

Friday, February 03, 2012

REQUEST NUMBER: 12-712

**LOS ALAMOS  
NATIONAL LABORATORY**

ATTN: Valerie Davis

General Engineering Laboratories, Inc., Charleston, SC.  
2040 Savage Rd  
Charleston, SC 29407

These Samples are on:

LANL Request Number: 12-712


Per Agreement Number: 126310011

Project Cost Code: MR1A015AGWJ0

Please analyse the enclosed samples  
according to the schedule indicated:

**SHIP DATE: 2/3/2012****TURNAROUND/REPORT DUE: 3/4/2012****TURNAROUND REQ'D: 30 Days****RAD SCREENING: Yes, Below Background****LAB REQUEST COMMENTS:**

LANL ER SMO CONTACT:

Signature: 

PRIORITY	METHOD CODE	CNTNR	SAMPLE ID	SAMPLE MATRIX	DATE SAMPLED	SPECIAL INSTRUCTIONS
	EPA:120.1	1	CAAN-12-2025	WG	2/2/2012	
	EPA:150.1	1	CAAN-12-2025	WG	2/2/2012	
	EPA:160.1	1	CAAN-12-2025	WG	2/2/2012	
	EPA:245.2	1	CAAN-12-2025	WG	2/2/2012	
	EPA:300.0	1	CAAN-12-2025	WG	2/2/2012	
	EPA:310.1	1	CAAN-12-2025	WG	2/2/2012	
	EPA:900	1	CAAN-12-2024	WG	2/2/2012	
	EPA:901.1	1	CAAN-12-2024	WG	2/2/2012	
	EPA:903.1	1	CAAN-12-2024	WG	2/2/2012	
	EPA:904	1	CAAN-12-2024	WG	2/2/2012	

Friday, February 03, 2012

REQUEST NUMBER: 12-712

PRIORITY	METHOD CODE	CNTNR	SAMPLE ID	SAMPLE MATRIX	DATE SAMPLED	SPECIAL INSTRUCTIONS
	EPA:905.0	1	CAAN-12-2024	WG	2/2/2012	
	HASL-300:AM-241	1	CAAN-12-2024	WG	2/2/2012	
	HASL-300:ISOPU	1	CAAN-12-2024	WG	2/2/2012	
	HASL-300:ISOU	1	CAAN-12-2024	WG	2/2/2012	
	SM:A2340B	1	CAAN-12-2025	WG	2/2/2012	
	SW-846:6010B	1	CAAN-12-2025	WG	2/2/2012	
	SW-846:6020	1	CAAN-12-2025	WG	2/2/2012	
	SW-846:6850	1	CAAN-12-2025	WG	2/2/2012	

Final Page of REQUEST NUMBER 12-712

Friday, February 03, 2012

LAB CHAIN OF CUSTODY DOCUMENT NUMBER: 12-712C

LOS ALAMOS

REQUEST NUMBER: 12-712

NATIONAL LABORATORY

ATTN: Valerie Davis

TURNAROUND/REPORT DUE: 3/4/2012

General Engineering Laboratories, Inc., Charleston, SC.

TURNAROUND REQ'D: 30

2040 Savage Rd

Charleston, SC 29407

LAB REQUEST COMMENTS:

295389 %

SAMPLE ID	CTNR	CTNR DESC	ORDER	PRESERV	MATRIX
CAAN-12-2024	1	POLY	WSP-GrossA/B	None	WG
CAAN-12-2024	1	POLY	WSP-RAD	Nitric Acid (HNO3)	WG
CAAN-12-2025	1	POLY	WSP-GENINORG	Ice	WG
CAAN-12-2025	1	POLY	WSP-Met+B+SN+SR+U	Nitric Acid (HNO3)	WG
CAAN-12-2024	1	POLY	Ra226+228	Nitric Acid (HNO3)	WG

Relinquished By:

Date

Time

Received By:

Date

Time

Signature

Signature

Signature

Signature

Signature

Signature

Received for DISPOSAL By:

Date

Time

Remarks:

Signature

## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 3734

EVENT NAME: Ancho, MDA AB Mon. Group Sampling Q2, January 2012, 2011  
Interim Plan rev. 1

SAMPLE ID: CAA-12-2024

WORK ORDER:

AS PLANNED		AS COLLECTED		AS PLANNED		AS COLLECTED	
DATE COLLECTED(MM/DD/YYYY):		02/02/2012		MEDIA:	WGR		OK
TIME COLLECTED (HH:MM)		1035		SUB-MEDIA:	UA		
PRS ID:	Ancho	OK		SAMPLE TECH CODE:	6SP		
LOCATION ID:	R-29			FIELD QC TYPE:	NA		
LOCATION TYPE:	MON			FIELD PREP:	UF		
PORT:	SINGLE COMPLETION			SAMPLE USAGE:	INV		
				SCREEN/PORT DESC:			
FIELD MATRIX:	WG			EXCAVATED: YES/NO	NA		
COMPOSITE TYPE:	NA			COMPOSITE TIME INTERVAL:	NA		
				WATER FLOWING: YES/NO	NA		
BOREHOLE: YES/NO	NA			BOREHOLE DECLINATION:	NA		
				BOREHOLE DIRECTION:	NA		

#	PRIORITY	ORDER	CNTNR	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
2		WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	Hydrochloric Acid (HCL)	Y	NA
2	WSP-8270C-SVOA	1 LITER AMBER GLASS	Ice			
2	WSP-8321A-NMED HEXP	1 LITER AMBER GLASS	Ice			
1	WSP-GrossA/B	1 LITER POLY	None			
2	WSP-HEXMOD	1 LITER AMBER GLASS	Ice			
1	WSP-LL-H-3	1 LITER POLY	None			
1	WSP-RAD	1 GAL POLY	Nitric Acid (HNO3)			
1	WSP-TKN+TOC	500 ML AMBER GLASS	Sulfuric Acid (H2SO4)			
1	Ra226+228	1 GAL POLY	Nitric Acid (HNO3)		OK 1/30/12	

SAMPLE DESC:

NA

SAMPLE COMMENTS:

Samples taken within 50 feet of a running diesel generator

LOCATION DESC:

NA

FIELD SCREENING/MEASUREMENT RESULTS:

Time (MST)	pH (SV)	Temp (°C)	SC (µS/cm)	DO (mg/L)	Turb (NTU)	ORP (mV)	Q (gpm)
1035	8.13	18.15	133	7.22	8.94	36.2	6.8

COLLECTED BY (PRINT) W Shaw

REVIEWED BY (PRINT) D Woody

RELINQUISHED BY

Date/Time

RECEIVED BY

Date/Time

**SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**

EVENT ID: 3734

EVENT NAME: Ancho, MDA AB Mon. Group Sampling Q2, January 2012, 2011

(Printed Name) D Woody	02/02/12	(Printed Name) M. Martinez	02/02/12
(Signature) D Woody	1200	(Signature) M. Martinez	1200
RELINQUISHED BY	Date/Time	RECEIVED BY	Date/Time
(Printed Name)		(Printed Name)	
(Signature)		(Signature)	

3734

CAAN-12-2024

**SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**

EVENT ID: 3734

EVENT NAME: Ancho, MDA AB Mon. Group Sampling Q2, January 2012, 2011  
Interim Plan rev. 1

SAMPLE ID: CAAN-12-2025

WORK ORDER:

<u>AS PLANNED</u>		<u>AS COLLECTED</u>	<u>AS PLANNED</u>		<u>AS COLLECTED</u>
DATE COLLECTED(MM/DD/YYYY):		02/02/2012	MEDIA:		WGR
TIME COLLECTED (HH:MM)		1035	SUB-MEDIA:		UA
PRS ID:	Ancho	OK	SAMPLE TECH CODE:		GSP
LOCATION ID:	R-29		FIELD QC TYPE:		NA
LOCATION TYPE:	MON		FIELD PREP:		E
PORT:	SINGLE COMPLETION		SAMPLE USAGE:		INV
FIELD MATRIX:		WG	SCREEN/PORT DESC:		
COMPOSITE TYPE:		NA	EXCAVATED: YES/NO/NA		NA
COMPOSITE TIME INTERVAL:		NA	WATER FLOWING: YES/NO/NA		NA
BOREHOLE: YES/NO/NA		NA	BOREHOLE DECLINATION:		NA
BOREHOLE DIRECTION:		NA			

#	PRIORITY	ORDER	CNTNR	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
1	NA	WSP-GENINORG	1 LITER POLY	Ice	Y	NA
1		WSP-Met+B+SN +SR+U	1 LITER POLY	Nitric Acid (HNO3)		
1		WSP-NH3+NO3/ NO2+PO4	500 ML AMBER GLASS	Sulfuric Acid (H2SO4)		

SAMPLE DESC:

SAMPLE COMMENTS:

LOCATION DESC:

FIELD SCREENING/MEASUREMENT RESULTS:

See CAAN-12-2024

COLLECTED BY (PRINT) W Shaw

REVIEWED BY (PRINT) D Woody

RELINQUISHED BY (Printed Name) D Woody (Signature) D Woody	Date/Time 02/02/12 1200	RECEIVED BY (Printed Name) M. Manty (Signature) [Signature]	Date/Time 02/02/12 1200
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

**DATA VALIDATION COVER SHEET****5121-1****Data Validation Cover Sheet**

Records Use only

**Section I.**REQUEST NUMBER: 12-712 VALIDATION DATE: 3/8/12 LAB CODE: GELCONTRACT LABORATORY NAME: GEL Laboratories LLCVALIDATOR: Larry Fukui ORGANIZATION: Analytical Quality Associates, Inc.

ANALYTICAL SUITE (CHECK ALL THAT APPLY):

- |  |  |   |   |
|--|--|---|---|
| <input type="checkbox"/> TPH-GRO                 | <input type="checkbox"/> HIGH EXPLOSIVES | <input type="checkbox"/> DIOXIN FURANS          | <input checked="" type="checkbox"/> LCMSMS PERCHLORATES       |
| <input type="checkbox"/> TPH-DRO                 | <input type="checkbox"/> METALS          | <input type="checkbox"/> PCB CONGENERS          | <input type="checkbox"/> ORGANOCHLORINE                       |
| <input type="checkbox"/> GENERAL CHEMISTRY       | <input type="checkbox"/> RADIOCHEMISTRY  | <input type="checkbox"/> LCMSMS HIGH EXPLOSIVES | <input type="checkbox"/> PESTICIDES/POLYCHLORINATED BIPHENYLS |
| <input type="checkbox"/> OTHER (DESCRIBE): _____ |  |   |   |

**Section II. Completeness Check**

- | YES                                 | NO                       | N/A                                 | (CHECK ONE)                 | YES                                 | NO                       | N/A                                 | (CHECK ONE)              |
|-------------------------------------|--------------------------|-------------------------------------|-----------------------------|-------------------------------------|--------------------------|-------------------------------------|--------------------------|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | 1. CHAIN-OF-CUSTODY FORM(S) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | 6. RAW/BSS DATA          |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | 2. CASE NARRATIVE           | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | 7. QUALITY CONTROL FORMS |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | 3. SAMPLE RESULT FORMS      | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | 8. QUANTITATION REPORTS  |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | 4. SAMPLE CHROMATOGRAMS     | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 9. TICS FORMS            |
| <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 5. STANDARD CHROMATOGRAMS   | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 10. TICS MASS SPECTRA    |

Comments/problems noted (include information about requests for further information submitted to the contract laboratory and agreed-upon date of resolution and contract laboratory point of contact):

1. It should be noted that the MS and MSD parent sample was from another LANL RN and the raw data for the parent sample were not included in the package. No sample data were qualified as a result.

Reviewed by: Eric T. MinkLevel: 1Date: 3/11/12

VALIDATOR'S SIGNATURE: \_\_\_\_\_

A handwritten signature in black ink, appearing to read "Larry Fukui".

DATE: 3/8/12

**LC/MS/MS PERCHLORATE ANALYTICAL DATA VALIDATION CHECKLIST****5121-2****LC/MS/MS Perchlorate Analytical Data Validation Checklist**

Records Use only



Yes No N/A (Check One)				Assign Qualifier Listed Below If Criterion = Yes	
				Non-detected Analyte	Detected Analyte
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. The Internal Standard (IS) relative retention time has shifted by more than 0.98 to 1.02 seconds.	R, PERC0	J, PERC0
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. Required IS retention time documentation is missing. Data may not be acceptable for use. Contact the SMO or external laboratory for information.	R, PERC0b	R, PERC0b
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3. The IS are count is <25% of the expected value.	UJ, PERC1a	J, PERC1a
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4. The IS area count is <70% but >25% of the average of that obtained from the calibration standards.	UJ, PERC1b	J, PERC1b
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	5. The IS area count is >130% of the average of that obtained from the calibration standards.	UJ, PERC1c	J, PERC1c
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	6. Required IS information is missing. Data may not be acceptable for use. Contact the SMO or external laboratory for information.	R, PERC1d	R, PERC1d
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. The sample result is $\leq 5X$ the concentration of the related analyte in the method blank.	U, PERC4	N/A
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. The affected analytes are considered estimated and biased high because this analyte was identified in the method blank but was $>5X$ .	N/A	J+, PERC4a
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	9. The sample result is $\leq 5X$ the concentration of the related analyte in the trip blank, rinsate blank, and/or equipment blank.	U, PERC4d	N/A
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	10. Required method blank information is missing. Data may not be acceptable for use. Contact the SMO or external laboratory for information.	R, PERC4e	R, PERC4e
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	11. The affected results were not analyzed with a valid 5-point calibration curve and/or a standard at the reporting limit.	UJ, PERC7	J, PERC7
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	12. The affected analytes were analyzed with an initial calibration curve that exceeded the %RSD criteria and/or the associated multipoint calibration correlation coefficient is $<0.99$ .	UJ, R, PERC7a	J, PERC7a



**LC/MS/MS PERCHLORATE ANALYTICAL DATA VALIDATION CHECKLIST****5121-2****LC/MS/MS Perchlorate Analytical Data Validation Checklist**

Records Use only



Yes No N/A (Check One)				Assign Qualifier Listed Below If Criterion = Yes	
				Non-detected Analyte	Detected Analyte
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	13. The ICV and/or CCV were recovered outside the method limits.	UJ, R, PERC7c	J, PERC7c
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	14. The ICV and/or CCV were not analyzed at the appropriate method frequency.	UJ, R, PERC7d	J, PERC7d
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	15. Required calibration information is missing or samples were analyzed on an expired calibration. Contact the SMO or external laboratory for information.	R, PERC7f	R. PERC7f
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	16. The affected analyte is considered not detected because ion abundance ratios did not meet specifications.	N/A	R, PERC8
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	17. The ion ratio documentation is missing. Data may not be acceptable for use. Contact the SMO or external laboratory for information.	N/A	R, PERC8a
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	18. The holding time was >1 and ≤2 times the applicable holding time requirement.	UJ PERC9	J-, PERC9
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	19. The holding time was > 2 times the applicable holding time requirement.	R, PERC9a	J-, PERC9a
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	20. The LCS percent recovery was <10%. Follow the external laboratory limits.	R, PERC12	J-, PERC12
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	21. The LCS percent recovery was < the Lower Acceptance Limit but >10%. Follow the external laboratory limits.	UJ, PERC12a	J-, PERC12a
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	22. The LCS percent recovery was > the Upper Acceptance Limit. Follow the external laboratory limits.	N/A	J+, PERC12b
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	23. The LCS documentation is missing. Data may not be acceptable for use. Contact the SMO or external laboratory for information.	R, PERC12c	R, PERC12c
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	24. The MS/MSD percent recovery was <10%	R, PERC12d	R, PERC12d
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	25. The MS/MSD percent recovery was >10% but <75%	UJ, PERC12e	J, PERC12e
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	26. The MS/MSD percent recovery was >125%.	N/A	J+, PERC12f

**LC/MS/MS PERCHLORATE ANALYTICAL DATA VALIDATION CHECKLIST****5121-2****LC/MS/MS Perchlorate Analytical Data Validation Checklist**

Records Use only



Yes   No   N/A				Assign Qualifier Listed Below If Criterion = Yes	
(Check One)				Non-detected Analyte	Detected Analyte
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	27. The MS/MSD relative percent difference was >20%.	UJ, PERC12g	J, PERC12g
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	28. The affected analytes are considered suspect because the sample was diluted without any target analytes identified due to matrix interference. Qualify as Reject if the analytical laboratory cannot provide proof for matrix interference.	UJ, R, PERC15	N/A
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	29. The sample was diluted because target analytes were > the initial verification calibration.	UJ, PERC15a	J, PERC15a
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	30. The Contract Required Detection Limit check standard (CRI) sample did not pass method-acceptance limits.	UJ, R, PERC16	J, PERC16
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	31. The Interference Check Sample was not within $\pm 20\%$ of the known value.	UJ, PERC16a	J, PERC16a
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	32. The required CRI sample information is missing. Contact the SMO or external laboratory for information.	R, PERC16c	R, PERC16c
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	33. The LANL project chemist identified quality deficiencies in the reported data that require further qualification. This code can ONLY be used and/or under advisement by the LANL project chemist.	UJ, R, PERC19	J, R, PERC19
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	34. Duplicate, dilution, or reanalysis.	UJ, PERC88	J, PERC88

**DATA VALIDATION COVER SHEET****5118-1****Data Validation Cover Sheet**

Records Use only

**Section I.**REQUEST NUMBER: 12-712 VALIDATION DATE: 3/8/12 LAB CODE: GELCONTRACT LABORATORY NAME: GEL Laboratories LLCVALIDATOR: Larry Fukui ORGANIZATION: Analytical Quality Associates, Inc.

ANALYTICAL SUITE (CHECK ALL THAT APPLY):

- |  |  |   |   |
|--|--|---|---|
| <input type="checkbox"/> TPH-GRO                 | <input type="checkbox"/> HIGH EXPLOSIVES   | <input type="checkbox"/> DIOXIN FURANS          | <input type="checkbox"/> LCMSMS PERCHLORATES                  |
| <input type="checkbox"/> TPH-DRO                 | <input checked="" type="checkbox"/> METALS | <input type="checkbox"/> PCB CONGENERS          | <input type="checkbox"/> ORGANOCHLORINE                       |
| <input type="checkbox"/> GENERAL CHEMISTRY       | <input type="checkbox"/> RADIOCHEMISTRY    | <input type="checkbox"/> LCMSMS HIGH EXPLOSIVES | <input type="checkbox"/> PESTICIDES/POLYCHLORINATED BIPHENYLS |
| <input type="checkbox"/> OTHER (DESCRIBE): _____ |  |   |   |

**Section II. Completeness Check**

- | YES                                 | NO                       | N/A                                 | (CHECK ONE)                 | YES                                 | NO                       | N/A                                 | (CHECK ONE)              |
|-------------------------------------|--------------------------|-------------------------------------|-----------------------------|-------------------------------------|--------------------------|-------------------------------------|--------------------------|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | 1. CHAIN-OF-CUSTODY FORM(S) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | 6. RAW/BSS DATA          |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | 2. CASE NARRATIVE           | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | 7. QUALITY CONTROL FORMS |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | 3. SAMPLE RESULT FORMS      | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | 8. QUANTITATION REPORTS  |
| <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 4. SAMPLE CHROMATOGRAMS     | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 9. TICS FORMS            |
| <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 5. STANDARD CHROMATOGRAMS   | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 10. TICS MASS SPECTRA    |

Comments/problems noted (include information about requests for further information submitted to the contract laboratory and agreed-upon date of resolution and contract laboratory point of contact):

- In the opening CCB, Mo was detected. The associated sample result was a detect >5X the blank concentration and, thus, was not qualified.
- It should be noted that the matrix QC parent sample for CVAA was from another LANL RN. No sample data were qualified as a result.

Reviewed by: Eric T. MinkLevel: 1Date: 3/11/12

VALIDATOR'S SIGNATURE: \_\_\_\_\_

DATE: 3/8/12

# METALS ANALYTICAL DATA VALIDATION CHECKLIST

5118-2

## Metals Analytical Data Validation Checklist

Records Use only



Yes	No	N/A		Assign Qualifier Listed Below If Criterion = Yes	
				Non-detected Analyte	Detected Analyte
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. The holding time was >1 and ≤2 times the applicable holding time requirement.	UJ, I9	J-, I9
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. The holding time was >2 times the applicable holding time requirement.	R, I9a	J-, I9a
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3. The instrument performance sample did not pass method acceptance criteria.	R, I16	R, I16
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4. The mass calibration is not within 0.1 amu or %RSD is >5% for any isotope (Be, Mg, Co, In, Pb).	UJ, I16a	J, I16a
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	5. Samples were analyzed outside specific method tune time criteria.	N/A	J, I16b
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	6. The required instrument performance sample information is missing. Contact the SMO or external laboratory for information.	R, I16c	R, I16c
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. The affected results were not analyzed with a valid 5-point calibration curve and/or a standard at the reporting limit.	UJ, R, I7	J, I7
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. The affected analytes were analyzed with an initial calibration curve that exceeded the %RSD criteria and/or the associated multipoint calibration correlation coefficient is <0.995.	UJ, I7a	J, I7a
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	9. The initial Calibration Verification (ICV) and/or Continuing Calibration Verification (CCV) were recovered outside the method-specific limits.	UJ, I7c	J, I7c
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	10. The ICV and/or CCV were not analyzed at the appropriate method frequency.	UJ, I7d	J, I7d
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	11. Required calibration information is missing or samples were analyzed on an expired calibration. Contact the SMO or external laboratory for information.	R, I7f	R, I7f
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	12. Metals interference check sample percent recover value is <50%.	R, I2	J-, I2

# METALS ANALYTICAL DATA VALIDATION CHECKLIST

5118-2

## Metals Analytical Data Validation Checklist

Records Use only



Yes No N/A				Assign Qualifier Listed Below If Criterion = Yes	
(Check One)				Non-detected Analyte	Detected Analyte
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	13. Metals interference check sample percent recovery value is $\geq 50\%$ and $< 80\%$	UJ, I2a	J-, I2a
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	14. Metals interference check sample percent recovery value is $> 120\%$ .	N/A	J+, I2b
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	15. Metals interference check sample was not analyzed with the samples.	R, I2c	R, I2c
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	16. The sample result is $\leq 5X$ the concentration of the related analyte in the method blank.	U, I4	N/A
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	17. The affected analytes are considered estimated and biased high because this analyte was identified in the method blank but was $> 5X$ .	N/A	J, I4a
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	18. The sample result is $\leq 5X$ the concentration of the related analyte in the instrument blank and continuing calibration blank.	U, I4b	N/A
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	19. Continuing calibration blanks were not analyzed at the appropriate method frequency.	UJ, I4c	J, I4c
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	20. The sample result is $\leq 5X$ the concentration of the related analyte in the trip blank, rinsate blank, or equipment blank.	U, I4d	N/A
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	21. Required method blank information is missing. Data may not be acceptable for use. Contact the SMO or external laboratory for information.	R, I4e	R, I4e
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	22. The associated matrix spike recovery was $< 10\%$ . Follow the external laboratory limits located within the associated data package.	R, I6	R, I6
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	23. The associated matrix spike recovery was $<$ the LAL but $> 10\%$ . Follow the external laboratory limits located within the associated data package.	UJ, I6a	J+, I6a
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	24. The associated matrix spike recovery was $>$ the UAL. Follow the external laboratory limits located within the associated data package.	UJ, I6b	J+, I6b

# METALS ANALYTICAL DATA VALIDATION CHECKLIST

5118-2

## Metals Analytical Data Validation Checklist

Records Use only



Yes No N/A				Assign Qualifier Listed Below If Criterion = Yes	
(Check One)				Non-detected Analyte	Detected Analyte
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	25. Required matrix spike information is missing. Data may not be acceptable for use. Contact the SMO or external laboratory for information. If the LCS information is present, do not Reject. Qualify data based on the LCS information.	R, I6c	R, I6c
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	26. The sample and the duplicate sample results were $\geq 5X$ the RL and the duplicate RPD was $>20\%$ for water samples and $>35\%$ for soil samples.	UJ, I10a	J, I10a
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	27. The duplicate sample was not prepared and/or analyzed with the samples for unspecified reasons. The duplicate information is missing. Data may not be acceptable for use. Contact the SMO or external laboratory for information.	UJ, I10d	J, I10d
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	28. The LCS percent recovery was $<10\%$ . Follow the external laboratory limits located within the associated data package.	R, I12	R, I12
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	29. The LCS percent recover was $<$ the LAL but $>10\%$ . Follow the external laboratory limits located within the associated data package.	UJ, I12a	J-, I12a
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	30. The LCS percent recovery was $>$ the UAL. Follow the external laboratory limits located within the associated data package.	N/A	J+, I12b
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	31. The LCS documentation is missing. Data may not be acceptable for use. Contact the SMO or external laboratory for information. Do not Reject if MS/MSD information is present. Qualify according to MS/MSD criteria.	R, I12c	R, I12c
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	32. The quantitating IS area count is $<10\%$ for metals window in relation to the initial calibration blank. Follow the method-specific windows.	R, I1a	J, I1a

# METALS ANALYTICAL DATA VALIDATION CHECKLIST

5118-2

## Metals Analytical Data Validation Checklist

Records Use only



Yes	No	N/A		Assign Qualifier Listed Below If Criterion = Yes	
				Non-detected Analyte	Detected Analyte
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	33. The IS area count for the quantitating IS is <60% but >10% for metals window in relation to the initial calibration blank. Follow the method-specific windows.	UJ, I1b	J, I1b
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	34. The IS area count for the quantitating IS is >125% in relation to the metals initial calibration blank. Follow method-specific windows.	UJ, I1c	J, I1c
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	35. Required IS information is missing. Data may not be acceptable for use. Contact the SMO or external laboratory for information.	R, I1d	R, I1d
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	36. Serial dilution sample RPD was >10% and the sample result was >50X the MDL (>100X the MDL for ICPMS). Qualify ONLY the sample used for the serial dilution.	UJ, I18	J, I18
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	37. Serial dilution sample was not analyzed with the samples.	UJ, I18a	J, I18
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	38. The sample result was reported as detected between the IDL and the EDL.	N/A	J, I1
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	39. Duplicate, dilution, or reanalysis.	UJ, I88	J, I88
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40. Qualification of data via data validation did not occur based on Quality Control requirements in this procedure. Adhere to the external laboratory qualifiers found within the Form I analytical data summary sheets generated by the external laboratory.	U, U_LAB	J, J_LAB, NQ, NQ
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	41. The LANL project chemist identified quality deficiencies in the reported data that require further qualification. This code can ONLY be used and/or under advisement by the LANL project chemist.	UJ, R, I19	J, R, I19

**METALS**  
**-1-**  
**INORGANICS ANALYSIS DATA PACKAGE**

SDG No: 12-712

METHOD TYPE: EPA

SAMPLE ID: 295389002

CLIENT ID: CAAN-12-2025

CONTRACT: ESHL00210

MATRIX:WG

DATE RECEIVED 04-FEB-12

LEVEL: Low %SOLIDS:

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7439-97-6	Mercury	0.066	ug/L	U		AV	0.066	1	HG3	021512W1-6
7631-86-9	Silica	66.8	mg/L			P	0.053	1	OPTIMA	021512-1
7429-90-5	Aluminum	68	ug/L	U		P	68	1	OPTIMA	021512-1
7440-36-0	Antimony	1	ug/L	U		MS	1	1	ICPMS5	120216-4
7440-38-2	Arsenic	1.7	ug/L	U		MS	1.7	1	ICPMS5	120216-5
7440-39-3	Barium	18.2	ug/L			P	1	1	OPTIMA	021512-1
7440-41-7	Beryllium	1	ug/L	U		P	1	1	OPTIMA	021512-1
7440-42-8	Boron	15	ug/L	U		P	15	1	OPTIMA	021512-1
7440-43-9	Cadmium	0.11	ug/L	U		MS	0.11	1	ICPMS5	120216-4
7440-70-2	Calcium	11200	ug/L			P	50	1	OPTIMA	021512-1
7440-47-3	Chromium	2	ug/L	U		MS	2	1	ICPMS5	120216-3
7440-48-4	Cobalt	1.42	ug/L	J		P	1	1	OPTIMA	021512-1
7440-50-8	Copper	3	ug/L	U		P	3	1	OPTIMA	021512-1
7439-89-6	Iron	30	ug/L	U		P	30	1	OPTIMA	021512-1
7439-92-1	Lead	0.5	ug/L	U		MS	0.5	1	ICPMS5	120216-3
7439-95-4	Magnesium	3030	ug/L			P	110	1	OPTIMA	021512-1
7439-96-5	Manganese	16.9	ug/L			P	2	1	OPTIMA	021512-1
7439-98-7	Molybdenum	2.34	ug/L			MS	0.165	1	ICPMS5	120216-4
7440-02-0	Nickel	1.04	ug/L	J		MS	0.5	1	ICPMS5	120216-3
7440-09-7	Potassium	1370	ug/L			P	50	1	OPTIMA	021512-1
7782-49-2	Selenium	1.5	ug/L	U		MS	1.5	1	ICPMS5	120216-5
7440-22-4	Silver	0.2	ug/L	U		MS	0.2	1	ICPMS5	120216-4
7440-23-5	Sodium	14000	ug/L			P	100	1	OPTIMA	021512-1
7440-24-6	Strontium	71.2	ug/L			P	1	1	OPTIMA	021512-1
7440-28-0	Thallium	0.45	ug/L	U		MS	0.45	1	ICPMS5	120216-3
7440-31-5	Tin	2.5	ug/L	U		P	2.5	1	OPTIMA	021512-1

LMF  
3/8/12



**METALS**  
**-1-**  
**INORGANICS ANALYSIS DATA PACKAGE**

SDG No: 12-712

METHOD TYPE: EPA

SAMPLE ID: 295389002

CLIENT ID: CAAN-12-2025

CONTRACT: ESHL00210

MATRIX:WG

DATE RECEIVED 04-FEB-12

LEVEL: Low %SOLIDS:

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.484	ug/L			MS	0.067	1	ICPMS4	120216-2
7440-62-2	Vanadium	5.87	ug/L			P	1	1	OPTIMA	021512-1
7440-66-6	Zinc	3.3	ug/L	U		P	3.3	1	OPTIMA	021512-1
	Hardness as CaCO3	40.3	mg/L				0.453	1	CALC00	

**\*Analytical Methods:**

P EPA 200.7  
MS EPA 200.8  
AV EPA 245.1/245.2  
AF EPA 1631E

LMF  
3/8/12

**DATA VALIDATION COVER SHEET****5120-1****Data Validation Cover Sheet**

Records Use only

**Section I.**REQUEST NUMBER: 12-712 VALIDATION DATE: 3/8/12 LAB CODE: GELCONTRACT LABORATORY NAME: GEL Laboratories LLCVALIDATOR: Larry Fukui ORGANIZATION: Analytical Quality Associates, Inc.

ANALYTICAL SUITE (CHECK ALL THAT APPLY):

- |   |  |   |  |
|---|--|---|--|
| <input type="checkbox"/> TPH-GRO                      | <input type="checkbox"/> HIGH EXPLOSIVES | <input type="checkbox"/> DIOXIN FURANS          | <input type="checkbox"/> LCMSMS PERCHLORATES |
| <input type="checkbox"/> TPH-DRO                      | <input type="checkbox"/> METALS          | <input type="checkbox"/> PCB CONGENERS          | <input type="checkbox"/> ORGANOCHLORINE      |
| <input checked="" type="checkbox"/> GENERAL CHEMISTRY | <input type="checkbox"/> RADIOCHEMISTRY  | <input type="checkbox"/> LCMSMS HIGH EXPLOSIVES | PESTICIDES/POLYCHLORINATED BIPHENYLS         |

☐ OTHER (DESCRIBE):  
\_\_\_\_\_**Section II. Completeness Check**

- | YES                                 | NO                       | N/A                                 | (CHECK ONE)                 | YES                                 | NO                       | N/A                                 | (CHECK ONE)              |
|-------------------------------------|--------------------------|-------------------------------------|-----------------------------|-------------------------------------|--------------------------|-------------------------------------|--------------------------|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | 1. CHAIN-OF-CUSTODY FORM(S) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | 6. RAW/BSS DATA          |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | 2. CASE NARRATIVE           | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | 7. QUALITY CONTROL FORMS |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | 3. SAMPLE RESULT FORMS      | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | 8. QUANTITATION REPORTS  |
| <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 4. SAMPLE CHROMATOGRAMS     | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 9. TICS FORMS            |
| <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 5. STANDARD CHROMATOGRAMS   | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 10. TICS MASS SPECTRA    |

Comments/problems noted (include information about requests for further information submitted to the contract laboratory and agreed-upon date of resolution and contract laboratory point of contact):

1. In the MB, TDS was detected. The associated sample result was a detect >5X but ≤50X the MB concentration and, thus, was qualified J,I4a.
2. The duplicate RPD was >20% for TDS and both the parent and duplicate sample results were ≥5X the RL. The associated sample result was a detect and, thus, was qualified J,I10a.
3. The sample was analyzed >2X the method-specified HT for pH. The associated sample result was qualified J-,I9a, based on professional judgment.
4. It should be noted that the matrix QC for the IC analysis was performed on a parent sample from another LANL RN. No sample data were qualified as a result.

Reviewed by: Eric T. MinkLevel: 1Date: 3/11/12

VALIDATOR'S SIGNATURE: \_\_\_\_\_

DATE: 3/8/12

# GENERAL CHEMISTRY ANALYTICAL DATA VALIDATION CHECKLIST

5120-2

## General Chemistry Analytical Data Validation Checklist

Records Use only



Yes	No	N/A		Assign Qualifier Listed Below If Criterion = Yes	
				Non-detected Analyte	Detected Analyte
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. The holding time was >1 and ≤2 times the applicable holding time requirement.	UJ, I9	J-, I9
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2. The holding time was >2 times the applicable holding time requirement.	R, I9a	J-, I9a
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3. The affected analytes are regarded as rejected because the analytical holding time was exceeded.	R, I9b	R, I9b
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. The affected results were not analyzed with a valid 5-point calibration curve and/or a standard at the reporting limit.	UJ, R, I7	J, I7
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. The affected analytes were analyzed with an initial calibration curve that exceeded the %RSD criteria and/or the associated multipoint calibration correlation coefficient is <0.995.	UJ, I7a	J, I7a
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	6. The ICV and/or CCV were recovered outside the method specific limits.	UJ, I7c	J, I7c
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. The ICV and/or CCV were not analyzed at the appropriate method frequency.	UJ, I7d	J, I7d
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. Required calibration information is missing or samples were analyzed on an expired calibration. Contact the SMO or external laboratory for information.	R, I7f	R, I7f
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	9. The interference check sample percent recovery value is <50%.	R, I2	J-, I2
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	10. The interference check sample percent recovery value is ≥50% and <80%.	UJ, I2a	J-, I2a
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	11. The interference check sample percent recovery value is >120%.	N/A	J+, I2b
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	12. The interference check sample was not analyzed with the samples.	R, I2c	R, I2c
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	13. The sample result is ≤5X the concentration of the related analyte in the method blank.	U, I4	N/A

# GENERAL CHEMISTRY ANALYTICAL DATA VALIDATION CHECKLIST

5120-2

## General Chemistry Analytical Data Validation Checklist

Records Use only



Yes No N/A				Assign Qualifier Listed Below If Criterion = Yes	
(Check One)				Non-detected Analyte	Detected Analyte
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	14. The affected analytes are considered estimated and biased high because this analyte was identified in the method blank but was >5X.	N/A	J, I4a
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	15. The sample result is ≤5X the concentration of the related analyte in the instrument blank and continuing calibration blank.	U, I4b	N/A
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	16. Continuing calibration blanks were not analyzed at the appropriate method frequency.	UJ, I4c	J, I4c
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17. The sample result is ≤5X the concentration of the related analyte in the trip blank, rinsate blank, or equipment blank.	U, I4d	N/A
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	18. Required method blank information is missing. Data may not be acceptable for use. Contact the SMO or external laboratory for information.	R, I4e	R, I4e
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	19. The associate matrix spike recovery was <10%. Follow the external laboratory limits located within the associated data package.	R, I6	R, I6
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	20. The associated matrix spike recovery was below the Lower Acceptance Limit (LAL) but >10%. Follow the external laboratory limits located within the associated data package.	UJ, I6a	J-, I6a
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	21. The associated matrix spike recovery was above the Upper Acceptance Limit (UAL). Follow the external laboratory limits located within the associated data package.	UJ, I6b	J+, I6b
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	22. Required matrix spike information is missing. Data may not be acceptable for use. Contact the SMO or external laboratory for information. If LCS information is present, do not reject. Qualify data based on LCS information.	R, I6c	R, I6c
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	23. The sample and/or the duplicate sample results RPD is not within the acceptance limits. Follow the external laboratory limits located within the associated data package.	UJ, I10b	J, I10b

# GENERAL CHEMISTRY ANALYTICAL DATA VALIDATION CHECKLIST

5120-2

## General Chemistry Analytical Data Validation Checklist

Records Use only



Yes No N/A				Assign Qualifier Listed Below If Criterion = Yes	
(Check One)				Non-detected Analyte	Detected Analyte
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	24. The duplicate sample was not prepared and/or analyzed with the samples for unspecified reasons. The duplicate information is missing. Data may not be acceptable for use. Contact the SMO or external laboratory for information.	UJ, I10d	J, I10d
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	25. The LCS percent recovery was <10%. Follow the external laboratory limits located within the associated data package.	R, I12	R, I12
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	26. The LCS percent recover was < the LAL but >10%. Follow the external laboratory limits located within the associated data package.	UJ, I12a	J-, I12a
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	27. The LCS percent recovery was > the UAL. Follow the external laboratory limits located within the associated data package.	N/A	J+, I12b
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	28. The LCS documentation is missing. Data may not be acceptable for use. Contact the SMO or external laboratory for information. Do not Reject if MS/MSD information is present. Qualify according to MS/MSD criteria.	R, I12c	R, I12c
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	29. Duplicate, dilution, or reanalysis	UJ, I88	J, I88
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	30. The LANL project chemist identified quality deficiencies in the reported data that require further qualification. This code can ONLY be used and/or under advisement by the LANL project chemist.	UJ, R, I19	J, R, I19
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	31. Qualification of data via data validation does not occur based on Quality Control requirements in this procedure. Adhere to the external laboratory qualifiers found within the Form I analytical data summary sheets generated by the external laboratory.	U, U_LAB	J, J_LAB NQ, NQ (no qualification)

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: February 27, 2012

Company : Los Alamos National Laboratory  
Address : TA-03, SM271, Drop Pt. 02U, Rm111

Los Alamos, New Mexico 87545

Contact: Ms. Joylene Valdez  
Project: LANL-WQH Water Samples

Client SDG: 12-712

Client Sample ID: CAAN-12-2025  
Sample ID: 295389002  
Matrix: WG  
Collect Date: 02-FEB-12 12:00  
Receive Date: 04-FEB-12  
Collector: Client

Project: ESHL00210  
Client ID: ARSL001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Conductivity Analysis											
EPA120.1 Specific Conductivity "As Received"											
Conductivity		135	1.00	1.00	umhos/cm	1	LXA1	02/08/12	1543	1186762	1
Electrode Analysis											
EPA 150.1 pH "As Received"											
pH at Temp 13.6C	H	7.95	J-,l9a	0.010	0.100	SU	1	TXT1	02/06/12	1434	1185822 2
Ion Chromatography											
EPA 300.0 Anions Liquid 28 day "As Received"											
Bromide	U	ND	0.066	0.200	mg/L	1	VH1	02/07/12	2115	1185986	3
Chloride		1.79	0.066	0.200	mg/L	1					
Fluoride		0.248	0.033	0.100	mg/L	1					
Sulfate		5.76	0.100	0.400	mg/L	1					
Solids Analysis											
EPA 160.1 Solids, Dissolved-F "As Received"											
Total Dissolved Solids		136	J,l4a	3.40	14.3	mg/L	LYG1	02/08/12	0934	1186676	4
Titration Analysis											
EPA 310.1 Total Alkalinity "As Received"											
Alkalinity, Total as CaCO3		54.4	0.725	1.00	mg/L		LXA1	02/07/12	1621	1186112	5
Carbonate alkalinity (CaCO3)	U	ND	0.725	1.00	mg/L						

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 120.1	
2	EPA 150.1	
3	EPA 300.0	
4	EPA 160.1	
5	EPA 310.1	

LMF  
3/8/12

**DATA VALIDATION COVER SHEET****5119-1****Data Validation Cover Sheet**

Records Use only

**Section I.**REQUEST NUMBER: 12-712 VALIDATION DATE: 3/8/12 LAB CODE: GELCONTRACT LABORATORY NAME: GEL Laboratories LLCVALIDATOR: Larry Fukui ORGANIZATION: Analytical Quality Associates, Inc.

ANALYTICAL SUITE (CHECK ALL THAT APPLY):

- |  |  |   |  |
|--|--|---|--|
| <input type="checkbox"/> TPH-GRO                 | <input type="checkbox"/> HIGH EXPLOSIVES           | <input type="checkbox"/> DIOXIN FURANS          | <input type="checkbox"/> LCMSMS PERCHLORATES |
| <input type="checkbox"/> TPH-DRO                 | <input type="checkbox"/> METALS                    | <input type="checkbox"/> PCB CONGENERS          | <input type="checkbox"/> ORGANOCHLORINE      |
| <input type="checkbox"/> GENERAL CHEMISTRY       | <input checked="" type="checkbox"/> RADIOCHEMISTRY | <input type="checkbox"/> LCMSMS HIGH EXPLOSIVES | PESTICIDES/POLYCHLORINATED BIPHENYLS         |
| <input type="checkbox"/> OTHER (DESCRIBE): _____ |  |   |  |

**Section II. Completeness Check**

- | YES                                 | NO                       | N/A                                 | (CHECK ONE)                 | YES                                 | NO                       | N/A                                 | (CHECK ONE)              |
|-------------------------------------|--------------------------|-------------------------------------|-----------------------------|-------------------------------------|--------------------------|-------------------------------------|--------------------------|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | 1. CHAIN-OF-CUSTODY FORM(S) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | 6. RAW/BSS DATA          |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | 2. CASE NARRATIVE           | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | 7. QUALITY CONTROL FORMS |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | 3. SAMPLE RESULT FORMS      | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | 8. QUANTITATION REPORTS  |
| <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 4. SAMPLE CHROMATOGRAMS     | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 9. TICS FORMS            |
| <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 5. STANDARD CHROMATOGRAMS   | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 10. TICS MASS SPECTRA    |

Comments/problems noted (include information about requests for further information submitted to the contract laboratory and agreed-upon date of resolution and contract laboratory point of contact):

- The alpha spec Am-243 tracer %R was < the laboratory LAL in the sample. The associated sample result was an ND and, thus, was not qualified.
- It should be noted that the matrix QC analyses for gamma spec and gross alpha/beta were performed on parent samples from other LANL RNs. No sample data were qualified as a result.

Reviewed by: Eric T. MinkLevel: 1Date: 3/11/12

VALIDATOR'S SIGNATURE: \_\_\_\_\_

DATE: 3/8/12

# RAD ANALYTICAL DATA VALIDATION CHECKLIST

5119-2

## Rad Analytical Data Validation Checklist

Records Use only



Yes	No	N/A		Assign Qualifier Listed Below If Criterion = Yes	
				Non-detected Analyte	Detected Analyte
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. The holding time was >1 and ≤2 times the applicable holding time requirement.	UJ, R9	J-, R9
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. The holding time was >2 times the applicable holding time requirement.	R, R9a	J-, R9a
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3. The results for the affected analytes are considered not detected (U) because the associated sample concentration was less than or equal to the MDC.	U, R5	N/A
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. The analyte should be regarded as rejected because spectral interferences prevent positive identification of the analytes.	R, R5a	R, R5a
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. The MDC and/or TPU documentation is missing. Data may not be acceptable for use. Contact the SMO or external laboratory for information.	R, R5b	J-, R5b
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	6. The results for the affected analytes should be regarded as not detected (U) because the associated sample concentration was less than 3X the 1 sigma TPU.	U, R11	N/A
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. The sample result is ≤5X the concentration of the related analyte in the method blank.	U, R4	N/A
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. The affected analytes are considered estimated and biased high because this analyte was identified in the method blank but was >5X.	N/A	J, R4a
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	9. The sample result is ≤5X the concentration of the related analyte in the trip blank, rinsate blank, or equipment blank.	U, R4d	N/A
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	10. Required method blank information is missing. Data may not be acceptable for use. Contact the SMO or external laboratory for information.	R, R4e	R, R4e
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	11. The tracer is <10%R. Follow the external laboratory limits located within the associated data package. Tracer%R is not applicable for Gamma Spectroscopy.	R, R3	R, R3



# RAD ANALYTICAL DATA VALIDATION CHECKLIST

5119-2

## Rad Analytical Data Validation Checklist

Records Use only



Yes No N/A				Assign Qualifier Listed Below If Criterion = Yes	
(Check One)				Non-detected Analyte	Detected Analyte
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12. The tracer is < the Lower Acceptance Level (LAL) but $\geq 10\%R$ . Follow the external laboratory limits located within the associated data package. Tracer%R is not applicable for Gamma Spectroscopy.	UJ, R3a	J-, R3a
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	13. The Tracer%R value is > the Upper Acceptance Limit (UAL). Follow the external laboratory limits located within the associated data package. Tracer%R is not applicable for Gamma Spectroscopy.	N/A	J+, R3b
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	14. Required tracer information is missing. Data may not be acceptable for use. Contact the SMO or external laboratory for information. Tracer%R is not applicable for Gamma Spectroscopy.	R, R3d	R, R3d
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	15. The LCS percent recovery was <10%. Follow the external laboratory limits located within the associated data package.	R, R12	R, R12
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	16. The LCS percent recovery was < the LAL but >10%. Follow the external laboratory limits located within the associated data package.	UJ, R12a	J-, R12a
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	17. The LCS percent recovery was > the UAL. Follow the external laboratory limits located within the associated data package.	N/A	J+, R12b
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	18. The LCS documentation is missing. Data may not be acceptable for use. Contact the SMO or external laboratory for information.	R, R12c	R, R12c
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	19. Associated duplicate sample has DER or RER > the analytical laboratory's acceptance limits.	R, R10	J, J10
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	20. The duplicate sample was not prepared and/or analyzed with the samples for unspecified reasons. The duplicate information is missing. Data may not be acceptable for use. Contact the SMO or external laboratory for information.	R, R6	R, R6

# RAD ANALYTICAL DATA VALIDATION CHECKLIST

5119-2

## Rad Analytical Data Validation Checklist

Records Use only



Yes No N/A				Assign Qualifier Listed Below If Criterion = Yes	
(Check One)				Non-detected Analyte	Detected Analyte
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	21. The associated matrix spike recovery was <10%. Follow the external laboratory limits. MS/MSD is not applicable to Gamma Spectroscopy.	R, R6	R, R6
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	22. The associated matrix spike recovery was <10%. Follow the external laboratory limits. MS/MSD is not applicable to Gamma Spectroscopy.	UJ, R6a	J-, R6a
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	23. The associated matrix spike recovery was above the UAL. Follow the external laboratory limits. MS/MSD is not applicable to Gamma Spectroscopy.	UJ, R6b	J+, R6b
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	24. Required matrix spike information is missing. Data may not be acceptable for use. Contact the SMO or external laboratory for information. If LCS information is present, do not Reject. Qualify data based on LCS information. MS/MSD is not applicable to Gamma Spectroscopy.	R, R6c	R, R6c
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	25. Duplicate, dilution, or reanalysis.	UJ, R88	J, R88
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	26. The LANL project chemist identified quality deficiencies in the reported data that require further qualification. This code can ONLY be used and/or under advisement by the LANL project chemist.	UJ, R, R19	J, R, R19
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	27. Quantification of data via data validation did not occur based on Quality Control requirements in this procedure. Adhere to the external laboratory qualifiers found within the Form I analytical data summary sheets generated by the external laboratory.	U, U_LAB	J, J_LAB NQ, NQ

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Company : Los Alamos National Laboratory  
Address : TA-03, SM271, Drop Pt. 02U, Rm111

Los Alamos, New Mexico 87545

Contact: Ms. Joylene Valdez

Project: LANL-WQH Water Samples

Report Date: February 29, 2012

Client Sample ID: CAAN-12-2024  
Sample ID: 295389001  
Matrix: WG  
Collect Date: 02-FEB-12  
Receive Date: 04-FEB-12  
Collector: Client

Project: ESHL00210  
Client ID: ARSL001

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>													
<i>Alphaspec Am241 Liquid "As Received"</i>													
Americium-241	U	-0.00184	+/-0.0134	0.0445	+/-0.0134	0.050	pCi/L		LYS1	02/27/12	1316	1185834	1
<i>Alphaspec Pu, Liquid "As Received"</i>													
Plutonium-238	U	0.00	+/-0.00441	0.0278	+/-0.00441	0.050	pCi/L		LYS1	02/18/12	1558	1185827	2
Plutonium-239/240	U	0.0022	+/-0.00382	0.0324	+/-0.00382	0.050	pCi/L						
<i>Alphaspec U, Liquid "As Received"</i>													
Uranium-234		0.279	+/-0.0263	0.0493	+/-0.0316	1.00	pCi/L		LYS1	02/18/12	1603	1185825	3
Uranium-235/236	U	0.0212	+/-0.00751	0.0262	+/-0.00762	1.00	pCi/L						
Uranium-238		0.187	+/-0.0207	0.0375	+/-0.0238	0.500	pCi/L						
<b>Rad Gamma Spec Analysis</b>													
<i>Gammaspex "As Received"</i>													
Cesium-137	U	-1.66	+/-1.39	4.58	+/-1.39	8.00	pCi/L		KXG3	02/11/12	1052	1186207	4
Cobalt-60	U	0.00898	+/-1.14	4.31	+/-1.14	8.00	pCi/L						
Neptunium-237	U	-1.29	+/-2.51	8.82	+/-2.51	10.0	pCi/L						
Potassium-40	U	24.6	+/-15.3	53.1	+/-15.3	10.0	pCi/L						
Sodium-22	U	-1.43	+/-1.37	4.65	+/-1.37	10.0	pCi/L						
<b>Rad Gas Flow Proportional Counting</b>													
<i>GFPC, Sr90, liquid "As Received"</i>													
Strontium-90	U	0.129	+/-0.146	0.491	+/-0.147	0.500	pCi/L		JXR1	02/15/12	2036	1185966	5
<i>WSP-GrossA/B "As Received"</i>													
Beta	U	-0.152	+/-0.527	2.11	+/-0.527	3.00	pCi/L		DXF3	02/14/12	1938	1185980	6
Alpha	U	-0.0212	+/-0.275	1.71	+/-0.276	3.00	pCi/L		DXF3	02/16/12	2036	1185980	7

### The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Am-05-RC Modified
2	DOE EML HASL-300, Pu-11-RC Modified
3	DOE EML HASL-300, U-02-RC Modified
4	EPA 901.1
5	EPA 905.0 Modified
6	EPA 900.0/SW846 9310
7	EPA 900.0/SW846 9310

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Americium-243 Tracer	Alphaspec Am241 Liquid "As Received"	1185834	39.7 *	(50%-105%)
Plutonium-242 Tracer	Alphaspec Pu, Liquid "As Received"	1185827	71.0	(50%-105%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1185825	78.2	(50%-105%)
Strontium Carrier	GFPC, Sr90, liquid "As Received"	1185966	78.9	(50%-105%)

LMF  
3/8/12

Friday, February 03, 2012

LAB CHAIN OF CUSTODY DOCUMENT NUMBER: 12-712C

LOS ALAMOS

REQUEST NUMBER: 12-712

NATIONAL LABORATORY

ATTN: Valerie Davis

TURNAROUND/REPORT DUE: 3/4/2012

General Engineering Laboratories, Inc., Charleston, SC.

TURNAROUND REQ'D: 30

2040 Savage Rd

Charleston, SC 29407

LAB REQUEST COMMENTS:

SAMPLE ID	CTNR	CTNR DESC	ORDER	PRESERV	MATRIX
CAAN-12-2024	1	POLY	WSP-GrossA/B	None	WG
CAAN-12-2024	1	POLY	WSP-RAD	Nitric Acid (HNO3)	WG
CAAN-12-2025	1	POLY	WSP-GENINORG	Ice	WG
CAAN-12-2025	1	POLY	WSP-Met+B+SN+SR+U	Nitric Acid (HNO3)	WG
CAAN-12-2024	1	POLY	Ra226+228	Nitric Acid (HNO3)	WG

Relinquished By:

Date

Time

Received By:

Date

Time

Signature

Signature

Signature

Signature

Signature

Signature

Received for DISPOSAL By:

Date

Time

Remarks:

Signature

Friday, February 03, 2012

REQUEST NUMBER: 12-712

PRIORITY	METHOD CODE	CNTNR	SAMPLE ID	SAMPLE MATRIX	DATE SAMPLED	SPECIAL INSTRUCTIONS
	EPA:905.0	1	CAAN-12-2024	WG	2/2/2012	
	HASL-300:AM-241	1	CAAN-12-2024	WG	2/2/2012	
	HASL-300:ISOPU	1	CAAN-12-2024	WG	2/2/2012	
	HASL-300:ISOU	1	CAAN-12-2024	WG	2/2/2012	
	SM:A2340B	1	CAAN-12-2025	WG	2/2/2012	
	SW-846:6010B	1	CAAN-12-2025	WG	2/2/2012	
	SW-846:6020	1	CAAN-12-2025	WG	2/2/2012	
	SW-846:6850	1	CAAN-12-2025	WG	2/2/2012	

Final Page of REQUEST NUMBER 12-712

Friday, February 03, 2012

REQUEST NUMBER: 12-712

**LOS ALAMOS  
NATIONAL LABORATORY**

ATTN: Valerie Davis

General Engineering Laboratories, Inc., Charleston, SC.  
2040 Savage Rd  
Charleston, SC 29407

These Samples are on:

LANL Request Number: 12-712

Per Agreement Number: 126310011

Project Cost Code: MR1A015AGWJ0

Please analyse the enclosed samples  
according to the schedule indicated:

**SHIP DATE: 2/3/2012****TURNAROUND/REPORT DUE: 3/4/2012****TURNAROUND REQ'D: 30 Days****RAD SCREENING: Yes, Below Background****LAB REQUEST COMMENTS:**

LANL ER SMO CONTACT:

Signature: 

PRIORITY	METHOD CODE	CNTNR	SAMPLE ID	SAMPLE MATRIX	DATE SAMPLED	SPECIAL INSTRUCTIONS
	EPA:120.1	1	CAAN-12-2025	WG	2/2/2012	
	EPA:150.1	1	CAAN-12-2025	WG	2/2/2012	
	EPA:160.1	1	CAAN-12-2025	WG	2/2/2012	
	EPA:245.2	1	CAAN-12-2025	WG	2/2/2012	
	EPA:300.0	1	CAAN-12-2025	WG	2/2/2012	
	EPA:310.1	1	CAAN-12-2025	WG	2/2/2012	
	EPA:900	1	CAAN-12-2024	WG	2/2/2012	
	EPA:901.1	1	CAAN-12-2024	WG	2/2/2012	
	EPA:903.1	1	CAAN-12-2024	WG	2/2/2012	
	EPA:904	1	CAAN-12-2024	WG	2/2/2012	



February 07, 2012

[www.gel.com](http://www.gel.com)

Ms. Joylene Valdez  
Los Alamos National Laboratory  
TA-03, SM271, Drop Pt. 02U, Rm111  
Los Alamos, New Mexico 87545

Re: LANL-WQH Water Samples  
Work Order: 295389  
SDG: 12-712

Dear Ms. Valdez:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on February 04, 2012, and analyzed for General Chemistry, Metals, Perchlorates by LCMSMS and Radiochemistry. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4485.

Sincerely,

Hope Taylor for  
Valerie Davis  
Project Manager

Purchase Order: 63641-10  
Chain of Custody: 12-712  
Enclosures



**ARS International (63641-10)**  
**LANL-WQH Water Samples**  
**Work Order #: 295389**  
**SDG: 12-712**



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# Case Narrative

**Case Narrative for  
ARS International (63641-10)  
LANL-WQH Water Samples  
Workorder #: 295389  
SDG # : 12-712**

**February 07, 2012**

**Laboratory Identification:**

GEL Laboratories LLC  
2040 Savage Road  
Charleston, South Carolina 29407  
(843) 556-8171

**Summary**

**Sample receipt** The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on February 04, 2012 for analysis. The samples were prepared/analyzed within the required holding time. Shipping container temperatures were checked, documented, and within specifications. The samples were screened according to GEL Standard Operating Procedure. Please see attached email for discrepancies. All sample containers arrived without any visible signs of tampering or breakage. The containers for Gross A/B were preserved prior to analysis. There are no additional comments concerning sample receipt. Shipping container temperature was within specification (0 - 6C).

**Sample Identification** The laboratory received the following samples:

<b><u>Laboratory ID</u></b>	<b><u>Client ID</u></b>
295389001	CAAN-12-2024
295389002	CAAN-12-2025

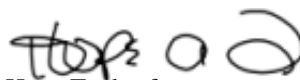
**Case Narrative**

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

**Data Package**

The enclosed data package contains the following sections: Case Narrative, Chain of Custody, Cooler Receipt Checklist, Data Package Qualifier Definitions and data from the following fractions: General Chemistry, Metals, Perchlorates by LCMSMS and Radiochemistry.

I certify that this data report is in compliance with the terms and conditions of the subcontract and task order, both technically and for completeness, for other than the conditions detailed in the attached case narrative.



Hope Taylor for  
Valerie Davis  
Project Manager

**List of current GEL Certifications as of 07 February 2012**

<b>State</b>	<b>Certification</b>
Arizona	AZ0766
Arkansas	88-0651
CLIA	42D0904046
California NELAP	01151CA
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP A2LA ISO 17025	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-09-00191
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA110008
Maryland	270
Massachusetts	M-SC012
Mississippi	SC00012
Nevada	SC000122011-1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
Oklahoma	9904
Pennsylvania NELAP	68-00485
South Carolina Chemistry	10120001
South Carolina Radiochemi	10120002
Tennessee	TN 02934
Texas NELAP	T104704235-12-7
Utah NELAP	SC00012
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
Wisconsin	999887790

# **Chain of Custody and Supporting Documentation**

Friday, February 03, 2012

LAB CHAIN OF CUSTODY DOCUMENT NUMBER: 12-712C

LOS ALAMOS

REQUEST NUMBER: 12-712

NATIONAL LABORATORY

ATTN: Valerie Davis

TURNAROUND/REPORT DUE: 3/4/2012

General Engineering Laboratories, Inc., Charleston, SC.

TURNAROUND REQ'D: 30

2040 Savage Rd

Charleston, SC 29407

LAB REQUEST COMMENTS:

295389 %

SAMPLE ID	CTNR	CTNR DESC	ORDER	PRESERV	MATRIX
CAAN-12-2024	1	POLY	WSP-GrossA/B	None	WG
CAAN-12-2024	1	POLY	WSP-RAD	Nitric Acid (HNO3)	WG
CAAN-12-2025	1	POLY	WSP-GENINORG	Ice	WG
CAAN-12-2025	1	POLY	WSP-Met+B+SN+SR+U	Nitric Acid (HNO3)	WG
CAAN-12-2024	1	POLY	Ra226+228	Nitric Acid (HNO3)	WG

Relinquished By:

Date

Time

Received By:

Date

Time

Signature

Signature

Signature

Signature

Signature

Signature

Received for DISPOSAL By:

Date

Time

Remarks:

Signature

Friday, February 03, 2012

REQUEST NUMBER: 12-712

LOS ALAMOS

NATIONAL LABORATORY

ATTN: Valerie Davis

General Engineering Laboratories, Inc., Charleston, SC.  
2040 Savage Rd  
Charleston, SC 29407

These Samples are on:

LANL Request Number: 12-712  
Per Agreement Number: 126310011  
Project Cost Code: MR1A015AGWJ0

Please analyse the enclosed samples  
according to the schedule indicated:

SHIP DATE: 2/3/2012

TURNAROUND/REPORT DUE: 3/4/2012

TURNAROUND REQ'D: 30 Days

RAD SCREENING: Yes, Below Background

LAB REQUEST COMMENTS:

LANL ER SMO CONTACT:

Signature:

PRIORITY	METHOD CODE	CNTNR	SAMPLE ID	SAMPLE MATRIX	DATE SAMPLED	SPECIAL INSTRUCTIONS
	EPA:120.1	1	CAAN-12-2025	WG	2/2/2012	
	EPA:150.1	1	CAAN-12-2025	WG	2/2/2012	
	EPA:160.1	1	CAAN-12-2025	WG	2/2/2012	
	EPA:245.2	1	CAAN-12-2025	WG	2/2/2012	
	EPA:300.0	1	CAAN-12-2025	WG	2/2/2012	
	EPA:310.1	1	CAAN-12-2025	WG	2/2/2012	
	EPA:900	1	CAAN-12-2024	WG	2/2/2012	
	EPA:901.1	1	CAAN-12-2024	WG	2/2/2012	
	EPA:903.1	1	CAAN-12-2024	WG	2/2/2012	
	EPA:904	1	CAAN-12-2024	WG	2/2/2012	

Friday, February 03, 2012

REQUEST NUMBER: 12-712

PRIORITY	METHOD CODE	CNTNR	SAMPLE ID	SAMPLE MATRIX	DATE SAMPLED	SPECIAL INSTRUCTIONS
	EPA:905.0	1	CAAN-12-2024	WG	2/2/2012	
	HASL-300:AM-241	1	CAAN-12-2024	WG	2/2/2012	
	HASL-300:ISOPU	1	CAAN-12-2024	WG	2/2/2012	
	HASL-300:ISOU	1	CAAN-12-2024	WG	2/2/2012	
	SM:A2340B	1	CAAN-12-2025	WG	2/2/2012	
	SW-846:6010B	1	CAAN-12-2025	WG	2/2/2012	
	SW-846:6020	1	CAAN-12-2025	WG	2/2/2012	
	SW-846:6850	1	CAAN-12-2025	WG	2/2/2012	

Final Page of REQUEST NUMBER 12-712





## SAMPLE RECEIPT &amp; REVIEW FORM

Client: LANL			SDG/AR/COC/Work Order: 12-712		
Received By: Patricia Dent			Date Received: February 4, 2012		
Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.		
COC/Samples marked as radioactive?		X	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <b>0 CPM</b>		
Classified Radioactive II or III by RSO?		X	If yes, Were swipes taken of sample containers < action levels?		
COC/Samples marked containing PCBs?		X			
Shipped as a DOT Hazardous?		X	Hazard Class Shipped: UN#:		
Samples identified as Foreign Soil?		X			

Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	X			Circle Applicable: Seals broken    Damaged container    Leaking container    Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	X			Preservation Method: Ice bags    Blue ice    Dry ice    None    Other (describe) *all temperatures are recorded in Celsius <b>3,4C</b>
2a	Daily check performed and passed on IR temperature gun?	X			Temperature Device Serial #: Secondary Temperature Device Serial # (If Applicable): <b>61524646</b>
3	Chain of custody documents included with shipment?	X			
4	Sample containers intact and sealed?	X			Circle Applicable: Seals broken    Damaged container    Leaking container    Other (describe)
5	Samples requiring chemical preservation at proper pH?			X	Sample ID's, containers affected and observed pH: <b>CAAN-12-2024 for Gross A/B</b> If Preservation added Lot#: <b>K33025</b>
6	VOA vials free of headspace (defined as < 6mm bubble)?		X		Sample ID's and containers affected:
7	Are Encore containers present?			X	(If yes, immediately deliver to Volatiles laboratory)
8	Samples received within holding time?	X			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	X			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?			X	Sample ID's affected: <b>Time not notated on COC</b>
11	Number of containers received match number indicated on COC?			X	Sample ID's affected: <b>CAAN-12-2024 for Ra226+228</b>
12	Are sample containers identifiable as GEL provided?			X	Clients
13	COC form is properly signed in relinquished/received sections?	X			
14	Carrier and tracking number.	X			Circle Applicable: FedEx Air    FedEx Ground    UPS    Field Services    Courier    Other <b>7209 7856 3240 3C 7209 7856 3230 4C</b> <b>7209 7856 3251 4C</b>

Comments (Use Continuation Form if needed):

**Subject:** RE: Ra226+Ra228

**From:** "Greene, Keith R" <kgreene@lanl.gov>

**Date:** 2/8/2012 10:35 AM

**To:** Hope Taylor <Hope.Taylor@gel.com>

**CC:** "LANL@amrad.com" <LANL@amrad.com>, "team.davis" <team.davis@gel.com>

Number 1, please excluded Joy from all future e-mails as she does not work at the SMO anymore.

For 12-712, 12-719 and 12-699 cancel the Ra-226+228 as they were not collected.  
For 12-727 analyze the Gross a/b but cancel the ra226+228 bottle.

-----Original Message-----

From: Hope Taylor [<mailto:Hope.Taylor@gel.com>]

Sent: Wednesday, February 08, 2012 7:19 AM

To: Greene, Keith R

Cc: Valdez, Joylene F; [LANL@amrad.com](mailto:LANL@amrad.com); team.davis

Subject: Ra226+Ra228

Good morning Keith,

We did not receive the containers for the Ra226+Ra228 for below IDs.  
Since we received Rad (gallon) and Gross A/B (1000 ml) containers and you did not respond to the issues on the day of receipt the Ra226+Ra228 was not canceled.

Sample Receipt for 020412: RN#12-712, 719 the lab did not receive  
Ra226+228 containers for CAAN-12-2024, CAWA-12-2018.

Sample Receipt for 020312: RN 12-699 Lab did not receive a container for Ra226+Ra228  
for ID CAAN-12-2031.

I just want to clarify if you would like the Ra226+Ra228 canceled for RN  
12-727 ID CAWA-12-2023 received on 020712. We received a Rad and a Gross A/B containers  
for this ID also.

Thanks

--

Hope Taylor

Project Manager Assistant

GEL Laboratories, LLC

2040 Savage Road

Charleston, SC 29407

Direct: 843.769.7376 ext. 4778

Main: 843.556.8171

Fax: 843.766.1178

E-mail: [hop01200@gel.com](mailto:hop01200@gel.com)

Web: [www.gel.com](http://www.gel.com)

JOYLENE VALDEZ (505) 665-9968  
LOS ALAMOS NATL LAB  
TA00 BLDG 1237 DPU 03

SHIP DATE: 03FEB12  
ACTWGT: 53.0 LB MAN  
CAD: 0014176/CAFE2511

LOS ALAMOS, NM 87545  
UNITED STATES US

BILL SENDER

TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: 8H010AMR1A015AGWHO

3c

ORIGIN ID: SAFA (505) 665-9968  
JOYLENE VALDEZ  
LOS ALAMOS NATL LAB  
TA00 BLDG 1237 DPU 03

SHIP DATE: 03FEB12  
ACTWGT: 49.0 LB MAN  
CAD: 0014176/CAFE2511

LOS ALAMOS, NM 87545  
UNITED STATES US

BILL SENDER

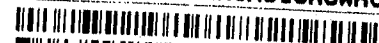
TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

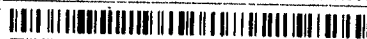
(843) 556-8171

REF: 8H010AMR1A015AGWHO

4c



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Express



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2 of 2  
MPS# 7209 7856 3240  
Mstr# 7209 7856 3230

### SATURDAY ### A1  
PRIORITY OVERNIGHT

0201

X0 CHSA

29407  
SC-US CHS



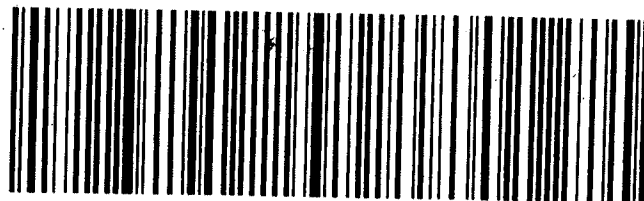
1 of 2  
TRK# 7209 7856 3230  
0201

### SATURDAY ### A1  
PRIORITY OVERNIGHT

MM MASTER MM

X0 CHSA

29407  
SC-US CHS



ORIGIN ID: SAFA (505) 665-9968  
JOYLENE VALDEZ  
LOS ALAMOS NATL LAB  
TA00 BLDG 1237 DPU 03

SHIP DATE: 03FEB12  
ACTWGT: 45.0 LB MAN  
CAD: 0014176/CAFE2511

LOS ALAMOS, NM 87545  
UNITED STATES US

BILL SENDER

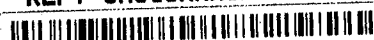
TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: 8H010AMR3A02244M00

4c



FedEx  
Express



TRK# 7209 7856 3251  
0201

### SATURDAY ### A1  
PRIORITY OVERNIGHT

X0 CHSA

29407  
SC-US CHS

# **Data Review Qualifier Flag Definition Sheet**

## Data Review Qualifier Definitions

Qualifier	Explanation
*	A quality control analyte recovery is outside of specified acceptance criteria
**	Analyte is a surrogate compound
<	Result is less than value reported
>	Result is greater than value reported
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL
A	The TIC is a suspected aldol-condensation product
B	Target analyte was detected in the associated blank
B	Metals-Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL
BD	Results are either below the MDC or tracer recovery is low
C	Analyte has been confirmed by GC/MS analysis
D	Results are reported from a diluted aliquot of the sample
d	5-day BOD-The 2:1 depletion requirement was not met for this sample
E	Organics-Concentration of the target analyte exceeds the instrument calibration range
E	Metals-%difference of sample and SD is >10%. Sample concentration must meet flagging criteria
H	Analytical holding time was exceeded
h	Preparation or preservation holding time was exceeded
J	Value is estimated
N	Metals-The Matrix spike sample recovery is not within specified control limits
N	Organics-Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
N/A	Spike recovery limits do not apply. Sample concentration exceeds spike concentration by 4X or more
ND	Analyte concentration is not detected above the reporting limit
UI	Gamma Spectroscopy-Uncertain identification
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	QC Samples were not spiked with this compound
Z	Paint Filter Test-Particulates passed through the filter, however no free liquids were observed.

# **Perchlorates by LCMSMS Analysis**

# Case Narrative

**Perchlorate by LC/MSMS  
ARS International (ARSL)  
SDG 12-712**

**Method/Analysis Information**

**Procedure:** **Definitive Low Level Perchlorate Analysis Utilizing Liquid Chromatography/Mass Spectrometry/Mass Spectrometry (LC/MS/MS) by EPA Method 6850 Modified (6850M)**

Analytical Method: SW846 6850 Modified

Prep Method: SW846 6850 Modified

Analytical Batch Number: 1185769

Prep Batch Number: 1185768

**Sample Analysis**

<b>Sample ID</b>	<b>Client ID</b>
295389002	CAAN-12-2025
1202593083	Interference Check Sample (ICS)
1202593079	Method Blank (MB)
1202593080	Laboratory Control Sample (LCS)
1202593081	295075001(BuckmanPZ-12-2179) Matrix Spike (MS)
1202593082	295075001(BuckmanPZ-12-2179) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on an "as received" basis.

**Preparation/Analytical Method Verification**

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-067 REV# 9.

**Calibration Information**

**Initial Calibration**

All initial calibration requirements have been met for this SDG. Due to software constraints, all Initial Calibration Blanks must be designated as IPB001.

**CCV Requirements**

All associated calibration verification standard(s) (ICV or CCV) met the acceptance criteria.

**CCB Requirements**

All continuing calibration blanks (CCB) bracketing the analyses associated with this batch were within acceptance criteria.



**CCV Requirements**

All continuing calibration checks (CCV) requirements were met by all bracketing CCV standards.

**Low Level Standard (CRI) Requirements**

All low level calibration verification (CRI) requirements were met by all bracketing CRI standards.

**Quality Control (QC) Information****Method Blank (MB) Statement**

The MB(s) analyzed with this SDG met the acceptance criteria.

**Interference Check Sample (ICS)**

The interference check sample (ICS) met all recovery acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

**QC Sample Designation**

Client sample 295075001 (BuckmanPZ-12-2179) from SDG 12-688 was chosen for matrix spike and matrix spike duplicate analysis.

**Matrix Spike (MS) Recovery Statement**

The MS recoveries were within the established acceptance limits.

**Matrix Spike Duplicate (MSD) Recovery Statement**

The MSD recoveries were within the established acceptance limits.

**MS/MSD Relative Percent Difference (RPD) Statement**

The RPD(s) between the MS and MSD met the acceptance limits.

**Retention Time Standard Area Acceptance**

The retention time standard areas were within the required acceptance criteria for all samples and QC.

**Retention Time**

During the analysis of Perchlorate by LC/MS/MS, retention time shifts are commonly observed. These retention time shifts, which are caused by fouling of the column by the sample matrices, are problematic when the retention time is used as one of the criterion for confirmation. To overcome this problem, a known amount of O(18) labeled Perchlorate was added to each sample as a retention time standard. The presence of Perchlorate was confirmed by the relative retention time (RRT) of the Perchlorate peak and the O(18) standard. A RRT window of 0.98 to 1.02, as required by Method 332.0, has been used. In addition to the isotopic ratio, the presence of Perchlorate in the samples associated with this data package have been confirmed using the relative retention criteria stated above, not the absolute retention time.

**Technical Information****Holding Time Specifications**

All samples in this SDG in this analytical batch met the specified holding time. GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection of sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration.

**Preparation/Analytical Method Verification**

All procedures were performed as stated in the SOP.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-extraction/Re-analysis**

Re-extractions or re-analyses were not required in this SDG except for dilutions.

**Miscellaneous Information****Data Exception (DER) Documentation**

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG for this analytical batch.

**Manual Integrations**

Some initial calibration standards, continuing calibration standards, and/or samples may require manual integrations due to software limitations.

**Method Comments**

The sample in this SDG was not originally analyzed using EPA Method 314.0.

**Additional Comments**

The Perchlorate Isotope Ratio on the Form I may differ slightly from the ratio on the corresponding raw data due to rounding rules and/or significant figures or due to software limitations when there are manual integrations, dilutions or other factors. The ratio value of the Form I is the correct value.

The retention time marker, Perchlorate-O (18), is added to all samples, instrument blanks, and standards prior to injection. It is used to verify the retention time of Perchlorate and Perchlorate-101 and to insure an accurate injection occurred. Due to various anions affecting the recovery of Perchlorate-O (18) and not Perchlorate and Perchlorate-101, the calibration curves of Perchlorate and Perchlorate-101 are not internally corrected for using Perchlorate-O (18). They are external calibrations.

**Perchlorate Isotope Ratio**

The Perchlorate isotope ratio met acceptance criteria for all samples and QC samples. Please see the isotope ratio criteria in the Miscellaneous Section.

**System Configuration**

The laboratory utilizes a Waters LC 2795 liquid chromatography instrument for perchlorate analysis. It is coupled with either a Micromass Quattro Micro Mass Spectrometer/ Mass Spectrometer, or a Micromass Quattro Ultima Mass Spectrometer/ Mass Spectrometer. Each being designated as LCMSMS #1 and LCMSMS #2, respectively. It is fitted with an electrospray probe that is operated in the negative electrospray ionization mode for perchlorate analysis. The laboratory may also utilize an Agilent 1100 liquid chromatography instrument for perchlorate analysis. It is coupled with an Applied Biosystems 4000 Mass Spectrometer/ Mass Spectrometer, designated as LCMSMS #3 or LCMSMS #4. It is also fitted with an electrospray probe that is operated in the negative electrospray ionization mode for perchlorate analysis.

**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

**Chromatographic Columns**

Chromatographic separation of perchlorate is accomplished through analysis on the following anion column:

Dionex: IonPac AG-16 2 x 50 mm.

**Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

## GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

### Qualifier Definition Report for

ARSL001 ARS International (63641-10)

Client SDG: 12-712 GEL Work Order: 295389

#### The Qualifiers in this report are defined as follows:

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE Indicates that sample is re-extracted.

#### Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: 

Name: Herbert Maier

Date: 14 FEB 2012

Title: Data Validator

# **Sample Data Summary**

## Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1185768Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAAN-12-2025Date Received: 04-FEB-12GEL Job No (SDG): 12-712GEL Sample ID: 295389002Date Filtered: 10-FEB-12Injection Volume (uL): 20%Solids:     

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.233	ug/L		1	11-FEB-12 14:58	per0211026a
	Perchlorate Isotope Ratio			3.17			1	11-FEB-12 14:58	per0211026a
14797-73-0	Perchlorate-101	.05	.2	0.237	ug/L		1	11-FEB-12 14:58	per0211026a
	Perchlorate-O(18)			0.510	ug/L		1	11-FEB-12 14:58	per0211026a

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

\*Concentration =

$$\text{Instrument Value} \times \frac{\text{Concentrated Extract Volume}}{\text{Aliquot}} \times \frac{1}{\% \text{Solids}}$$

# **Quality Control Summary**

Perchlorate Laboratory Control Sample

Lab Name: General Engineering Laboratories

Lab Code: GEL

GEL Job No. (SDG): 12-712

Extract Batch Code: 1185768

Date Filtered: 10-FEB-12

Matrix: WATER

Sample ID: 1202593080

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.205	ug/L	102		85 - 115
Perchlorate Isotope Ratio		3.3				-
Perchlorate-101	0.200	.2	ug/L	100		85 - 115
Perchlorate-O(18)		.504	ug/L			-

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.



### Perchlorate Spike/Spike Duplicate Summary

**Lab Name:** General Engineering Laboratories

**Lab Code:** GEL

**GEL Job No (SDG):** 12-712

**Extract Batch Code:** 1185768

**Date Extracted:** 10-FEB-12

**GEL MS/PS ID:** 1202593081

**Client ID:** BuckmanPZ-12-2179

**GEL MSD/PSD ID:** 1202593082

**QC Type:** MS

Compound^	Spike Added	Sample Conc	Units	MS Conc	MS Rec #	MSD Conc	MSD Rec #	RPD #	RPD Limit	Recovery Limit
Perchlorate	0.200	0.630	ug/L	0.823	96.5	.817	93.3	.8	30	75 - 125
Perchlorate Isotope Ratio	0	3.20		3.26		3.26		.00599		-
Perchlorate-101	0.200	0.636	ug/L	0.813	88.7	.807	85.5	.794	30	75 - 125
Perchlorate-O(18)	0	0.554	ug/L	0.538		.54		.343		-

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

# Quality Control Data

## Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: EPA 6850 ModifiedMatrix: WATERExtraction Batch ID: 1185768Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 10-FEB-12GEL Job No (SDG): 12-712GEL Sample ID: 1202593079Date Filtered: 10-FEB-12Injection Volume (uL): 20%Solids:     

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.050	ug/L	U	1	11-FEB-12 12:23	per0211012a
	Perchlorate Isotope Ratio						1	11-FEB-12 12:23	per0211012a
14797-73-0	Perchlorate-101	.05	.2	0.050	ug/L	U	1	11-FEB-12 12:23	per0211012a
	Perchlorate-O(18)			0.496	ug/L		1	11-FEB-12 12:23	per0211012a

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

\*Concentration =

$$\text{Instrument Value} \times \frac{\text{Concentrated Extract Volume}}{\text{Aliquot}} \times \frac{1}{\% \text{Solids}}$$

## Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: EPA 6850 ModifiedMatrix: WATERExtraction Batch ID: 1185768Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 10-FEB-12GEL Job No (SDG): 12-712GEL Sample ID: 1202593080Date Filtered: 10-FEB-12Injection Volume (uL): 20%Solids:     

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.205	ug/L		1	11-FEB-12 12:34	per0211013a
	Perchlorate Isotope Ratio			3.3			1	11-FEB-12 12:34	per0211013a
14797-73-0	Perchlorate-101	.05	.2	0.200	ug/L		1	11-FEB-12 12:34	per0211013a
	Perchlorate-O(18)			0.504	ug/L		1	11-FEB-12 12:34	per0211013a

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

\*Concentration =

$$\text{Instrument Value} \times \frac{\text{Concentrated Extract Volume}}{\text{Aliquot}} \times \frac{1}{\% \text{Solids}}$$

## Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1185768Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 12-712GEL Sample ID: 1202593083Date Filtered: 10-FEB-12Injection Volume (uL): 20

%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.215	ug/L		1	11-FEB-12 12:45	per0211014a
	Perchlorate Isotope Ratio			3.05			1	11-FEB-12 12:45	per0211014a
14797-73-0	Perchlorate-101	.05	.2	0.228	ug/L		1	11-FEB-12 12:45	per0211014a
	Perchlorate-O(18)			0.541	ug/L		1	11-FEB-12 12:45	per0211014a

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

\*Concentration =

$$\text{Instrument Value} \times \frac{\text{Concentrated Extract Volume}}{\text{Aliquot}} \times \frac{1}{\% \text{Solids}}$$

## Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1185768Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

BuckmanPZ-12-2179MSDate Received: 01-FEB-12GEL Job No (SDG): 12-712GEL Sample ID: 1202593081Date Filtered: 10-FEB-12Injection Volume (uL): 20%Solids:     

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.823	ug/L		1	11-FEB-12 13:07	per0211016a
	Perchlorate Isotope Ratio			3.26			1	11-FEB-12 13:07	per0211016a
14797-73-0	Perchlorate-101	.05	.2	0.813	ug/L		1	11-FEB-12 13:07	per0211016a
	Perchlorate-O(18)			0.538	ug/L		1	11-FEB-12 13:07	per0211016a

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

\*Concentration =

$$\text{Instrument Value} \times \frac{\text{Concentrated Extract Volume}}{\text{Aliquot}} \times \frac{1}{\% \text{Solids}}$$

## Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1185768Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

BuckmanPZ-12-2179MSDDate Received: 01-FEB-12GEL Job No (SDG): 12-712GEL Sample ID: 1202593082Date Filtered: 10-FEB-12Injection Volume (uL): 20%Solids:     

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.817	ug/L		1	11-FEB-12 13:18	per0211017a
	Perchlorate Isotope Ratio			3.26			1	11-FEB-12 13:18	per0211017a
14797-73-0	Perchlorate-101	.05	.2	0.807	ug/L		1	11-FEB-12 13:18	per0211017a
	Perchlorate-O(18)			0.540	ug/L		1	11-FEB-12 13:18	per0211017a

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

\*Concentration =

$$\text{Instrument Value} \times \frac{\text{Concentrated Extract Volume}}{\text{Aliquot}} \times \frac{1}{\% \text{Solids}}$$

# Metals Analysis



# Case Narrative

**Metals Fractional Narrative  
ARS International (ARSL)  
SDG 12-712**

**Sample Analysis**

<b>Sample ID</b>	<b>Client ID</b>
295389002	CAAN-12-2025
1202594814	Method Blank (MB) <b>ICP</b>
1202594815	Laboratory Control Sample (LCS)
1202594818	295389002(CAAN-12-2025L) Serial Dilution (SD)
1202594816	295389002(CAAN-12-2025D) Sample Duplicate (DUP)
1202594817	295389002(CAAN-12-2025S) Matrix Spike (MS)
1202594819	Method Blank (MB) <b>ICP-MS</b>
1202594820	Laboratory Control Sample (LCS)
1202594823	295389002(CAAN-12-2025L) Serial Dilution (SD)
1202594821	295389002(CAAN-12-2025D) Sample Duplicate (DUP)
1202594822	295389002(CAAN-12-2025S) Matrix Spike (MS)
1202593219	Method Blank (MB) <b>CVAA</b>
1202593220	Laboratory Control Sample (LCS)
1202593244	295268001(CAAN-12-2030L) Serial Dilution (SD)
1202593221	295268001(CAAN-12-2030D) Sample Duplicate (DUP)
1202593222	295268001(CAAN-12-2030S) Matrix Spike (MS)

**Method/Analysis Information**

<b>Analytical Batch:</b>	1186491, 1186494, 1185821 and 1192819
<b>Prep Batch :</b>	1186490, 1186493 and 1185819
<b>Standard Operating Procedures:</b>	GL-MA-E-013 REV# 20, GL-MA-E-006 REV# 9, GL-MA-E-014 REV# 24, GL-MA-E-010 REV# 25 and GL-GC-E-107 REV# 7
<b>Analytical Method:</b>	SW846 3005/6010B, SW846 3005/6020 DOE-AL, EPA 245.1/245.2 and SM 2340 B
<b>Prep Method :</b>	SW846 3005A and EPA 245.1/245.2 Prep

## **Preparation/Analytical Method Verification**

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

### **System Configuration**

The Hardness as CaCO<sub>3</sub> is calculated from Calcium and Magnesium results.

The Metals analysis-ICP was performed on a P E 5300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with a Burgener nebulizer, cyclonic spray chamber, and yttrium or scandium internal standard. Operating conditions for the ICP are set at a power level of 1500 watts. The instrument has a peristaltic pump flow rate of 1.4L/min, argon gas flows of 15 L/min and 0.2 L/min for the torch and auxiliary gases, and a flow setting of 0.65L/min for the nebulizer.

The Metals analysis - ICPMS was performed on a Perkin Elmer ELAN 6100E inductively coupled plasma mass spectrometer (ICP-MS). The instrument is equipped with a cross-flow nebulizer, quadrupole mass spectrometer, and dual mode electron multiplier detector. Internal standards of scandium, germanium, indium, tantalum, and/or lutetium were utilized to cover the mass spectrum. Operating conditions are set at 1400W power and combined argon pressures of 360+/-7 kPa for the plasma and auxiliary gases, and 0.85 L/min carrier gas flow, and an initial lens voltage of 5.2.

The Metals analysis - ICPMS was performed on a Perkin Elmer ELAN 9000 inductively coupled plasma mass spectrometer (ICP-MS). The instrument is equipped with a cross-flow nebulizer, quadrupole mass spectrometer, and dual mode electron multiplier detector. Internal standards of scandium, germanium, indium, tantalum, and/or lutetium were utilized to cover the mass spectrum. Operating conditions are set at 1400W power and combined argon pressures of 360+/-7 kPa for the plasma and auxiliary gases, and 0.85 L/min carrier gas flow, and an initial lens voltage of 5.2.

The Metals analysis-Mercury was performed on a Perkin-Elmer Flow Injection Mercury System (FIMS-100) automated mercury analyzer. The instrument consists of a cold vapor atomic absorption spectrometer set to detect mercury at a wavelength of 253.7 nm. Sample introduction through the flow injection system is performed via a peristaltic pump at 9 mL/min and nitrogen carrier gas rate of 80 mL/min.

### **Calibration Information**

#### **Instrument Calibration**

All initial calibration requirements have been met for this sample delivery group (SDG).

**CRDL Requirements**

All CRDL standard(s) met the referenced advisory control limits.

**ICSA/ICSAB Statement**

All interference check samples (ICSA and ICSAB) associated with this SDG met the established acceptance criteria.

**Continuing Calibration Blank (CCB) Requirements**

All continuing calibration blanks (CCB) bracketing this batch met the established acceptance criteria.

**Continuing Calibration Verification (CCV) Requirements**

All continuing calibration verifications (CCV) bracketing this SDG met the acceptance criteria.

**Quality Control (QC) Information****Method Blank (MB) Statement**

The MBs analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

**Quality Control (QC) Sample Statement**

The following samples were selected as the quality control (QC) samples for this SDG: 295389002 (CAAN-12-2025)-ICP and ICP-MS and 295268001 (CAAN-12-2030)-CVAA.

**Matrix Spike (MS) Recovery Statement**

The percent recoveries (%R) obtained from the MS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. All applicable elements met the acceptance criteria.

**Duplicate Relative Percent Difference (RPD) Statement**

The RPD obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20% when the sample is >5X the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control of +/-RL is used to evaluate the DUP results. All applicable analytes met these requirements.

**Serial Dilution % Difference Statement**

The serial dilution is used to assess matrix suppression or enhancement. Raw element concentrations that are 25X the IDL/MDL for CVAA, 50X the IDL/MDL for ICP, and 100X the IDL/MDL for ICP-MS analyses are applicable for serial dilution assessment. All applicable analytes met the acceptance criteria of less than 10% difference (%D).

## **Technical Information**

### **Holding Time Specifications**

GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection of sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

### **Preparation/Analytical Method Verification**

All procedures were performed as stated in the SOP.

### **Sample Dilutions**

Dilutions are performed to minimize matrix interferences resulting from elevated mineral element concentrations present in solid samples and/or to bring over range target analyte concentrations into the linear calibration range of the instrument. The samples in this SDG did not require dilutions.

### **Preparation Information**

The samples in this SDG were prepared exactly according to the cited SOP.

## **Miscellaneous Information**

### **Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

### **Data Exception (DER) Documentation**

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

### **Additional Comments**

Additional comments were not required for this SDG.

Total Hardness by Calculation is determined using the results of Total Calcium (Ca) and Total Magnesium (Mg) determined by ICP or ICP-MS.

Hardness = 2.497 (Ca) + 4.118 (Mg)

Please refer to the Total Ca and Total Mg data to validate results appearing on the Hardness Summary sheet. Both results are in the Inorganic/metals section of the package. There is no Batch QC for calculated results, and thus no QC Summary for the Hardness by Calculation Batch. The MDLs and PQLs are calculated using the higher of the two calculated values of Ca or Mg.


**Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

**Review Validation:**

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

**The following data validator verified the information presented in this case narrative:**

Reviewer:  Date: 03/02/12

# **Sample Data Summary**

## GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

### Qualifier Definition Report for

ARSL001 ARS International (63641-10)

Client SDG: 12-712 GEL Work Order: 295389

**The Qualifiers in this report are defined as follows:**

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the detection limit.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis.

Reviewed by



03/02/12



**METALS**  
**-1-**  
**INORGANICS ANALYSIS DATA PACKAGE**

SDG No: 12-712

METHOD TYPE: EPA

SAMPLE ID: 295389002

CLIENT ID: CAAN-12-2025

CONTRACT: ESHL00210

MATRIX:WG

DATE RECEIVED 04-FEB-12

LEVEL: Low %SOLIDS:

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7439-97-6	Mercury	0.066	ug/L	U		AV	0.066	1	HG3	021512W1-6
7631-86-9	Silica	66.8	mg/L			P	0.053	1	OPTIMA	021512-1
7429-90-5	Aluminum	68	ug/L	U		P	68	1	OPTIMA	021512-1
7440-36-0	Antimony	1	ug/L	U		MS	1	1	ICPMS5	120216-4
7440-38-2	Arsenic	1.7	ug/L	U		MS	1.7	1	ICPMS5	120216-5
7440-39-3	Barium	18.2	ug/L			P	1	1	OPTIMA	021512-1
7440-41-7	Beryllium	1	ug/L	U		P	1	1	OPTIMA	021512-1
7440-42-8	Boron	15	ug/L	U		P	15	1	OPTIMA	021512-1
7440-43-9	Cadmium	0.11	ug/L	U		MS	0.11	1	ICPMS5	120216-4
7440-70-2	Calcium	11200	ug/L			P	50	1	OPTIMA	021512-1
7440-47-3	Chromium	2	ug/L	U		MS	2	1	ICPMS5	120216-3
7440-48-4	Cobalt	1.42	ug/L	J		P	1	1	OPTIMA	021512-1
7440-50-8	Copper	3	ug/L	U		P	3	1	OPTIMA	021512-1
7439-89-6	Iron	30	ug/L	U		P	30	1	OPTIMA	021512-1
7439-92-1	Lead	0.5	ug/L	U		MS	0.5	1	ICPMS5	120216-3
7439-95-4	Magnesium	3030	ug/L			P	110	1	OPTIMA	021512-1
7439-96-5	Manganese	16.9	ug/L			P	2	1	OPTIMA	021512-1
7439-98-7	Molybdenum	2.34	ug/L			MS	0.165	1	ICPMS5	120216-4
7440-02-0	Nickel	1.04	ug/L	J		MS	0.5	1	ICPMS5	120216-3
7440-09-7	Potassium	1370	ug/L			P	50	1	OPTIMA	021512-1
7782-49-2	Selenium	1.5	ug/L	U		MS	1.5	1	ICPMS5	120216-5
7440-22-4	Silver	0.2	ug/L	U		MS	0.2	1	ICPMS5	120216-4
7440-23-5	Sodium	14000	ug/L			P	100	1	OPTIMA	021512-1
7440-24-6	Strontium	71.2	ug/L			P	1	1	OPTIMA	021512-1
7440-28-0	Thallium	0.45	ug/L	U		MS	0.45	1	ICPMS5	120216-3
7440-31-5	Tin	2.5	ug/L	U		P	2.5	1	OPTIMA	021512-1

**METALS**  
**-1-**  
**INORGANICS ANALYSIS DATA PACKAGE**

SDG No: 12-712

METHOD TYPE: EPA

SAMPLE ID: 295389002

CLIENT ID: CAAN-12-2025

CONTRACT: ESHL00210

MATRIX:WG

DATE RECEIVED 04-FEB-12

LEVEL: Low %SOLIDS:

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.484	ug/L			MS	0.067	1	ICPMS4	120216-2
7440-62-2	Vanadium	5.87	ug/L			P	1	1	OPTIMA	021512-1
7440-66-6	Zinc	3.3	ug/L	U		P	3.3	1	OPTIMA	021512-1
	Hardness as CaCO3	40.3	mg/L				0.453	1	CALC00	

**\*Analytical Methods:**

P EPA 200.7  
MS EPA 200.8  
AV EPA 245.1/245.2  
AF EPA 1631E

# **Quality Control Summary**

**METALS**  
**-3b-**  
**PREPARATION BLANK SUMMARY**

**SDG NO.** 12-712  
**Contract:** ESHL00210  
**Matrix:** WG

<u>Sample ID</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>Acceptance Window</u>	<u>Conc Qual</u>	<u>M*</u>	<u>MDL</u>	<u>RDL</u>
1202593219	Mercury	0.066	ug/L	+/-0.2	U	AV	0.066	0.2
1202594814	Aluminum	68	ug/L	+/-200	U	P	68	200
	Barium	1	ug/L	+/-5	U	P	1	5
	Beryllium	1	ug/L	+/-5	U	P	1	5
	Boron	15	ug/L	+/-50	U	P	15	50
	Calcium	50	ug/L	+/-200	U	P	50	200
	Cobalt	1	ug/L	+/-5	U	P	1	5
	Copper	3	ug/L	+/-10	U	P	3	10
	Iron	30	ug/L	+/-100	U	P	30	100
	Magnesium	110	ug/L	+/-300	U	P	110	300
	Manganese	2	ug/L	+/-10	U	P	2	10
	Potassium	50	ug/L	+/-150	U	P	50	150
	Silica	0.053	mg/L	+/-0.213	U	P	0.053	0.213
	Sodium	100	ug/L	+/-300	U	P	100	300
	Strontium	1	ug/L	+/-5	U	P	1	5
	Tin	2.5	ug/L	+/-10	U	P	2.5	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10
1202594819	Antimony	1	ug/L	+/-3	U	MS	1	3
	Arsenic	1.7	ug/L	+/-5	U	MS	1.7	5
	Cadmium	0.11	ug/L	+/-1	U	MS	0.11	1
	Chromium	-2.45	ug/L	+/-10	J	MS	2	10
	Lead	0.5	ug/L	+/-2	U	MS	0.5	2
	Molybdenum	0.165	ug/L	+/-0.5	U	MS	0.165	0.5
	Nickel	0.5	ug/L	+/-2	U	MS	0.5	2
	Selenium	1.5	ug/L	+/-5	U	MS	1.5	5
	Silver	0.2	ug/L	+/-1	U	MS	0.2	1
	Thallium	0.45	ug/L	+/-2	U	MS	0.45	2
	Uranium	0.067	ug/L	+/-0.2	U	MS	0.067	0.2

**\*Analytical Methods:**

P EPA 200.7  
MS EPA 200.8  
AV EPA 245.1/245.2  
AF EPA 1631E

## METALS

-5a-

## Matrix Spike Summary

SDG NO. 12-712 Client ID: CAAN-12-2030S

Contract: ESHL00210 Level: Low

Matrix: WATER % Solids:

Sample ID: 295268001 Spike ID: 1202593222

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Mercury	ug/L	75-125	2.06		0.066	U	2	103		AV

## \*Analytical Methods:

P	EPA 200.7
MS	EPA 200.8
AV	EPA 245.1/245.2
AF	EPA 1631E

## METALS

-5a-

## Matrix Spike Summary

SDG NO. 12-712

Client ID: CAAN-12-2025S

Contract: ESHL00210

Level: Low

Matrix: WATER

% Solids:

Sample ID: 295389002

Spike ID: 1202594817

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Aluminum	ug/L	75-125	5190		68	U	5000	103		P
Barium	ug/L	75-125	513		18.2		500	99		P
Beryllium	ug/L	75-125	499		1	U	500	99.7		P
Boron	ug/L	75-125	503		15	U	500	98.5		P
Calcium	ug/L	75-125	15900		11200		5000	94.2		P
Cobalt	ug/L	75-125	484		1.42	J	500	96.6		P
Copper	ug/L	75-125	518		3	U	500	104		P
Iron	ug/L	75-125	5130		30	U	5000	102		P
Magnesium	ug/L	75-125	7960		3030		5000	98.6		P
Manganese	ug/L	75-125	520		16.9		500	101		P
Potassium	ug/L	75-125	6430		1370		5000	101		P
Silica	mg/L		75.9		66.8		10.7	84.6	N/A	P
Sodium	ug/L	75-125	18900		14000		5000	97.6		P
Strontium	ug/L	75-125	576		71.2		500	101		P
Tin	ug/L	75-125	499		2.5	U	500	99.8		P
Vanadium	ug/L	75-125	514		5.87		500	102		P
Zinc	ug/L	75-125	484		3.3	U	500	96.5		P

## \*Analytical Methods:

P EPA 200.7  
MS EPA 200.8  
AV EPA 245.1/245.2  
AF EPA 1631E

## METALS

-5a-

## Matrix Spike Summary

SDG NO. 12-712

Client ID: CAAN-12-2025S

Contract: ESHL00210

Level: Low

Matrix: WATER

% Solids:

Sample ID: 295389002

Spike ID: 1202594822

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Lead	ug/L	75-125	36.6		0.5	U	40	91.6		MS
Molybdenum	ug/L	75-125	52.1		2.34		50	99.6		MS
Chromium	ug/L	75-125	43.8		2	U	50	87.6		MS
Nickel	ug/L	75-125	45.1		1.04	J	50	88		MS
Selenium	ug/L	75-125	17.7		1.5	U	20	88.6		MS
Silver	ug/L	75-125	51.9		0.2	U	50	104		MS
Thallium	ug/L	75-125	81.1		0.45	U	100	80.8		MS
Uranium	ug/L	75-125	48		0.484		50	95		MS
Antimony	ug/L	75-125	188		1	U	200	93.8		MS
Arsenic	ug/L	75-125	71.5		1.7	U	80	87.7		MS
Cadmium	ug/L	75-125	10.8		0.11	U	10	108		MS

## \*Analytical Methods:

P EPA 200.7  
MS EPA 200.8  
AV EPA 245.1/245.2  
AF EPA 1631E

**Metals**  
**–6–**  
**Duplicate Sample Summary**

SDG No.: 12-712

Lab Code: GEL

Contract: ESHL00210

Client ID: CAAN-12-2030D

Matrix: LIQUID

Level: Low

Sample ID: 295268001

Duplicate ID: 1202593221

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Mercury	ug/L		0.066	U	0.066	U			AV

**\*Analytical Methods:**

P EPA 200.7  
MS EPA 200.8  
AV EPA 245.1/245.2  
AF EPA 1631E



**Metals**  
**–6–**  
**Duplicate Sample Summary**

SDG No.: 12-712

Lab Code: GEL

Contract: ESHL00210

Client ID: CAAN-12-2025D

Matrix: LIQUID

Level: Low

Sample ID: 295389002

Duplicate ID: 1202594816

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Aluminum	ug/L		68 U		68 U				P
Barium	ug/L	+/-5	18.2		17.8		2.44		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L		15 U		15 U				P
Calcium	ug/L	+/-20%	11200		10800		2.89		P
Cobalt	ug/L	+/-5	1.42 J		1.09 J		26.3		P
Copper	ug/L		3 U		3 U				P
Iron	ug/L		30 U		30 U				P
Magnesium	ug/L	+/-20%	3030		2930		3.31		P
Manganese	ug/L	+/-10	16.9		16.4		2.98		P
Potassium	ug/L	+/-20%	1370		1360		.765		P
Silica	mg/L	+/-20%	66.8		65		2.67		P
Sodium	ug/L	+/-20%	14000		13600		2.88		P
Strontium	ug/L	+/-20%	71.2		69		3.08		P
Tin	ug/L		2.5 U		2.5 U				P
Vanadium	ug/L	+/-5	5.87		5.66		3.75		P
Zinc	ug/L		3.3 U		3.3 U				P

## \*Analytical Methods:

P EPA 200.7  
MS EPA 200.8  
AV EPA 245.1/245.2  
AF EPA 1631E

**Metals**  
**–6–**  
**Duplicate Sample Summary**

SDG No.: 12-712

Lab Code: GEL

Contract: ESHL00210

Client ID: CAAN-12-2025D

Matrix: LIQUID

Level: Low

Sample ID: 295389002

Duplicate ID: 1202594821

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Antimony	ug/L		1 U		1 U				MS
Arsenic	ug/L		1.7 U		1.7 U				MS
Cadmium	ug/L		0.11 U		0.11 U				MS
Chromium	ug/L		2 U		2 U				MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	2.34		2.25		3.96		MS
Nickel	ug/L	+/- 2	1.04 J		1.06 J		1.82		MS
Selenium	ug/L		1.5 U		1.5 U				MS
Silver	ug/L		0.2 U		0.2 U				MS
Thallium	ug/L		0.45 U		0.45 U				MS
Uranium	ug/L	+/- .2	0.484		0.451		7.06		MS

## \*Analytical Methods:

P EPA 200.7  
MS EPA 200.8  
AV EPA 245.1/245.2  
AF EPA 1631E

## METALS

-7-

## Laboratory Control Sample Summary

SDG NO. 12-712

Contract: ESHL00210

Aqueous LCS Source: GEL

Solid LCS Source:

<u>Sample ID</u>	<u>Analyte</u>	<u>Units</u>	<u>True Value</u>	<u>Result</u>	<u>C</u>	<u>% Recovery</u>	<u>Acceptance Limit</u>	<u>M*</u>
1202593220	Mercury	ug/L	2	2.01		100	85-115	AV

## \*Analytical Methods:

P EPA 200.7  
MS EPA 200.8  
AV EPA 245.1/245.2  
AF EPA 1631E

## METALS

-7-

## Laboratory Control Sample Summary

SDG NO. 12-712

Contract: ESHL00210

Aqueous LCS Source:OS2I

Solid LCS Source:

<u>Sample ID</u>	<u>Analyte</u>	<u>Units</u>	<u>True Value</u>	<u>Result</u>	<u>C</u>	<u>% Recovery</u>	<u>Acceptance Limit</u>	<u>M*</u>
1202594815								
	Aluminum	ug/L	5000	5250		105	80-120	P
	Barium	ug/L	500	511		102	80-120	P
	Beryllium	ug/L	500	505		101	80-120	P
	Boron	ug/L	500	498		99.5	80-120	P
	Calcium	ug/L	5000	5340		107	80-120	P
	Cobalt	ug/L	500	500		100	80-120	P
	Copper	ug/L	500	519		104	80-120	P
	Iron	ug/L	5000	5250		105	80-120	P
	Magnesium	ug/L	5000	5270		105	80-120	P
	Manganese	ug/L	500	518		104	80-120	P
	Potassium	ug/L	5000	5350		107	80-120	P
	Silica	mg/L	10.7	10.7		100	80-120	P
	Sodium	ug/L	5000	5330		107	80-120	P
	Strontium	ug/L	500	529		106	80-120	P
	Tin	ug/L	500	513		103	80-120	P
	Vanadium	ug/L	500	520		104	80-120	P
	Zinc	ug/L	500	492		98.4	80-120	P

## \*Analytical Methods:

P EPA 200.7  
 MS EPA 200.8  
 AV EPA 245.1/245.2  
 AF EPA 1631E

## METALS

-7-

## Laboratory Control Sample Summary

SDG NO. 12-712

Contract: ESHL00210

Aqueous LCS Source: O2si

Solid LCS Source:

<u>Sample ID</u>	<u>Analyte</u>	<u>Units</u>	<u>True Value</u>	<u>Result</u>	<u>C</u>	<u>% Recovery</u>	<u>Acceptance Limit</u>	<u>M*</u>
1202594820								
	Antimony	ug/L	50	53.6		107	80-120	MS
	Arsenic	ug/L	50	44.7		89.4	80-120	MS
	Cadmium	ug/L	50	53.6		107	80-120	MS
	Chromium	ug/L	50	43.8		87.5	80-120	MS
	Lead	ug/L	50	47.4		94.8	80-120	MS
	Molybdenum	ug/L	50	51.8		104	80-120	MS
	Nickel	ug/L	50	49.3		98.7	80-120	MS
	Selenium	ug/L	50	49.7		99.4	80-120	MS
	Silver	ug/L	50	55.2		110	80-120	MS
	Thallium	ug/L	50	43.9		87.9	80-120	MS
	Uranium	ug/L	50	49		97.9	80-120	MS

## \*Analytical Methods:

P EPA 200.7  
MS EPA 200.8  
AV EPA 245.1/245.2  
AF EPA 1631E

## METALS

-9-

## Serial Dilution Sample Summary

**SDG NO.** 12-712 **Client ID:** CAAN-12-2030L**Contract:** ESHL00210**Matrix:** LIQUID **Level:** Low**Sample ID:** 295268001 **Serial Dilution ID:** 1202593244

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Mercury	.066	U	.33	U				AV

**\*Analytical Methods:**

P EPA 200.7  
MS EPA 200.8  
AV EPA 245.1/245.2  
AF EPA 1631E

## METALS

-9-

## Serial Dilution Sample Summary

SDG NO. 12-712

Client ID: CAAN-12-2025L

Contract: ESHL00210

Matrix: LIQUID

Level: Low

Sample ID: 295389002

Serial Dilution ID: 1202594818

<u>Analyte</u>	<u>Initial Value</u> ug/L	<u>C</u>	<u>Serial Value</u> ug/L	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Aluminum	68	U	340	U				P
Barium	18.2		17.8	J	2.08			P
Beryllium	1	U	5	U				P
Boron	15	U	75	U				P
Calcium	11200		10900		2.24		10	P
Cobalt	1.42	J	5	U	100			P
Copper	3	U	15	U				P
Iron	30	U	150	U				P
Magnesium	3030		3030		.035			P
Manganese	16.9		17.4	J	3.16			P
Potassium	1370		1360		.135			P
Silica	66800		65500		1.96		10	P
Sodium	14000		13900		.268		10	P
Strontium	71.2		73.5		3.22		10	P
Tin	2.5	U	12.5	U				P
Vanadium	5.87		8.68	J	47.7			P
Zinc	3.3	U	16.5	U				P

## \*Analytical Methods:

P EPA 200.7  
MS EPA 200.8  
AV EPA 245.1/245.2  
AF EPA 1631E

## METALS

-9-

## Serial Dilution Sample Summary

SDG NO. 12-712

Client ID: CAAN-12-2025L

Contract: ESHL00210

Matrix: LIQUID

Level: Low

Sample ID: 295389002

Serial Dilution ID: 1202594823

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Antimony	1	U	5	U				MS
Arsenic	1.7	U	8.5	U				MS
Cadmium	.11	U	.55	U				MS
Chromium	2	U	10	U				MS
Lead	.5	U	2.5	U				MS
Molybdenum	2.34		2.09	J	10.9			MS
Nickel	1.04	J	2.5	U	100			MS
Selenium	1.5	U	7.5	U				MS
Silver	.2	U	1	U				MS
Thallium	.45	U	2.77	J				MS
Uranium	.484		.63	J	30.2			MS

## \*Analytical Methods:

P EPA 200.7  
MS EPA 200.8  
AV EPA 245.1/245.2  
AF EPA 1631E



# **General Chem Analysis**

# Case Narrative

**General Chemistry Narrative  
ARS International (ARSL)  
SDG 12-712**

**Method/Analysis Information**

**Product:**                    **Specific Conductivity**

**Analytical Batch:**    1186762                                    **Method:**    EPA120.1 Specific Conductivity

**Sample Analysis**

The following samples were analyzed using the analytical protocol as established in EPA 120.1:

<b>Sample ID</b>	<b>Client ID</b>
295389002	CAAN-12-2025
1202595412	Laboratory Control Sample (LCS)
1202595413	294676003(CAWA-12-1983) Sample Duplicate (DUP)

The samples in this SDG were analyzed on an "as received" basis.

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-009 REV# 10.

**Preparation/Analytical Method Verification**

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

**Calibration Information**

The Conductivity analysis was performed on a Orion 160 Conductivity Meter.

**Initial Calibration**

All initial calibration requirements have been met for this SDG.

**Calibration Verification Information**

All associated calibration verification standard(s) (ICV or CCV) met the acceptance criteria.

**Quality Control (QC) Information**

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

The following sample was selected for QC analysis: 294676003 (CAWA-12-1983).

**Duplicate Relative Percent Difference (RPD) Statement**

The RPD between the sample and its duplicate met the acceptance limits.

**Technical Information**

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

The samples in this SDG did not require re-analysis.

**Miscellaneous Information****Data Exception (DER) Documentation**

A DER was not required for this SDG.

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

### **Method/Analysis Information**

**Product:** pH

**Analytical Batch:** 1185822 **Method:** EPA 150.1 pH

### **Sample Analysis**

The following samples were analyzed using the analytical protocol as established in EPA 150.1:

<b>Sample ID</b>	<b>Client ID</b>
295389002	CAAN-12-2025
1202593226	Laboratory Control Sample (LCS)
1202593229	295268001(CAAN-12-2030) Sample Duplicate (DUP)

The samples in this SDG were analyzed on an "as received" basis.

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-008 REV# 20.

### **Preparation/Analytical Method Verification**

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

### **Calibration Information**

The Electrode analysis was performed on a PerpHect pH Meter Orion 370.

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Calibration Verification Information (CCV)**

All continuing calibration verification standards (CCVs) associated with reported data from this batch were within acceptance limits.

### **Quality Control (QC) Information**

### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

The following sample was selected for QC analysis: 295268001 (CAAN-12-2030).

**Duplicate Relative Percent Difference (RPD) Statement**

The RPD between the sample and its duplicate met the acceptance limits.

**Technical Information**

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

**Holding Times**

The following sample from this sample group was received by the lab outside of the method specified holding time: 295389002 (CAAN-12-2025).

**Sample Re-analysis**

The samples in this SDG did not require re-analysis.

**Miscellaneous Information**

**Data Exception (DER) Documentation**

The following DER was generated for this SDG: 1048396 1202593229 (CAAN-12-2030) and 295389002 (CAAN-12-2025).

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

### **Method/Analysis Information**

**Product:** Ion Chromatography

**Analytical Batch:** 1185986

**Method:** EPA 300.0 Anions Liquid 28 day

### **Sample Analysis**

The following samples were analyzed using the analytical protocol as established in EPA 300.0:

<b>Sample ID</b>	<b>Client ID</b>
295389002	CAAN-12-2025
1202593733	Method Blank (MB)
1202593734	295389002(CAAN-12-2025) Sample Duplicate (DUP)
1202593735	295389002(CAAN-12-2025) Post Spike (PS)
1202593736	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-086 REV# 20.

### **Preparation/Analytical Method Verification**

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

### **Calibration Information**

The Ion Chromatography analysis was performed on a Dionex ICS-3000 Ion Chromatograph.

#### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

#### **Continuing Calibration Blanks**

All continuing calibration blanks (CCBs) associated with reported data from this batch were within acceptance limits.

### **Calibration Verification Information (CCV)**

All continuing calibration verification standards (CCVs) associated with reported data from this batch were within acceptance limits.

**Y Intercept Rule**

The absolute value of the intercept is less than 3 times the MDL.

**Quality Control (QC) Information**

**Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

The following sample was selected for QC analysis: 295389002 (CAAN-12-2025).

**Matrix Spike (MS)/Post Spike (PS) Recovery Statement**

The MS/PS recovery for this sample set was within the required acceptance limits.

**Duplicate Relative Percent Difference (RPD) Statement**

The RPD between the sample and its duplicate met the acceptance limits.

**Technical Information**

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

The samples in this SDG did not require re-analysis.

**Miscellaneous Information**

**Data Exception (DER) Documentation**

A DER was not required for this SDG.

**Manual Integrations**

The following samples from this sample group had to be manually integrated due to errors in the instrument software peak integration: 1202593734 (CAAN-12-2025), 1202593735 (CAAN-12-2025) and 295389002 (CAAN-12-2025).

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an



effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

### **Method/Analysis Information**

**Product:** Solids, Total Dissolved

**Analytical Batch:** 1186676

**Method:** EPA 160.1 Solids and Dissolved-F

### **Sample Analysis**

The following samples were analyzed using the analytical protocol as established in EPA 160.1:

<b>Sample ID</b>	<b>Client ID</b>
295389002	CAAN-12-2025
1202595227	Method Blank (MB)
1202595228	295268001(CAAN-12-2030) Sample Duplicate (DUP)
1202595232	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-001 REV# 11.

### **Preparation/Analytical Method Verification**

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

### **Calibration Information**

The Solids analysis was performed on a Sartorius Balance BAL216. Solids lab

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Quality Control (QC) Information**

#### **Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

#### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

The following sample was selected for QC analysis: 295268001 (CAAN-12-2030).

**Duplicate Relative Percent Difference (RPD) Statement**

The Relative Percent Difference (RPD) between the sample and duplicate falls outside of the established acceptance limits because of the heterogeneous matrix of the sample: 1202595228 (CAAN-12-2030).

**Technical Information**

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Re-analysis**

The samples in this SDG did not require re-analysis.

**Sample Aliquot**

A sufficient amount of sample was provided by the client for analysis.

**Miscellaneous Information****Data Exception (DER) Documentation**

The following DER was generated for this SDG: 1050449 1202595228 (CAAN-12-2030).

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

### **Method/Analysis Information**

**Product:** Alkalinity

**Analytical Batch:** 1186112      **Method:** EPA 310.1 Total Alkalinity

### **Sample Analysis**

The following samples were analyzed using the analytical protocol as established in EPA 310.1:

<b>Sample ID</b>	<b>Client ID</b>
295389002	CAAN-12-2025
1202594058	Laboratory Control Sample (LCS)
1202594062	Method Blank (MB)
1202594063	294676002(CAWA-12-1967) Sample Duplicate (DUP)
1202594064	294676002(CAWA-12-1967) Matrix Spike (MS)

The samples in this SDG were analyzed on an "as received" basis.

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-033 REV# 8.

### **Preparation/Analytical Method Verification**

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

### **Calibration Information**

The Titration analysis was performed on a manually operated buret.

### **Initial Standardization**

The titrant was properly standardized

### **Quality Control (QC) Information**

#### **Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

The following sample was selected for QC analysis: 294676002 (CAWA-12-1967).

**Matrix Spike (MS)/Post Spike (PS) Recovery Statement**

The MS/PS recovery for this sample set was within the required acceptance limits.

**Duplicate Relative Percent Difference (RPD) Statement**

The RPD between the sample and its duplicate met the acceptance limits.

**Technical Information**

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Re-analysis**

The samples in this SDG did not require re-analysis.

**Miscellaneous Information****Data Exception (DER) Documentation**

A DER was not required for this SDG.

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

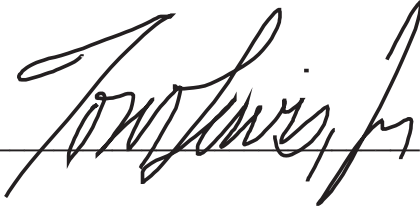
**Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

**Review Validation:**

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

**The following data validator verified the information presented in this case narrative:**

Reviewer:  Date: 02March12

# **Sample Data Summary**

## GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

### Certificate of Analysis Report for

ARSL001 ARS International (63641-10)

Client SDG: 12-712 GEL Work Order: 295389

**The Qualifiers in this report are defined as follows:**

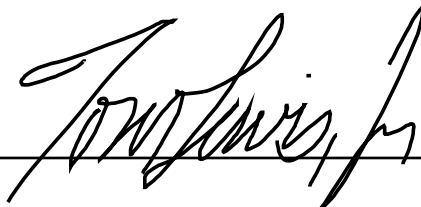
- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- H Analytical holding time was exceeded
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the detection limit.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis.

Reviewed by

A handwritten signature in black ink, appearing to read 'Valerie Davis', is written over a horizontal line.



# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: February 27, 2012

Company : Los Alamos National Laboratory  
Address : TA-03, SM271, Drop Pt. 02U, Rm111

Los Alamos, New Mexico 87545

Contact: Ms. Joylene Valdez  
Project: LANL-WQH Water Samples

Client SDG: 12-712

Client Sample ID: CAAN-12-2025  
Sample ID: 295389002  
Matrix: WG  
Collect Date: 02-FEB-12 12:00  
Receive Date: 04-FEB-12  
Collector: Client

Project: ESHL00210  
Client ID: ARSL001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Conductivity Analysis											
EPA120.1 Specific Conductivity "As Received"											
Conductivity		135	1.00	1.00	umhos/cm	1	LXA1	02/08/12	1543	1186762	1
Electrode Analysis											
EPA 150.1 pH "As Received"											
pH at Temp 13.6C	H	7.95	0.010	0.100	SU	1	TXT1	02/06/12	1434	1185822	2
Ion Chromatography											
EPA 300.0 Anions Liquid 28 day "As Received"											
Bromide	U	ND	0.066	0.200	mg/L	1	VH1	02/07/12	2115	1185986	3
Chloride		1.79	0.066	0.200	mg/L	1					
Fluoride		0.248	0.033	0.100	mg/L	1					
Sulfate		5.76	0.100	0.400	mg/L	1					
Solids Analysis											
EPA 160.1 Solids, Dissolved-F "As Received"											
Total Dissolved Solids		136	3.40	14.3	mg/L		LYG1	02/08/12	0934	1186676	4
Titration Analysis											
EPA 310.1 Total Alkalinity "As Received"											
Alkalinity, Total as CaCO3		54.4	0.725	1.00	mg/L		LXA1	02/07/12	1621	1186112	5
Carbonate alkalinity (CaCO3)	U	ND	0.725	1.00	mg/L						

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 120.1	
2	EPA 150.1	
3	EPA 300.0	
4	EPA 160.1	
5	EPA 310.1	

# **Quality Control Summary**

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Report Date: February 27, 2012

Page 1 of 3

Los Alamos National Laboratory  
TA-03, SM271, Drop Pt. 02U, Rm111  
Los Alamos, New Mexico

Contact: Ms. Joylene Valdez

Workorder: 295389

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Conductivity Analysis</b>											
Batch	1186762										
QC1202595413	294676003	DUP									
Conductivity			143	143	umhos/cm	0.210		(0%-10%)	LXA1	02/08/12	15:21
QC1202595412	LCS										
Conductivity	1410			1400	umhos/cm		99.4	(95%-105%)		02/08/12	15:14
<b>Electrode Analysis</b>											
Batch	1185822										
QC1202593229	295268001	DUP									
pH		H	8.04	H	8.07	SU	0.372	(0%-10%)	TXT1	02/06/12	14:05
QC1202593226	LCS										
pH	7.00			7.01	SU		100	(99%-101%)		02/06/12	14:01
<b>Ion Chromatography</b>											
Batch	1185986										
QC1202593734	295389002	DUP									
Bromide		U	ND	U	ND	mg/L	N/A		VH1	02/07/12	21:41
Chloride			1.79		1.80	mg/L	0.457	(0%-20%)			
Fluoride			0.248		0.239	mg/L	3.69 ^	(+/-0.100)			
Sulfate			5.76		5.69	mg/L	1.09	(0%-20%)			
QC1202593736	LCS										
Bromide	2.50				2.62	mg/L		105	(90%-110%)	02/07/12	20:49
Chloride	10.0				9.59	mg/L		95.9	(90%-110%)		
Fluoride	5.00				5.00	mg/L		99.9	(90%-110%)		
Sulfate	20.0				19.7	mg/L		98.7	(90%-110%)		
QC1202593733	MB										
Bromide				U	ND	mg/L				02/07/12	20:23
Chloride				U	ND	mg/L					
Fluoride				U	ND	mg/L					
Sulfate				U	ND	mg/L					
QC1202593735	295389002	PS									
Bromide	2.50	U	ND		2.45	mg/L		98.1	(90%-110%)	02/07/12	22:07
Chloride	10.0		1.79		11.2	mg/L		93.8	(90%-110%)		
Fluoride	5.00		0.248		4.96	mg/L		94.3	(90%-110%)		
Sulfate	20.0		5.76		25.1	mg/L		96.8	(90%-110%)		
<b>Solids Analysis</b>											
Batch	1186676										
QC1202595228	295268001	DUP									
Total Dissolved Solids			82.9		120	mg/L	43.5*	(0%-10%)	LYG1	02/08/12	09:34
QC1202595232	LCS										
Total Dissolved Solids	300				301	mg/L		100	(95%-105%)	02/08/12	09:34
QC1202595227	MB										
Total Dissolved Solids			J		4.29	mg/L				02/08/12	09:34
<b>Titration Analysis</b>											

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## QC Summary

Workorder: 295389

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Titration Analysis</b>											
Batch	1186112										
QC1202594063	294676002	DUP									
Alkalinity, Total as CaCO3		53.8		53.8	mg/L	0.00		(0%-20%)	LXA1	02/07/12	14:54
Carbonate alkalinity (CaCO3)	U	ND	U	ND	mg/L	N/A					
QC1202594058	LCS										
Alkalinity, Total as CaCO3	50.0			51.2	mg/L		102	(90%-110%)		02/07/12	14:46
QC1202594062	MB										
Alkalinity, Total as CaCO3			U	ND	mg/L					02/07/12	14:39
Carbonate alkalinity (CaCO3)			U	ND	mg/L						
QC1202594064	294676002	MS									
Alkalinity, Total as CaCO3	50.0	53.8		105	mg/L		101	(80%-120%)		02/07/12	14:56

### Notes:

RER is calculated at the 95% confidence level (2-sigma).

The Qualifiers in this report are defined as follows:

- \*\* Analyte is a surrogate compound
- < Result is less than value reported
- > Result is greater than value reported
- A The TIC is a suspected aldol-condensation product
- B For General Chemistry and Organic analysis the target analyte was detected in the associated blank.
- BD Results are either below the MDC or tracer recovery is low
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of the sample
- E General Chemistry--Concentration of the target analyte exceeds the instrument calibration range
- E Metals--%difference of sample and SD is >10%. Sample concentration must meet flagging criteria
- E Organics--Concentration of the target analyte exceeds the instrument calibration range
- F Estimated Value
- FB Mercury was found present at quantifiable concentrations in field blanks received with these samples. Data associated with the blank are deemed invalid for reporting to regulatory agencies
- H Analytical holding time was exceeded
- J Value is estimated
- K Analyte present. Reported value may be biased high. Actual value is expected to be lower.
- L Analyte present. Reported value may be biased low. Actual value is expected to be higher.
- M M if above MDC and less than LLD
- M Matrix Related Failure
- N Metals--The Matrix spike sample recovery is not within specified control limits
- N Organics--Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
- N/A RPD or %Recovery limits do not apply.
- N1 See case narrative
- ND Analyte concentration is not detected above the detection limit

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## QC Summary

Workorder: 295389

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
P	Organics--The concentrations between the primary and confirmation columns/detectors is >40% different. For HPLC, difference is also <70%										
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.										
R	Sample results are rejected										
U	Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.										
UI	Gamma Spectroscopy--Uncertain identification										
UJ	Gamma Spectroscopy--Uncertain identification										
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Y	QC Samples were not spiked with this compound										
Z	Paint Filter Test--Particulates passed through the filter, however no free liquids were observed.										
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.										
d	5-day BOD--The 2:1 depletion requirement was not met for this sample										
h	Preparation or preservation holding time was exceeded										

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

\* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

# Miscellaneous

DATA EXCEPTION REPORT			
<b>Mo.Day Yr.</b> 08-FEB-12	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> ELECTRODE	<b>Test / Method:</b> EPA 150.1	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> ESHL, UCOR
<b>Batch ID:</b> 1185822	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 295268(12-699),295272(12-703),295337,295389(12-712),295393(12-719)</b> <b>Application Issues:</b> Sample received out of holding			
<b>Specification and Requirements</b>		<b>DER Disposition:</b>	
<b>Exception Description:</b>			
1. Sample received out of holding:  295268 001,004  295272 002,004  295337 002,007,013  295389 002  295393 002  QC 1202593227DUP,1202593229DUP		Samples received out of holding	

**Originator's Name:**

Travis Tola 08-FEB-12

**Data Validator/Group Leader:**

Elzbieta Szulc 13-FEB-12

DATA EXCEPTION REPORT			
<b>Mo.Day Yr.</b> 14-FEB-12	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> BALANCE	<b>Test / Method:</b> EPA 160.1	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> ESHL, INEL, UCOR, UDSL
<b>Batch ID:</b> 1186676	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG):</b> 295182,295268(12-699),295272(12-703),295289,295337,295349(10512-01_WCH),295389(12-712) <b>Application Issues:</b> Failed RPD for DUP			
<b>Specification and Requirements</b>		<b>DER Disposition:</b>	
<b>Exception Description:</b>  1. Failed RPD for DUP:  QC 1202595228DUP		1.The Relative Percent Difference (RPD) between the sample and duplicate falls outside of the established acceptance limits because of the heterogeneous matrix of the sample	

**Originator's Name:**  
Lisa Gregory 14-FEB-12

**Data Validator/Group Leader:**  
Elzbieta Szulc 14-FEB-12



# **Radiological Analysis**

**Radiochemistry Case Narrative  
ARS International (ARSL)  
SDG 12-712  
Work Order 295389**

**Method/Analysis Information**

**Product:** Alphaspec U, Liquid  
**Analytical Method:** DOE EML HASL-300, U-02-RC Modified  
**Analytical Batch Number:** 1185825

<b>Sample ID</b>	<b>Client ID</b>
295389001	CAAN-12-2024
1202593241	Method Blank (MB)
1202593242	295389001(CAAN-12-2024) Sample Duplicate (DUP)
1202593243	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-011 REV# 21.

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met. Calibrations are performed monthly using mixed alpha standards comprised of the following: Gd-148, Np-237, and Cm-244.

**Standards Information**

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

**Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

**Quality Control (QC) Information:**

**Blank Information**

Aliquots for samples 1202593241 (MB) and 1202593243 (LCS) were changed to 1.0 per client request.

**Designated QC**

The following sample was used for QC: 295389001 (CAAN-12-2024). The QC was from ARSL work order 295389.

**QC Information**

All of the QC samples met the required acceptance limits.

#### **CSU**

The blank result is less than 1.65 times the CSU.

#### **Technical Information:**

##### **Holding Time**

All sample procedures for this sample set were performed within the required holding time.

##### **Sample Re-prep/Re-analysis**

None of the samples in this sample set required reprep or reanalysis.

#### **Miscellaneous Information:**

##### **Data Exception (DER) Documentation**

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

##### **Manual Integration**

No manual integrations were performed on data in this batch.

##### **Additional Comments**

The MDCs are calculated using a blank population.

##### **Blank Decision Level**

The blank result is less than the decision level.

#### **Qualifier Information**

Manual qualifiers were not required.

#### **Method/Analysis Information**

<b>Product:</b>	<b>Alphaspec Pu, Liquid</b>
Analytical Method:	DOE EML HASL-300, Pu-11-RC Modified
Analytical Batch Number:	1185827

<b>Sample ID</b>	<b>Client ID</b>
295389001	CAAN-12-2024
1202593245	Method Blank (MB)
1202593246	295389001(CAAN-12-2024) Sample Duplicate (DUP)
1202593247	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

#### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as

Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-011 REV# 21.

### **Calibration Information:**

#### **Calibration Information**

All initial and continuing calibration requirements have been met. Calibrations are performed monthly using mixed alpha standards comprised of the following: Gd-148, Np-237, and Cm-244.

#### **Standards Information**

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

#### **Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

### **Quality Control (QC) Information:**

#### **Blank Information**

Aliquots for samples 1202593245 (MB) and 1202593247 (LCS) were changed to 1.0 per client request.

#### **Designated QC**

The following sample was used for QC: 295389001 (CAAN-12-2024). The QC was from ARSL work order 295389.

#### **QC Information**

All of the QC samples met the required acceptance limits.

#### **CSU**

The blank result is less than 1.65 times the CSU.

### **Technical Information:**

#### **Holding Time**

All sample procedures for this sample set were performed within the required holding time.

#### **Sample Re-prep/Re-analysis**

None of the samples in this sample set required reprep or reanalysis.

### **Miscellaneous Information:**

#### **Data Exception (DER) Documentation**

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

#### **Manual Integration**

No manual integrations were performed on data in this batch.

#### **Additional Comments**

The MDCs are calculated using a blank population.

#### **Blank Decision Level**

The blank result is less than the decision level.

### **Qualifier Information**

Manual qualifiers were not required.

### **Method/Analysis Information**

**Product:** Alphaspec Am241 Liquid  
**Analytical Method:** DOE EML HASL-300, Am-05-RC Modified  
**Analytical Batch Number:** 1185834

<b>Sample ID</b>	<b>Client ID</b>
295389001	CAAN-12-2024
1202593258	Method Blank (MB)
1202593259	295389001(CAAN-12-2024) Sample Duplicate (DUP)
1202593260	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-011 REV# 21.

### **Calibration Information:**

#### **Calibration Information**

All initial and continuing calibration requirements have been met. Calibrations are performed monthly using mixed alpha standards comprised of the following: Gd-148, Np-237, and Cm-244.

#### **Standards Information**

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

#### **Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

### **Quality Control (QC) Information:**

#### **Blank Information**

Aliquots for samples 1202593258 (MB) and 1202593260 (LCS) were changed to 1.0 per client request.

#### **Designated QC**

The following sample was used for QC: 295389001 (CAAN-12-2024). The QC was from ARSL work order 295389.

#### **QC Information**

All of the QC samples met the required acceptance limits.

**CSU**

The blank result is less than 1.65 times the CSU.

**Technical Information:****Holding Time**

All sample procedures for this sample set were performed within the required holding time.

**Sample Re-prep/Re-analysis**

Sample 295389001 (CAAN-12-2024) was recounted due to high MDC. The recount is reported.

**Miscellaneous Information:****Data Exception (DER) Documentation**

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

**Manual Integration**

No manual integrations were performed on data in this batch.

**Additional Comments**

The MDCs are calculated using a blank population. Sample 295389001 (CAAN-12-2024) did not meet the client's yield requirement. However, there are 400 tracer counts, GEL's standard tracer yield requirements are met, and the client's detection limits are met.

**Blank Decision Level**

The blank result is less than the decision level.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:**                      **Gammasepec**

Analytical Method:            EPA 901.1

Analytical Batch Number:    1186207

<b>Sample ID</b>	<b>Client ID</b>
295389001	CAAN-12-2024
1202594216	Method Blank (MB)
1202594217	295268002(CAAN-12-2031) Sample Duplicate (DUP)
1202594218	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as

Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-013 REV# 23.

#### **Calibration Information:**

##### **Calibration Information**

All initial and continuing calibration requirements have been met. The initial Calibrations were performed in April 2011, August 2011, November 2011 and January 2012.

##### **Standards Information**

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

##### **Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

#### **Quality Control (QC) Information:**

##### **Blank Information**

The blank volume is representative of the sample volume in this batch.

##### **Designated QC**

The following sample was used for QC: 295268002 (CAAN-12-2031). The QC was from ARSL work order 295268.

##### **QC Information**

All of the QC samples met the required acceptance limits.

##### **CSU**

The blank result is less than 1.65 times the CSU.

#### **Technical Information:**

##### **Holding Time**

All sample procedures for this sample set were performed within the required holding time.

##### **Sample Re-prep/Re-analysis**

None of the samples in this sample set required reprep or reanalysis.

#### **Miscellaneous Information:**

##### **Data Exception (DER) Documentation**

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

##### **Additional Comments**

Additional comments were not required for this sample set.

##### **Blank Decision Level**

The blank result is less than the decision level.

#### **Qualifier Information**

Manual qualifiers were not required.

## **Method/Analysis Information**

**Product:** GFPC, Sr90, liquid

Analytical Method: EPA 905.0 Modified

Analytical Batch Number: 1185966

<b>Sample ID</b>	<b>Client ID</b>
295389001	CAAN-12-2024
1202593670	Method Blank (MB)
1202593671	295389001(CAAN-12-2024) Sample Duplicate (DUP)
1202593672	295389001(CAAN-12-2024) Matrix Spike (MS)
1202593673	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-004 REV# 14.

### **Calibration Information:**

#### **Calibration Information**

All initial and continuing calibration requirements have been met. The initial Calibration was performed in March 2011.

#### **Standards Information**

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

#### **Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

### **Quality Control (QC) Information:**

#### **Blank Information**

Aliquots for samples 1202593670 (MB) and 1202593673 (LCS) were changed to 1.0 per client request.

#### **Designated QC**

The following sample was used for QC: 295389001 (CAAN-12-2024). The QC was from ARSL work order 295389.

#### **QC Information**

All of the QC samples met the required acceptance limits.

#### **CSU**

The blank result is less than 1.65 times the CSU.



### **Technical Information:**

#### **Holding Time**

All sample procedures for this sample set were performed within the required holding time.

#### **Sample Re-prep/Re-analysis**

Sample 1202593671 (CAAN-12-2024) was recounted due to a suspected false positive. The recount is reported.

#### **Chemical Recoveries**

All chemical recoveries meet the required acceptance limits for this sample set.

### **Miscellaneous Information:**

#### **Data Exception (DER) Documentation**

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

#### **Additional Comments**

The matrix spike, 1202593672 (CAAN-12-2024), aliquot was reduced to conserve sample volume.

#### **Blank Decision Level**

The blank result is less than the decision level.

#### **Qualifier Information**

Manual qualifiers were not required.

### **Method/Analysis Information**

<b>Product:</b>	<b>WSP-GrossA/B</b>
Analytical Method:	EPA 900.0/SW846 9310
Analytical Batch Number:	1185980

<b>Sample ID</b>	<b>Client ID</b>
295389001	CAAN-12-2024
1202593717	Method Blank (MB)
1202593718	295268002(CAAN-12-2031) Sample Duplicate (DUP)
1202593719	295268002(CAAN-12-2031) Matrix Spike (MS)
1202593720	295268002(CAAN-12-2031) Matrix Spike Duplicate (MSD)
1202593721	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

#### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-001 REV# 14.

### **Calibration Information:**

#### **Calibration Information**

All initial and continuing calibration requirements have been met. The initial Calibration was performed in September 2011. The discrimination settings are calibrated in beta discriminating mode to reduce beta to alpha crosstalk.

#### **Standards Information**

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

#### **Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

### **Quality Control (QC) Information:**

#### **Blank Information**

Aliquots for samples 1202593717 (MB) and 1202593721 (LCS) were changed to 1.0 per client request.

#### **Designated QC**

The following sample was used for QC: 295268002 (CAAN-12-2031). The QC was from ARSL work order 295268.

#### **QC Information**

All of the QC samples met the required acceptance limits.

#### **CSU**

The blank result is less than 1.65 times the CSU.

### **Technical Information:**

#### **Holding Time**

All sample procedures for this sample set were performed within the required holding time.

#### **Sample Re-prep/Re-analysis**

None of the samples in this sample set required prep or reanalysis.

#### **Chemical Recoveries**

All chemical recoveries meet the required acceptance limits for this sample set.

#### **Gross Alpha/Beta Preparation Information**

High hygroscopic salt content in evaporated samples can cause the sample mass to fluctuate due to moisture absorption. To minimize this interference, the salts are converted to oxides by heating the sample under a flame until a dull red color is obtained. The conversion to oxides stabilizes the sample weight and ensures that proper alpha/beta efficiencies are assigned for each sample. Volatile radioisotopes of carbon, hydrogen, technetium, polonium and cesium may be lost during sample heating, especially to a dull red heat. For this sample set, the prepared planchet was counted for beta activity before being flamed. After flaming, the planchet was counted for alpha activity.

### **Miscellaneous Information:**

#### **Data Exception (DER) Documentation**

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

#### **Additional Comments**

The matrix spike and matrix spike duplicate, 1202593719 (CAAN-12-2031) and 1202593720 (CAAN-12-2031), aliquots were reduced to conserve sample volume.

**Blank Decision Level**

The blank result is less than the decision level.

**Qualifier Information**

Manual qualifiers were not required.

**Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

## **GEL LABORATORIES LLC**

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### **Qualifier Definition Report for**

ARSL001 ARS International (63641-10)

Client SDG: 12-712 GEL Work Order: 295389

**The Qualifiers in this report are defined as follows:**

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

**Review/Validation**

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

**Signature:**



**Name: Kate Gellatly**

**Date: 29 FEB 2012**

**Title: Analyst I**

# **Sample Data Summary**

# GEL LABORATORIES LLC

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## Certificate of Analysis

Company : Los Alamos National Laboratory  
Address : TA-03, SM271, Drop Pt. 02U, Rm111

Los Alamos, New Mexico 87545

Contact: Ms. Joylene Valdez

Project: LANL-WQH Water Samples

Report Date: February 29, 2012

Client Sample ID: CAAN-12-2024  
Sample ID: 295389001  
Matrix: WG  
Collect Date: 02-FEB-12  
Receive Date: 04-FEB-12  
Collector: Client

Project: ESHL00210  
Client ID: ARSL001

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>													
<i>Alphaspec Am241 Liquid "As Received"</i>													
Americium-241	U	-0.00184	+/-0.0134	0.0445	+/-0.0134	0.050	pCi/L		LYS1	02/27/12	1316	1185834	1
<i>Alphaspec Pu, Liquid "As Received"</i>													
Plutonium-238	U	0.00	+/-0.00441	0.0278	+/-0.00441	0.050	pCi/L		LYS1	02/18/12	1558	1185827	2
Plutonium-239/240	U	0.0022	+/-0.00382	0.0324	+/-0.00382	0.050	pCi/L						
<i>Alphaspec U, Liquid "As Received"</i>													
Uranium-234		0.279	+/-0.0263	0.0493	+/-0.0316	1.00	pCi/L		LYS1	02/18/12	1603	1185825	3
Uranium-235/236	U	0.0212	+/-0.00751	0.0262	+/-0.00762	1.00	pCi/L						
Uranium-238		0.187	+/-0.0207	0.0375	+/-0.0238	0.500	pCi/L						
<b>Rad Gamma Spec Analysis</b>													
<i>Gammaspex "As Received"</i>													
Cesium-137	U	-1.66	+/-1.39	4.58	+/-1.39	8.00	pCi/L		KXG3	02/11/12	1052	1186207	4
Cobalt-60	U	0.00898	+/-1.14	4.31	+/-1.14	8.00	pCi/L						
Neptunium-237	U	-1.29	+/-2.51	8.82	+/-2.51	10.0	pCi/L						
Potassium-40	U	24.6	+/-15.3	53.1	+/-15.3	10.0	pCi/L						
Sodium-22	U	-1.43	+/-1.37	4.65	+/-1.37	10.0	pCi/L						
<b>Rad Gas Flow Proportional Counting</b>													
<i>GFPC, Sr90, liquid "As Received"</i>													
Strontium-90	U	0.129	+/-0.146	0.491	+/-0.147	0.500	pCi/L		JXR1	02/15/12	2036	1185966	5
<i>WSP-GrossA/B "As Received"</i>													
Beta	U	-0.152	+/-0.527	2.11	+/-0.527	3.00	pCi/L		DXF3	02/14/12	1938	1185980	6
Alpha	U	-0.0212	+/-0.275	1.71	+/-0.276	3.00	pCi/L		DXF3	02/16/12	2036	1185980	7

### The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Am-05-RC Modified
2	DOE EML HASL-300, Pu-11-RC Modified
3	DOE EML HASL-300, U-02-RC Modified
4	EPA 901.1
5	EPA 905.0 Modified
6	EPA 900.0/SW846 9310
7	EPA 900.0/SW846 9310

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Americium-243 Tracer	Alphaspec Am241 Liquid "As Received"	1185834	39.7 *	(50%-105%)
Plutonium-242 Tracer	Alphaspec Pu, Liquid "As Received"	1185827	71.0	(50%-105%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1185825	78.2	(50%-105%)
Strontium Carrier	GFPC, Sr90, liquid "As Received"	1185966	78.9	(50%-105%)

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Certificate of Analysis

Company :  
Address :  
  
Contact:  
Project:  
Client Sample ID:  
Sample ID:

Los Alamos National Laboratory  
TA-03, SM271, Drop Pt. 02U, Rm111  
  
Los Alamos, New Mexico 87545  
Ms. Joylene Valdez  
LANL-WQH Water Samples  
CAAN-12-2024  
295389001

Report Date: February 29, 2012  
  
  
  
Project: ESHL00210  
Client ID: ARSL001

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	Test									Batch ID	Recovery%	Acceptable Limits	

Notes:  
TPU and Uncertainty are calculated at the 67% confidence level (1-sigma).

# Quality Control Data



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## QC Summary

Report Date: February 29, 2012

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Client : Los Alamos National Laboratory  
TA-03, SM271, Drop Pt. 02U, Rm

Contact: Los Alamos, New Mexico  
Ms. Joylene Valdez

Workorder: 295389

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	1185825										
QC1202593242	295389001	DUP									
Uranium-234		0.279		0.290	pCi/L	0.0886		(0-1)	LYS1	02/18/1216:03	
		Uncert:	+/-0.0263	+/-0.0272							
		TPU:	+/-0.0316	+/-0.0329							
		Yield:	78.2	68.4							
Uranium-235/236		U	0.0212	U 0.0124	pCi/L	0.317		(0-1)			
		Uncert:	+/-0.00751	+/-0.00621							
		TPU:	+/-0.00762	+/-0.00626							
		Yield:	78.2	68.4							
Uranium-238		0.187		0.189	pCi/L	0.0176		(0-1)			
		Uncert:	+/-0.0207	+/-0.0226							
		TPU:	+/-0.0238	+/-0.0256							
		Yield:	78.2	68.4							
QC1202593243	LCS										
Uranium-234				2.42	pCi/L					02/18/1216:03	
		Uncert:		+/-0.0653							
		TPU:		+/-0.165							
		Yield:		78.7							
Uranium-235/236				0.139	pCi/L						
		Uncert:		+/-0.0176							
		TPU:		+/-0.0197							
		Yield:		78.7							
Uranium-238	2.59			2.60	pCi/L		100	(80%-120%)			
		Uncert:		+/-0.0678							
		TPU:		+/-0.177							
		Yield:		78.7							
QC1202593241	MB										
Uranium-234			U	-0.00847	pCi/L					02/18/1216:03	
		Uncert:		+/-0.00368							
		TPU:		+/-0.00368							
		Yield:		90.1							
Uranium-235/236			U	0.00	pCi/L						
		Uncert:		+/-0.00371							
		TPU:		+/-0.00371							
		Yield:		90.1							
Uranium-238			U	0.00	pCi/L						
		Uncert:		+/-0.00212							
		TPU:		+/-0.00212							
		Yield:		90.1							
Batch	1185827										
QC1202593246	295389001	DUP									
Plutonium-238		U	0.00	U 0.00581	pCi/L	0.230		(0-1)	LYS1	02/18/1215:58	
		Uncert:	+/-0.00441	+/-0.00821							

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## QC Summary

Workorder: 295389

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	1185827										
Plutonium-239/240	TPU:	+/-0.00441		+/-0.00822							
	Yield:	71.0		64.4							
	U	0.0022	U	0.0029	pCi/L	0.0232		(0-1)			
	Uncert:	+/-0.00382		+/-0.0112							
	TPU:	+/-0.00382		+/-0.0112							
Plutonium-238	Yield:	71.0		64.4							
	QC1202593247	LCS									
	U		U	0.012	pCi/L			(80%-120%)			
	Uncert:			+/-0.00617							
	TPU:			+/-0.0062							
Plutonium-239/240	Yield:			82.8							
	2.03			2.18	pCi/L		107	(80%-120%)			
	Uncert:			+/-0.0612							
	TPU:			+/-0.114							
	Yield:			82.8							
Plutonium-238	QC1202593245	MB									
	U		U	0.00	pCi/L					02/18/1215:58	
	Uncert:			+/-0.00279							
	TPU:			+/-0.00279							
	Yield:			70.4							
Plutonium-239/240	U		U	0.00394	pCi/L						
	Uncert:			+/-0.00394							
	TPU:			+/-0.00395							
	Yield:			70.4							
	Batch	1185834									
Americium-241	QC1202593259	295389001	DUP								
	U	-0.00184	U	0.00	pCi/L	0.0461		(0-1)	LYS1	02/18/1215:58	
	Uncert:	+/-0.0134		+/-0.00653							
	TPU:	+/-0.0134		+/-0.00653							
	Yield:	39.7		85.4							
Americium-241	QC1202593260	LCS									
	1.42			1.32	pCi/L		93.2	(80%-120%)			
	Uncert:			+/-0.0472							
	TPU:			+/-0.0713							
	Yield:			79.0							
Americium-241	QC1202593258	MB									
	U		U	0.00	pCi/L						
	Uncert:			+/-0.00428							
	TPU:			+/-0.00428							
	Yield:			60.0							
<b>Rad Gamma Spec</b>											
Batch	1186207										
Cesium-137	QC1202594217	295268002	DUP								
	U	1.90	U	-0.185	pCi/L	0.449		(0-1)	KXG3	02/11/1210:56	
	Uncert:	+/-1.26		+/-1.07							
	TPU:	+/-1.26		+/-1.07							
	U	-0.747	U	1.24	pCi/L	0.411		(0-1)			
Cobalt-60	Uncert:	+/-1.29		+/-1.13							

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## QC Summary

Workorder: 295389

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>											
Batch	1186207										
Neptunium-237	TPU:	+/-1.29		+/-1.13							
	U	-5.04	U	0.417	pCi/L	0.521		(0-1)			
	Uncert:	+/-2.88		+/-2.36							
Potassium-40	TPU:	+/-2.88		+/-2.36							
	U	1.52	U	-13.2	pCi/L	0.221		(0-1)			
	Uncert:	+/-17.9		+/-15.5							
Sodium-22	TPU:	+/-17.9		+/-15.5							
	U	-1.55	U	0.537	pCi/L	0.387		(0-1)			
	Uncert:	+/-1.57		+/-1.13							
QC1202594218 LCS Americium-241	TPU:	+/-1.57		+/-1.13							
	2790			2690	pCi/L		96.4	(80%-120%)		02/11/12	12:13
	Uncert:			+/-150							
Cesium-137	TPU:			+/-150							
	6200			6380	pCi/L		103	(80%-120%)			
	Uncert:			+/-274							
Cobalt-60	TPU:			+/-274							
	6250			6370	pCi/L		102	(80%-120%)			
	Uncert:			+/-266							
Neptunium-237	TPU:			+/-266							
			U	-9.98	pCi/L						
	Uncert:			+/-23.8							
Potassium-40	TPU:			+/-23.8							
			U	-9.69	pCi/L						
	Uncert:			+/-57.5							
Sodium-22	TPU:			+/-57.5							
			U	5.13	pCi/L						
	Uncert:			+/-9.48							
QC1202594216 MB Cesium-137	TPU:			+/-9.48							
			U	0.157	pCi/L					02/11/12	10:54
	Uncert:			+/-1.33							
Cobalt-60	TPU:			+/-1.33							
			U	0.126	pCi/L						
	Uncert:			+/-1.11							
Neptunium-237	TPU:			+/-1.11							
			U	-1.25	pCi/L						
	Uncert:			+/-1.89							
Potassium-40	TPU:			+/-1.89							
			U	-8.04	pCi/L						
	Uncert:			+/-12.9							
Sodium-22	TPU:			+/-12.9							
			U	-0.981	pCi/L						
	Uncert:			+/-0.990							
QC1202593671 295389001 DUP Rad Gas Flow	TPU:			+/-0.990							
	Batch	1185966									

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## QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Gas Flow</b>											
Batch	1185966										
Strontium-90	U	0.129	U	0.113	pCi/L	0.0276		(0-1)	JXR1	02/17/12	16:33
	Uncert:	+/-0.146		+/-0.135							
	TPU:	+/-0.147		+/-0.135							
	Yield:	78.9		93.3							
QC1202593673 LCS											
Strontium-90	24.6			25.7	pCi/L		104	(80%-120%)		02/15/12	21:03
	Uncert:			+/-0.711							
	TPU:			+/-2.16							
	Yield:			84.4							
QC1202593670 MB											
Strontium-90			U	-0.0644	pCi/L					02/15/12	20:36
	Uncert:			+/-0.0666							
	TPU:			+/-0.0666							
	Yield:			70.0							
QC1202593672 295389001 MS											
Strontium-90	123 U	0.129		149	pCi/L		121	(75%-125%)		02/15/12	21:03
	Uncert:	+/-0.146		+/-3.78							
	TPU:	+/-0.147		+/-12.4							
	Yield:	78.9		87.8							
Batch	1185980										
QC1202593718 295268002 DUP											
Alpha	U	0.191	U	1.75	pCi/L	0.624		(0-1)	DXF3	02/16/12	20:36
	Uncert:	+/-0.412		+/-0.824							
	TPU:	+/-0.412		+/-0.837							
Beta	U	0.251	U	0.897	pCi/L	0.249		(0-1)		02/14/12	19:38
	Uncert:	+/-0.632		+/-0.662							
	TPU:	+/-0.632		+/-0.666							
QC1202593721 LCS											
Alpha	12.0			13.3	pCi/L		110	(80%-120%)		02/16/12	20:36
	Uncert:			+/-0.662							
	TPU:			+/-1.30							
Beta	49.2			54.3	pCi/L		110	(80%-120%)		02/14/12	19:39
	Uncert:			+/-0.946							
	TPU:			+/-4.59							
QC1202593717 MB											
Alpha			U	0.015	pCi/L					02/16/12	20:36
	Uncert:			+/-0.0568							
	TPU:			+/-0.0569							
Beta			U	-0.0669	pCi/L					02/14/12	19:38
	Uncert:			+/-0.0838							
	TPU:			+/-0.0838							
QC1202593719 295268002 MS											
Alpha	241 U	0.191		268	pCi/L		111	(75%-125%)		02/16/12	20:36
	Uncert:	+/-0.412		+/-13.6							
	TPU:	+/-0.412		+/-26.3							
Beta	984 U	0.251		1070	pCi/L		109	(75%-125%)		02/14/12	19:38
	Uncert:	+/-0.632		+/-18.9							
	TPU:	+/-0.632		+/-90.8							
QC1202593720 295268002 MSD											

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## QC Summary

Workorder: 295389

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Parmname	NOM	Sample Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Gas Flow</b>										
Batch	1185980									
Alpha	241	U	0.191	281	pCi/L	0.118	117	(0-1)		
		Uncert:	+/-0.412	+/-14.4						
		TPU:	+/-0.412	+/-27.6						
Beta	984	U	0.251	1120	pCi/L	0.132	114	(0-1)	02/14/12	19:39
		Uncert:	+/-0.632	+/-19.5						
		TPU:	+/-0.632	+/-95.0						

### Notes:

The Qualifiers in this report are defined as follows:

**	Analyte is a surrogate compound
<	Result is less than value reported
>	Result is greater than value reported
A	The TIC is a suspected aldol-condensation product
B	For General Chemistry and Organic analysis the target analyte was detected in the associated blank.
BD	Results are either below the MDC or tracer recovery is low
C	Analyte has been confirmed by GC/MS analysis
D	Results are reported from a diluted aliquot of the sample
E	General Chemistry--Concentration of the target analyte exceeds the instrument calibration range
E	Metals--%difference of sample and SD is >10%. Sample concentration must meet flagging criteria
E	Organics--Concentration of the target analyte exceeds the instrument calibration range
F	Estimated Value
FB	Mercury was found present at quantifiable concentrations in field blanks received with these samples. Data associated with the blank are deemed invalid for reporting to regulatory agencies
H	Analytical holding time was exceeded
J	Value is estimated
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
M	M if above MDC and less than LLD
M	Matrix Related Failure
N	Metals--The Matrix spike sample recovery is not within specified control limits
N	Organics--Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
N/A	RPD or %Recovery limits do not apply.
N1	See case narrative
ND	Analyte concentration is not detected above the detection limit
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
P	Organics--The concentrations between the primary and confirmation columns/detectors is >40% different. For HPLC, difference is also <70%
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
R	Sample results are rejected
U	Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
UI	Gamma Spectroscopy--Uncertain identification
UJ	Gamma Spectroscopy--Uncertain identification

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## QC Summary

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Parmname	NOM	Sample Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.									
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier									
Y	QC Samples were not spiked with this compound									
Z	Paint Filter Test--Particulates passed through the filter, however no free liquids were observed.									
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.									
d	5-day BOD--The 2:1 depletion requirement was not met for this sample									
h	Preparation or preservation holding time was exceeded									

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.

\*\* Indicates analyte is a surrogate compound.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.