AUXIER & ASSOCIATES, INC.

PAP-KAN

1428

STANDARD LEVEL IV
REPORT OF ANALYSIS

WORK ORDER #15-10107-OR

October 23, 2015

EBERLINE ANALYTICAL/OAK RIDGE LABORATORY
OAK RIDGE, TN

TABLE OF CONTENTS

Eberline Services – Oak Ridge Laboratory

LABORATORY DATA SUPPORT CHECKLIST

MP-001-3

Eberline Services Work Order # 15 - 10 107

The checklist items listed below are to be initialed by appropriate staff upon completion/verification.

Date for Partial	Initials	Date	Initials	Checklist Items
		10-19-15	JGB	Sample Log-In
		10/21/15	JG	Data Compilation
		10-21-15	MLT	First Technical Data Review
		10/21/15	MLT	Second Technical Data Review
		10/22/15	EJT	Data Entry/Electronic Deliverable
		10/22/15	EJT	Case Narrative
		10/22/15	KBS	Electronic Deliverable Proof
		10/22/15	MLT	Samples Analyzed within Holding Time Yes? [X] No? [ ]
		10/22/15	MLT	QA/QC Review
		10/21/15	EJT	Client in Possession of Data Electronic or Hard Copy
				Invoiced by Laboratory

Technical/Clerical Corrections, Signatures Needed, Problems, Etc	Date/Initials

Date package approved by: _____ 10/23/15

Laboratory Manager Date

SECTION I

CHAIN OF CUSTODY
&
pH CHECK SHEET

Chain of Custody Record

№ 7238

Eberline Services
601 Scarboro Road
Oak Ridge, TN 37830
(865) 481-0683 Phone • (865) 483-4621 Fax

EBERLINE SERVICES

15-10097 (struck out) SED 10-19 Page 1 of 1

REC'D OCT 15 2015

15-10107

Purchase Order #:

Project Name: ~~BFC~~ Jun PAP/KAN	Project Number: SSP-1428
Send Report To: Cecilia Green/Auxier	Sampler (Print Name): SSPA-LM
Address:	Sampler (Print Name): SSPA-LM
9821 Cogdill Rd. Ste. 1	Shipment Method: Federal Express
Knoxville, TN 37932	Airbill Number:
Phone: 865-675-3669	Laboratory Receiving:
Fax: 865-675-3677	

Analysis Requested

Field Sample ID	Sample Date	Sample Time	Sample Matrix	Number of Containers	Total Suspended Solids	Total dissolved solids	Gross Alpha	Gross Beta	Isotopic Uranium	Isotopic Thorium					Comments, Special Instructions, etc.	Lab Sample ID (to be completed by lab)
KC84-18-L 4	10/7/15	10:10	W	1	X	X	X	X	X	X					Analyze TSS + TDS	
KC84-18-M 5	↓	11:20	W	1	X	X	X	X	X	X					Contact Cecilia	
KC84-18-U 6	↓	13:10	W	1	X	X	X	X	X	X					filter as directed	
CP-0403 7	↓	16:17	W	1	X	X	X	X	X	X					Analyze GA + GB	
CP-0404 8	↓	17:25	W	1	X	X	X	X	X	X					contact Cecilia	
Trip Blank	↓			1											Proceed as directed	
RB-20-10/07/15 9	↓	1805	W	1	X	X	X	X	X	X					Rinsate blank	

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
[signature]	Fedex	10/13/15	1500
Relinquished by: (Signature)	Received by: (Signature) James E. [signature]	10.15.15	1200
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

Sample Custodian Remarks (Completed By Laboratory):

QA/QC Level	Turnaround	Sample Receipt	
		Total # Containers Received?	
Level I ☐	Routine ☐	COC Seals Present?	
Level II ☐	24 Hour ☐	COC Seals Intact?	
Level III ☐	1 Week ☐	Received Containers Intact?	
Other ☐	Other ____	Temperature?	

EBERLINE SERVICES
Oak Ridge Laboratory

Internal Chain of Custody

Work Order #	15-10107
Lab Deadline	10/22/2015
Analysis	GaGbT_ThSr - Level 4
Sample Matrix	Water

Comments

Relog of 15-10097-04 thru 15-10097-09
10/19/15

Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
04	32	P1.5
05	35	P1.5
06	32	P1.5
07	36	P1.5
08	33	P1.5
09	37	P1.5

	Location (circle one)					Initials	Date
Received by	(Sample Storage)	Rough Prep	Prep	Separations	Count Room	MH	20 OCT 15
Relinquished by	Sample Storage	Rough Prep	(Prep)	Separations	Count Room	MH	20 OCT 15 0850
Received by	Sample Storage	Rough Prep	Prep	Separations	(Count Room)		10/20/15 0850
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	(Count Room)	KD	10/20/15 1420
Received by	(Sample Storage)	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		

EBERLINE SERVICES

Sample Receiving Report
(Volumes, pH, & CPM)

Internal Work Order
15-10107
Received By
JBAILEY

FR	ClientID	# Btls	Comments	Matrix	Storage	Rec Vol Ttl	CPM Max
01	LCS	0		WA	P1.5		
02	BLANK	0		WA	P1.5		
03	DUP	0		WA	P1.5		
04	KC84-18-L	1		WA	P1.5	3.76	32
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	3.7600	32
05	KC84-18-M	1		WA	P1.5	3.76	35
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	3.7600	35
06	KC84-18-U	1		WA	P1.5	3.76	32
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	3.7600	32
07	CP-0403	1		WA	P1.5	3.76	36
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	3.7600	36
08	CP-0404	1		WA	P1.5	3.76	33
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	3.7600	33
09	RB-20-10 07 15	1		WA	P1.5	3.76	37
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	3.7600	37

10/19/15

Received by: _____ Date: 10-19-15

SECTION II

SAMPLE ACKNOWLEDGEMENT

Client Name	Contract/PO	Project Type	Date Received	Required Turnaround Days	Eberline Services Work Order
Auxier & Associates, Inc.	PAP-KAN	Environmental	10/19/2015	3	15-10107
Project Name	**Client WO**	**Sample Disp**	**Lab Deadline**	**Internal Deadline**	**Client Deadline**
PAP-KAN	PAP-KAN	W	10/22/2015	10/22/2015	10/22/2015

Internal ID	Client ID	Sample Date	Matrix	Storage	GaGbT	TtI
01	LCS	10/19/15	WA	P1.5	X	1
02	BLANK	10/19/15	WA	P1.5	X	1
03	DUP	10/19/15	WA	P1.5	X	1
04	KC84-18-L	10/07/15 10:10	WA	P1.5	X	1
05	KC84-18-M	10/07/15 11:20	WA	P1.5	X	1
06	KC84-18-U	10/07/15 13:10	WA	P1.5	X	1
07	CP-0403	10/07/15 16:17	WA	P1.5	X	1
08	CP-0404	10/07/15 17:25	WA	P1.5	X	1
09	RB-20-10 07 15	10/07/15 18:05	WA	P1.5	X	1
						0
						0
						0
						0
						0
						0
						0
						0
						0
						0
						0
Totals Per Analysis (non QA samples)					6	

Totals Per Analysis (non QA samples), remaining analysis columns: 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

EBERLINE SERVICES

Sample Log In Report

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830

Voice: (865) 481-0683
Fax: (865) 483-4621

Invoice	Accounts Payable Auxier & Associates, Inc. 9821 Cogdill Drive #1 Knoxville, TN 37932	**Report Data**	Cecilia Greene Auxier & Associates, Inc. 9821 Cogdill Road, Suite 1 Knoxville, TN 37830
Voice	865-675-3669	Voice	865-675-3669
Fax	865-675-3677	Fax	865-675-3677
Contact	Harvey Cohen		
Voice	301-718-8900		
Fax	301-718-8909		

Printed: 10/19/2015 10:27 AM

Eberline Services – Oak Ridge Laboratory

SAMPLE RECEIPT CHECKLIST
MP-001-2

WORK ORDER # 15 - 10 107

SAMPLE MATRIX/MATRICES: (CIRCLE ~~ONE~~ OR BOTH)

(AQUEOUS) NON-AQUEOUS

(CIRCLE EITHER YES, NO, OR N/A)

WERE SAMPLES:

Received in good condition?	(Y)	N	
If aqueous, properly preserved	(Y)	N	N/A

WERE CHAIN OF CUSTODY SEALS:

Present on outside of package?	(Y)	N
Unbroken on outside of package?	(Y)	N
Present on samples?	(Y)	N
Unbroken on samples?	(Y)	N
Was chain of custody present upon sample receipt?	(Y)	N

IF THE RESPONSE TO ANY OF THE ABOVE IS **NO**, A DISCREPANT SAMPLE RECEIPT REPORT (DSR) HAS BEEN ISSUED.

REMARKS: _____

SIGNATURE: James E Bailey DATE: 10-19-15

SECTION III

CASE NARRATIVE

EBERLINE SERVICES

EBERLINE ANALYTICAL CORPORATION
601 SCARBORO ROAD
OAK RIDGE, TENNESSEE 37830
PHONE (865) 481-0683
FAX (865) 483-4621

EBS-OR-39846

October 23, 2015

Cecilia Greene
USA ENV LP/Auxier & Associates, Inc.
9821 Cogdill Road, Suite 1
Knoxville, TN 37932

CASE NARRATIVE
Work Order# 15-10107-OR

SAMPLE RECEIPT

This work order contains six water samples received 10/15/2015 and re-logged at the client's request 10/19/2015. These samples were analyzed for Gross Alpha/Beta.

CLIENT ID	LAB ID
KC84-18-L	15-10107-04
KC84-18-M	15-10107-05
KC84-18-U	15-10107-06
CP-0403	15-10107-07
CP-0404	15-10107-08
RB-20-10 07 15	15-10107-09

ANALYTICAL METHODS

Gross Alpha/Beta was analyzed using EPA Method 900.0 Modified.

ANALYTICAL RESULTS

Combined Standard Uncertainty is reported at 2-sigma value.

Minimum Detectable Activity (MDA) values for data represented in this report are sample-specific. MDA measurements are determined based on factors and conditions including instrument settings, aliquot size and matrix type.

GROSS ALPHA & BETA

Samples were prepared by evaporation of representative volumetric aliquots acidified with HNO_3. Reduced samples were then transferred to steel planchets for final evaporation to dryness and flaming. Samples were then counted on a gas proportional counter. Results were corrected as required for inherent self-absorption based on residual mass present.

ANALYTICAL RESULTS CONTINUED

Samples demonstrated acceptable results for all Gross Alpha and Beta analyses. The Gross Alpha and Beta method blank demonstrated acceptable results. Results for the Gross Alpha duplicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Gross Beta duplicate demonstrated a high relative percent difference and normalized difference. Results for the Gross Alpha and Beta laboratory control sample demonstrated an acceptable percent recovery.

CERTIFICATION OF ACCURACY

I certify that this data report is in compliance with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.

M.R. McDougall
Laboratory Manager

Date: 10/23/2015

Eberline Analytical wants and encourages your feedback regarding our performance providing radioanalytical services. Please visit http://www.eberlineservices.com/client.htm to provide us with feedback on our services.

SECTION IV

ANALYTICAL RESULTS SUMMARY

Eberline Analytical
Final Report of Analysis

Report To:
Cecilia Greene
Auxier & Associates, Inc.
9821 Cogdill Road, Suite 1
Knoxville, TN 37830

Work Order Details:

SDG:	15-10107
Purchase Order:	PAP-KAN
Analysis Category:	ENVIRONMENTAL
Sample Matrix:	WA

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	CV	Report Units
15-10107-01	LCS	KNOWN	10/19/15 00:00	10/19/2015	10/20/2015	15-10107	Gross Alpha	EPA 900.0 Modified	2.67E+02	1.15E+01				pCi/l
15-10107-01	LCS	SPIKE	10/19/15 00:00	10/19/2015	10/20/2015	15-10107	Gross Alpha	EPA 900.0 Modified	2.97E+02	3.88E+00	3.27E+01	3.40E-01	3.49E-01	pCi/l
15-10107-02	MBL	BLANK	10/19/15 00:00	10/19/2015	10/20/2015	15-10107	Gross Alpha	EPA 900.0 Modified	2.52E-02	7.82E-02	7.82E-02	1.82E-01	1.83E-01	pCi/l
15-10107-03	DUP	KC84-18-L	10/07/15 10:10	10/19/2015	10/20/2015	15-10107	Gross Alpha	EPA 900.0 Modified	1.58E+00	1.54E+00	1.55E+00	2.84E+00	1.23E+00	pCi/l
15-10107-04	DO	KC84-18-L	10/07/15 10:10	10/19/2015	10/20/2015	15-10107	Gross Alpha	EPA 900.0 Modified	-1.23E+00	2.05E+00	2.05E+00	5.28E+00	2.21E+00	pCi/l
15-10107-05	TRG	KC84-18-M	10/07/15 11:20	10/19/2015	10/20/2015	15-10107	Gross Alpha	EPA 900.0 Modified	5.06E+00	3.17E+00	3.22E+00	5.48E+00	1.65E+00	pCi/l
15-10107-06	TRG	KC84-18-U	10/07/15 13:10	10/19/2015	10/20/2015	15-10107	Gross Alpha	EPA 900.0 Modified	8.05E+00	3.21E+00	3.33E+00	4.69E+00	1.91E+00	pCi/l
15-10107-07	TRG	CP-0403	10/07/15 16:17	10/19/2015	10/20/2015	15-10107	Gross Alpha	EPA 900.0 Modified	-1.17E+00	1.88E+00	1.89E+00	4.76E+00	3.27E+00	pCi/l
15-10107-08	TRG	CP-0404	10/07/15 17:25	10/19/2015	10/20/2015	15-10107	Gross Alpha	EPA 900.0 Modified	4.77E+00	2.23E+00	2.29E+00	2.51E+00	9.58E-01	pCi/l
15-10107-09	TRG	RB-20-10 07 15	10/07/15 18:05	10/19/2015	10/20/2015	15-10107	Gross Alpha	EPA 900.0 Modified	-1.32E-01	1.44E+00	1.44E+00	3.40E+00	3.49E+00	pCi/l
15-10107-01	LCS	KNOWN	10/19/15 00:00	10/19/2015	10/20/2015	15-10107	Gross Beta	EPA 900.0 Modified	2.91E+02	8.74E+00				pCi/l
15-10107-01	LCS	SPIKE	10/19/15 00:00	10/19/2015	10/20/2015	15-10107	Gross Beta	EPA 900.0 Modified	2.77E+02	3.14E+00	3.84E+01	6.25E-01	1.50E+00	pCi/l
15-10107-02	MBL	BLANK	10/19/15 00:00	10/19/2015	10/20/2015	15-10107	Gross Beta	EPA 900.0 Modified	1.57E-01	2.63E-01	2.64E-01	5.44E-01	1.20E+00	pCi/l
15-10107-03	DUP	KC84-18-L	10/07/15 10:10	10/19/2015	10/20/2015	15-10107	Gross Beta	EPA 900.0 Modified	4.75E+00	3.00E+00	3.07E+00	5.87E+00	1.09E+01	pCi/l
15-10107-04	DO	KC84-18-L	10/07/15 10:10	10/19/2015	10/20/2015	15-10107	Gross Beta	EPA 900.0 Modified	-2.88E+00	3.42E+00	3.44E+00	7.55E+00	1.74E+01	pCi/l
15-10107-05	TRG	KC84-18-M	10/07/15 11:20	10/19/2015	10/20/2015	15-10107	Gross Beta	EPA 900.0 Modified	3.85E+00	3.56E+00	3.60E+00	7.19E+00	1.51E+01	pCi/l
15-10107-06	TRG	KC84-18-U	10/07/15 13:10	10/19/2015	10/20/2015	15-10107	Gross Beta	EPA 900.0 Modified	3.88E+00	3.01E+00	3.06E+00	5.88E+00	1.10E+01	pCi/l
15-10107-07	TRG	CP-0403	10/07/15 16:17	10/19/2015	10/20/2015	15-10107	Gross Beta	EPA 900.0 Modified	7.18E-01	3.05E+00	3.06E+00	6.44E+00	1.57E+01	pCi/l
15-10107-08	TRG	CP-0404	10/07/15 17:25	10/19/2015	10/20/2015	15-10107	Gross Beta	EPA 900.0 Modified	7.61E-01	3.29E+00	3.29E+00	6.93E+00	1.44E+01	pCi/l
15-10107-09	TRG	RB-20-10 07 15	10/07/15 18:05	10/19/2015	10/20/2015	15-10107	Gross Beta	EPA 900.0 Modified	7.86E-02	2.93E+00	2.93E+00	6.25E+00	1.50E+01	pCi/l

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (2-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original; CV=Critical Value

EBERLINE SERVICES

EBERLINE ANALYTICAL CORPORATION
601 SCARBORO ROAD OAK RIDGE, TN 37830 865/481-0683 FAX 865/483-4621

SECTION V

ANALYTICAL STANDARDS

Am-4

ANALYTICS

QA/QC REVIEWED
Date 4/30/96 Initials MT

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 · U.S.A.

Phone (404) 352-8677
Fax (404) 352-2837

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

52094-416

Am-241 10 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master liquid radionuclide solution source. The master source was calibrated by liquid scintillation counting.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

ISOTOPE:	Am-241
ACTIVITY (dps):	1.975 E+05
HALF-LIFE:	432.2 years
CALIBRATION DATE:	March 19, 1996 12:00 EST
TOTAL ERROR:	3.0%
SYSTEMATIC ERROR:	2.37%
RANDOM ERROR:	0.63%

10.01177 grams of solution 1M HCl.

P O NUMBER OR3830, Item 1

SOURCE PREPARED BY: Kare D'Brie Beverly
K. O. Beverly, Radiochemist

Q A APPROVED: D M. Mc 4-26-96

EBERLINE SERVICES | **QUALITY CONTROL PROGRAM**
MP-009

Rev.8; 1/10/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS
SECONDARY DILUTION (RE-CERTIFICATION)

Date: 8/5/2015 0:00
Solution Reference #: Analytics 52094-416
Solution #: A/B-7 (alpha)

Principal Radionuclide	Half Life, Years	Half Life, Days
^{241}Americium	4.322E+02	1.579E+05

Radionuclide of Interest: ^{241}Am
Parent Solution Conc.: 1.19E+04 dpm/ml

Reference Date: 3/19/1996 0:00

Chemical Composition of Standard Solution
$^{241}AmCl_3$ in 1M HCL

Dilution Instructions:

Dilution Solvent Used: 1 M HNO_3

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution: 60.0000 ml
Total Activity: 7.1100E+05 dpm
Final Volume: 1000.00 ml

Final Activity Concentration: 7.1100E+02 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

NOTES:

Expiration Date: August 4, 2016

Verified & Approved By: _____ Date: 8/5/15

QC Approval: _____ Date: 8/5/15

Sr-11
13 uCi

National Institute of Standards & Technology

Certificate

Standard Reference Material 4234A
Strontium-90 Radioactivity Standard

This Standard Reference Material (SRM) consists of radioactive strontium-90 chloride, non-radioactive strontium chloride, non-radioactive yttrium chloride, and hydrochloric acid dissolved in 5 mL of distilled water. The solution is contained in a flame-sealed NIST borosilicate-glass ampoule. The SRM is intended for the calibration of beta-particle counting instruments and for the monitoring of radiochemical procedures.

Radiological Hazard

The SRM ampoule contains strontium-90 with a total activity of approximately 13 MBq. Strontium-90 decays by beta-particle emission to yttrium-90, which also decays by beta-particle emission. None of the beta particles escape from the SRM ampoule. The beta particles emitted from strontium-90 and yttrium-90 produce bremsstrahlung photons with energies up to 2 MeV. Most of these photons escape from the SRM ampoule and can represent a radiation hazard. Approximate unshielded dose rates at several distances (as of the reference time) are given in note [a]*. Appropriate shielding and/or distance should be used to minimize personnel exposure. The SRM should be used only by persons qualified to handle radioactive material.

Chemical Hazard

The SRM ampoule contains hydrochloric acid (HCl) with a concentration of 1 mole per liter of water. The solution is corrosive and represents a health hazard if it comes in contact with eyes or skin. If the ampoule is to be opened to transfer the solution, the recommended procedure is given on page 2. The ampoule should be opened only by persons qualified to handle both radioactive material and strong acid solution.

Storage and Handling

The SRM should be stored and used at a temperature between 5 and 65 °C. The solution in an unopened ampoule should remain stable and homogeneous until at least March 2005.

The ampoule (or any subsequent container) should always be clearly marked as containing radioactive material. If the ampoule is transported it should be packed, marked, labeled, and shipped in accordance with the applicable national, international, and carrier regulations. The solution in the ampoule is a dangerous good (hazardous material) both because of the radioactivity and because of the strong acid.

Preparation

This Standard Reference Material was prepared in the Physics Laboratory, Ionizing Radiation Division, Radioactivity Group, J.M.R. Hutchinson, Group Leader. The overall technical direction and physical measurements leading to certification were provided by L.L. Lucas of the Radioactivity Group and D.B. Golas, Nuclear Energy Institute Research Associate.

The support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program by N.M. Trahey.

Gaithersburg, Maryland 20899
May 1995 (Text only revised November 1997)

Thomas E. Gills, Chief
Standard Reference Materials Program

*Notes and references are on pages 5 and 6.

EBERLINE SERVICES

QUALITY CONTROL PROGRAM
QCP-009

Rev.7; 9/29/99
Title: **Radioactive Reference Standards Solutions & Records**

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS
SECONDARY DILUTION (RE-CERTIFICATION)

	QCP-009-1-A	Date	8/5/2015 0:00
Solution Reference #	NIST 4234A	Solution #	A/B-7 (beta)

Principal Radionuclide	Half Life, Years	Half Life, Days
^{90}Strontium	2.878E+01	1.051E+04

Radionuclide of Interest: ^{90}Sr
Parent Solution Conc.: 1.52E+06 dpm/ml

Reference Date: 3/13/1995 0:00

The beta activity of solution reflects the original ^{90}Strontium concentration and an equal concentration of ^{90}Yttrium.

Chemical Composition of Standard Solution
$^{90}SrCl_2$ in 1 M HCl

Dilution Instructions:

Dilution Solvent Used: 1 M HNO_3

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution:	0.5000	ml
Total Activity:	7.5764E+05	dpm
Final Volume:	1000.00	ml

Final Activity Concentration: 7.5764E+02 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

NOTES:

Expiration Date: August 4, 2016

Verified & Approved By _____ Date: 08/05/15

QC Approval _____ Date: 8/5/15

SECTION VI

QUALITY CONTROL SAMPLE RESULTS SUMMARY

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
15-10107	GaGbT_ThSr	1	pCi	l	Auxier & Associates, Inc.

Laboratory Control Sample

Analyte		LCS Measured	CSU Measured	LCS Expected	Uncert. Expected	Known	Known Error	Result	CSU	Standard ID	Standard ACT (dpm)	Standard Error	Standard Added (g)
GROSS ALPHA_TH		111.20%	11.00%	100.00%	4.30%	2.67E+02	1.15E+01	2.97E+02	3.27E+01	A/B-07	5.96E+02	4.30E+00	9.96E-01
GROSS BETA_SR		95.08%	13.86%	100.00%	3.00%	2.91E+02	8.74E+00	2.77E+02	3.84E+01	A/B-07	6.49E+02	3.00E+00	9.96E-01

Matrix Spike

Analyte	*Normalized Difference*	*MS Actual % Rec*	*Expected MS Result*	*Expected MS Uncert*	*Actual MS Result*	*Actual MS CSU*	*Sample Result*	*Sample CSU*	*Sample Aliquot*	*Standard ID*	*Standard ACT (dpm)*	*Standard Error %*	*Standard Added (g)*

Replicate Sample

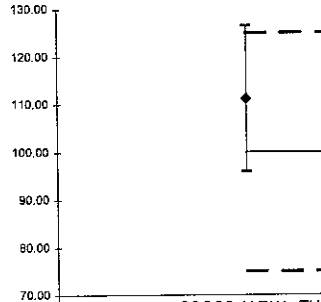
Analyte	*Normalized Difference*	*RPD*	*Original Result*	*Original CSU*	*Replicate Result*	*Replicate CSU*
GROSS ALPHA_TH	2.14	1613.21	-1.23E+00	2.05E+00	1.58E+00	1.55E+00
GROSS BETA_SR	3.25	818.94	-2.88E+00	3.44E+00	4.75E+00	3.07E+00

QC Summary

LCS Relative Bias	*LCS % R*		*MS % R*	*MS ND*	*Rep RPD*	*Rep ND*
1.11	OK				NA	OK
0.95	OK				NA	INV

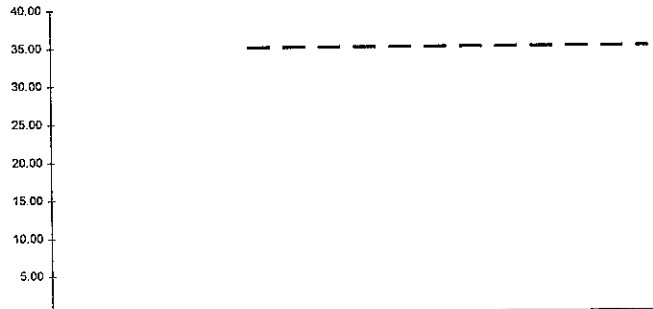
WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
15-10107	GaGbT_ThSr	1	pCi	l	Auxier & Associates, Inc.

LCS % Recovery



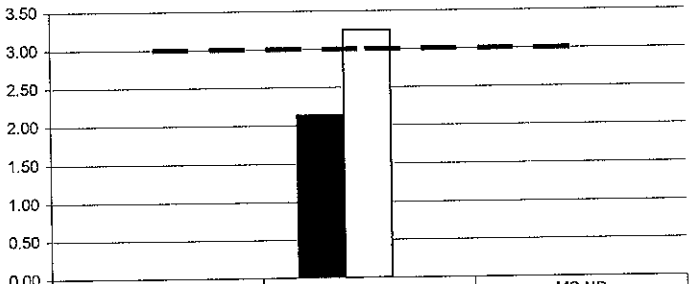
	GROSS ALPHA_TH	GROSS BETA_SR
Lower Error	95.90	78.21
Upper Error	126.50	111.94
%R	111.20	95.08
LCL	75	75
Mean	100	100
UCL	125	125

Replicate Sample RPD



	GROSS ALPHA_TH	GROSS BETA_SR
Lower Error	9975.64	2248.37
Upper Error	-6749.21	-610.49
RPD	1613.21	818.94
CL	35	35

Normalized Difference



	LCS ND	REP ND	MS ND
GROSS ALPHA_TH	0.00	2.14	0.00
GROSS BETA_SR	0.00	3.25	0.00
	0.00	0.00	0.00
UCL	3	3	3

No Matrix Spike

SECTION VII

LABORATORY TECHNICIAN'S NOTES & RUNLOGS

EBERLINE SERVICES

Work Order Analysis Notes

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830
Voice: 865.481.0683
www.eberlineservices.com

Internal Work Order	15-10107
Analysis Code	GaGbT_ThSr
Run Number	1

#	Date	Dept	User	Notes
1	10/20/15 06:44	PREP	MHIGHTOWER	Ran TDS to determine aliquot. Aliquoted samples, dried, nitrated, transferred to tared planchets, dried, flamed, re-weighed, and submitted to count room

Mh 20 OCT15

EBERLINE SERVICES

Reagents Used in an Analysis

Internal Work Order	
15-10107	
Analysis Code	Run
GaGbT_ThSr	1

Reagent ID	Reagent Name	Reagent Concentration	Analyst ID	Date Recorded
016403D12	Nitric Acid	3N	MHIGHTOWER	10/20/2015

LB4110 Aqua

Date	Sample ID	Client	Load Time	Ct Volume	Analysis	Tech
10/15	1510081AB(4,5)	Parsons	0740	8hrs	LID	[illegible]
10/15	1510081AB(1)	Parsons	0740	[illegible]	LID	[illegible]
10/15	1510054RA(1)	UST	0942	[illegible]	RA8	[illegible]
10/15	1510075RA(2-4)	UST	0941	[illegible]	RA8	[illegible]
10/15	1510035RA(1)	UST	1044	[illegible]	RA8	[illegible]
10/16/15	Daily Bkgd	Lab	0609	1 HR	αB	AG
10/19/15	Daily Bkgd	Lab	0552	1 HR	αB	AG
10/19/15	Dai Eff Check	Lab	0732	30m	αB	AG
~~10/19/15~~	~~1510010SR(1-4)~~	~~WCP~~	~~0822~~	~~2 HR~~	Sr	AG
10/19/15	1510019RA(1-10)	Mi Pisani	0934	2 Hr	Ra-228	AG
~~10/19/15~~				~~2 hr~~		KB
10/19/15	1510015SR(1-4)	Unitech	1159	1 hr	Tot Sr	KB
10/19/15	1510098AB(1-8)	Auxier	1345	2 hrs	αβ	KB
10/19/15	1510010SR(1-4)	Wash. Closure	1421	2 hrs	Tot Sr	KB
10/2	BKGA10	LAB	0619	[illegible]	LID	[illegible]
10/2	EFFA10	LAB	0725	[illegible]	LID	[illegible]
10/2	1510021NP(4)	[illegible]	0855	[illegible]	NP237	[illegible]
10/2	1510040NP(1-2,5)	Unitech	0856	[illegible]	NP237	[illegible]
10/20/15	1510027RA(1-7)	Texas Brine	1011	2 hrs	Ra8	KB
10/20/15	1509151RA(1)	UCOR	1015	1 hr	Ra8	KB
10/2	1510107AB(1)	Auxier	1113	[illegible]	LID	[illegible]
10/20/15	1510107AB(2-9)	Auxier	1221	2 hrs	αβ	KB

 EJT 10/22/15

SECTION VIII

ANALYTICAL DATA (GROSS ALPHA/BETA)

15-10107
GaGbT_ThSr
Run 1

Work Order	15-10107
Analysis Code	GaGbT_ThSr
Run	1
Date Received	10/19/2015
Lab Deadline	10/22/2015
Client	Auxier & Associates, Inc.
Project	PAP-KAN
Report Level	4
Activity Units	pCi
Aliquot Units	l
Matrix	WA
Method	EPA 900.0 Modified
Instrument Type	Alpha/Beta GPC
Radiometric Tracer	
Radiometric Sol#	
Tracer Act (dpm/g)	
Carrier	
Carrier Conc (mg/ml)	

Internal Fraction	Sample Desc	Client ID	Login CPM	Sample Date	Sample Aliquot
01	LCS	LCS		10/19/15 00:00	1.0000E+00
02	MBL	BLANK		10/19/15 00:00	1.0000E+00
03	DUP	KC84-18-L	32	10/07/15 10:10	1.0000E-01
04	DO	KC84-18-L	32	10/07/15 10:10	1.0000E-01
05	TRG	KC84-18-M	35	10/07/15 11:20	1.0000E-01
06	TRG	KC84-18-U	32	10/07/15 13:10	1.0000E-01
07	TRG	CP-0403	36	10/07/15 16:17	1.0000E-01
08	TRG	CP-0404	33	10/07/15 17:25	1.0000E-01
09	TRG	RB-20-10 07 15	37	10/07/15 18:05	1.0000E-01

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ^ Indicates estimated SAF value.
** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Eberline Services
Oak Ridge Laboratory
Analysis Sheet

15-10107
GaGbT_ThSr
Run 1

Internal Fraction	Sample Desc	Tracer Aliquot (g)	Tracer Total ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	Grav Carrier Added (ml)	Grav Filter Tare (g)	Grav Filter Final (g)	Grav Filter Net (g)	Grav % Rec	Mean % Rec	SAF 1*	SAF 2*
01	LCS				0.00		7.6013	7.6014	0.0001			1.00	1.00
02	MBL				0.00		7.4553	7.4554	0.0001			1.00	1.00
03	DUP				0.00		7.5878	7.6222	0.0344			1.00	1.00
04	DO				0.00		7.4406	7.4767	0.0361			1.00	1.00
05	TRG				0.00		7.6034	7.6492	0.0458			1.00	1.00
06	TRG				0.00		7.4385	7.4743	0.0358			1.00	1.00
07	TRG				0.00		7.6047	7.6282	0.0235			1.00	1.00
08	TRG				0.00		7.5770	7.6192	0.0422			1.00	1.00
09	TRG				0.00		7.4566	7.4575	0.0009			1.00	1.00

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ^ Indicates estimated SAF value.
** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

15-10107
GaGbT_ThSr
Run 1

Internal Fraction	Sample Desc	Rough Prep Date	Rough Prep By	Prep Date	Prep By	Sep t0 Date/Time	Sep t0 By	Sep t1 Date/Time	Sep t1 By
01	LCS			10/20/15 06:57	MHIGHTOWER				
02	MBL			10/20/15 06:57	MHIGHTOWER				
03	DUP			10/20/15 06:57	MHIGHTOWER				
04	DO			10/20/15 06:57	MHIGHTOWER				
05	TRG			10/20/15 06:57	MHIGHTOWER				
06	TRG			10/20/15 06:57	MHIGHTOWER				
07	TRG			10/20/15 06:57	MHIGHTOWER				
08	TRG			10/20/15 06:57	MHIGHTOWER				
09	TRG			10/20/15 06:57	MHIGHTOWER				

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ^ Indicates estimated SAF value.
** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Preliminary Data Report & Analytical Calculations

Work Order: 15-10107-GaGbT-1

Client: Auxier & Associates, Inc.
Eberline Services Work Order: 15-10107
Analysis Code: GaGbT
Run: 1

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	GROSS ALPHA	LCS	LCS	pCi/l	2.97E+02	3.88E+00	3.40E-01	2.67E+02	111.20	OK		OK	
02	GROSS ALPHA	MBL	BLANK	pCi/l	2.52E-02	7.82E-02	1.82E-01					OK	OK
03	GROSS ALPHA	DUP	KC84-18-L	pCi/l	1.58E+00	1.54E+00	2.84E+00				NA	OK	
04	GROSS ALPHA	DO	KC84-18-L	pCi/l	-1.23E+00	2.05E+00	5.28E+00					INV	
05	GROSS ALPHA	TRG	KC84-18-M	pCi/l	5.06E+00	3.17E+00	5.48E+00					INV	
06	GROSS ALPHA	TRG	KC84-18-U	pCi/l	8.05E+00	3.21E+00	4.69E+00					OK	
07	GROSS ALPHA	TRG	CP-0403	pCi/l	-1.17E+00	1.88E+00	4.76E+00					OK	
08	GROSS ALPHA	TRG	CP-0404	pCi/l	4.77E+00	2.23E+00	2.51E+00					OK	
09	GROSS ALPHA	TRG	RB-20-10 07 15	pCi/l	-1.32E-01	1.44E+00	3.40E+00					OK	

Client: Auxier & Associates, Inc.
Eberline Services Work Order: 15-10107
Analysis Code: GaGbT
Run: 1

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	GROSS ALPHA	LCS	10/19/15 00:00	1.00E+00	0.00	0.00	0.00	1.00		
02	GROSS ALPHA	MBL	10/19/15 00:00	1.00E+00	0.00	0.00	0.00	1.00		
03	GROSS ALPHA	DUP	10/07/15 10:10	1.00E-01	0.00	0.00	0.00	1.52		
04	GROSS ALPHA	DO	10/07/15 10:10	1.00E-01	0.00	0.00	0.00	1.57		
05	GROSS ALPHA	TRG	10/07/15 11:20	1.00E-01	0.00	0.00	0.00	1.81		
06	GROSS ALPHA	TRG	10/07/15 13:10	1.00E-01	0.00	0.00	0.00	1.56		
07	GROSS ALPHA	TRG	10/07/15 16:17	1.00E-01	0.00	0.00	0.00	1.25		
08	GROSS ALPHA	TRG	10/07/15 17:25	1.00E-01	0.00	0.00	0.00	1.72		
09	GROSS ALPHA	TRG	10/07/15 18:05	1.00E-01	0.00	0.00	0.00	1.00		

Client: Auxier & Associates, Inc.
Eberline Services Work Order: 15-10107
Analysis Code: GaGbT
Run: 1

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	GROSS ALPHA	LCS	10/20/15 10:21		LB4110A	C1	120	22552	0.133333333	0.2845
02	GROSS ALPHA	MBL	10/20/15 10:21		LB4110A	A1	120	6	0.033333333	0.2976
03	GROSS ALPHA	DUP	10/20/15 10:21		LB4110A	A2	120	12	0.033333333	0.2903
04	GROSS ALPHA	DO	10/20/15 10:21		LB4110A	A3	120	10	0.133333333	0.2872
05	GROSS ALPHA	TRG	10/20/15 10:21		LB4110A	B1	120	33	0.1	0.2821
06	GROSS ALPHA	TRG	10/20/15 10:21		LB4110A	B2	120	51	0.1	0.2835
07	GROSS ALPHA	TRG	10/20/15 10:21		LB4110A	B3	120	13	0.166666667	0.2804
08	GROSS ALPHA	TRG	10/20/15 10:21		LB4110A	B4	120	23	0.016666667	0.2843
09	GROSS ALPHA	TRG	10/20/15 10:21		LB4110A	C1	120	15	0.133333333	0.2845

Work Order: 15-10107-GaGbT-1

Client: Auxier & Associates, Inc.
Eberline Services Work Order: 15-10107
Analysis Code: GaGbT
Run: 1

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	GROSS BETA	LCS	LCS	pCi/l	2.77E+02	3.14E+00	6.25E-01	2.91E+02	95.08	OK		OK	
02	GROSS BETA	MBL	BLANK	pCi/l	1.57E-01	2.63E-01	5.44E-01					OK	OK
03	GROSS BETA	DUP	KC84-18-L	pCi/l	4.75E+00	3.00E+00	5.87E+00				NA	INV	
04	GROSS BETA	DO	KC84-18-L	pCi/l	-2.88E+00	3.42E+00	7.55E+00					INV	
05	GROSS BETA	TRG	KC84-18-M	pCi/l	3.85E+00	3.56E+00	7.19E+00					INV	
06	GROSS BETA	TRG	KC84-18-U	pCi/l	3.88E+00	3.01E+00	5.88E+00					INV	
07	GROSS BETA	TRG	CP-0403	pCi/l	7.18E-01	3.05E+00	6.44E+00					INV	
08	GROSS BETA	TRG	CP-0404	pCi/l	7.61E-01	3.29E+00	6.93E+00					INV	
09	GROSS BETA	TRG	RB-20-10 07 15	pCi/l	7.86E-02	2.93E+00	6.25E+00					INV	

Work Order: 15-10107-GaGbT-1

Client: Auxier & Associates, Inc.
Eberline Services Work Order: 15-10107
Analysis Code: GaGbT
Run: 1

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	GROSS BETA	LCS	10/19/15 00:00	1.00E+00	0.00	0.00	0.00	1.00		
02	GROSS BETA	MBL	10/19/15 00:00	1.00E+00	0.00	0.00	0.00	1.00		
03	GROSS BETA	DUP	10/07/15 10:10	1.00E-01	0.00	0.00	0.00	1.07		
04	GROSS BETA	DO	10/07/15 10:10	1.00E-01	0.00	0.00	0.00	1.08		
05	GROSS BETA	TRG	10/07/15 11:20	1.00E-01	0.00	0.00	0.00	1.10		
06	GROSS BETA	TRG	10/07/15 13:10	1.00E-01	0.00	0.00	0.00	1.08		
07	GROSS BETA	TRG	10/07/15 16:17	1.00E-01	0.00	0.00	0.00	1.00		
08	GROSS BETA	TRG	10/07/15 17:25	1.00E-01	0.00	0.00	0.00	1.09		
09	GROSS BETA	TRG	10/07/15 18:05	1.00E-01	0.00	0.00	0.00	1.00		

Preliminary Data Report & Analytical Calculations

Work Order: 15-10107-GaGbT-1

Client: Auxier & Associates, Inc.
Eberline Services Work Order: 15-10107
Analysis Code: GaGbT
Run: 1

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff	A to B, Cor
01	GROSS BETA	LCS	10/20/15 10:21		LB4110A	C1	120	41228	1.5	0.4775	295.1362467
02	GROSS BETA	MBL	10/20/15 10:21		LB4110A	A1	120	171	1.25	0.5019	1.425
03	GROSS BETA	DUP	10/20/15 10:21		LB4110A	A2	120	197	1.166666667	0.4835	1.641666667
04	GROSS BETA	DO	10/20/15 10:21		LB4110A	A3	120	194	1.9	0.4765	1.616666667
05	GROSS BETA	TRG	10/20/15 10:21		LB4110A	B1	120	247	1.683333333	0.4817	2.058333333
06	GROSS BETA	TRG	10/20/15 10:21		LB4110A	B2	120	204	1.2	0.4903	1.592305
07	GROSS BETA	TRG	10/20/15 10:21		LB4110A	B3	120	195	1.55	0.4703	1.625
08	GROSS BETA	TRG	10/20/15 10:21		LB4110A	B4	120	201	1.6	0.484	1.675
09	GROSS BETA	TRG	10/20/15 10:21		LB4110A	C1	120	181	1.5	0.4775	1.508333333

Count Room Report
Client: Auxier Associates, Inc.

15-10107-GaGbT_ThSr-1 (pCi/l) in WA
Tracer ID:

Internal Fraction	Sample Desc	Client ID	Sample Date	Sample Aliquot	Tracer Aliquot (g)	Tracer ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	SAF 1*	SAF 2*
01	LCS	LCS	10/19/15 00:00	1.0000				0.00	1.00	1.00
02	MBL	BLANK	10/19/15 00:00	1.0000				0.00	1.00	1.00
03	DUP	KC84-18-L	10/07/15 10:10	0.1000				0.00	1.00	1.00
04	DO	KC84-18-L	10/07/15 10:10	0.1000				0.00	1.00	1.00
05	TRG	KC84-18-M	10/07/15 11:20	0.1000				0.00	1.00	1.00
06	TRG	KC84-18-U	10/07/15 13:10	0.1000				0.00	1.00	1.00
07	TRG	CP-0403	10/07/15 16:17	0.1000				0.00	1.00	1.00
08	TRG	CP-0404	10/07/15 17:25	0.1000				0.00	1.00	1.00
09	TRG	RB-20-10 07 15	10/07/15 18:05	0.1000				0.00	1.00	1.00

Eberline Services
Oak Ridge Laboratory

Spike and Tracer Worksheet

Internal Work Order	Run	Analysis Code	Date	Technician	Technician Initials	Witness Initials
15-10107	1	GaGbT_ThSr	10/20/2015 6:47	MHIGHTOWER	MH	

LCS & Matrix Spikes					LCS	MS	LCSD	MSD	LCS		MS		LCSD		MSD	
Isotope	*Sol #*	*Activity dpm/g*	*Solution Date*	*Approx Addition*	*Volume Used (g)*	*Volume Used (g)*	*Volume Used (g)*	*Volume Used (g)*	*Known pCi*	*Error Estimate*	*Added pCi*	*Error Estimate*	*Known pCi*	*Error Estimate*	*Added pCi*	*Error Estimate*
Am-241	A/B-07	596.000	10/20/2015	**0.790**	**0.9960**				267.39	11.498	0.00	0.000	0.00	0.000	0.00	0.000
SrY-90	A/B-07	649.380	10/20/2015	**0.850**	**0.9960**				291.34	8.740	0.00	0.000	0.00	0.000	0.00	0.000
Tc-99 MS	Tc-2a	22043.636	7/5/2014	0.1												

Tracers

fraction	*Isotope*	*Sol #*	*Activity dpm/g*	*Solution Date*	*Volume Used (g)*	*Approx Addition*

Balance Printer Tapes

Tracer	LCS

Matrix Spike

Eberline Analytical
Oak Ridge Laboratory

Aliquot Worksheet

Printed: 10/20/2015 6:44 AM

Work Order	Run	Analysis Code	Rpt Units	Lab Deadline	Technician
15-10107	1	GaGbT_ThSr	liters	10/22/2015	MHIGHTOWER

Lab Fraction	Auxier & Associates, Inc. Client ID	Sample Type	Muffle Data Ratio Post/Pre	Dilution Data No of Dils	Dil Factor	Ratio	Aliquot Data Aliquot	Net Equiv	MS Aliquot Data Aliquot	Net Equiv	H-3 Solids Only Water Added (ml)	H3 Dist Aliq
01	LCS	LCS					1.0000E+00	1.0000E+00				
02	BLANK	MBL					1.0000E+00	1.0000E+00				
03	KC84-18-L	DUP					1.0000E-01	1.0000E-01				
04	KC84-18-L	DO					1.0000E-01	1.0000E-01				
05	KC84-18-M	TRG					1.0000E-01	1.0000E-01				
06	KC84-18-U	TRG					1.0000E-01	1.0000E-01				
07	CP-0403	TRG					1.0000E-01	1.0000E-01				
08	CP-0404	TRG					1.0000E-01	1.0000E-01				
09	RB-20-10 07 15	TRG					1.0000E-01	1.0000E-01				

Comments	

Technician: MH Date: 10/20/15

Eberline Services - Oak Ridge
Version 1.0 9/1999

Gravimetric Worksheet

Printed: 10/20/2015 8:48 AM

Work Order	Run	Analysis Code	Gravimetric Carrier	Carrier Conc (mg/ml)	Technician
15-10107	1	GaGbT_ThSr			MHIGHTOWER

TRetec	Auxier & Associates, Inc.	Sample	Carrier Data	Filter Data			Gravimetric
Fraction	Client ID	Type	Carrier Added (ml)	Filter Tare (g)	Filter Final (g)	Filter Net (g)	% Recovery
01	LCS	LCS		7.6013	7.6014	0.0001	
02	BLANK	MBL		7.4553	7.4554	0.0001	
03	DUP	DUP		7.5878	7.6222	0.0344	
04	KC84-18-L	DO		7.4406	7.4767	0.0361	
05	KC84-18-M	TRG		7.6034	7.6492	0.0458	
06	KC84-18-U	TRG		7.4385	7.4743	0.0358	
07	CP-0403	TRG		7.6047	7.6282	0.0235	
08	CP-0404	TRG		7.5770	7.6192	0.0422	
09	RB-20-10 07 15	TRG		7.4566	7.4575	0.0009	

Technician: MH Date: 10/20/15

A
10/20/15
VB

Detector ID	Sample ID	Alpha	Beta	Count Time	Voltage	TOD
B4	1510107-08	23	201	120	1410	10/20/15 12:21
B3	1510107-07	13	195	120	1410	10/20/15 12:21
C1	1510107-01	22552	41228	120	1410	10/20/15 12:21
C1	1510107-09	15	181	120	1410	10/20/15 12:21
B2	1510107-06	51	204	120	1410	10/20/15 12:21
A2	1510107-03	12	197	120	1410	10/20/15 12:21
A1	1510107-02	6	171	120	1410	10/20/15 12:21
B1	1510107-05	33	247	120	1410	10/20/15 12:21
A3	1510107-04	10	194	120	1410	10/20/15 12:21

GPC Detector Report
(ALL Backgrounds)

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Detector	Alpha/Beta	Calibration Date	Count Date	Bkg CPM	PFW	LCL	Mean	UCL
LB4110A - A1	Alpha	11/18/2007	10/20/2015	3.33E-02	P	-1.83E+01	2.23E-01	1.87E+01
LB4110A - A2	Alpha	11/18/2007	10/20/2015	3.33E-02	P	-1.55E+01	2.01E-01	1.59E+01
LB4110A - A3	Alpha	11/18/2007	10/20/2015	1.33E-01	P	-1.51E+01	1.77E-01	1.54E+01
LB4110A - A4	Alpha	11/18/2007	10/20/2015	1.17E-01	P	-1.60E+01	1.85E-01	1.64E+01
LB4110A - B1	Alpha	11/18/2007	10/20/2015	1.00E-01	P	-8.68E-02	7.19E-02	2.31E-01
LB4110A - B2	Alpha	11/18/2007	10/20/2015	1.00E-01	P	-6.91E-02	7.58E-02	2.21E-01
LB4110A - B3	Alpha	11/18/2007	10/20/2015	1.67E-01	P	-6.24E-02	5.69E-02	1.76E-01
LB4110A - B4	Alpha	11/18/2007	10/20/2015	1.67E-02	P	-1.22E-01	7.67E-02	2.75E-01
LB4110A - C1	Alpha	11/18/2007	10/20/2015	1.33E-01	P	-1.29E-01	8.71E-02	3.04E-01
LB4110A - C2	Alpha	11/18/2007	10/20/2015	2.50E-01	P	-1.58E-01	7.82E-02	3.14E-01
LB4110A - C3	Alpha	11/18/2007	10/20/2015	8.33E-02	P	-1.56E-01	8.96E-02	3.35E-01
LB4110A - C4	Alpha	11/18/2007	10/20/2015	6.67E-02	P	-6.48E-02	6.98E-02	2.04E-01
LB4110A - D1	Alpha	11/18/2007	10/20/2015	1.33E-01	P	-5.34E-02	7.77E-02	2.09E-01
LB4110A - D2	Alpha	11/18/2007	10/20/2015	1.33E-01	P	-6.60E-02	5.97E-02	1.85E-01
LB4110A - D3	Alpha	11/18/2007	10/20/2015	1.67E-01	P	-5.28E-02	6.37E-02	1.80E-01
LB4110A - D4	Alpha	11/18/2007	10/20/2015	1.00E-01	P	-6.38E-02	6.82E-02	2.00E-01
LB4110R - A1	Alpha	11/24/2006	10/20/2015	5.00E-02	P	-9.11E-02	9.48E-02	2.81E-01
LB4110R - A2	Alpha	11/24/2006	10/20/2015	3.33E-02	P	-8.24E-02	7.04E-02	2.23E-01
LB4110R - A3	Alpha	11/24/2006	10/20/2015	3.17E-01	F	-6.79E-02	8.19E-02	2.32E-01
LB4110R - A4	Alpha	11/24/2006	10/20/2015	1.67E-02	P	-5.08E-02	6.88E-02	1.88E-01
LB4110R - B1	Alpha	11/24/2006	10/20/2015	6.67E-02	P	-8.57E-02	6.23E-02	2.10E-01
LB4110R - B2	Alpha	11/24/2006	10/20/2015	2.33E-01	P	-2.81E+01	3.29E-01	2.88E+01
LB4110R - B3	Alpha	11/24/2006	10/20/2015	2.83E-01	P	-6.41E-02	7.22E-02	2.08E-01
LB4110R - B4	Alpha	11/24/2006	10/20/2015	5.00E-02	P	-5.91E-02	6.75E-02	1.94E-01
LB4110R - C1	Alpha	11/24/2006	10/20/2015	1.67E-01	P	-7.25E-02	7.20E-02	2.17E-01
LB4110R - C2	Alpha	11/24/2006	10/20/2015	1.17E-01	P	-7.40E-02	6.64E-02	2.07E-01
LB4110R - C3	Alpha	11/24/2006	10/20/2015	3.17E-01	F	-7.92E-02	8.40E-02	2.47E-01
LB4110R - C4	Alpha	11/24/2006	10/20/2015	6.67E-02	P	-5.87E-02	7.68E-02	2.12E-01
LB4110R - D1	Alpha	11/24/2006	11/1/2014	0.00E+00	P	-1.06E-01	6.70E-02	2.40E-01
LB4110R - D2	Alpha	11/24/2006	11/1/2014	0.00E+00	P	-8.23E-02	6.65E-02	2.15E-01
LB4110R - D3	Alpha	11/24/2006	11/1/2014	0.00E+00	P	-8.71E-02	6.63E-02	2.20E-01
LB4110R - D4	Alpha	11/24/2006	11/1/2014	0.00E+00	P	-8.04E-02	7.08E-02	2.22E-01
LB5100 - 1	Alpha	7/10/2006	10/26/2007	5.00E-02	P	-1.56E-02	9.58E-02	2.07E-01

GPC Detector Report
(ALL Backgrounds)

Detector	Alpha/Beta	Calibration Date	Count Date	Bkg CPM	PFW	LCL	Mean	UCL
LB4110A - A1	Beta	11/18/2007	10/20/2015	1.25E+00	P	-2.48E+02	6.44E+00	2.61E+02
LB4110A - A2	Beta	11/18/2007	10/20/2015	1.17E+00	P	-2.58E+01	2.57E+00	3.10E+01
LB4110A - A3	Beta	11/18/2007	10/20/2015	1.90E+00	P	-4.28E+01	2.47E+00	4.78E+01
LB4110A - A4	Beta	11/18/2007	10/20/2015	5.48E+00	F	-2.69E+01	4.17E+00	3.52E+01
LB4110A - B1	Beta	11/18/2007	10/20/2015	1.68E+00	P	-8.90E+00	2.87E+00	1.46E+01
LB4110A - B2	Beta	11/18/2007	10/20/2015	1.20E+00	P	-6.40E+00	1.86E+00	1.01E+01
LB4110A - B3	Beta	11/18/2007	10/20/2015	1.55E+00	P	-2.82E-01	1.41E+00	3.11E+00
LB4110A - B4	Beta	11/18/2007	10/20/2015	1.60E+00	P	-6.37E+00	1.87E+00	1.01E+01
LB4110A - C1	Beta	11/18/2007	10/20/2015	1.50E+00	P	-4.53E+00	1.94E+00	8.41E+00
LB4110A - C2	Beta	11/18/2007	10/20/2015	1.62E+00	P	4.04E-01	1.27E+00	2.13E+00
LB4110A - C3	Beta	11/18/2007	10/20/2015	1.32E+00	P	4.64E-01	1.56E+00	2.66E+00
LB4110A - C4	Beta	11/18/2007	10/20/2015	1.27E+00	P	-1.51E+00	1.91E+00	5.33E+00
LB4110A - D1	Beta	11/18/2007	10/20/2015	1.65E+00	P	-2.09E+00	2.40E+00	6.89E+00
LB4110A - D2	Beta	11/18/2007	10/20/2015	4.98E+00	F	-3.87E+00	2.42E+00	8.71E+00
LB4110A - D3	Beta	11/18/2007	10/20/2015	6.08E+00	F	2.06E-01	4.07E+00	7.93E+00
LB4110A - D4	Beta	11/18/2007	10/20/2015	1.18E+01	F	-7.55E+00	2.58E+00	1.27E+01
LB4110R - A1	Beta	11/24/2006	10/20/2015	1.25E+00	P	-5.32E+01	3.17E+00	5.95E+01
LB4110R - A2	Beta	11/24/2006	10/20/2015	1.00E+00	P	-4.20E+01	1.94E+00	4.59E+01
LB4110R - A3	Beta	11/24/2006	10/20/2015	2.00E+00	P	-3.90E+01	2.45E+00	4.39E+01
LB4110R - A4	Beta	11/24/2006	10/20/2015	8.00E-01	P	-3.86E+01	2.11E+00	4.29E+01
LB4110R - B1	Beta	11/24/2006	10/20/2015	1.20E+00	P	-4.08E+01	1.89E+00	4.46E+01
LB4110R - B2	Beta	11/24/2006	10/20/2015	1.52E+00	P	-5.97E+04	4.88E+02	6.06E+04
LB4110R - B3	Beta	11/24/2006	10/20/2015	1.40E+00	P	-4.07E+01	2.35E+00	4.54E+01
LB4110R - B4	Beta	11/24/2006	10/20/2015	1.25E+00	P	-4.10E+01	1.76E+00	4.45E+01
LB4110R - C1	Beta	11/24/2006	10/20/2015	1.58E+00	P	-4.09E+01	2.58E+00	4.61E+01
LB4110R - C2	Beta	11/24/2006	10/20/2015	1.80E+00	P	-4.08E+01	2.47E+00	4.57E+01
LB4110R - C3	Beta	11/24/2006	10/20/2015	1.87E+00	P	-4.12E+01	2.27E+00	4.57E+01
LB4110R - C4	Beta	11/24/2006	10/20/2015	1.00E+00	P	-4.65E+01	2.59E+00	5.17E+01
LB4110R - D1	Beta	11/24/2006	11/1/2014	0.00E+00	P	-4.36E+01	5.31E+00	5.43E+01
LB4110R - D2	Beta	11/24/2006	11/1/2014	0.00E+00	P	-4.67E+01	1.79E+00	5.03E+01
LB4110R - D3	Beta	11/24/2006	11/1/2014	0.00E+00	P	-5.02E+01	5.28E+00	6.07E+01
LB4110R - D4	Beta	11/24/2006	11/1/2014	0.00E+00	P	-4.64E+01	2.13E+00	5.07E+01
LB5100 - 1	Beta	7/10/2006	10/26/2007	4.52E+00	F	-3.19E-01	1.58E+00	3.48E+00

GPC Detector Report
(ALL Efficiencies)

Detector	Alpha/Beta	Calibration Date	Count Date	Eff	PFW	LCL	Mean	UCL
LB4110A - A1	Alpha	11/18/2007	10/20/2015	0.2308	P	0.0234	0.2202	0.4170
LB4110A - A2	Alpha	11/18/2007	10/20/2015	0.2086	P	-0.0134	0.1813	0.3760
LB4110A - A3	Alpha	11/18/2007	10/20/2015	0.1940	P	-0.0342	0.1733	0.3808
LB4110A - A4	Alpha	11/18/2007	10/20/2015	0.2230	P	-0.0132	0.1941	0.4014
LB4110A - B1	Alpha	11/18/2007	10/20/2015	0.2122	P	0.1939	0.2225	0.2511
LB4110A - B2	Alpha	11/18/2007	10/20/2015	0.2221	P	0.1882	0.2179	0.2477
LB4110A - B3	Alpha	11/18/2007	10/20/2015	0.2384	P	0.1424	0.2324	0.3224
LB4110A - B4	Alpha	11/18/2007	10/20/2015	0.2248	P	0.2048	0.2332	0.2617
LB4110A - C1	Alpha	11/18/2007	10/20/2015	0.2098	P	0.1971	0.2191	0.2412
LB4110A - C2	Alpha	11/18/2007	10/20/2015	0.2248	P	0.1997	0.2246	0.2496
LB4110A - C3	Alpha	11/18/2007	10/20/2015	0.2565	P	0.2247	0.2485	0.2722
LB4110A - C4	Alpha	11/18/2007	10/20/2015	0.2189	P	0.1984	0.2243	0.2502
LB4110A - D1	Alpha	11/18/2007	10/20/2015	0.2198	P	0.1796	0.2287	0.2777
LB4110A - D2	Alpha	11/18/2007	10/20/2015	0.2433	P	0.2021	0.2541	0.3062
LB4110A - D3	Alpha	11/18/2007	10/20/2015	0.2564	P	0.2068	0.2599	0.3131
LB4110A - D4	Alpha	11/18/2007	10/20/2015	0.1947	P	0.1499	0.1962	0.2425
LB4110R - A1	Alpha	11/24/2006	10/20/2015	0.2332	P	0.1212	0.2378	0.3544
LB4110R - A2	Alpha	11/24/2006	10/20/2015	0.2150	P	0.1845	0.2177	0.2508
LB4110R - A3	Alpha	11/24/2006	10/20/2015	0.2127	P	0.1920	0.2225	0.2530
LB4110R - A4	Alpha	11/24/2006	10/20/2015	0.2478	P	0.2118	0.2436	0.2753
LB4110R - B1	Alpha	11/24/2006	10/20/2015	0.1941	P	0.1662	0.2204	0.2746
LB4110R - B2	Alpha	11/24/2006	10/20/2015	0.1994	P	0.1628	0.2122	0.2617
LB4110R - B3	Alpha	11/24/2006	10/20/2015	0.2390	P	0.1948	0.2419	0.2889
LB4110R - B4	Alpha	11/24/2006	10/20/2015	0.2185	P	0.1778	0.2266	0.2753
LB4110R - C1	Alpha	11/24/2006	10/20/2015	0.1967	P	0.1793	0.2129	0.2464
LB4110R - C2	Alpha	11/24/2006	10/20/2015	0.2070	P	0.1881	0.2214	0.2547
LB4110R - C3	Alpha	11/24/2006	10/20/2015	0.2262	P	0.2028	0.2369	0.2710
LB4110R - C4	Alpha	11/24/2006	10/20/2015	0.2022	P	0.1759	0.2177	0.2596
LB4110R - D1	Alpha	11/24/2006	11/1/2014	0.0000	W	-0.0281	0.1904	0.4089
LB4110R - D2	Alpha	11/24/2006	11/1/2014	0.0000	W	-0.0314	0.2165	0.4644
LB4110R - D3	Alpha	11/24/2006	11/1/2014	0.0000	W	-0.0308	0.2127	0.4562
LB4110R - D4	Alpha	11/24/2006	11/1/2014	0.0000	W	-0.0260	0.1714	0.3689
LB5100 - 1	Alpha	7/10/2006	10/26/2007	0.3368	P	0.3332	0.3455	0.3578

GPC Detector Report
(ALL Efficiencies)

Detector	Alpha/Beta	Calibration Date	Count Date	Eff	PFW	LCL	Mean	UCL
LB4110A - A1	Beta	11/18/2007	10/20/2015	0.5491	P	0.2611	0.5625	0.8638
LB4110A - A2	Beta	11/18/2007	10/20/2015	0.4807	P	0.2071	0.4674	0.7277
LB4110A - A3	Beta	11/18/2007	10/20/2015	0.4687	P	0.1485	0.4665	0.7846
LB4110A - A4	Beta	11/18/2007	10/20/2015	0.5410	P	0.1986	0.5081	0.8177
LB4110A - B1	Beta	11/18/2007	10/20/2015	0.5323	P	0.4672	0.5344	0.6016
LB4110A - B2	Beta	11/18/2007	10/20/2015	0.5310	P	0.4677	0.5266	0.5855
LB4110A - B3	Beta	11/18/2007	10/20/2015	0.5905	P	0.3488	0.5462	0.7436
LB4110A - B4	Beta	11/18/2007	10/20/2015	0.5597	P	0.4959	0.5563	0.6168
LB4110A - C1	Beta	11/18/2007	10/20/2015	0.4979	P	0.4388	0.5122	0.5856
LB4110A - C2	Beta	11/18/2007	10/20/2015	0.5404	P	0.4057	0.5190	0.6322
LB4110A - C3	Beta	11/18/2007	10/20/2015	0.6316	P	0.5281	0.6002	0.6723
LB4110A - C4	Beta	11/18/2007	10/20/2015	0.5331	P	0.4555	0.5360	0.6164
LB4110A - D1	Beta	11/18/2007	10/20/2015	0.6651	P	0.3814	0.5792	0.7769
LB4110A - D2	Beta	11/18/2007	10/20/2015	0.6410	P	0.4421	0.5989	0.7558
LB4110A - D3	Beta	11/18/2007	10/20/2015	0.6358	P	0.4854	0.6198	0.7541
LB4110A - D4	Beta	11/18/2007	10/20/2015	0.4723	P	0.3589	0.4727	0.5865
LB4110R - A1	Beta	11/24/2006	10/20/2015	0.5574	P	0.4864	0.5706	0.6547
LB4110R - A2	Beta	11/24/2006	10/20/2015	0.5127	P	0.4283	0.5126	0.5970
LB4110R - A3	Beta	11/24/2006	10/20/2015	0.5106	P	0.4579	0.5394	0.6209
LB4110R - A4	Beta	11/24/2006	10/20/2015	0.6174	P	0.5119	0.5959	0.6799
LB4110R - B1	Beta	11/24/2006	10/20/2015	0.4753	P	0.4266	0.5365	0.6464
LB4110R - B2	Beta	11/24/2006	10/20/2015	0.4702	P	-63.4256	0.0040	63.4335
LB4110R - B3	Beta	11/24/2006	10/20/2015	0.5881	P	0.4855	0.5959	0.7064
LB4110R - B4	Beta	11/24/2006	10/20/2015	0.5333	P	0.4453	0.5467	0.6480
LB4110R - C1	Beta	11/24/2006	10/20/2015	0.4561	P	0.4159	0.5001	0.5843
LB4110R - C2	Beta	11/24/2006	10/20/2015	0.5040	P	0.4365	0.5342	0.6319
LB4110R - C3	Beta	11/24/2006	10/20/2015	0.5421	P	0.4867	0.5744	0.6621
LB4110R - C4	Beta	11/24/2006	10/20/2015	0.5032	P	0.4354	0.5252	0.6150
LB4110R - D1	Beta	11/24/2006	11/1/2014	0.0000	W	-0.0678	0.4553	0.9785
LB4110R - D2	Beta	11/24/2006	11/1/2014	0.0000	W	-0.0756	0.5116	1.0989
LB4110R - D3	Beta	11/24/2006	11/1/2014	0.0000	W	-0.0736	0.4969	1.0674
LB4110R - D4	Beta	11/24/2006	11/1/2014	0.0000	W	-0.0630	0.4090	0.8811
LB5100 - 1	Beta	7/10/2006	10/26/2007	0.4428	F	0.4555	0.4731	0.4906