }	9.98E-02	{ 0.00E+00 }	1.86E-02
979_125ppb'	2.06E+00	{ 1.25E-03 }	5.96E-01	{ 8.30E-05 }	1.18E-01	{ 2.22E-06 }	5.06E-01	{ 7.94E-05 }	4.62E-03	{ 0.00E+00 }	1.11E-05
127245'	1.12E+00	{ 6.95E-04 }	3.03E-01	{ 7.71E-06 }	1.17E-01	{ 3.18E-06 }	2.54E-01	{ 8.35E-06 }	1.50E-01	{ 7.84E-10 }	2.98E-02
127247'	1.46E+00	{ 4.47E-03 }	5.67E-01	{ 1.06E-05 }	1.18E-01	{ 3.36E-06 }	4.83E-01	{ 1.23E-05 }	2.18E-02	{ 8.28E-11 }	4.14E-03
127249'	1.52E+00	{ 3.35E-03 }	3.03E-01	{ 9.21E-06 }	1.17E-01	{ 2.42E-06 }	2.52E-01	{ 5.06E-06 }	4.16E-02	{ 2.73E-10 }	2.40E-03
127250'	1.33E+00	{ 7.03E-04 }	2.78E-01	{ 7.41E-06 }	1.17E-01	{ 2.77E-06 }	2.30E-01	{ 1.20E-05 }	8.90E-02	{ 0.00E+00 }	2.25E-02
127252'	1.56E-01	{ 9.37E-04 }	5.71E-01	{ 1.83E-05 }	1.18E-01	{ 5.26E-06 }	4.97E-01	{ 1.01E-05 }	1.87E-02	{ 5.46E-11 }	6.49E-03
125ppb_979'	2.11E+00	{ 4.53E-03 }	5.96E-01	{ 1.03E-04 }	1.18E-01	{ 1.92E-06 }	5.06E-01	{ 1.01E-04 }	4.66E-03	{ 1.19E-11 }	1.58E-05
127253'	1.51E+00	{ 3.14E-03 }	5.37E-01	{ 1.42E-05 }	1.18E-01	{ 3.63E-06 }	4.55E-01	{ 8.33E-06 }	1.26E-02	{ 0.00E+00 }	1.37E-02
127254'	1.97E+00	{ 9.57E-04 }	6.04E-01	{ 8.98E-06 }	1.18E-01	{ 2.05E-06 }	5.13E-01	{ 8.81E-06 }	5.34E-02	{ 0.00E+00 }	5.21E-03
127255'	1.54E+00	{ 1.01E-03 }	5.54E-01	{ 8.92E-06 }	1.18E-01	{ 2.97E-06 }	4.70E-01	{ 8.92E-06 }	2.23E-02	{ 0.00E+00 }	6.15E-03
127257'	2.30E+00	{ 5.17E-03 }	5.86E-01	{ 8.86E-06 }	1.18E-01	{ 1.89E-06 }	4.97E-01	{ 6.07E-06 }	2.80E-02	{ 1.23E-10 }	1.93E-03
127258'	1.15E+00	{ 1.48E-03 }	3.11E-01	{ 1.12E-05 }	1.17E-01	{ 3.38E-06 }	2.61E-01	{ 1.08E-05 }	1.24E-01	{ 0.00E+00 }	3.32E-02
979_125ppb'	2.10E+00	{ 3.79E-03 }	5.98E-01	{ 1.23E-04 }	1.18E-01	{ 2.00E-06 }	5.07E-01	{ 1.14E-04 }	4.60E-03	{ 3.39E-11 }	1.43E-05
127260'	2.15E+00	{ 9.63E-04 }	5.91E-01	{ 7.13E-06 }	1.18E-01	{ 2.02E-06 }	5.01E-01	{ 4.89E-06 }	2.92E-02	{ 1.93E-10 }	4.83E-04
127261'	1.23E+00	{ 2.19E-03 }	3.19E-01	{ 8.02E-06 }	1.17E-01	{ 2.71E-06 }	2.65E-01	{ 7.84E-06 }	3.10E-02	{ 0.00E+00 }	7.40E-03
127290'	1.76E+00	{ 1.04E-03 }	5.58E-01	{ 6.29E-06 }	1.18E-01	{ 2.37E-06 }	4.73E-01	{ 6.75E-06 }	1.25E-02	{ 0.00E+00 }	3.99E-03
127291'	8.73E-01	{ 5.75E-04 }	3.08E-01	{ 1.07E-05 }	1.18E-01	{ 4.06E-06 }	2.57E-01	{ 9.55E-06 }	2.22E-02	{ 7.26E-11 }	6.75E-02
127292'	1.59E-01	{ 1.80E-03 }	3.75E-01	{ 7.82E-05 }	1.17E-01	{ 3.24E-06 }	2.72E-01	{ 5.09E-06 }	6.33E-01	{ 1.57E-09 }	4.62E-02
979_125ppb'	2.10E+00	{ 2.95E-03 }	5.91E-01	{ 2.69E-04 }	1.18E-01	{ 2.65E-06 }	5.01E-01	{ 2.39E-04 }	4.88E-03	{ 3.56E-11 }	1.91E-05
127293'	1.32E+00	{ 3.20E-03 }	3.05E-01	{ 7.84E-06 }	1.17E-01	{ 2.85E-06 }	2.53E-01	{ 6.63E-06 }	3.73E-02	{ 0.00E+00 }	3.05E-02
127268'	1.42E+00	{ 2.16E-03 }	3.04E-01	{ 5.48E-06 }	1.17E-01	{ 3.13E-06 }	2.53E-01	{ 4.76E-06 }	1.07E-01	{ 0.00E+00 }	4.23E-03
127294'	2.18E+00	{ 1.28E-03 }	6.17E-01	{ 7.58E-06 }	1.18E-01	{ 2.40E-06 }	5.25E-01	{ 6.63E-06 }	4.96E-02	{ 0.00E+00 }	7.52E-04
127295'	1.73E+00	{ 9.83E-04 }	5.66E-01	{ 7.08E-06 }	1.18E-01	{ 2.60E-06 }	4.81E-01	{ 4.85E-06 }	3.51E-02	{ 1.52E-10 }	3.11E-03
127296'	1.18E+00	{ 1.11E-03 }	5.77E-01	{ 7.40E-06 }	1.18E-01	{ 3.07E-06 }	4.90E-01	{ 6.61E-06 }	2.94E-02	{ 0.00E+00 }	2.04E-03
979_125ppb'	2.11E+00	{ 1.26E-03 }	5.88E-01	{ 1.84E-04 }	1.18E-01	{ 2.28E-06 }	4.98E-01	{ 1.69E-04 }	5.02E-03	{ 0.00E+00 }	1.57E-05
127307'	9.32E-01	{ 5.46E-04 }	6.19E-01	{ 1.10E-05 }	1.18E-01	{ 3.49E-06 }	5.29E-01	{ 9.06E-06 }	3.37E-02	{ 0.00E+00 }	8.98E-03
127308'	2.37E+00	{ 1.11E-03 }	5.51E-01	{ 5.40E-06 }	1.18E-01	{ 1.55E-06 }	4.67E-01	{ 4.83E-06 }	4.95E-02	{ 2.83E-10 }	1.03E-04
127255-2'	1.21E+00	{ 6.50E-04 }	6.12E-01	{ 9.87E-06 }	1.18E-01	{ 2.82E-06 }	5.20E-01	{ 8.25E-06 }	1.25E-02	{ 6.67E-11 }	6.50E-04
127294-2'	2.23E+00	{ 1.39E-03 }	5.99E-01	{ 7.54E-06 }	1.18E-01	{ 2.18E-06 }	5.09E-01	{ 3.84E-06 }	2.75E-02	{ 0.00E+00 }	6.79E-04
110538'	2.15E+00	{ 1.10E-03 }	5.61E-01	{ 7.21E-06 }	1.18E-01	{ 1.86E-06 }	4.77E-01	{ 4.57E-06 }	9.08E-02	{ 0.00E+00 }	5.70E-04
979_125ppb'	2.12E+00	{ 1.56E-03 }	5.87E-01	{ 1.08E-04 }	1.18E-01	{ 2.26E-06 }	4.97E-01	{ 9.91E-05 }	5.05E-03	{ 0.00E+00 }	1.23E-05
Proc_3112a_1'	1.32E+00	{ 1.02E-03 }	6.02E-01	{ 1.12E-05 }	1.18E-01	{ 2.80E-06 }	5.11E-01	{ 6.40E-06 }	3.07E-02	{ 1.59E-10 }	6.45E-05
Proc_3112a_2'	1.83E+00	{ 1.24E-03 }	5.91E-01	{ 7.74E-06 }	1.17E-01	{ 2.33E-06 }	5.00E-01	{ 5.21E-06 }	4.53E-02	{ 0.00E+00 }	5.59E-05
979_125ppb'	2.11E+00	{ 1.25E-03 }	5.93E-01	{ 1.16E-04 }	1.18E-01	{ 2.13E-06 }	5.02E-01	{ 1.05E-04 }	5.01E-03	{ 0.00E+00 }	1.49E-05
979_125ppb'	2.11E+00	{ 1.07E-03 }	5.95E-01	{ 7.35E-05 }	1.18E-01	{ 2.27E-06 }	5.04E-01	{ 6.72E-05 }	4.91E-03	{ 3.35E-11 }	1.34E-05

std err	Raw 49/50	std err	Conv Err	std err	FeCorrEst	std err	VCorrEst	std err	TiCorrEst	std err	Mass Bias
{ 1.06E-06 }	8.82E-06 { 5.84E-14 }	-5.61E-05 { 6.86E-06 }	8.88E-02 { 2.33E-06 }	1.44E-05 { 9.96E-07 }	2.18E-03 { 3.18E-08 }	3.16E+01					
{ 8.63E-07 }	8.82E-06 { 0.00E+00 }	-4.09E-05 { 6.89E-06 }	8.81E-02 { 8.91E-07 }	9.12E-06 { 8.11E-07 }	2.18E-03 { 1.23E-08 }	3.17E+01					
{ 9.62E-07 }	5.75E-06 { 1.46E-14 }	-2.12E-05 { 6.39E-06 }	8.58E-02 { 1.13E-06 }	1.22E-05 { 9.04E-07 }	1.42E-03 { 1.04E-08 }	3.17E+01					
{ 9.29E-07 }	5.93E-06 { 2.65E-14 }	-4.52E-05 { 7.60E-06 }	8.86E-02 { 8.22E-07 }	1.05E-05 { 8.73E-07 }	1.47E-03 { 7.56E-09 }	3.18E+01					
{ 1.04E-06 }	4.86E-05 { 1.17E-14 }	-3.24E-05 { 3.78E-06 }	2.92E-01 { 2.22E-06 }	5.60E-04 { 9.00E-07 }	1.20E-02 { 5.09E-08 }	3.15E+01					
{ 8.38E-07 }	4.63E-05 { 1.16E-13 }	-3.68E-05 { 4.08E-06 }	2.92E-01 { 7.21E-06 }	5.61E-04 { 7.24E-07 }	1.15E-02 { 1.57E-07 }	3.17E+01					
{ 2.38E-06 }	1.52E-05 { 0.00E+00 }	-3.59E-05 { 6.54E-06 }	2.57E-01 { 4.23E-06 }	1.73E-05 { 2.26E-06 }	3.77E-03 { 3.44E-08 }	3.17E+01					
{ 2.64E-06 }	1.41E-05 { 0.00E+00 }	-3.93E-05 { 1.22E-05 }	2.71E-01 { 3.10E-06 }	1.06E-05 { 2.51E-06 }	3.50E-03 { 2.22E-08 }	3.17E+01					
{ 1.41E-06 }	5.34E-06 { 3.26E-14 }	-2.83E-05 { 7.01E-06 }	8.86E-02 { 2.90E-06 }	1.16E-05 { 1.33E-06 }	1.32E-03 { 2.40E-08 }	3.20E+01					
{ 1.10E-06 }	5.24E-06 { 1.85E-14 }	-4.05E-05 { 7.49E-06 }	8.76E-02 { 7.57E-07 }	1.07E-05 { 1.04E-06 }	1.30E-03 { 6.23E-09 }	3.20E+01					
{ 1.15E-06 }	6.25E-06 { 0.00E+00 }	-3.33E-05 { 6.62E-06 }	9.00E-02 { 7.68E-07 }	1.36E-05 { 1.08E-06 }	1.55E-03 { 7.34E-09 }	3.22E+01					
{ 1.14E-06 }	5.60E-06 { 9.83E-15 }	-3.78E-05 { 5.46E-06 }	8.70E-02 { 1.06E-06 }	9.04E-06 { 1.07E-06 }	1.39E-03 { 9.37E-09 }	3.21E+01					
{ 1.68E-06 }	1.18E-04 { 6.61E-13 }	-1.16E-05 { 1.03E-05 }	6.63E-01 { 7.37E-06 }	6.29E-05 { 1.59E-06 }	2.92E-02 { 1.80E-07 }	3.15E+01					
{ 1.19E-06 }	5.34E-06 { 1.27E-14 }	1.01E-06 { 6.10E-06 }	1.05E-01 { 1.32E-06 }	1.10E-05 { 1.11E-06 }	1.32E-03 { 9.29E-09 }	3.20E+01					
{ 2.07E-06 }	1.12E-04 { 3.86E-13 }	-2.81E-05 { 8.31E-06 }	6.51E-01 { 9.53E-06 }	6.43E-05 { 1.96E-06 }	2.78E-02 { 2.26E-07 }	3.15E+01					
{ 1.45E-06 }	7.66E-05 { 0.00E+00 }	-3.24E-05 { 8.88E-06 }	9.50E-01 { 8.89E-06 }	5.73E-05 { 1.40E-06 }	1.90E-02 { 9.85E-08 }	3.14E+01					
{ 8.78E-07 }	1.87E-05 { 0.00E+00 }	-3.06E-04 { 6.42E-05 }	6.74E-01 { 1.22E-05 }	3.56E-05 { 1.72E-06 }	4.63E-03 { 4.66E-08 }	3.19E+01					
{ 1.17E-06 }	6.95E-06 { 0.00E+00 }	-2.88E-05 { 6.71E-06 }	8.45E-02 { 8.86E-07 }	1.17E-05 { 1.09E-06 }	1.72E-03 { 1.00E-08 }	3.19E+01					
{ 2.20E-06 }	2.53E-04 { 1.29E-12 }	6.64E-04 { 1.30E-05 }	2.44E-01 { 2.09E-06 }	1.01E-03 { 2.26E-06 }	6.27E-02 { 2.97E-07 }	3.25E+01					
{ 2.14E-06 }	2.09E-04 { 0.00E+00 }	5.92E-04 { 1.10E-05 }	3.89E-01 { 6.00E-06 }	5.08E-03 { 2.10E-06 }	5.18E-02 { 4.43E-07 }	3.22E+01					
{ 1.00E-06 }	8.58E-05 { 3.26E-13 }	3.91E-04 { 7.06E-06 }	8.10E-01 { 8.64E-06 }	7.09E-04 { 9.60E-07 }	2.13E-02 { 1.26E-07 }	3.19E+01					
{ 4.42E-06 }	3.10E-04 { 1.96E-12 }	4.00E-04 { 9.35E-06 }	3.34E-01 { 5.55E-06 }	1.90E-02 { 4.26E-06 }	7.69E-02 { 7.09E-07 }	3.22E+01					
{ 2.42E-06 }	2.76E-04 { 0.00E+00 }	4.81E-04 { 1.01E-05 }	1.99E+00 { 1.72E-05 }	1.91E-02 { 2.53E-06 }	6.85E-02 { 3.27E-07 }	3.23E+01					
{ 1.05E-06 }	6.94E-06 { 0.00E+00 }	-2.61E-05 { 7.21E-06 }	9.25E-02 { 1.07E-06 }	1.06E-05 { 9.98E-07 }	1.72E-03 { 1.11E-08 }	3.19E+01					
{ 3.18E-06 }	4.01E-04 { 4.69E-13 }	2.65E-03 { 8.21E-05 }	2.99E+00 { 6.23E-05 }	5.59E-02 { 7.65E-06 }	9.94E-02 { 1.15E-06 }	3.23E+01					
{ 1.70E-06 }	1.75E-04 { 0.00E+00 }	3.07E-04 { 1.18E-05 }	4.35E-01 { 5.97E-06 }	4.14E-03 { 1.72E-06 }	4.35E-02 { 3.31E-07 }	3.29E+01					
{ 2.19E-06 }	5.47E-04 { 7.38E-13 }	3.41E-03 { 6.57E-05 }	8.32E-01 { 1.45E-05 }	4.49E-03 { 4.11E-06 }	1.35E-01 { 1.31E-06 }	3.19E+01					
{ 4.36E-06 }	6.95E-04 { 0.00E+00 }	3.93E-03 { 1.01E-04 }	1.78E+00 { 2.77E-05 }	4.62E-02 { 9.43E-06 }	1.72E-01 { 1.49E-06 }	3.18E+01					
{ 4.65E-06 }	8.88E-04 { 0.00E+00 }	1.10E-04 { 1.86E-05 }	9.72E-01 { 5.59E-06 }	6.38E-03 { 4.56E-06 }	1.71E-01 { 1.41E-06 }	3.55E+01					
{ 1.14E-06 }	6.82E-06 { 4.65E-14 }	-2.54E-05 { 6.94E-06 }	9.32E-02 { 1.08E-06 }	1.50E-05 { 1.08E-06 }	1.69E-03 { 1.09E-08 }	3.17E+01					
{ 1.22E-05 }	1.68E-04 { 0.00E+00 }	4.95E-04 { 1.13E-05 }	2.53E-01 { 4.63E-06 }	1.45E-02 { 1.29E-05 }	4.16E-02 { 4.23E-07 }	3.20E+01					
{ 1.12E-06 }	1.16E-04 { 0.00E+00 }	3.32E-04 { 6.09E-06 }	1.07E+00 { 1.03E-05 }	4.91E-03 { 9.33E-07 }	2.86E-02 { 1.53E-07 }	3.14E+01					
{ 2.38E-06 }	4.38E-04 { 2.73E-12 }	5.01E-04 { 1.11E-05 }	4.46E-01 { 7.50E-06 }	6.31E-03 { 2.48E-06 }	1.08E-01 { 1.01E-06 }	3.20E+01					
{ 8.66E-07 }	2.33E-04 { 5.51E-13 }	3.23E-04 { 6.42E-06 }	5.61E-01 { 5.67E-06 }	1.87E-03 { 8.39E-07 }	5.77E-02 { 3.24E-07 }	3.16E+01					
{ 4.94E-06 }	4.86E-04 { 2.11E-12 }	2.15E-03 { 7.65E-05 }	2.48E+00 { 3.75E-05 }	6.06E-02 { 1.31E-05 }	1.20E-01 { 1.01E-06 }	3.22E+01					
{ 9.13E-07 }	7.02E-06 { 0.00E+00 }	-1.59E-05 { 6.21E-06 }	9.21E-02 { 1.16E-06 }	1.36E-05 { 8.69E-07 }	1.74E-03 { 1.21E-08 }	3.17E+01					
{ 9.49E-07 }	5.98E-05 { 4.30E-13 }	3.07E-04 { 6.72E-06 }	5.84E-01 { 4.52E-06 }	4.65E-04 { 9.13E-07 }	1.48E-02 { 6.37E-08 }	3.13E+01					
{ 3.49E-06 }	5.12E-04 { 0.00E+00 }	1.98E-03 { 6.24E-05 }	6.21E-01 { 9.30E-06 }	1.32E-02 { 6.62E-06 }	1.27E-01 { 1.05E-06 }	3.14E+01					
{ 1.40E-06 }	4.72E-04 { 0.00E+00 }	4.72E-04 { 9.88E-06 }	2.50E-01 { 2.20E-06 }	4.07E-03 { 1.41E-06 }	1.17E-01 { 5.72E-07 }	3.17E+01					
{ 7.59E-06 }	5.62E-04 { 3.48E-12 }	4.02E-03 { 9.52E-05 }	4.44E-01 { 7.58E-06 }	1.24E-01 { 1.71E-05 }	1.40E-01 { 1.32E-06 }	3.35E+01					
{ 4.61E-05 }	6.40E-04 { 2.57E-12 }	3.02E-03 { 8.18E-05 }	2.73E-01 { 1.36E-04 }	8.31E-02 { 3.60E-06 }	1.59E-01 { 1.29E-06 }	3.26E+01					
{ 1.42E-06 }	8.36E-06 { 3.28E-14 }	-3.17E-05 { 8.04E-06 }	9.76E-02 { 9.64E-07 }	1.84E-05 { 1.37E-06 }	2.07E-03 { 1.14E-08 }	3.16E+01					
{ 5.99E-06 }	4.64E-04 { 1.72E-12 }	2.15E-03 { 6.84E-05 }	7.47E-01 { 1.03E-05 }	5.69E-02 { 1.11E-05 }	1.15E-01 { 8.78E-07 }	3.16E+01					
{ 1.78E-06 }	3.19E-04 { 0.00E+00 }	2.36E-03 { 8.04E-05 }	2.14E+00 { 3.23E-05 }	7.92E-03 { 3.31E-06 }	7.91E-02 { 6.62E-07 }	3.13E+01					
{ 1.07E-06 }	7.00E-05 { 8.93E-14 }	2.87E-04 { 7.18E-06 }	9.93E-01 { 8.87E-06 }	6.94E-04 { 9.89E-07 }	1.73E-02 { 8.59E-08 }	3.14E+01					
{ 1.36E-06 }	2.57E-04 { 0.00E+00 }	5.02E-04 { 9.57E-06 }	7.03E-01 { 5.01E-06 }	3.12E-03 { 1.36E-06 }	6.38E-02 { 2.52E-07 }	3.18E+01					
{ 1.70E-06 }	2.00E-04 { 0.00E+00 }	6.78E-04 { 1.10E-05 }	5.88E-01 { 5.54E-06 }	2.01E-03 { 1.68E-06 }	4.95E-02 { 2.59E-07 }	3.18E+01					
{ 1.01E-06 }	8.23E-06 { 5.32E-14 }	-1.34E-05 { 6.82E-06 }	1.00E-01 { 9.74E-07 }	1.52E-05 { 9.79E-07 }	2.04E-03 { 1.10E-08 }	3.16E+01					
{ 3.00E-06 }	3.26E-04 { 7.20E-13 }	2.36E-05 { 9.83E-06 }	6.72E-01 { 6.36E-06 }	8.22E-03 { 2.77E-06 }	8.09E-02 { 4.25E-07 }	3.31E+01					
{ 9.21E-07 }	7.63E-05 { 3.78E-13 }	4.90E-04 { 6.77E-06 }	9.91E-01 { 7.57E-06 }	1.06E-04 { 9.52E-07 }	1.89E-02 { 8.01E-08 }	3.12E+01					
{ 1.42E-06 }	1.56E-04 { 8.14E-13 }	3.76E-04 { 8.48E-06 }	2.50E-01 { 2.35E-06 }	6.03E-04 { 1.32E-06 }	3.85E-02 { 2.01E-07 }	3.18E+01					
{ 1.02E-06 }	5.53E-05 { 2.88E-14 }	2.83E-04 { 6.57E-06 }	5.50E-01 { 4.67E-06 }	6.45E-04 { 9.66E-07 }	1.37E-02 { 6.46E-08 }	3.15E+01					
{ 7.29E-07 }	1.11E-04 { 0.00E+00 }	4.31E-04 { 7.12E-06 }	1.82E+00 { 1.10E-05 }	5.78E-04 { 7.40E-07 }	2.75E-02 { 9.27E-08 }	3.12E+01					
{ 1.14E-06 }	1.01E-05 { 0.00E+00 }	-6.78E-06 { 6.60E-06 }	1.01E-01 { 8.07E-07 }	1.20E-05 { 1.10E-06 }	2.49E-03 { 1.10E-08 }	3.14E+01					
{ 2.21E-06 }	1.14E-04 { 5.47E-13 }	-1.23E-05 { 8.49E-06 }	6.16E-01 { 8.62E-06 }	6.10E-05 { 2.09E-06 }	2.83E-02 { 2.20E-07 }	3.12E+01					
{ 1.18E-06 }	7.68E-05 { 0.00E+00 }	-1.20E-05 { 7.50E-06 }	9.08E-01 { 7.01E-06 }	5.40E-05 { 1.13E-06 }	1.90E-02 { 8.14E-08 }	3.07E+01					
{ 1.07E-06 }	8.43E-06 { 0.00E+00 }	-2.07E-05 { 6.93E-06 }	1.00E-01 { 1.10E-06 }	1.43E-05 { 1.03E-06 }	2.09E-03 { 1.27E-08 }	3.16E+01					
{ 1.21E-06 }	6.92E-06 { 0.00E+00 }	-1.22E-05 { 6.88E-06 }	9.82E-02 { 7.23E-07 }	1.28E-05 { 1.16E-06 }	1.72E-03 { 7.01E-09 }	3.16E+01					

		Delta					Final Delta			
std err	54Spk/52Nat	53Cr	std err	Smpl ID	Date	Time	979 std mean	53Cr	Diff vs. Orig.	Comment
{ 1.42E-02 }	4.54E-01 { 2.89E-05 }	-0.18 { 2.13E-02 }	{ 979_125ppb' }	13-Apr	14:51	-1.23E-01	-0.06			
{ 5.48E-03 }	4.55E-01 { 4.05E-05 }	-0.13 { 2.14E-02 }	{ 979_125ppb' }	13-Apr	15:01	-1.23E-01	-0.01			
{ 7.14E-03 }	4.55E-01 { 4.34E-05 }	-0.07 { 1.99E-02 }	{ 979_125ppb' }	13-Apr	15:11	-1.23E-01	0.05			
{ 5.03E-03 }	4.55E-01 { 3.23E-05 }	-0.15 { 2.36E-02 }	{ 979_125ppb' }	13-Apr	15:21	-1.23E-01	-0.02			
{ 4.12E-03 }	4.97E-01 { 5.63E-06 }	-0.15 { 1.49E-02 }	{ 3112a_125pp }	13-Apr	15:36	-1.23E-01	-0.03			
{ 1.34E-02 }	4.97E-01 { 4.05E-06 }	-0.16 { 1.61E-02 }	{ 3112a_125pp }	13-Apr	15:46	-1.23E-01	-0.04			
{ 8.92E-03 }	4.49E-01 { 5.76E-05 }	-0.12 { 1.96E-02 }	{ 979_75ppb' r1 }	13-Apr	16:01	-1.23E-01	0.00			
{ 6.19E-03 }	4.49E-01 { 1.79E-05 }	-0.13 { 3.64E-02 }	{ 979_75ppb' r1 }	13-Apr	16:11	-1.23E-01	-0.01			
{ 1.77E-02 }	4.54E-01 { 3.33E-05 }	-0.09 { 2.18E-02 }	{ 979_125ppb' }	13-Apr	16:26	-1.23E-01	0.03			
{ 4.69E-03 }	4.55E-01 { 1.40E-05 }	-0.13 { 2.33E-02 }	{ 979_125ppb' }	13-Apr	16:35	-1.23E-01	-0.01			
{ 4.63E-03 }	4.54E-01 { 3.00E-05 }	-0.11 { 2.06E-02 }	{ 979_125ppb' }	13-Apr	16:57	-1.23E-01	0.02			
{ 6.60E-03 }	4.55E-01 { 2.34E-05 }	-0.12 { 1.70E-02 }	{ 979_125ppb' }	13-Apr	17:59	-6.44E-02	-0.06			
{ 6.03E-03 }	4.52E-01 { 6.33E-06 }	-0.08 { 3.09E-02 }	{ Proc_3112a_1 }	13-Apr	18:14	-6.44E-02	-0.01			
{ 6.85E-03 }	4.55E-01 { 3.70E-05 }	0.00 { 1.90E-02 }	{ 979_125ppb' }	13-Apr	18:29	-6.44E-02	0.06			
{ 7.93E-03 }	4.52E-01 { 4.60E-06 }	-0.13 { 2.49E-02 }	{ Proc_3112a_1 }	13-Apr	18:44	-6.44E-02	-0.06			
{ 5.07E-03 }	4.43E-01 { 4.54E-06 }	-0.15 { 2.48E-02 }	{ Proc_3112a_2 }	13-Apr	18:59	-6.44E-02	-0.09			
{ 9.88E-03 }	1.97E-01 { 5.57E-06 }	-0.13 { 2.31E-02 }	{ 979_Underspill }	13-Apr	19:14	-6.44E-02	-0.06			
{ 5.68E-03 }	4.55E-01 { 1.92E-05 }	-0.09 { 2.10E-02 }	{ 979_125ppb' }	13-Apr	19:29	-6.44E-02	-0.03			
{ 4.64E-03 }	4.13E-01 { 6.01E-06 }	1.58 { 3.12E-02 }	{ 127242' }	13-Apr	19:44	-6.44E-02	1.64			
{ 8.37E-03 }	4.28E-01 { 5.48E-06 }	1.53 { 2.88E-02 }	{ 127214' }	13-Apr	19:59	-6.44E-02	1.59			
{ 5.79E-03 }	4.46E-01 { 3.97E-06 }	1.08 { 2.03E-02 }	{ 127243' }	13-Apr	20:15	-6.44E-02	1.14			
{ 9.00E-03 }	4.37E-01 { 5.94E-06 }	1.09 { 2.59E-02 }	{ 127244' }	13-Apr	20:30	-6.44E-02	1.15			
{ 4.67E-03 }	4.11E-01 { 4.59E-06 }	0.97 { 2.32E-02 }	{ 127215' }	13-Apr	20:45	-6.44E-02	1.04			
{ 6.29E-03 }	4.48E-01 { 7.13E-05 }	-0.08 { 2.15E-02 }	{ 979_125ppb' }	13-Apr	21:00	-6.44E-02	-0.02			
{ 1.14E-02 }	2.08E-01 { 6.00E-06 }	0.97 { 3.20E-02 }	{ 127245' }	13-Apr	21:15	-6.44E-02	1.03			
{ 7.45E-03 }	4.24E-01 { 5.26E-06 }	0.78 { 2.93E-02 }	{ 127247' }	13-Apr	21:30	-6.44E-02	0.84			
{ 9.47E-03 }	2.08E-01 { 5.32E-06 }	1.37 { 2.68E-02 }	{ 127249' }	13-Apr	21:45	-6.44E-02	1.43			
{ 8.50E-03 }	1.87E-01 { 5.55E-06 }	1.18 { 3.14E-02 }	{ 127250' }	13-Apr	22:00	-6.44E-02	1.24			
{ 8.09E-03 }	1.31E-01 { 6.05E-06 }	0.35 { 3.05E-02 }	{ 127252' }	13-Apr	22:15	-6.44E-02	0.63			Low Volume
{ 6.28E-03 }	4.48E-01 { 8.68E-05 }	-0.08 { 2.08E-02 }	{ 125ppb_979' }	13-Apr	22:30	-6.44E-02	-0.02			
{ 9.92E-03 }	3.99E-01 { 4.50E-06 }	1.07 { 2.47E-02 }	{ 127253' }	13-Apr	22:45	-6.44E-02	1.13			
{ 5.20E-03 }	4.54E-01 { 4.36E-06 }	0.92 { 1.81E-02 }	{ 127254' }	13-Apr	23:00	-6.44E-02	0.98			
{ 9.11E-03 }	4.13E-01 { 3.21E-06 }	1.16 { 2.62E-02 }	{ 127255' }	13-Apr	23:15	-6.44E-02	1.23			
{ 5.48E-03 }	4.39E-01 { 4.21E-06 }	0.86 { 1.78E-02 }	{ 127257' }	13-Apr	23:30	-6.44E-02	0.93			
{ 8.25E-03 }	2.15E-01 { 8.56E-06 }	0.86 { 3.27E-02 }	{ 127258' }	13-Apr	23:45	-6.44E-02	0.92			
{ 6.81E-03 }	4.49E-01 { 1.04E-04 }	-0.05 { 1.87E-02 }	{ 979_125ppb' }	14-Apr	0:00	-6.44E-02	0.01			
{ 4.20E-03 }	4.43E-01 { 3.90E-06 }	0.84 { 1.92E-02 }	{ 127260' }	14-Apr	0:15	-6.44E-02	0.90			
{ 8.15E-03 }	2.20E-01 { 6.19E-06 }	0.91 { 2.94E-02 }	{ 127261' }	14-Apr	0:30	-6.44E-02	0.97			
{ 4.78E-03 }	4.16E-01 { 4.48E-06 }	1.13 { 2.41E-02 }	{ 127290' }	14-Apr	0:45	-6.44E-02	1.20			
{ 9.35E-03 }	2.13E-01 { 8.30E-06 }	1.74 { 4.15E-02 }	{ 127291' }	14-Apr	1:00	-6.44E-02	1.80			
{ 8.00E-03 }	1.31E-01 { 6.21E-06 }	0.35 { 3.05E-02 }	{ 127292' }	14-Apr	1:15	-6.44E-02	0.60			Photochem
{ 5.35E-03 }	4.43E-01 { 2.23E-04 }	-0.10 { 2.34E-02 }	{ 979_125ppb' }	14-Apr	1:30	-6.44E-02	-0.03			
{ 7.50E-03 }	2.09E-01 { 4.55E-06 }	0.87 { 2.83E-02 }	{ 127293' }	14-Apr	1:45	-6.44E-02	0.93			
{ 8.23E-03 }	2.09E-01 { 3.33E-06 }	0.88 { 3.23E-02 }	{ 127268' }	14-Apr	2:00	-6.44E-02	0.94			
{ 4.84E-03 }	4.64E-01 { 4.81E-06 }	0.85 { 2.28E-02 }	{ 127294' }	14-Apr	2:15	-6.44E-02	0.91			
{ 3.87E-03 }	4.23E-01 { 4.23E-06 }	1.22 { 2.41E-02 }	{ 127295' }	14-Apr	2:30	-6.44E-02	1.28			
{ 5.11E-03 }	4.32E-01 { 4.66E-06 }	1.77 { 2.95E-02 }	{ 127296' }	14-Apr	2:46	-6.44E-02	1.84			
{ 5.25E-03 }	4.41E-01 { 1.55E-04 }	-0.04 { 2.00E-02 }	{ 979_125ppb' }	14-Apr	3:01	-6.44E-02	0.03			
{ 5.14E-03 }	4.68E-01 { 7.20E-06 }	0.05 { 3.22E-02 }	{ 127307' }	14-Apr	3:16	-6.44E-02	0.12			
{ 4.14E-03 }	4.10E-01 { 2.77E-06 }	1.06 { 1.55E-02 }	{ 127308' }	14-Apr	3:31	-6.44E-02	1.12			
{ 5.10E-03 }	4.61E-01 { 4.88E-06 }	1.19 { 2.72E-02 }	{ 127255-2' }	14-Apr	3:46	-6.44E-02	1.25		0.03	
{ 4.60E-03 }	4.50E-01 { 3.50E-06 }	0.81 { 1.96E-02 }	{ 127294-2' }	14-Apr	4:01	-6.44E-02	0.87		-0.04	
{ 3.29E-03 }	4.19E-01 { 4.31E-06 }	0.89 { 1.67E-02 }	{ 110538' }	14-Apr	4:16	-6.44E-02	0.96		-0.02	
{ 4.32E-03 }	4.40E-01 { 9.09E-05 }	-0.03 { 1.88E-02 }	{ 979_125ppb' }	14-Apr	4:31	-6.44E-02	0.04			
{ 7.58E-03 }	4.52E-01 { 4.26E-06 }	-0.08 { 2.54E-02 }	{ Proc_3112a_1 }	14-Apr	4:50	-6.44E-02	-0.02			
{ 4.18E-03 }	4.42E-01 { 4.48E-06 }	-0.11 { 2.10E-02 }	{ Proc_3112a_2 }	14-Apr	5:05	-6.44E-02	-0.04			
{ 5.94E-03 }	4.45E-01 { 9.70E-05 }	-0.07 { 2.03E-02 }	{ 979_125ppb' }	14-Apr	5:20	-6.44E-02	0.00			
{ 3.99E-03 }	4.46E-01 { 6.25E-05 }	-0.04 { 2.04E-02 }	{ 979_125ppb' }	14-Apr	5:35	-6.44E-02	0.02			

University of Illinois		Chain of Custody/Analysis Request																		COC/Lab Request #: 2017-650-1 Page 1 of 1					
Urbana IL																									
Client Contact:		Lab Agreement #:				Site Name: Los Alamos National Laboratory																			
		Project Number:				WSP-CR62/53																		Rad Screening Info:	
		Analysis Turnaround Time:																						Lab Reporting Limit Type:	
		24 Hour - <input type="checkbox"/> Other - <input type="checkbox"/>																						Sample Quantitation Limit	
		7 Days - <input type="checkbox"/>																							
		14 Days - <input type="checkbox"/>																							
		21 Days - <input type="checkbox"/>																							
		28 Days - <input checked="" type="checkbox"/>																							
Field Sample ID		Sample Date		Sample Time		Sample Matrix																			
CAMO-17-127242	Nov 8 2016	10:34	W	1																					
CAMO-17-127214	Nov 8 2016	10:34	W	1																					
CAMO-17-127243	Nov 8 2016	13:34	W	1																					
CAMO-17-127244	Nov 15 2016	10:47	W	1																					
CAMO-17-127215	Nov 15 2016	10:47	W	1																					
CAMO-17-127245	Nov 7 2016	12:07	W	1																					
CAMO-17-127247	Nov 15 2016	12:34	W	1																					
CAMO-17-127249	Nov 14 2016	12:33	W	1																					
CAMO-17-127250	Nov 14 2016	14:03	W	1																					
CAMO-17-127252	Nov 7 2016	11:49	W	1																					
CAMO-17-127253	Nov 7 2016	14:05	W	1																					
CAMO-17-127254	Nov 17 2016	10:53	W	1																					
CAMO-17-127255	Nov 17 2016	12:57	W	1																					
CAMO-17-127257	Nov 18 2016	12:16	W	1																					
CAMO-17-127258	Nov 18 2016	15:05	W	1																					
CAMO-17-127260	Nov 16 2016	12:46	W	1																					
CAMO-17-127261	Nov 21 2016	10:47	W	1																					

Special Instructions:			
Relinquished by: [Signature]	Print Name: Melissa Montoya	Date/Time: 11/7/16 3:02	Received by: [Signature]
Relinquished by: [Signature]	Print Name:	Date/Time:	Received by:
Relinquished by:	Print Name:	Date/Time:	Received by:

[illegible]

UNIVERSITY OF ILLINOIS
AT URBANA - CHAMPAIGN

Department of Geology
School of Earth, Society, & Environment
156 Computing Applications Building
605 E. Springfield Avenue
Champaign, IL 61820



21 July, 2017

Ms. Susan Leese
ARS International, LLC
2609 North River Road
Port Allen, LA 70767-3469
225.381.2991 sleese@amrad.com

Subject: Cr stable isotope results

Dear Susan:

Please find below tabulated results from Cr stable isotope analysis of water samples from Los Alamos National Laboratory (LANL). The samples were analyzed on July 19th and 20th, 2017 and results were reported via EDD, on July 21st.

COC #	Sample ID	$\delta^{53}\text{Cr}^1$ (per mil)	Duplicate $\delta^{53}\text{Cr}^1$ (per mil)
2017-1391	CrCH1-17-129984	0.80	
2017-1391	CrCH1-17-129981	0.88	
2017-1391	CrCH1-17-129732	0.90	
2017-1391	CrCH1-17-129980	0.83	
2017-1391	CrCH1-17-129735	0.86	
2017-1392	CASA-17-129340	0.75	0.92
2017-1392	CASA-17-129341	1.84	
2017-1392	CAMO-17-129411	1.01	
2017-1392	CAMO-17-129290	1.25	
2017-1392	CAMO-17-129413	0.85	
2017-1392	CAMO-17-129412	1.20	
2017-1393	CrEX3-17-127067	0.89	
2017-1393	CrEX3-17-126943	1.33	
2017-1393	Cr-EX3-16-123292	1.03	
2017-1393	CrCH2-16-123335	1.34	
2017-1393	CrCH2-16-123328+123329	1.80	
2017-1393	CrCH2-16-123324-123326	2.84	
2017-1393	CrCH2-16-123342	1.25	1.25
2017-1393	CrCH2-16-123510	1.69	
2017-1393	CrCH2-16-123557	1.31	
2017-1393	CrCH2-16-123560	0.99	
2017-1393	CrCH2-16-123566	1.04	
2017-1393	CrCH2-17-129559	1.17	
2017-1393	CrCH2-17-129562	1.25	
2017-1396	TRR-42-16-123764	0.88	
2017-1396	TRR-42-16-123769	0.79	
2017-1396	TRR-28-16-123657	1.07	
2017-1396	TRR-42-16-123759	0.90	
2017-1396	TRR-28-16-123688	1.23	
2017-1396	TRR-28-16-123667	1.23	
2017-1396	TRR-28-16-123651	1.11	

2017-1396	TRR-42-16-123756	0.97	
2017-1396	TRR-28-16-123677	1.26	
2017-1396	TRR-42-17-126877	0.95	
2017-1396	TRR-42-17-126884	0.89	
2017-1396	TRR-28-17-127645	1.13	
2017-1396	TRR-28-17-129043	1.19	
2017-1396	TRR-42-17-126870	0.86	
2017-1396	TRR-28-17-127650	1.03	0.95
2017-1396	TRR-28-17-127668	0.97	
2017-1398	CrCH2-16-123532	1.05	
2017-1398	CrCH2-16-123582	1.28	
2017-1398	CrCH2-16-123578	1.25	
2017-1398	CrCH2-17-128860	1.20	1.22
2017-1398	CrCH2-17-128857	1.19	
2017-1398	CrCH2-17-128859	1.18	
2017-1398	CrCH2-17-128856	1.35	
2017-1398	CrCH2-17-128862	1.14	
2017-650-1	CAMO-17-127252	1.05	
2017-649	CASA-17-127292	1.13	

¹Parts per thousand deviation of the measured ⁵³Cr/⁵²Cr ratio from that of the NIST SRM-979 standard.

²Not analyzed; insufficient Cr(VI) was present in the sample to allow accurate isotope ratio analysis.

³Reanalysis in progress; sample must be prepared again.

The analytical methods used for these samples are identical to those used for LANL water analyses for the past several years, and are described in the article: Reinhard, C.T., et al., 2014. The isotopic composition of authigenic chromium in anoxic marine sediments: A case study from the Cariaco Basin. *Earth and Planetary Science Letters* vol. **407**, pp. 9-18. Nominal precision is ±0.2 per mil, though actual reproducibility is generally better than that.

A raw data table is attached. Analyses identified as “979” are NIST SRM-979. Analyses identified as “3112a” are NIST SRM-3112a, which has a published value of -0.07 per mil. The SRM-3112a standard solutions were processed through the sample preparation procedure with the reported samples. Sample results are normalized to the mean value of SRM-979 for the analytical session.

Chain of Custody (COC) forms are also attached. Some samples may not have been analyzed, as indicated above. Where indicated, very little Cr was recovered by our sample preparation method. Other possible causes are: 1) The samples were acidified or 2) Other dissolved components in the sample (e.g., organic compounds) interfered with our anion exchange process. In some cases, sufficient Cr is present but samples must be prepared a second time to attain an acceptable ratio of double spike to sample Cr.

Sincerely,



Thomas M. Johnson
Professor of Geology