AUXIER & ASSOCIATES, INC.

Westlake Landfill

Air

STANDARD LEVEL IV
REPORT OF ANALYSIS

WORK ORDER #16-04001-OR

May 5, 2016

EBERLINE ANALYTICAL/OAK RIDGE LABORATORY
OAK RIDGE, TN

TABLE OF CONTENTS

SECTION	DESCRIPTION	PAGE
I	Chain of Custody	0004
II	Sample Acknowledgement	0007
III	Case Narrative	0010
IV	Analytical Results Summary	0013
V	Analytical Standard	0016
VI	Quality Control Sample Results Summary	0021
VII	Laboratory Technician's Notes & Run Logs	0024
VIII	Analytical Data (Gross Alpha/Beta)	0030
	Last Page Number	0054

Eberline Services – Oak Ridge Laboratory

LABORATORY DATA SUPPORT CHECKLIST

MP-001-3

Eberline Services Work Order # 16-04001

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

Date for Partial	Initials	Date	Initials	Checklist Items
		4-1-16	JEB	Sample Log-In
		4/21/16	KBS	Data Compilation
		4/25/16	MLT	First Technical Data Review
		4/26/16	MSK	Second Technical Data Review
		05/04/16	EJT	Data Entry/Electronic Deliverable
		05/04/16	EJT	Case Narrative
		5/5/16	KBS	Electronic Deliverable Proof
		5/5/16	MSK	Samples Analyzed within Holding Time Yes? [X] No? [ ]
		5/5/16	MSK	QA/QC Review
				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: [signature] 5/5/16

Laboratory Manager Date

Copy No. _____

SECTION I

CHAIN OF CUSTODY

Chain of Custody Record

№ 1604

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

EBERLINE SERVICES

16-04001
RECD APR 01 2016

Page 1 of 1

Project Name: West Lake Landfill	Project Number:
Send Report To: EMSI / Auxier & Assoc. mjoseph@auxier.com	Sampler (Print Name): BILL ABERNATHY 1
Address: Environmental Management Support, Inc. 7220 W. Jefferson Ave., Suite 406	Sampler (Print Name):
Lakewood, CO 80235 Auxier & Associates, Inc.	Shipment Method: FedEx
9821 Cogdill Road, Suite 1 Knoxville, TN 37932	Airbill Number: 7759 9863 2540 2
Phone: EMSI (303) 940-3426 / A & A (865) 675-3669	Laboratory Receiving: 601 Scarboro Road Oak Ridge, TN 37830
Fax: EMSI (303) 940-3422 / A & A (865) 675-3677	(865) 481-0683

Purchase Order #:

Field Sample ID	3 Sample Date	4 Sample Time	Sample Matrix	Number of Containers	Gross alpha	Gross beta	Gamma Spec	Isotopic Uranium	Isotopic Thorium	Comments, Special Instructions, etc.	Lab Sample ID (to be completed by lab)
ENGWESA001 4	3/31/16	1026	air filter	1	X	X					47,320,848,700
ENGWESA002 5	3/30/16	1347	air filter	1	X	X					43,722,768,600
ENGWESA003 6	3/31/16	0852	air filter	1	X	X					45,533,489,300
ENGWESA004 7	3/31/16	0835	air filter	1	X	X					45,309,219,900
ENGWESA005 8	3/30/16	1252	air filter	1	X	X					45,239,475,500
ENGWESA006 9	3/31/16	1047	air filter	1	X	X					44,573,888,000
ENGWESA007 10	3/30/16	1226	air filter	1	X	X					44,322,264,500
ENGWESA008 11	3/31/16	0940	air filter	1	X	X					45,669,410,200
ENGWESA009 12	3/31/16	0810	air filter	1	X	X					47,517,594,100
ENGWESA010 13	3/30/16	1028	air filter	1	X	X					42,528,364,000
ENGWESA011 14	3/30/16	0917	air filter	1	X	X					42,668,532,400
ENGWESA012 15	3/30/16	0944	air filter	1	X	X					44,930,765,300
ENGWESA013 16	3/24/16	1239	air filter	1	X	X					36,324,765,900
Field Blank 17	3/31/16	0810	air filter	1	X	X					n/a
* ENGWESA008 FIELD DUP 18	3/31/16	0940	"	"	"	"					* Lab selected from 11 to split for field Dup. Eg 04/01/16

lab : select one of the filters at random (not the field blank) and split it for a field duplicate.

Relinquished by: (Signature)	Received by: (Signature)	Date: 7	Time: 8
5 [signature]	6 FEDEX 7759 9863 2540	3/31/16	1530
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
	[signature]	4-1-16	0930
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

Sample Custodian Remarks (Completed By Laboratory):

QA/QC Level		Turnaround		Sample Receipt	
Level IV	☒			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?	

00005

EBERLINE SERVICES Oak Ridge Laboratory	Internal Chain of Custody	Work Order #	16-04001
		Lab Deadline	4/22/2016
		Analysis	GaGbT_ThSr - Level 4
		Sample Matrix	Air Filter

Comments	Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
	04	36	S1.1
	05	41	S1.1
	06	36	S1.1
	07	37	S1.1
	08	37	S1.1
	09	36	S1.1
	10	35	S1.1
	11	39	S1.1
	12	34	S1.1
	13	35	S1.1
	14	38	S1.1
	15	35	S1.1
	16	34	S1.1
	17	39	S1.1
	18	0	S1.1

	Location (circle one)					Initials	Date
Received by	(Sample Storage)	Rough Prep	Prep	Separations	Count Room	MH	13 APR 16
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	MH	18 APR 16 0835
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	[illegible]
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	(Count Room)	KB	4/19/16 1808
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		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		

SECTION II

SAMPLE ACKNOWLEDGEMENT

Client Name	Contract/PO	Project Type	Date Received	Required Turnaround Days	Eberline Services Work Order
Auxier & Associates, Inc.	WESTLAKE	Environmental	04/01/2016	28	16-04001
Project Name	**Client WO**	**Sample Disp**	**Lab Deadline**	**Internal Deadline**	**Client Deadline**
WESTLAKE	West Lake Landfill	H	04/22/2016	04/28/2016	04/29/2016

Internal ID	Client ID	Sample Date	Matrix	Storage	GaGbT																						Ttl
01	LCS	04/01/16	AF	S1.1	X																						1
02	BLANK	04/01/16	AF	S1.1	X																						1
03	DUP	04/01/16	AF	S1.1	X																						1
04	ENGWESA001	03/31/16 10:26	AF	S1.1	X																						1
05	ENGWESA002	03/30/16 13:47	AF	S1.1	X																						1
06	ENGWESA003	03/31/16 08:52	AF	S1.1	X																						1
07	ENGWESA004	03/31/16 08:35	AF	S1.1	X																						1
08	ENGWESA005	03/30/16 12:52	AF	S1.1	X																						1
09	ENGWESA006	03/31/16 10:47	AF	S1.1	X																						1
10	ENGWESA007	03/30/16 12:26	AF	S1.1	X																						1
11	ENGWESA008	03/31/16 09:40	AF	S1.1	X																						1
12	ENGWESA009	03/31/16 08:10	AF	S1.1	X																						1
13	ENGWESA010	03/30/16 10:28	AF	S1.1	X																						1
14	ENGWESA011	03/30/16 09:17	AF	S1.1	X																						1
15	ENGWESA012	03/30/16 09:44	AF	S1.1	X																						1
16	ENGWESA013	03/24/16 12:39	AF	S1.1	X																						1
17	FIELD BLANK	03/31/16 08:10	AF	S1.1	X																						1
18	ENGWESA008 FIELD DUP	03/31/16 09:40	AF	S1.1	X																						1
																											0
																											0
		Totals Per Analysis (non QA samples)			15	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
Voice	865-675-3669
Fax	865-675-3677
Contact	Cecilia Greene
Voice	865-675-3669
Fax	865-675-3677

Report Data	Marsha Joseph Auxier & Associates, Inc. 9821 Cogdill Drive #1 Knoxville, TN 37932
Voice	865-675-3669
Fax	865-675-3677

Printed: 4/1/2016 11:25 AM

Eberline Services – Oak Ridge Laboratory

SAMPLE RECEIPT CHECKLIST
MP-001-2

WORK ORDER # 16-04001

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: 4-1-16

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-40681

May 5, 2016

Marsha Joseph
Auxier & Associates, Inc.
9821 Cogdill Road #1
Knoxville, TN 37932

CASE NARRATIVE
Work Order # 16-04001-OR

SAMPLE RECEIPT

This work order contains fourteen air filter samples received 04/01/2016. These samples were analyzed for Gross Alpha/Beta.

CLIENT ID	LAB ID	CLIENT ID	LAB ID
ENGWESA001	16-04001-04	ENGWESA009	16-04001-12
ENGWESA002	16-04001-05	ENGWESA010	16-04001-13
ENGWESA003	16-04001-06	ENGWESA011	16-04001-14
ENGWESA004	16-04001-07	ENGWESA012	16-04001-15
ENGWESA005	16-04001-08	ENGWESA013	16-04001-16
ENGWESA006	16-04001-09	FIELD BLANK	16-04001-17
ENGWESA007	16-04001-10	ENGWESA008 FIELD DUP	16-04001-18
ENGWESA008	16-04001-11		

ANALYTICAL METHODS

Gross Alpha/Beta was performed using Method LANL MLR-100 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.

SPECIAL CIRCUMSTANCE

Per direction from the client, one of the samples was chosen at random and split for a field duplicate. Client ID ENGWESA008 was split and lab fraction -18 was designated as the field duplicate.

ANALYTICAL RESULTS CONTINUED

GROSS ALPHA & BETA

Air filters analyzed for Gross Alpha and Beta activity were attached directly to stainless steel planchets and transferred to the counting room for activity determinations by gas-flow proportional counting.

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 and Beta duplicate demonstrated an acceptable 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: 5/5/2016

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:

Marsha Joseph
Auxier & Associates, Inc.
9821 Cogdill Drive #1
Knoxville, TN 37932

Work Order Details:

SDG:	16-04001
Project:	WESTLAKE
Analysis Category:	ENVIRONMENTAL
Sample Matrix:	AF

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	CV	Report Units
16-04001-01	LCS	KNOWN	04/01/16 00:00	4/1/2016	4/18/2016	16-04001	Gross Alpha	LANL MLR-100 Modified	2.71E+02	1.16E+01				pCi/m3
16-04001-01	LCS	SPIKE	04/01/16 00:00	4/1/2016	4/18/2016	16-04001	Gross Alpha	LANL MLR-100 Modified	2.61E+02	3.62E+00	2.88E+01	3.54E-01	3.85E-01	pCi/m3
16-04001-02	MBL	BLANK	04/01/16 00:00	4/1/2016	4/18/2016	16-04001	Gross Alpha	LANL MLR-100 Modified	4.96E-06	9.72E-06	9.74E-06	2.10E-05	2.18E-05	pCi/m3
16-04001-03	DUP	ENGWESA001	03/31/16 10:26	4/1/2016	4/18/2016	16-04001	Gross Alpha	LANL MLR-100 Modified	2.93E-03	1.17E-04	3.40E-04	2.52E-05	2.59E-05	pCi/m3
16-04001-04	DO	ENGWESA001	03/31/16 10:26	4/1/2016	4/18/2016	16-04001	Gross Alpha	LANL MLR-100 Modified	2.79E-03	1.12E-04	3.25E-04	2.23E-05	2.29E-05	pCi/m3
16-04001-05	TRG	ENGWESA002	03/30/16 13:47	4/1/2016	4/18/2016	16-04001	Gross Alpha	LANL MLR-100 Modified	3.15E-03	1.27E-04	3.67E-04	2.25E-05	2.34E-05	pCi/m3
16-04001-06	TRG	ENGWESA003	03/31/16 08:52	4/1/2016	4/18/2016	16-04001	Gross Alpha	LANL MLR-100 Modified	3.15E-03	1.24E-04	3.65E-04	3.41E-05	3.71E-05	pCi/m3
16-04001-07	TRG	ENGWESA004	03/31/16 08:35	4/1/2016	4/18/2016	16-04001	Gross Alpha	LANL MLR-100 Modified	3.07E-03	1.23E-04	3.57E-04	1.43E-05	1.75E-05	pCi/m3
16-04001-08	TRG	ENGWESA005	03/30/16 12:52	4/1/2016	4/18/2016	16-04001	Gross Alpha	LANL MLR-100 Modified	2.92E-03	1.18E-04	3.40E-04	2.34E-05	2.40E-05	pCi/m3
16-04001-09	TRG	ENGWESA006	03/31/16 10:47	4/1/2016	4/18/2016	16-04001	Gross Alpha	LANL MLR-100 Modified	2.90E-03	1.21E-04	3.39E-04	2.20E-05	2.28E-05	pCi/m3
16-04001-10	TRG	ENGWESA007	03/30/16 12:26	4/1/2016	4/18/2016	16-04001	Gross Alpha	LANL MLR-100 Modified	2.81E-03	1.19E-04	3.29E-04	3.51E-05	3.82E-05	pCi/m3
16-04001-11	TRG	ENGWESA008	03/31/16 09:40	4/1/2016	4/18/2016	16-04001	Gross Alpha	LANL MLR-100 Modified	3.15E-03	1.24E-04	3.66E-04	1.41E-05	1.74E-05	pCi/m3
16-04001-12	TRG	ENGWESA009	03/31/16 08:10	4/1/2016	4/18/2016	16-04001	Gross Alpha	LANL MLR-100 Modified	2.54E-03	1.07E-04	2.97E-04	2.23E-05	2.29E-05	pCi/m3
16-04001-13	TRG	ENGWESA010	03/30/16 10:28	4/1/2016	4/18/2016	16-04001	Gross Alpha	LANL MLR-100 Modified	2.85E-03	1.22E-04	3.34E-04	1.51E-05	1.85E-05	pCi/m3
16-04001-14	TRG	ENGWESA011	03/30/16 09:17	4/1/2016	4/18/2016	16-04001	Gross Alpha	LANL MLR-100 Modified	3.58E-03	1.37E-04	4.15E-04	3.63E-05	3.96E-05	pCi/m3
16-04001-15	TRG	ENGWESA012	03/30/16 09:44	4/1/2016	4/18/2016	16-04001	Gross Alpha	LANL MLR-100 Modified	3.24E-03	1.28E-04	3.76E-04	2.22E-05	2.31E-05	pCi/m3
16-04001-16	TRG	ENGWESA013	03/24/16 12:39	4/1/2016	4/18/2016	16-04001	Gross Alpha	LANL MLR-100 Modified	3.93E-03	1.62E-04	4.59E-04	2.94E-05	3.04E-05	pCi/m3
16-04001-17	TRG	FIELD BLANK	03/31/16 08:10	4/1/2016	4/18/2016	16-04001	Gross Alpha	LANL MLR-100 Modified	5.89E-05	1.89E-05	1.99E-05	2.12E-05	2.20E-05	pCi/m3
16-04001-18	TRG	ENGWESA008 FIELD DUP	03/31/16 09:40	4/1/2016	4/18/2016	16-04001	Gross Alpha	LANL MLR-100 Modified	3.25E-03	1.30E-04	3.78E-04	3.60E-05	3.92E-05	pCi/m3

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 Analytical
Final Report of Analysis

Report To:

Marsha Joseph
Auxier & Associates, Inc.
9821 Cogdill Drive #1
Knoxville, TN 37932

Work Order Details:

SDG: 16-04001
Project: WESTLAKE
Analysis Category: ENVIRONMENTAL
Sample Matrix: AF

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	CV	Report Units
16-04001-01	LCS	KNOWN	04/01/16 00:00	4/1/2016	4/18/2016	16-04001	Gross Beta	LANL MLR-100 Modified	2.92E+02	8.76E+00				pCi/m3
16-04001-01	LCS	SPIKE	04/01/16 00:00	4/1/2016	4/18/2016	16-04001	Gross Beta	LANL MLR-100 Modified	2.36E+02	2.90E+00	3.27E+01	5.79E-01	1.81E+00	pCi/m3
16-04001-02	MBL	BLANK	04/01/16 00:00	4/1/2016	4/18/2016	16-04001	Gross Beta	LANL MLR-100 Modified	1.13E-05	1.98E-05	1.99E-05	4.13E-05	1.19E-04	pCi/m3
16-04001-03	DUP	ENGWESA001	03/31/16 10:26	4/1/2016	4/18/2016	16-04001	Gross Beta	LANL MLR-100 Modified	2.27E-02	2.53E-04	3.15E-03	4.83E-05	1.46E-04	pCi/m3
16-04001-04	DO	ENGWESA001	03/31/16 10:26	4/1/2016	4/18/2016	16-04001	Gross Beta	LANL MLR-100 Modified	2.16E-02	2.43E-04	2.99E-03	5.26E-05	1.66E-04	pCi/m3
16-04001-05	TRG	ENGWESA002	03/30/16 13:47	4/1/2016	4/18/2016	16-04001	Gross Beta	LANL MLR-100 Modified	2.45E-02	2.73E-04	3.40E-03	6.04E-05	1.94E-04	pCi/m3
16-04001-06	TRG	ENGWESA003	03/31/16 08:52	4/1/2016	4/18/2016	16-04001	Gross Beta	LANL MLR-100 Modified	2.48E-02	2.72E-04	3.44E-03	6.74E-05	2.31E-04	pCi/m3
16-04001-07	TRG	ENGWESA004	03/31/16 08:35	4/1/2016	4/18/2016	16-04001	Gross Beta	LANL MLR-100 Modified	2.10E-02	2.39E-04	2.91E-03	4.07E-05	1.19E-04	pCi/m3
16-04001-08	TRG	ENGWESA005	03/30/16 12:52	4/1/2016	4/18/2016	16-04001	Gross Beta	LANL MLR-100 Modified	2.18E-02	2.50E-04	3.02E-03	5.52E-05	1.74E-04	pCi/m3
16-04001-09	TRG	ENGWESA006	03/31/16 10:47	4/1/2016	4/18/2016	16-04001	Gross Beta	LANL MLR-100 Modified	2.19E-02	2.55E-04	3.03E-03	5.90E-05	1.89E-04	pCi/m3
16-04001-10	TRG	ENGWESA007	03/30/16 12:26	4/1/2016	4/18/2016	16-04001	Gross Beta	LANL MLR-100 Modified	2.04E-02	2.51E-04	2.83E-03	6.94E-05	2.38E-04	pCi/m3
16-04001-11	TRG	ENGWESA008	03/31/16 09:40	4/1/2016	4/18/2016	16-04001	Gross Beta	LANL MLR-100 Modified	2.15E-02	2.41E-04	2.99E-03	4.03E-05	1.18E-04	pCi/m3
16-04001-12	TRG	ENGWESA009	03/31/16 08:10	4/1/2016	4/18/2016	16-04001	Gross Beta	LANL MLR-100 Modified	1.89E-02	2.28E-04	2.63E-03	5.26E-05	1.66E-04	pCi/m3
16-04001-13	TRG	ENGWESA010	03/30/16 10:28	4/1/2016	4/18/2016	16-04001	Gross Beta	LANL MLR-100 Modified	2.09E-02	2.57E-04	2.90E-03	5.82E-05	1.81E-04	pCi/m3
16-04001-14	TRG	ENGWESA011	03/30/16 09:17	4/1/2016	4/18/2016	16-04001	Gross Beta	LANL MLR-100 Modified	2.71E-02	2.94E-04	3.76E-03	5.95E-05	1.86E-04	pCi/m3
16-04001-15	TRG	ENGWESA012	03/30/16 09:44	4/1/2016	4/18/2016	16-04001	Gross Beta	LANL MLR-100 Modified	2.26E-02	2.62E-04	3.13E-03	5.33E-05	1.63E-04	pCi/m3
16-04001-16	TRG	ENGWESA013	03/24/16 12:39	4/1/2016	4/18/2016	16-04001	Gross Beta	LANL MLR-100 Modified	2.55E-02	3.21E-04	3.54E-03	8.01E-05	2.58E-04	pCi/m3
16-04001-17	TRG	FIELD BLANK	03/31/16 08:10	4/1/2016	4/18/2016	16-04001	Gross Beta	LANL MLR-100 Modified	5.15E-04	4.37E-05	8.36E-05	4.17E-05	1.21E-04	pCi/m3
16-04001-18	TRG	ENGWESA008 FIELD DUP	03/31/16 09:40	4/1/2016	4/18/2016	16-04001	Gross Beta	LANL MLR-100 Modified	2.29E-02	2.62E-04	3.17E-03	6.16E-05	2.01E-04	pCi/m3

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 STANDARD

Am-4

ANALYTICS

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

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: Karen O'Brie Beverly
K. O. Beverly, Radiochemist

Q A APPROVED: D M. Mark 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-90
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.

: 00019

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

Solution Reference # NIST 4234A

Date 8/5/2015 0:00

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

NOTES:

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.

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
16-04001	GaGbT_ThSr	1	pCi	m3	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		96.45%	11.01%	100.00%	4.30%	2.71E+02	1.16E+01	2.61E+02	2.88E+01	A/B-07	5.96E+02	4.30E+00	1.01E+00
GROSS BETA_SR		80.83%	13.87%	100.00%	3.00%	2.92E+02	8.76E+00	2.36E+02	3.27E+01	A/B-07	6.42E+02	3.00E+00	1.01E+00

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)

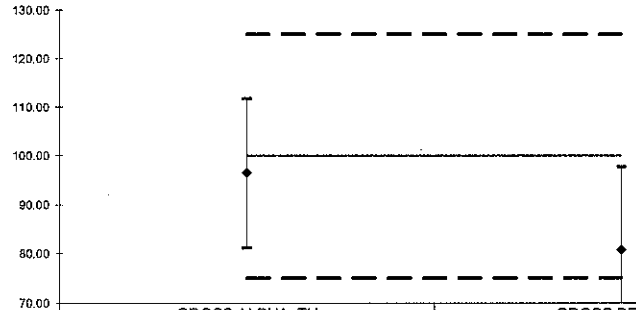
Replicate Sample / QC Summary

Analyte	Normalized Difference	RPD	Original Result	Original CSU	Replicate Result	Replicate CSU	LCS Relative Bias	LCS % R		MS % R	MS ND	Rep RPD	Rep ND
GROSS ALPHA_TH	0.55	4.62	2.79E-03	3.25E-04	2.93E-03	3.40E-04	0.96	OK				OK	OK
GROSS BETA_SR	0.50	5.03	2.16E-02	2.99E-03	2.27E-02	3.15E-03	0.81	OK				OK	OK

000222

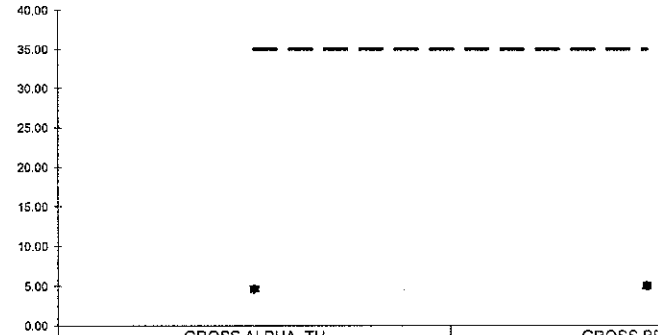
WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
16-04001	GaGbT_ThSr	1	pCi	m3	Auxier & Associates, Inc.

LCS % Recovery



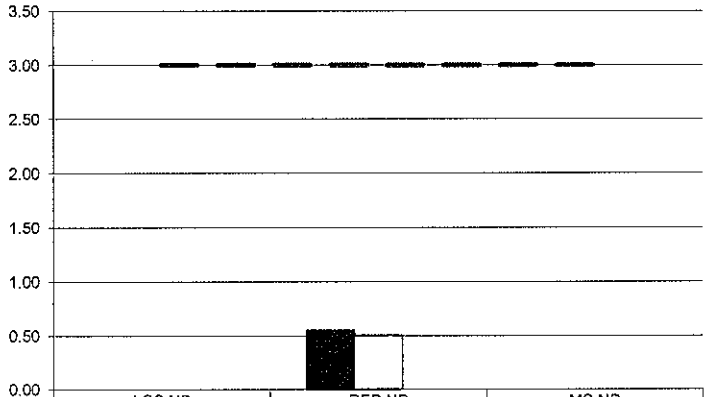
	GROSS ALPHA_TH	GROSS BETA_SR
Lower Error	81.14	63.96
Upper Error	111.76	97.70
%R	96.45	80.83
LCL	75	75
Mean	100	100
UCL	125	125

Replicate Sample RPD



	GROSS ALPHA_TH	GROSS BETA_SR
Lower Error	4.89	5.38
Upper Error	4.35	4.68
RPD	4.62	5.03
CL	35	35

Normalized Difference



	LCS ND	REP ND	MS ND
GROSS ALPHA_TH	0.00	0.55	0.00
GROSS BETA_SR	0.00	0.50	0.00
	0.00	0.00	0.00
UCL	3	3	3

No Matrix Spike

SECTION VII

LABORATORY TECHNICIAN'S NOTES & RUN LOGS

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	16-04001
Analysis Code	GaGbT_ThSr
Run Number	1

#	Date	Dept	User	Notes
1	04/13/16 08:08	PREP	MHIGHTOWER	Prepared spike and blank, affixed samples to planchets, and submitted to count room.

Mr 13 ADR16

EBERLINE SERVICES

Reagents Used in an Analysis

Internal Work Order	
16-04001	
Analysis Code	Run
GaGbT_ThSr	1

Reagent ID	Reagent Name	Reagent Concentration	Analyst ID	Date Recorded
016886D03	Nitric Acid	3N	MHIGHTOWER	4/18/2016

CB4110 Aqua

Date	Sample	Client	Time	CT Time	Analyst	Tech
4/12/16	Blanac	LAS	0506	6	LB	C
4/12/16	GTFOC	LAS	0611	7	LB	
4/12/16	1603123RA(1-3)	MCL	1007	2	RB	—
4/12	1603091RA(1-3)	Accutest	1004	2	RB	—
4/13	Blanac	LAS	0509	6	LB	C
4/13	GTFOC	LAS	0608	7	LB	
4/13	1603126RA(1-4)	~~MPA~~ UCOR	0951	4	RB	—
4/13	1603120RA(8-11)	MPA	0952	2	RB	—
4/13	1603126RA(1)	UCOR	0952	1	RB	—
4/13/16	1603087TR(1-4)	Env. Monitoring	1203	2hrs	TOT Rec	KB
4/14/16	Daily Blgd/Eff Ch	Lab	0710/0637	1 hr/30min	OP	AG
4/14/16	1603145SY(2-4,6)	UCOR	0837	2 hr	Sr.90	AG
4/14/16	1603147SY(2-4,6)	UCOR	0839	2 hr	Sr.90	AG
4/14/16	1603145SY(1)	UCOR	0840	30 min	Sr.90	AG
4/14/16	1603080RA(2-5)	Indust. + Env.	0937	2hrs	Rad	KB
4/14/16	1604054AB(1-4)	City of OR	1042	2hrs	αβ	KB
4/14/16	1604057AB(2,3,6,7)	UCOR	1043	2hrs	αβ	KB
4/14/16	1604057AB(1)	UCOR	1116	30min	αβ	KB
4/14/16	1603094AB(9-12)	CT. Dept. of EEP	1145	4 hrs	αβ	KB
4/14/16	1603094AB(1)	CT. Dept. of EEP	1148	30mins	αβ	KB
4/15	Blanac	LAS	0456	6	LB	C
4/15	GTFOC	LAS	0603	7	LB	
4/15/16	1603095RA(1-11)	Republic Services	0957	2hrs	Rad	KB
4/16/16	Weekly Diesel	Lab	0710	2hrs	αβ	KB
4/18	Blanac	LAS	0503	6	LB	C
4/18	GTFOC	LAS	0606	7	LB	
4/18	1604001AB(1,7-15,17-19)	Auxier	0824	2	LB	—
4/18/16	1604044RA(2-3,19-20)	USA	1237	2hrs	Rad	KB
4/18/16	1603107RA(1-8)	Accutest	1238	2hrs	Rad	KB
4/18/16	1604001AB(8e-11a)	Auxier	1441	2hrs	αβ	KB
4/19	Blanac	LAS	0512	6	LB	C
4/19	GTFOC	LAS	0615	7	LB	
4/19	1604091AB(9-12)	Aerostar	0711	2	LB	—
4/19	Purge Recirt AB(1-5)	LAS	0711	15	LB	

CB4110 Agua

Date	Sample #	Client	Load Time	C Time	Analysis	Tech
4/18	1604081PbL(1)	UST	~~0803~~ 0800	2h	Pb210	C
4/18	1604081PbL(2-4)	UST	~~0795~~ 0800	2h	Pb210	C
4/19	1603145PbL(1)	UCOR	0842	2h	Pb210	C
4/19	1607147RAL(1-4)	UCOR	0957	2h	RAB	—
4/19	1607179RAL(1-6)	Miss. Dept.	1014	2h	RAB	—
4/19/16	1603145Pb(2-4)	UCOR	1154	2hrs	Pb210	KB
4/19/16	Am-4Arecent(1-5)	Lab	1224	15mins	αβ	KB
4/19/16	1604001AB(12e-13e)	Auxier	1242	2hr	αβ	KB
4/19/16	1604001AB(4a-4d)	Auxier	1307	2hr	αβ	KB
4/19/16	1604001AB(16c-17c	Auxier	1448	2hr	αβ	KB

LB4110 RED

Date	Sample	Client	Loading Time	Counting Time	Analyst	Reader
4/15/16	1603095RA(12-19)	Republic Services	0957	2 hrs	RaB	KB
4/16/16	Weekly Bkgd	Lab	0710	12 hrs	αβ	KB
4/18	67Fec	LAB	0503	7	LB	C
4/18	Bkgrnc	LAB	0536	6	LB	
4/18	1604088AD(1-4)	USA	0708	2	LB	—
4/18	1604001AD(12,34-34,40-40)	Auxier	0924	2	LB	—
4/18/16	1603145RA(2-4)	UCOR	1229	4 hrs	RaB	KB
4/19/16	1604044RA(1)	USA	1236	1 hr	RaB	KB
4/19/16	1603145RA(1)	UCOR	1237	1 hr	RaB	KB
4/19/16	1604001AD(7b-8d)	Auxier	1340	2 hrs	αβ	KB
4/19	67Fec	LAB	0512	7	LB	C
4/19	Bkgrnc	LAB	0544	6	LB	
4/19	1604091AD(1-8)	Aerostar	0711	2	LB	—
4/19	1603145NP(1-4)	UCOR	0915	1	NPZ	—
4/19	1603147NP(1-4)	UCOR	0927	10	NPZ	—
4/19	1604045RH(2-8)	USA	0912	2	RHB	—
4/19	1604045RH(1)	USA	0952	2	RHB	—
4/19/16	1604001AB(17b-12d)	Auxier	1158.	2 hrs	αβ	KB
4/19/16	1604001AB(14c-14b)	Auxier	1402	2 hrs	αβ	KB
4/19/16	1604001AB(17d-18e)	Auxier	1607	2 hrs	αβ	KB

SECTION VIII

ANALYTICAL DATA (GROSS ALPHA/BETA)

Eberline Services
Oak Ridge Laboratory
Analysis Sheet

16-04001
GaGbT_ThSr
Run 1

Work Order	16-04001
Analysis Code	GaGbT_ThSr
Run	1
Date Received	4/1/2016
Lab Deadline	4/22/2016
Client	Auxier & Associates, Inc.
Project	WESTLAKE
Report Level	4
Activity Units	pCi
Aliquot Units	m3
Matrix	AF
Method	LANL MLR-100 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		04/01/16 00:00	1.0000E+00
02	MBL	BLANK		04/01/16 00:00	1.0200E+04
03	DUP	ENGWESA001	36	03/31/16 10:26	1.0800E+04
04	DO	ENGWESA001	36	03/31/16 10:26	1.0800E+04
05	TRG	ENGWESA002	41	03/30/16 13:47	9.9700E+03
06	TRG	ENGWESA003	36	03/31/16 08:52	1.0400E+04
07	TRG	ENGWESA004	37	03/31/16 08:35	1.0300E+04
08	TRG	ENGWESA005	37	03/30/16 12:52	1.0300E+04
09	TRG	ENGWESA006	36	03/31/16 10:47	1.0200E+04
10	TRG	ENGWESA007	35	03/30/16 12:26	1.0100E+04
11	TRG	ENGWESA008	39	03/31/16 09:40	1.0400E+04
12	TRG	ENGWESA009	34	03/31/16 08:10	1.0800E+04
13	TRG	ENGWESA010	35	03/30/16 10:28	9.7000E+03
14	TRG	ENGWESA011	38	03/30/16 09:17	9.7300E+03
15	TRG	ENGWESA012	35	03/30/16 09:44	1.0200E+04
16	TRG	ENGWESA013	34	03/24/16 12:39	8.2800E+03
17	TRG	FIELD BLANK	39	03/31/16 08:10	1.0100E+04
18	TRG	ENGWESA008 FIELD DUP		03/31/16 09:40	1.0400E+04

* 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.

16-04001
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		7.5839	7.5840	0.0001			1.00	1.00
02	MBL				0.00		7.5744	7.5745	0.0001			1.00	1.00
03	DUP				0.00		1.0000	1.0001	0.0001			1.00	1.00
04	DO				0.00		1.0000	1.0001	0.0001			1.00	1.00
05	TRG				0.00		1.0000	1.0001	0.0001			1.00	1.00
06	TRG				0.00		1.0000	1.0001	0.0001			1.00	1.00
07	TRG				0.00		1.0000	1.0001	0.0001			1.00	1.00
08	TRG				0.00		1.0000	1.0001	0.0001			1.00	1.00
09	TRG				0.00		1.0000	1.0001	0.0001			1.00	1.00
10	TRG				0.00		1.0000	1.0001	0.0001			1.00	1.00
11	TRG				0.00		1.0000	1.0001	0.0001			1.00	1.00
12	TRG				0.00		1.0000	1.0001	0.0001			1.00	1.00
13	TRG				0.00		1.0000	1.0001	0.0001			1.00	1.00
14	TRG				0.00		1.0000	1.0001	0.0001			1.00	1.00
15	TRG				0.00		1.0000	1.0001	0.0001			1.00	1.00
16	TRG				0.00		1.0000	1.0001	0.0001			1.00	1.00
17	TRG				0.00		1.0000	1.0001	0.0001			1.00	1.00
18	TRG				0.00		1.0000	1.0001	0.0001			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.

16-04001
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			04/15/16 07:58	MHIGHTOWER				
02	MBL			04/15/16 07:58	MHIGHTOWER				
03	DUP			04/15/16 07:58	MHIGHTOWER				
04	DO			04/15/16 07:58	MHIGHTOWER				
05	TRG			04/15/16 07:58	MHIGHTOWER				
06	TRG			04/15/16 07:58	MHIGHTOWER				
07	TRG			04/15/16 07:58	MHIGHTOWER				
08	TRG			04/15/16 07:58	MHIGHTOWER				
09	TRG			04/15/16 07:58	MHIGHTOWER				
10	TRG			04/15/16 07:58	MHIGHTOWER				
11	TRG			04/15/16 07:58	MHIGHTOWER				
12	TRG			04/15/16 07:58	MHIGHTOWER				
13	TRG			04/15/16 07:58	MHIGHTOWER				
14	TRG			04/15/16 07:58	MHIGHTOWER				
15	TRG			04/15/16 07:58	MHIGHTOWER				
16	TRG			04/15/16 07:58	MHIGHTOWER				
17	TRG			04/15/16 07:58	MHIGHTOWER				
18	TRG			04/15/16 07:58	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: 16-04001-GaGbT-1

Client: Auxier & Associates, Inc.
Eberline Analytical Work Order: 16-04001
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/m3	2.61E+02	3.62E+00	3.54E-01	2.71E+02	96.45	OK		INV	
02	GROSS ALPHA	MBL	BLANK	pCi/m3	4.96E-06	9.72E-06	2.10E-05					OK	OK
03	GROSS ALPHA	DUP	ENGWESA001	pCi/m3	2.93E-03	1.17E-04	2.52E-05				OK	OK	
04	GROSS ALPHA	DO	ENGWESA001	pCi/m3	2.79E-03	1.12E-04	2.23E-05					OK	
05	GROSS ALPHA	TRG	ENGWESA002	pCi/m3	3.15E-03	1.27E-04	2.25E-05					OK	
06	GROSS ALPHA	TRG	ENGWESA003	pCi/m3	3.15E-03	1.24E-04	3.41E-05					OK	
07	GROSS ALPHA	TRG	ENGWESA004	pCi/m3	3.07E-03	1.23E-04	1.43E-05					OK	
08	GROSS ALPHA	TRG	ENGWESA005	pCi/m3	2.92E-03	1.18E-04	2.34E-05					OK	
09	GROSS ALPHA	TRG	ENGWESA006	pCi/m3	2.90E-03	1.21E-04	2.20E-05					OK	
10	GROSS ALPHA	TRG	ENGWESA007	pCi/m3	2.81E-03	1.19E-04	3.51E-05					OK	
11	GROSS ALPHA	TRG	ENGWESA008	pCi/m3	3.15E-03	1.24E-04	1.41E-05					OK	
12	GROSS ALPHA	TRG	ENGWESA009	pCi/m3	2.54E-03	1.07E-04	2.23E-05					OK	
13	GROSS ALPHA	TRG	ENGWESA010	pCi/m3	2.85E-03	1.22E-04	1.51E-05					OK	
14	GROSS ALPHA	TRG	ENGWESA011	pCi/m3	3.58E-03	1.37E-04	3.63E-05					OK	
15	GROSS ALPHA	TRG	ENGWESA012	pCi/m3	3.24E-03	1.28E-04	2.22E-05					OK	
16	GROSS ALPHA	TRG	ENGWESA013	pCi/m3	3.93E-03	1.62E-04	2.94E-05					OK	
17	GROSS ALPHA	TRG	FIELD BLANK	pCi/m3	5.89E-05	1.89E-05	2.12E-05					OK	
18	GROSS ALPHA	TRG	ENGWESA008 FIELD DUP	pCi/m3	3.25E-03	1.30E-04	3.60E-05					OK	

Preliminary Data Report & Analytical Calculations

Work Order: 16-04001-GaGbT-1

Client	Eberline Analytical Work Order	Analysis Code	Run
Auxier & Associates, Inc.	16-04001	GaGbT	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	04/01/16 00:00	1.00E+00	0.00	0.00	0.00	1.00		
02	GROSS ALPHA	MBL	04/01/16 00:00	1.02E+04	0.00	0.00	0.00	1.00		
03	GROSS ALPHA	DUP	03/31/16 10:26	1.08E+04	0.00	0.00	0.00	1.00		
04	GROSS ALPHA	DO	03/31/16 10:26	1.08E+04	0.00	0.00	0.00	1.00		
05	GROSS ALPHA	TRG	03/30/16 13:47	9.97E+03	0.00	0.00	0.00	1.00		
06	GROSS ALPHA	TRG	03/31/16 08:52	1.04E+04	0.00	0.00	0.00	1.00		
07	GROSS ALPHA	TRG	03/31/16 08:35	1.03E+04	0.00	0.00	0.00	1.00		
08	GROSS ALPHA	TRG	03/30/16 12:52	1.03E+04	0.00	0.00	0.00	1.00		
09	GROSS ALPHA	TRG	03/31/16 10:47	1.02E+04	0.00	0.00	0.00	1.00		
10	GROSS ALPHA	TRG	03/30/16 12:26	1.01E+04	0.00	0.00	0.00	1.00		
11	GROSS ALPHA	TRG	03/31/16 09:40	1.04E+04	0.00	0.00	0.00	1.00		
12	GROSS ALPHA	TRG	03/31/16 08:10	1.08E+04	0.00	0.00	0.00	1.00		
13	GROSS ALPHA	TRG	03/30/16 10:28	9.70E+03	0.00	0.00	0.00	1.00		
14	GROSS ALPHA	TRG	03/30/16 09:17	9.73E+03	0.00	0.00	0.00	1.00		
15	GROSS ALPHA	TRG	03/30/16 09:44	1.02E+04	0.00	0.00	0.00	1.00		
16	GROSS ALPHA	TRG	03/24/16 12:39	8.28E+03	0.00	0.00	0.00	1.00		
17	GROSS ALPHA	TRG	03/31/16 08:10	1.01E+04	0.00	0.00	0.00	1.00		
18	GROSS ALPHA	TRG	03/31/16 09:40	1.04E+04	0.00	0.00	0.00	1.00		

Scan :

Preliminary Data Report & Analytical Calculations

Work Order: 16-04001-GaGbT-1

Client	Eberline Analytical Work Order	Analysis Code	Run
Auxier & Associates, Inc.	16-04001	GaGbT	1

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	GROSS ALPHA	LCS	04/18/16 09:24		LB4110A	E1	120	20094	0.15	0.2885
02	GROSS ALPHA	MBL	04/18/16 09:24		LB4110A	E2	120	10	0.05	0.2968
03	GROSS ALPHA	DUP	04/18/16 09:24		LB4110A	F4	120	2448	0.083333333	0.2895
04	GROSS ALPHA	DO	04/18/16 09:24		LB4110A	A1	120	2401	0.066666667	0.2976
05	GROSS ALPHA	TRG	04/18/16 09:24		LB4110A	B2	120	2380	0.05	0.2835
06	GROSS ALPHA	TRG	04/18/16 09:24		LB4110A	C3	120	2527	0.15	0.2878
07	GROSS ALPHA	TRG	04/18/16 09:24		LB4110A	E4	120	2378	0.016666667	0.2825
08	GROSS ALPHA	TRG	04/18/16 09:24		LB4110A	A1	120	2394	0.066666667	0.2976
09	GROSS ALPHA	TRG	04/18/16 09:24		LB4110A	B2	120	2241	0.05	0.2835
10	GROSS ALPHA	TRG	04/18/16 09:24		LB4110A	C3	120	2196	0.15	0.2878
11	GROSS ALPHA	TRG	04/18/16 09:24		LB4110A	E4	120	2467	0.016666667	0.2825
12	GROSS ALPHA	TRG	04/18/16 09:24		LB4110A	A1	120	2181	0.066666667	0.2976
13	GROSS ALPHA	TRG	04/18/16 09:24		LB4110A	B4	120	2094	0.016666667	0.2843
14	GROSS ALPHA	TRG	04/18/16 09:24		LB4110A	E1	120	2698	0.15	0.2885
15	GROSS ALPHA	TRG	04/18/16 09:24		LB4110A	G1	120	2477	0.05	0.2806
16	GROSS ALPHA	TRG	04/18/16 09:24		LB4110A	A4	120	2275	0.05	0.2619
17	GROSS ALPHA	TRG	04/18/16 09:24		LB4110A	E2	120	53	0.05	0.2968
18	GROSS ALPHA	TRG	04/18/16 09:24		LB4110A	G4	120	2469	0.15	0.2722

Preliminary Data Report & Analytical Calculations

Work Order: 16-04001-GaGbT-1

Client: Auxier & Associates, Inc.
Eberline Analytical Work Order: 16-04001
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/m3	2.36E+02	2.90E+00	5.79E-01	2.92E+02	80.83	OK		INV	
02	GROSS BETA	MBL	BLANK	pCi/m3	1.13E-05	1.98E-05	4.13E-05					OK	OK
03	GROSS BETA	DUP	ENGWESA001	pCi/m3	2.27E-02	2.53E-04	4.83E-05				OK	OK	
04	GROSS BETA	DO	ENGWESA001	pCi/m3	2.16E-02	2.43E-04	5.26E-05					OK	
05	GROSS BETA	TRG	ENGWESA002	pCi/m3	2.45E-02	2.73E-04	6.04E-05					OK	
06	GROSS BETA	TRG	ENGWESA003	pCi/m3	2.48E-02	2.72E-04	6.74E-05					OK	
07	GROSS BETA	TRG	ENGWESA004	pCi/m3	2.10E-02	2.39E-04	4.07E-05					OK	
08	GROSS BETA	TRG	ENGWESA005	pCi/m3	2.18E-02	2.50E-04	5.52E-05					OK	
09	GROSS BETA	TRG	ENGWESA006	pCi/m3	2.19E-02	2.55E-04	5.90E-05					OK	
10	GROSS BETA	TRG	ENGWESA007	pCi/m3	2.04E-02	2.51E-04	6.94E-05					OK	
11	GROSS BETA	TRG	ENGWESA008	pCi/m3	2.15E-02	2.41E-04	4.03E-05					OK	
12	GROSS BETA	TRG	ENGWESA009	pCi/m3	1.89E-02	2.28E-04	5.26E-05					OK	
13	GROSS BETA	TRG	ENGWESA010	pCi/m3	2.09E-02	2.57E-04	5.82E-05					OK	
14	GROSS BETA	TRG	ENGWESA011	pCi/m3	2.71E-02	2.94E-04	5.95E-05					OK	
15	GROSS BETA	TRG	ENGWESA012	pCi/m3	2.26E-02	2.62E-04	5.33E-05					OK	
16	GROSS BETA	TRG	ENGWESA013	pCi/m3	2.55E-02	3.21E-04	8.01E-05					OK	
17	GROSS BETA	TRG	FIELD BLANK	pCi/m3	5.15E-04	4.37E-05	4.17E-05					OK	
18	GROSS BETA	TRG	ENGWESA008 FIELD DUP	pCi/m3	2.29E-02	2.62E-04	6.16E-05					OK	

Preliminary Data Report & Analytical Calculations

Work Order: 16-04001-GaGbT-1

Client: Auxier & Associates, Inc.
Eberline Analytical Work Order: 16-04001
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	04/01/16 00:00	1.00E+00	0.00	0.00	0.00	1.00		
02	GROSS BETA	MBL	04/01/16 00:00	1.02E+04	0.00	0.00	0.00	1.00		
03	GROSS BETA	DUP	03/31/16 10:26	1.08E+04	0.00	0.00	0.00	1.00		
04	GROSS BETA	DO	03/31/16 10:26	1.08E+04	0.00	0.00	0.00	1.00		
05	GROSS BETA	TRG	03/30/16 13:47	9.97E+03	0.00	0.00	0.00	1.00		
06	GROSS BETA	TRG	03/31/16 08:52	1.04E+04	0.00	0.00	0.00	1.00		
07	GROSS BETA	TRG	03/31/16 08:35	1.03E+04	0.00	0.00	0.00	1.00		
08	GROSS BETA	TRG	03/30/16 12:52	1.03E+04	0.00	0.00	0.00	1.00		
09	GROSS BETA	TRG	03/31/16 10:47	1.02E+04	0.00	0.00	0.00	1.00		
10	GROSS BETA	TRG	03/30/16 12:26	1.01E+04	0.00	0.00	0.00	1.00		
11	GROSS BETA	TRG	03/31/16 09:40	1.04E+04	0.00	0.00	0.00	1.00		
12	GROSS BETA	TRG	03/31/16 08:10	1.08E+04	0.00	0.00	0.00	1.00		
13	GROSS BETA	TRG	03/30/16 10:28	9.70E+03	0.00	0.00	0.00	1.00		
14	GROSS BETA	TRG	03/30/16 09:17	9.73E+03	0.00	0.00	0.00	1.00		
15	GROSS BETA	TRG	03/30/16 09:44	1.02E+04	0.00	0.00	0.00	1.00		
16	GROSS BETA	TRG	03/24/16 12:39	8.28E+03	0.00	0.00	0.00	1.00		
17	GROSS BETA	TRG	03/31/16 08:10	1.01E+04	0.00	0.00	0.00	1.00		
18	GROSS BETA	TRG	03/31/16 09:40	1.04E+04	0.00	0.00	0.00	1.00		

Preliminary Data Report & Analytical Calculations

Work Order: 16-04001-GaGbT-1

Client: Auxier & Associates, Inc.
Eberline Analytical Work Order: 16-04001
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	04/18/16 09:24		LB4110A	E1	120	35353	1.283333333	0.4777	251.4564683
02	GROSS BETA	MBL	04/18/16 09:24		LB4110A	E2	120	97	0.683333333	0.4871	0.808333333
03	GROSS BETA	DUP	04/18/16 09:24		LB4110A	F4	120	32465	1.066666667	0.4858	265.3723067
04	GROSS BETA	DO	04/18/16 09:24		LB4110A	A1	120	31933	1.366666667	0.5019	261.0382217
05	GROSS BETA	TRG	04/18/16 09:24		LB4110A	B2	120	32714	1.466666667	0.4903	267.5909
06	GROSS BETA	TRG	04/18/16 09:24		LB4110A	C3	120	33942	1.933333333	0.4808	277.5138183
07	GROSS BETA	TRG	04/18/16 09:24		LB4110A	E4	120	31062	0.8	0.526582251	253.8284567
08	GROSS BETA	TRG	04/18/16 09:24		LB4110A	A1	120	30757	1.366666667	0.5019	251.2530033
09	GROSS BETA	TRG	04/18/16 09:24		LB4110A	B2	120	29895	1.466666667	0.4903	244.392755
10	GROSS BETA	TRG	04/18/16 09:24		LB4110A	C3	120	27221	1.933333333	0.4808	222.2044467
11	GROSS BETA	TRG	04/18/16 09:24		LB4110A	E4	120	32154	0.8	0.526582251	262.7405183
12	GROSS BETA	TRG	04/18/16 09:24		LB4110A	A1	120	28077	1.366666667	0.5019	229.369455
13	GROSS BETA	TRG	04/18/16 09:24		LB4110A	B4	120	26788	1.25	0.484	218.8115033
14	GROSS BETA	TRG	04/18/16 09:24		LB4110A	E1	120	34434	1.283333333	0.4777	281.2527233
15	GROSS BETA	TRG	04/18/16 09:24		LB4110A	G1	120	30171	1.133333333	0.4795	246.1944017
16	GROSS BETA	TRG	04/18/16 09:24		LB4110A	A4	120	25942	1.483333333	0.4473	211.3792917
17	GROSS BETA	TRG	04/18/16 09:24		LB4110A	E2	120	771	0.683333333	0.4871	6.313081667
18	GROSS BETA	TRG	04/18/16 09:24		LB4110A	G4	120	31120	1.583333333	0.4781	254.1196283

Count Room Report
Client: Auxier Associates, Inc.

16-04001-GaGbT_ThSr-1 (pCi/m3) in AF
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	04/01/16 00:00	1.0000				0.00	1.00	1.00
02	MBL	BLANK	04/01/16 00:00	10200.0000				0.00	1.00	1.00
03	DUP	ENGWESA001	03/31/16 10:26	10800.0000				0.00	1.00	1.00
04	DO	ENGWESA001	03/31/16 10:26	10800.0000				0.00	1.00	1.00
05	TRG	ENGWESA002	03/30/16 13:47	9970.0000				0.00	1.00	1.00
06	TRG	ENGWESA003	03/31/16 08:52	10400.0000				0.00	1.00	1.00
07	TRG	ENGWESA004	03/31/16 08:35	10300.0000				0.00	1.00	1.00
08	TRG	ENGWESA005	03/30/16 12:52	10300.0000				0.00	1.00	1.00
09	TRG	ENGWESA006	03/31/16 10:47	10200.0000				0.00	1.00	1.00
10	TRG	ENGWESA007	03/30/16 12:26	10100.0000				0.00	1.00	1.00
11	TRG	ENGWESA008	03/31/16 09:40	10400.0000				0.00	1.00	1.00
12	TRG	ENGWESA009	03/31/16 08:10	10800.0000				0.00	1.00	1.00
13	TRG	ENGWESA010	03/30/16 10:28	9700.0000				0.00	1.00	1.00
14	TRG	ENGWESA011	03/30/16 09:17	9730.0000				0.00	1.00	1.00
15	TRG	ENGWESA012	03/30/16 09:44	10200.0000				0.00	1.00	1.00
16	TRG	ENGWESA013	03/24/16 12:39	8280.0000				0.00	1.00	1.00
17	TRG	FIELD BLANK	03/31/16 08:10	10100.0000				0.00	1.00	1.00
18	TRG	ENGWESA008 FIELD DUP	03/31/16 09:40	10400.0000				0.00	1.00	1.00

Eberline Services
Oak Ridge Laboratory

Spike and Tracer Worksheet

Printed: 4/15/2016 7:58 AM

Internal Work Order	Run	Analysis Code	Date	Technician	Technician Initials	Witness Initials
16-04001	1	GaGbT_ThSr	4/15/2016 7:58	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	595.530	4/15/2016	0.790	1.0096				270.83	11.646	0.00	0.000	0.00	0.000	0.00	0.000
SrY-90	A/B-07	641.760	4/15/2016	0.860	1.0096				291.86	8.756	0.00	0.000	0.00	0.000	0.00	0.000
Tc-99 MS	Tc-2a	22043.51	4/15/2016	0.1												

Tracers

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

Balance Printer Tapes

Tracer	LCS

Matrix Spike

Version 2.0 08/99

Eberline Analytical
Oak Ridge Laboratory

Aliquot Worksheet

Work Order	Run	Analysis Code	Rpt Units	Lab Deadline	Technician
16-04001	1	GaGbT_ThSr	m3	4/22/2016	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					1.0200E+04	1.0200E+04				
03	ENGWESA001	DUP					1.0800E+04	1.0800E+04				
04	ENGWESA001	DO					1.0800E+04	1.0800E+04				
05	ENGWESA002	TRG					9.9700E+03	9.9700E+03				
06	ENGWESA003	TRG					1.0400E+04	1.0400E+04				
07	ENGWESA004	TRG					1.0300E+04	1.0300E+04				
08	ENGWESA005	TRG					1.0300E+04	1.0300E+04				
09	ENGWESA006	TRG					1.0200E+04	1.0200E+04				
10	ENGWESA007	TRG					1.0100E+04	1.0100E+04				
11	ENGWESA008	TRG					1.0400E+04	1.0400E+04				
12	ENGWESA009	TRG					1.0800E+04	1.0800E+04				
13	ENGWESA010	TRG					9.7000E+03	9.7000E+03				
14	ENGWESA011	TRG					9.7300E+03	9.7300E+03				
15	ENGWESA012	TRG					1.0200E+04	1.0200E+04				
16	ENGWESA013	TRG					8.2800E+03	8.2800E+03				
17	FIELD BLANK	TRG					1.0100E+04	1.0100E+04				
18	ENGWESA008 FIELD DUP	TRG					1.0400E+04	1.0400E+04				

Comments	

Technician: Mu Date: 4, 13, 16

00512

Gravimetric Worksheet

Work Order	Run	Analysis Code	Gravimetric Carrier	Carrier Conc (mg/ml)	Technician
16-04001	1	GaGbT_ThSr			MHIGHTOWER

TRetec Fraction	Auxier & Associates, Inc. Client ID	Sample Type	Carrier Data: Carrier Added (ml)	Filter Data: Filter Tare (g)	Filter Final (g)	Filter Net (g)	Gravimetric: % Recovery
01	LCS	LCS		7.5839	7.5840	0.0001	
02	BLANK	MBL		7.5744	7.5745	0.0001	
03	DUP	DUP		1.0000	1.0001	0.0001	
04	ENGWESA001	DO		1.0000	1.0001	0.0001	
05	ENGWESA002	TRG		1.0000	1.0001	0.0001	
06	ENGWESA003	TRG		1.0000	1.0001	0.0001	
07	ENGWESA004	TRG		1.0000	1.0001	0.0001	
08	ENGWESA005	TRG		1.0000	1.0001	0.0001	
09	ENGWESA006	TRG		1.0000	1.0001	0.0001	
10	ENGWESA007	TRG		1.0000	1.0001	0.0001	
11	ENGWESA008	TRG		1.0000	1.0001	0.0001	
12	ENGWESA009	TRG		1.0000	1.0001	0.0001	
13	ENGWESA010	TRG		1.0000	1.0001	0.0001	
14	ENGWESA011	TRG		1.0000	1.0001	0.0001	
15	ENGWESA012	TRG		1.0000	1.0001	0.0001	
16	ENGWESA013	TRG		1.0000	1.0001	0.0001	
17	FIELD BLANK	TRG		1.0000	1.0001	0.0001	
18	ENGWESA008 FIELD DUP	TRG		1.0000	1.0001	0.0001	

Technician: MH Date: 4/13/16

000149

Detector ID	Sample ID	Alpha	Beta	Count Time	Voltage	TOD	
E1	1604001-01	20094	35353	120	1410	4/18/2016 9:24:37 AM	
E2	1604001-02	10	97	120	1410	4/18/2016 9:24:37 AM	
E3	1604001-03A	511	6621	120	1410	4/18/2016 9:24:37 AM	
E4	1604001-03B	520	6943	120	1410	4/18/2016 9:24:37 AM	
F1	1604001-03C	474	6032	120	1410	4/18/2016 9:24:38 AM	
F3	1604001-03D	487	6461	120	1410	4/18/2016 9:24:38 AM	
F4	1604001-03E	456	6408	120	1410	4/18/2016 9:24:38 AM	
F4	**1604004-03**	**2448**	**32465**	**120**	**1410**	**4/18/2016 9:24:38 AM**	**SUM**
G1	1604001-04A	514	6130	120	1410	4/18/2016 9:24:38 AM	
G2	1604001-04B	468	6602	120	1410	4/18/2016 9:24:38 AM	
G3	1604001-04C	487	6550	120	1410	4/18/2016 9:24:38 AM	
G4	1604001-04D	440	6372	120	1410	4/18/2016 9:24:38 AM	
A1	1604001-04E	492	6279	120	1410	4/18/2016 9:24:36 AM	
A1	**1604004-04**	**2401**	**31933**	**120**	**1410**	**4/18/2016 9:24:38 AM**	**SUM**
A2	1604001-05A	492	6654	120	1410	4/18/2016 9:24:36 AM	
A3	1604001-05B	422	6193	120	1410	4/18/2016 9:24:36 AM	
A4	1604001-05C	483	6320	120	1410	4/18/2016 9:24:36 AM	
B1	1604001-05D	497	6814	120	1410	4/18/2016 9:24:36 AM	
B2	1604001-05E	486	6733	120	1410	4/18/2016 9:24:36 AM	
B2	**1604004-05**	**2380**	**32714**	**120**	**1410**	**4/18/2016 9:24:38 AM**	**SUM**
B3	1604001-06A	441	6339	120	1410	4/18/2016 9:24:36 AM	
B4	1604001-06B	476	6244	120	1410	4/18/2016 9:24:36 AM	
C1	1604001-06C	524	6795	120	1410	4/18/2016 9:24:37 AM	
C2	1604001-06D	536	7015	120	1410	4/18/2016 9:24:37 AM	
C3	1604001-06E	550	7549	120	1410	4/18/2016 9:24:37 AM	
C3	**1604004-06**	**2527**	**33942**	**120**	**1410**	**4/18/2016 9:24:38 AM**	**SUM**
C4	1604001-07A	479	6255	120	1410	4/18/2016 9:24:37 AM	
E1	1604001-07B	487	6076	120	1410	4/18/2016 1:39:46 PM	
E2	1604001-07C	489	6270	120	1410	4/18/2016 1:39:46 PM	
E3	1604001-07D	440	6091	120	1410	4/18/2016 1:39:46 PM	
E4	1604001-07E	483	6370	120	1410	4/18/2016 1:39:47 PM	
E4	**1604004-07**	**2378**	**31062**	**120**	**1410**	**4/18/2016 9:24:38 AM**	**SUM**
G1	1604001-08A	482	6220	120	1410	4/18/2016 1:39:47 PM	
G2	1604001-08B	466	6033	120	1410	4/18/2016 1:39:47 PM	
G3	1604001-08C	472	6009	120	1410	4/18/2016 1:39:47 PM	
G4	1604001-08D	464	6127	120	1410	4/18/2016 1:39:47 PM	
A1	1604001-08E	510	6368	120	1410	4/18/2016 2:40:49 PM	

A1	**1604004-08**	**2394**	**30757**	**120**	**1410**	**4/18/2016 9:24:38 AM**	**SUM**
A2	1604001-09A	466	5953	120	1410	4/18/2016 2:40:49 PM	
A3	1604001-09B	396	5708	120	1410	4/18/2016 2:40:50 PM	
A4	1604001-09C	459	5930	120	1410	4/18/2016 2:40:50 PM	
B1	1604001-09D	500	6323	120	1410	4/18/2016 2:40:50 PM	
B2	1604001-09E	420	5981	120	1410	4/18/2016 2:40:50 PM	
B2	**1604004-09**	**2241**	**29895**	**120**	**1410**	**4/18/2016 9:24:38 AM**	**SUM**
B3	1604001-10A	453	5377	120	1410	4/18/2016 2:40:50 PM	
B4	1604001-10B	421	5143	120	1410	4/18/2016 2:40:50 PM	
C1	1604001-10C	436	5558	120	1410	4/18/2016 2:40:50 PM	
C2	1604001-10D	443	5498	120	1410	4/18/2016 2:40:50 PM	
C3	1604001-10E	443	5645	120	1410	4/18/2016 2:40:50 PM	
C3	**1604004-10**	**2196**	**27221**	**120**	**1410**	**4/18/2016 9:24:38 AM**	**SUM**
C4	1604001-11A	499	6439	120	1410	4/18/2016 2:40:51 PM	
E1	1604001-11B	461	6436	120	1410	4/19/2016 11:57:42 AM	
E2	1604001-11C	519	6595	120	1410	4/19/2016 11:57:42 AM	
E3	1604001-11D	487	6321	120	1410	4/19/2016 11:57:43 AM	
E4	1604001-11E	501	6363	120	1410	4/19/2016 11:57:43 AM	
E4	**1604004-11**	**2467**	**32154**	**120**	**1410**	**4/18/2016 9:24:38 AM**	**SUM**
F1	1604001-12A	415	5234	120	1410	4/19/2016 11:57:44 AM	
G1	1604001-12B	466	5586	120	1410	4/19/2016 11:57:44 AM	
G2	1604001-12C	433	5806	120	1410	4/19/2016 11:57:45 AM	
G4	1604001-12D	437	5811	120	1410	4/19/2016 11:57:45 AM	
A1	1604001-12E	430	5640	120	1410	4/19/2016 12:42:06 PM	
A1	**1604004-12**	**2181**	**28077**	**120**	**1410**	**4/18/2016 9:24:38 AM**	**SUM**
A3	1604001-13A	396	5087	120	1410	4/19/2016 12:42:06 PM	
A4	1604001-13B	394	5240	120	1410	4/19/2016 12:42:07 PM	
B1	1604001-13C	481	5590	120	1410	4/19/2016 12:42:07 PM	
B2	1604001-13D	421	5567	120	1410	4/19/2016 12:42:07 PM	
B4	1604001-13E	402	5304	120	1410	4/19/2016 12:42:07 PM	
B4	**1604004-13**	**2094**	**26788**	**120**	**1410**	**4/18/2016 9:24:38 AM**	**SUM**
C1	1604001-14A	540	6924	120	1410	4/19/2016 1:56:34 PM	
C2	1604001-14B	562	6856	120	1410	4/19/2016 1:56:35 PM	
C3	1604001-14C	534	7331	120	1410	4/19/2016 1:56:35 PM	
C4	1604001-14D	549	6814	120	1410	4/19/2016 1:56:36 PM	
E1	1604001-14E	513	6509	120	1410	4/19/2016 2:02:03 PM	
E1	**1604004-14**	**2698**	**34434**	**120**	**1410**	**4/18/2016 9:24:38 AM**	**SUM**
E2	1604001-15A	539	6318	120	1410	4/19/2016 2:02:03 PM	

E3	1604001-15B	471	6235	120	1410	4/19/2016 2:02:04 PM	
E4	1604001-15C	518	6540	120	1410	4/19/2016 2:02:04 PM	
F1	1604001-15D	451	5409	120	1410	4/19/2016 2:02:04 PM	
G1	1604001-15E	498	5669	120	1410	4/19/2016 2:02:04 PM	
G1	1604004-15	2477	30171	120	1410	4/18/2016 9:24:38 AM	**SUM**
G2	1604001-16A	430	5311	120	1410	4/19/2016 2:02:05 PM	
G4	1604001-16B	443	5075	120	1410	4/19/2016 2:02:05 PM	
A1	1604001-16C	450	5198	120	1410	4/19/2016 2:47:04 PM	
A3	1604001-16D	465	5217	120	1410	4/19/2016 2:47:04 PM	
A4	1604001-16E	487	5141	120	1410	4/19/2016 2:47:05 PM	
A4	**1604004-16**	**2275**	**25942**	**120**	**1410**	**4/18/2016 9:24:38 AM**	**SUM**
B1	1604001-17A	7	190	120	1410	4/19/2016 2:47:05 PM	
B2	1604001-17B	9	166	120	1410	4/19/2016 2:47:05 PM	
B4	1604001-17C	9	159	120	1410	4/19/2016 2:47:06 PM	
E1	1604001-17D	16	147	120	1410	4/19/2016 4:06:01 PM	
E2	1604001-17E	12	109	120	1410	4/19/2016 4:06:02 PM	
E2	**1604004-17**	**53**	**771**	**120**	**1410**	**4/18/2016 9:24:38 AM**	**SUM**
E3	1604001-18A	468	6363	120	1410	4/19/2016 4:06:02 PM	
E4	1604001-18B	530	6478	120	1410	4/19/2016 4:06:02 PM	
G1	1604001-18C	501	6174	120	1410	4/19/2016 4:06:02 PM	
G2	1604001-18D	476	6113	120	1410	4/19/2016 4:06:02 PM	
G4	1604001-18E	494	5992	120	1410	4/19/2016 4:06:02 PM	
G4	1604004-18	2469	31120	120	1410	4/18/2016 9:24:38 AM	

Eberline Analytical
Oak Ridge Laboratory

GPC Detector Report
(ALL Backgrounds)

Detector	Alpha/Beta	Calibration Date	Count Date	Bkg CPM	PFW	LCL	Mean	UCL
LB4110A - A1	Alpha	10/20/2015	4/18/2016	6.67E-02	P	-7.92E-02	1.08E-01	2.95E-01
LB4110A - A2	Alpha	10/20/2015	4/18/2016	1.67E-02	P	-5.88E-02	7.75E-02	2.14E-01
LB4110A - A3	Alpha	10/20/2015	4/18/2016	0.00E+00	P	-4.71E-02	1.05E-01	2.56E-01
LB4110A - A4	Alpha	10/20/2015	4/18/2016	5.00E-02	P	-7.05E-02	9.28E-02	2.56E-01
LB4110A - B1	Alpha	10/20/2015	4/18/2016	1.67E-02	P	-8.86E-02	1.16E-01	3.21E-01
LB4110A - B2	Alpha	10/20/2015	4/18/2016	5.00E-02	P	-2.59E-02	1.19E-01	2.64E-01
LB4110A - B3	Alpha	10/20/2015	4/18/2016	3.33E-02	P	-6.18E-02	9.80E-02	2.58E-01
LB4110A - B4	Alpha	10/20/2015	4/18/2016	1.67E-02	P	-4.93E-02	8.42E-02	2.18E-01
LB4110A - C1	Alpha	10/20/2015	4/18/2016	5.00E-02	P	-1.29E-01	1.00E-01	3.29E-01
LB4110A - C2	Alpha	10/20/2015	4/18/2016	1.67E-02	P	-8.27E-02	7.27E-02	2.28E-01
LB4110A - C3	Alpha	10/20/2015	4/18/2016	1.50E-01	P	-8.52E-02	1.02E-01	2.90E-01
LB4110A - C4	Alpha	10/20/2015	4/18/2016	5.00E-02	P	-6.38E-02	8.68E-02	2.37E-01
LB4110A - D1	Alpha	10/20/2015	2/16/2016	3.17E-01	F	1.95E-03	2.10E-01	4.19E-01
LB4110A - D2	Alpha	10/20/2015	2/16/2016	2.00E-01	P	-2.93E-02	1.83E-01	3.96E-01
LB4110A - D3	Alpha	10/20/2015	2/16/2016	5.00E-02	P	-8.27E-02	7.92E-02	2.41E-01
LB4110A - D4	Alpha	10/20/2015	2/16/2016	1.83E-01	P	-8.87E-03	1.04E-01	2.18E-01
LB4110A - E1	Alpha	10/20/2015	4/18/2016	1.50E-01	P	-1.40E-01	1.56E-01	4.52E-01
LB4110A - E2	Alpha	10/20/2015	4/18/2016	5.00E-02	P	-6.85E-02	6.41E-02	1.97E-01
LB4110A - E3	Alpha	10/20/2015	4/18/2016	1.50E-01	P	-7.68E-02	1.45E-01	3.68E-01
LB4110A - E4	Alpha	10/20/2015	4/18/2016	1.67E-02	P	-6.84E-02	7.89E-02	2.26E-01
LB4110A - F1	Alpha	10/20/2015	4/18/2016	6.67E-02	P	-6.41E-02	1.14E-01	2.91E-01
LB4110A - F2	Alpha	10/20/2015	4/18/2016	6.67E-02	P	-3.16E-01	7.99E-02	4.76E-01
LB4110A - F3	Alpha	10/20/2015	4/18/2016	8.33E-02	P	-8.57E-02	1.45E-01	3.75E-01
LB4110A - F4	Alpha	10/20/2015	4/18/2016	8.33E-02	P	-4.83E-02	8.77E-02	2.24E-01
LB4110A - G1	Alpha	10/20/2015	4/18/2016	5.00E-02	P	-7.10E-02	1.10E-01	2.90E-01
LB4110A - G2	Alpha	10/20/2015	4/18/2016	1.17E-01	P	-8.85E-02	8.41E-02	2.57E-01
LB4110A - G3	Alpha	10/20/2015	4/18/2016	1.33E-01	P	-6.87E-02	1.48E-01	3.64E-01
LB4110A - G4	Alpha	10/20/2015	4/18/2016	1.50E-01	P	-3.33E-02	9.78E-02	2.29E-01

000047

Eberline Analytical
Oak Ridge Laboratory

GPC Detector Report
(ALL Backgrounds)

4/18

Detector	Alpha/Beta	Calibration Date	Count Date	Bkg CPM	PFW	LCL	Mean	UCL
LB4110A - A1	Beta	10/20/2015	4/18/2016	1.37E+00	P	9.44E-01	1.50E+00	2.05E+00
LB4110A - A2	Beta	10/20/2015	4/18/2016	1.45E+00	P	1.04E+00	1.48E+00	1.91E+00
LB4110A - A3	Beta	10/20/2015	4/18/2016	1.15E+00	P	1.02E+00	1.61E+00	2.20E+00
LB4110A - A4	Beta	10/20/2015	4/18/2016	1.48E+00	P	-1.09E+00	1.82E+00	4.73E+00
LB4110A - B1	Beta	10/20/2015	4/18/2016	1.57E+00	P	1.04E+00	1.64E+00	2.23E+00
LB4110A - B2	Beta	10/20/2015	4/18/2016	1.47E+00	P	8.74E-01	1.47E+00	2.07E+00
LB4110A - B3	Beta	10/20/2015	4/18/2016	9.67E-01	P	9.25E-01	1.49E+00	2.05E+00
LB4110A - B4	Beta	10/20/2015	4/18/2016	1.25E+00	P	9.02E-01	1.49E+00	2.07E+00
LB4110A - C1	Beta	10/20/2015	4/18/2016	1.22E+00	P	9.27E-01	1.39E+00	1.86E+00
LB4110A - C2	Beta	10/20/2015	4/18/2016	1.43E+00	P	7.20E-01	1.19E+00	1.65E+00
LB4110A - C3	Beta	10/20/2015	4/18/2016	1.93E+00	P	7.37E-01	1.70E+00	2.66E+00
LB4110A - C4	Beta	10/20/2015	4/18/2016	1.38E+00	P	7.90E-01	1.29E+00	1.79E+00
LB4110A - D1	Beta	10/20/2015	2/16/2016	6.07E+00	F	1.83E+00	5.38E+00	8.93E+00
LB4110A - D2	Beta	10/20/2015	2/16/2016	4.12E+00	F	3.96E+00	4.83E+00	5.70E+00
LB4110A - D3	Beta	10/20/2015	2/16/2016	2.63E+00	F	1.27E+00	3.38E+00	5.50E+00
LB4110A - D4	Beta	10/20/2015	2/16/2016	4.32E+00	F	1.20E+00	4.91E+00	8.63E+00
LB4110A - E1	Beta	10/20/2015	4/18/2016	1.28E+00	P	8.96E-01	1.45E+00	2.01E+00
LB4110A - E2	Beta	10/20/2015	4/18/2016	6.83E-01	P	5.03E-01	9.20E-01	1.34E+00
LB4110A - E3	Beta	10/20/2015	4/18/2016	1.03E+00	P	6.59E-01	1.26E+00	1.85E+00
LB4110A - E4	Beta	10/20/2015	4/18/2016	8.00E-01	P	6.42E-01	1.05E+00	1.46E+00
LB4110A - F1	Beta	10/20/2015	4/18/2016	1.50E+00	P	1.01E+00	1.51E+00	2.01E+00
LB4110A - F2	Beta	10/20/2015	4/18/2016	4.52E+00	F	-6.26E+02	3.96E+01	7.05E+02
LB4110A - F3	Beta	10/20/2015	4/18/2016	1.37E+00	P	6.66E-01	1.31E+00	1.95E+00
LB4110A - F4	Beta	10/20/2015	4/18/2016	1.07E+00	P	6.51E-01	1.09E+00	1.53E+00
LB4110A - G1	Beta	10/20/2015	4/18/2016	1.13E+00	P	7.28E-01	1.24E+00	1.76E+00
LB4110A - G2	Beta	10/20/2015	4/18/2016	1.65E+00	P	1.14E+00	1.66E+00	2.18E+00
LB4110A - G3	Beta	10/20/2015	4/18/2016	1.32E+00	P	7.60E-01	1.36E+00	1.95E+00
LB4110A - G4	Beta	10/20/2015	4/18/2016	1.58E+00	P	9.00E-01	1.36E+00	1.82E+00

Eberline Analytical
Oak Ridge Laboratory

GPC Detector Report
(ALL Efficiencies)

Detector	Alpha/Beta	Calibration Date	Count Date	Eff	PFW	LCL	Mean	UCL
LB4110A - A1	Alpha	10/20/2015	4/18/2016	0.2309	P	0.2254	0.2331	0.2408
LB4110A - A2	Alpha	10/20/2015	4/18/2016	0.2091	P	0.2037	0.2110	0.2184
LB4110A - A3	Alpha	10/20/2015	4/18/2016	0.1976	P	0.1931	0.2024	0.2117
LB4110A - A4	Alpha	10/20/2015	4/18/2016	0.2291	P	0.2213	0.2303	0.2393
LB4110A - B1	Alpha	10/20/2015	4/18/2016	0.2126	P	0.1988	0.2109	0.2229
LB4110A - B2	Alpha	10/20/2015	4/18/2016	0.2200	P	0.2026	0.2158	0.2290
LB4110A - B3	Alpha	10/20/2015	4/18/2016	0.2445	P	0.2217	0.2360	0.2502
LB4110A - B4	Alpha	10/20/2015	4/18/2016	0.2263	P	0.2140	0.2253	0.2366
LB4110A - C1	Alpha	10/20/2015	4/18/2016	0.2066	P	0.2029	0.2121	0.2213
LB4110A - C2	Alpha	10/20/2015	4/18/2016	0.2197	P	0.2103	0.2221	0.2339
LB4110A - C3	Alpha	10/20/2015	4/18/2016	0.2487	P	0.2360	0.2482	0.2604
LB4110A - C4	Alpha	10/20/2015	4/18/2016	0.2171	P	0.2092	0.2213	0.2333
LB4110A - D1	Alpha	10/20/2015	2/16/2016	0.2230	P	0.2123	0.2210	0.2298
LB4110A - D2	Alpha	10/20/2015	2/16/2016	0.2503	P	0.2377	0.2478	0.2580
LB4110A - D3	Alpha	10/20/2015	2/16/2016	0.2538	P	0.2457	0.2566	0.2675
LB4110A - D4	Alpha	10/20/2015	2/16/2016	0.1853	P	0.1822	0.1920	0.2019
LB4110A - E1	Alpha	10/20/2015	4/18/2016	0.2354	P	0.2251	0.2355	0.2459
LB4110A - E2	Alpha	10/20/2015	4/18/2016	0.2129	P	0.2016	0.2137	0.2257
LB4110A - E3	Alpha	10/20/2015	4/18/2016	0.2127	P	0.2023	0.2115	0.2206
LB4110A - E4	Alpha	10/20/2015	4/18/2016	0.2449	P	0.2360	0.2452	0.2545
LB4110A - F1	Alpha	10/20/2015	4/18/2016	0.1920	P	0.1497	0.1954	0.2411
LB4110A - F2	Alpha	10/20/2015	4/18/2016	0.1963	P	0.1531	0.2001	0.2470
LB4110A - F3	Alpha	10/20/2015	4/18/2016	0.2471	P	0.1836	0.2401	0.2967
LB4110A - F4	Alpha	10/20/2015	4/18/2016	0.2153	P	0.1659	0.2165	0.2671
LB4110A - G1	Alpha	10/20/2015	4/18/2016	0.2084	P	0.2012	0.2073	0.2134
LB4110A - G2	Alpha	10/20/2015	4/18/2016	0.2099	P	0.2030	0.2101	0.2172
LB4110A - G3	Alpha	10/20/2015	4/18/2016	0.2322	P	0.2243	0.2308	0.2373
LB4110A - G4	Alpha	10/20/2015	4/18/2016	0.2023	P	0.1983	0.2047	0.2112

✓ 4/18

Eberline Analytical
Oak Ridge Laboratory

GPC Detector Report
(ALL Efficiencies)

Detector	Alpha/Beta	Calibration Date	Count Date	Eff	PFW	LCL	Mean	UCL
LB4110A - A1	Beta	10/20/2015	4/18/2016	0.5435	P	0.5300	0.5479	0.5658
LB4110A - A2	Beta	10/20/2015	4/18/2016	0.4783	P	0.4631	0.4782	0.4933
LB4110A - A3	Beta	10/20/2015	4/18/2016	0.4733	P	0.4607	0.4781	0.4954
LB4110A - A4	Beta	10/20/2015	4/18/2016	0.5555	P	0.5374	0.5544	0.5714
LB4110A - B1	Beta	10/20/2015	4/18/2016	0.5306	P	0.5014	0.5241	0.5467
LB4110A - B2	Beta	10/20/2015	4/18/2016	0.5267	P	0.4942	0.5196	0.5451
LB4110A - B3	Beta	10/20/2015	4/18/2016	0.5914	P	0.5552	0.5823	0.6093
LB4110A - B4	Beta	10/20/2015	4/18/2016	0.5568	P	0.5297	0.5523	0.5748
LB4110A - C1	Beta	10/20/2015	4/18/2016	0.4904	P	0.4727	0.4954	0.5180
LB4110A - C2	Beta	10/20/2015	4/18/2016	0.5271	P	0.5024	0.5288	0.5553
LB4110A - C3	Beta	10/20/2015	4/18/2016	0.6178	P	0.5867	0.6168	0.6469
LB4110A - C4	Beta	10/20/2015	4/18/2016	0.5318	P	0.5067	0.5400	0.5732
LB4110A - D1	Beta	10/20/2015	2/16/2016	0.6528	P	0.6315	0.6527	0.6740
LB4110A - D2	Beta	10/20/2015	2/16/2016	0.6341	P	0.6210	0.6393	0.6576
LB4110A - D3	Beta	10/20/2015	2/16/2016	0.6200	P	0.6116	0.6354	0.6592
LB4110A - D4	Beta	10/20/2015	2/16/2016	0.4556	W	0.4550	0.4752	0.4954
LB4110A - E1	Beta	10/20/2015	4/18/2016	0.5664	P	0.5444	0.5619	0.5794
LB4110A - E2	Beta	10/20/2015	4/18/2016	0.5123	P	0.4930	0.5140	0.5350
LB4110A - E3	Beta	10/20/2015	4/18/2016	0.5132	P	0.4996	0.5144	0.5292
LB4110A - E4	Beta	10/20/2015	4/18/2016	0.6107	P	0.5924	0.6097	0.6269
LB4110A - F1	Beta	10/20/2015	4/18/2016	0.4744	P	0.3700	0.4769	0.5837
LB4110A - F2	Beta	10/20/2015	4/18/2016	0.4578	P	0.3620	0.4738	0.5855
LB4110A - F3	Beta	10/20/2015	4/18/2016	0.6107	P	0.4561	0.5964	0.7366
LB4110A - F4	Beta	10/20/2015	4/18/2016	0.5268	P	0.4052	0.5288	0.6525
LB4110A - G1	Beta	10/20/2015	4/18/2016	0.4665	P	0.4572	0.4708	0.4843
LB4110A - G2	Beta	10/20/2015	4/18/2016	0.4987	P	0.4926	0.5048	0.5169
LB4110A - G3	Beta	10/20/2015	4/18/2016	0.5592	P	0.5464	0.5614	0.5764
LB4110A - G4	Beta	10/20/2015	4/18/2016	0.5062	P	0.4922	0.5057	0.5192

4/18

Eberline Analytical
Oak Ridge Laboratory

GPC Detector Report
(ALL Backgrounds)

4119

Detector	Alpha/Beta	Calibration Date	Count Date	Bkg CPM	PFW	LCL	Mean	UCL
LB4110A - A1	Alpha	10/20/2015	4/19/2016	5.00E-02	P	-7.93E-02	1.07E-01	2.94E-01
LB4110A - A2	Alpha	10/20/2015	4/19/2016	2.00E-01	P	-6.00E-02	7.83E-02	2.17E-01
LB4110A - A3	Alpha	10/20/2015	4/19/2016	1.17E-01	P	-4.65E-02	1.05E-01	2.56E-01
LB4110A - A4	Alpha	10/20/2015	4/19/2016	1.83E-01	P	-7.05E-02	9.34E-02	2.57E-01
LB4110A - B1	Alpha	10/20/2015	4/19/2016	1.50E-01	P	-8.79E-02	1.17E-01	3.21E-01
LB4110A - B2	Alpha	10/20/2015	4/19/2016	5.00E-02	P	-2.66E-02	1.19E-01	2.64E-01
LB4110A - B3	Alpha	10/20/2015	4/19/2016	2.67E-01	P	-6.40E-02	9.91E-02	2.62E-01
LB4110A - B4	Alpha	10/20/2015	4/19/2016	1.00E-01	P	-4.88E-02	8.43E-02	2.17E-01
LB4110A - C1	Alpha	10/20/2015	4/19/2016	8.33E-02	P	-1.28E-01	1.00E-01	3.29E-01
LB4110A - C2	Alpha	10/20/2015	4/19/2016	5.00E-02	P	-8.24E-02	7.25E-02	2.27E-01
LB4110A - C3	Alpha	10/20/2015	4/19/2016	1.33E-01	P	-8.45E-02	1.03E-01	2.90E-01
LB4110A - C4	Alpha	10/20/2015	4/19/2016	6.67E-02	P	-6.35E-02	8.67E-02	2.37E-01
LB4110A - D1	Alpha	10/20/2015	2/16/2016	3.17E-01	F	1.95E-03	2.10E-01	4.19E-01
LB4110A - D2	Alpha	10/20/2015	2/16/2016	2.00E-01	P	-2.93E-02	1.83E-01	3.96E-01
LB4110A - D3	Alpha	10/20/2015	2/16/2016	5.00E-02	P	-8.27E-02	7.92E-02	2.41E-01
LB4110A - D4	Alpha	10/20/2015	2/16/2016	1.83E-01	P	-8.87E-03	1.04E-01	2.18E-01
LB4110A - E1	Alpha	10/20/2015	4/19/2016	1.00E-01	P	-1.40E-01	1.56E-01	4.51E-01
LB4110A - E2	Alpha	10/20/2015	4/19/2016	1.67E-02	P	-6.88E-02	6.37E-02	1.96E-01
LB4110A - E3	Alpha	10/20/2015	4/19/2016	8.33E-02	P	-7.68E-02	1.45E-01	3.67E-01
LB4110A - E4	Alpha	10/20/2015	4/19/2016	5.00E-02	P	-6.82E-02	7.87E-02	2.26E-01
LB4110A - F1	Alpha	10/20/2015	4/19/2016	5.00E-02	P	-6.45E-02	1.13E-01	2.91E-01
LB4110A - F2	Alpha	10/20/2015	4/19/2016	8.33E-02	P	-3.15E-01	7.99E-02	4.74E-01
LB4110A - F3	Alpha	10/20/2015	4/19/2016	5.67E-01	F	-1.00E-01	1.48E-01	3.96E-01
LB4110A - F4	Alpha	10/20/2015	4/19/2016	2.50E-01	P	-5.14E-02	8.89E-02	2.29E-01
LB4110A - G1	Alpha	10/20/2015	4/19/2016	6.67E-02	P	-7.09E-02	1.09E-01	2.90E-01
LB4110A - G2	Alpha	10/20/2015	4/19/2016	6.67E-02	P	-8.80E-02	8.40E-02	2.56E-01
LB4110A - G3	Alpha	10/20/2015	4/19/2016	2.50E-01	P	-6.83E-02	1.49E-01	3.65E-01
LB4110A - G4	Alpha	10/20/2015	4/19/2016	5.00E-02	P	-3.37E-02	9.74E-02	2.29E-01

15051

Eberline Analytical
Oak Ridge Laboratory

GPC Detector Report
(ALL Backgrounds)

4/19

Detector	Alpha/Beta	Calibration Date	Count Date	Bkg CPM	PFW	LCL	Mean	UCL
LB4110A - A1	Beta	10/20/2015	4/19/2016	1.35E+00	P	9.44E-01	1.50E+00	2.05E+00
LB4110A - A2	Beta	10/20/2015	4/19/2016	1.50E+00	P	1.04E+00	1.48E+00	1.91E+00
LB4110A - A3	Beta	10/20/2015	4/19/2016	1.73E+00	P	1.02E+00	1.61E+00	2.20E+00
LB4110A - A4	Beta	10/20/2015	4/19/2016	1.35E+00	P	-1.09E+00	1.82E+00	4.72E+00
LB4110A - B1	Beta	10/20/2015	4/19/2016	1.75E+00	P	1.05E+00	1.64E+00	2.23E+00
LB4110A - B2	Beta	10/20/2015	4/19/2016	1.48E+00	P	8.76E-01	1.47E+00	2.07E+00
LB4110A - B3	Beta	10/20/2015	4/19/2016	1.77E+00	P	9.25E-01	1.49E+00	2.05E+00
LB4110A - B4	Beta	10/20/2015	4/19/2016	1.52E+00	P	9.04E-01	1.49E+00	2.07E+00
LB4110A - C1	Beta	10/20/2015	4/19/2016	1.32E+00	P	9.28E-01	1.39E+00	1.86E+00
LB4110A - C2	Beta	10/20/2015	4/19/2016	1.10E+00	P	7.21E-01	1.19E+00	1.65E+00
LB4110A - C3	Beta	10/20/2015	4/19/2016	1.60E+00	P	7.39E-01	1.70E+00	2.65E+00
LB4110A - C4	Beta	10/20/2015	4/19/2016	1.20E+00	P	7.91E-01	1.29E+00	1.78E+00
LB4110A - D1	Beta	10/20/2015	2/16/2016	6.07E+00	F	1.83E+00	5.38E+00	8.93E+00
LB4110A - D2	Beta	10/20/2015	2/16/2016	4.12E+00	F	3.96E+00	4.83E+00	5.70E+00
LB4110A - D3	Beta	10/20/2015	2/16/2016	2.63E+00	F	1.27E+00	3.38E+00	5.50E+00
LB4110A - D4	Beta	10/20/2015	2/16/2016	4.32E+00	F	1.20E+00	4.91E+00	8.63E+00
LB4110A - E1	Beta	10/20/2015	4/19/2016	1.50E+00	P	8.99E-01	1.45E+00	2.01E+00
LB4110A - E2	Beta	10/20/2015	4/19/2016	8.83E-01	P	5.05E-01	9.20E-01	1.33E+00
LB4110A - E3	Beta	10/20/2015	4/19/2016	1.13E+00	P	6.60E-01	1.26E+00	1.85E+00
LB4110A - E4	Beta	10/20/2015	4/19/2016	1.10E+00	P	6.44E-01	1.05E+00	1.46E+00
LB4110A - F1	Beta	10/20/2015	4/19/2016	1.23E+00	P	1.01E+00	1.51E+00	2.01E+00
LB4110A - F2	Beta	10/20/2015	4/19/2016	5.83E+00	F	-6.24E+02	3.93E+01	7.02E+02
LB4110A - F3	Beta	10/20/2015	4/19/2016	2.15E+00	F	6.47E-01	1.32E+00	1.99E+00
LB4110A - F4	Beta	10/20/2015	4/19/2016	1.58E+00	P	6.43E-01	1.10E+00	1.55E+00
LB4110A - G1	Beta	10/20/2015	4/19/2016	1.12E+00	P	7.28E-01	1.24E+00	1.76E+00
LB4110A - G2	Beta	10/20/2015	4/19/2016	1.87E+00	P	1.14E+00	1.66E+00	2.18E+00
LB4110A - G3	Beta	10/20/2015	4/19/2016	1.30E+00	P	7.62E-01	1.36E+00	1.95E+00
LB4110A - G4	Beta	10/20/2015	4/19/2016	1.22E+00	P	9.00E-01	1.36E+00	1.82E+00

Eberline Analytical
Oak Ridge Laboratory

GPC Detector Report
(ALL Efficiencies)

✓ 4/19

Detector	Alpha/Beta	Calibration Date	Count Date	Eff	PFW	LCL	Mean	UCL
LB4110A - A1	Alpha	10/20/2015	4/19/2016	0.2318	P	0.2254	0.2331	0.2408
LB4110A - A2	Alpha	10/20/2015	4/19/2016	0.2038	W	0.2035	0.2110	0.2184
LB4110A - A3	Alpha	10/20/2015	4/19/2016	0.1983	P	0.1930	0.2024	0.2117
LB4110A - A4	Alpha	10/20/2015	4/19/2016	0.2252	P	0.2212	0.2302	0.2393
LB4110A - B1	Alpha	10/20/2015	4/19/2016	0.2100	P	0.1988	0.2109	0.2229
LB4110A - B2	Alpha	10/20/2015	4/19/2016	0.2199	P	0.2026	0.2158	0.2290
LB4110A - B3	Alpha	10/20/2015	4/19/2016	0.2343	P	0.2217	0.2360	0.2502
LB4110A - B4	Alpha	10/20/2015	4/19/2016	0.2278	P	0.2140	0.2253	0.2366
LB4110A - C1	Alpha	10/20/2015	4/19/2016	0.2142	P	0.2030	0.2122	0.2213
LB4110A - C2	Alpha	10/20/2015	4/19/2016	0.2218	P	0.2103	0.2221	0.2338
LB4110A - C3	Alpha	10/20/2015	4/19/2016	0.2427	P	0.2359	0.2482	0.2604
LB4110A - C4	Alpha	10/20/2015	4/19/2016	0.2211	P	0.2093	0.2213	0.2333
LB4110A - D1	Alpha	10/20/2015	2/16/2016	0.2230	P	0.2123	0.2210	0.2298
LB4110A - D2	Alpha	10/20/2015	2/16/2016	0.2503	P	0.2377	0.2478	0.2580
LB4110A - D3	Alpha	10/20/2015	2/16/2016	0.2538	P	0.2457	0.2566	0.2675
LB4110A - D4	Alpha	10/20/2015	2/16/2016	0.1853	P	0.1822	0.1920	0.2019
LB4110A - E1	Alpha	10/20/2015	4/19/2016	0.2286	P	0.2250	0.2355	0.2460
LB4110A - E2	Alpha	10/20/2015	4/19/2016	0.2093	P	0.2016	0.2136	0.2257
LB4110A - E3	Alpha	10/20/2015	4/19/2016	0.2094	P	0.2023	0.2114	0.2205
LB4110A - E4	Alpha	10/20/2015	4/19/2016	0.2426	P	0.2360	0.2452	0.2544
LB4110A - F1	Alpha	10/20/2015	4/19/2016	0.1906	P	0.1499	0.1954	0.2409
LB4110A - F2	Alpha	10/20/2015	4/19/2016	0.2038	P	0.1533	0.2001	0.2469
LB4110A - F3	Alpha	10/20/2015	4/19/2016	0.2376	P	0.1838	0.2401	0.2964
LB4110A - F4	Alpha	10/20/2015	4/19/2016	0.2173	P	0.1661	0.2165	0.2670
LB4110A - G1	Alpha	10/20/2015	4/19/2016	0.2052	P	0.2012	0.2073	0.2134
LB4110A - G2	Alpha	10/20/2015	4/19/2016	0.2081	P	0.2030	0.2101	0.2171
LB4110A - G3	Alpha	10/20/2015	4/19/2016	0.2318	P	0.2244	0.2308	0.2373
LB4110A - G4	Alpha	10/20/2015	4/19/2016	0.2034	P	0.1983	0.2047	0.2112

00053

Eberline Analytical
Oak Ridge Laboratory

GPC Detector Report
(ALL Efficiencies)

4/19

Detector	Alpha/Beta	Calibration Date	Count Date	Eff	PFW	LCL	Mean	UCL
LB4110A - A1	Beta	10/20/2015	4/19/2016	0.5450	P	0.5300	0.5479	0.5657
LB4110A - A2	Beta	10/20/2015	4/19/2016	0.4691	P	0.4630	0.4781	0.4933
LB4110A - A3	Beta	10/20/2015	4/19/2016	0.4695	P	0.4606	0.4780	0.4954
LB4110A - A4	Beta	10/20/2015	4/19/2016	0.5585	P	0.5375	0.5545	0.5714
LB4110A - B1	Beta	10/20/2015	4/19/2016	0.5252	P	0.5015	0.5241	0.5466
LB4110A - B2	Beta	10/20/2015	4/19/2016	0.5260	P	0.4943	0.5197	0.5451
LB4110A - B3	Beta	10/20/2015	4/19/2016	0.5888	P	0.5553	0.5823	0.6093
LB4110A - B4	Beta	10/20/2015	4/19/2016	0.5617	P	0.5297	0.5523	0.5749
LB4110A - C1	Beta	10/20/2015	4/19/2016	0.4949	P	0.4728	0.4954	0.5179
LB4110A - C2	Beta	10/20/2015	4/19/2016	0.5307	P	0.5025	0.5289	0.5552
LB4110A - C3	Beta	10/20/2015	4/19/2016	0.6201	P	0.5868	0.6168	0.6468
LB4110A - C4	Beta	10/20/2015	4/19/2016	0.5377	P	0.5068	0.5399	0.5731
LB4110A - D1	Beta	10/20/2015	2/16/2016	0.6528	P	0.6315	0.6527	0.6740
LB4110A - D2	Beta	10/20/2015	2/16/2016	0.6341	P	0.6210	0.6393	0.6576
LB4110A - D3	Beta	10/20/2015	2/16/2016	0.6200	P	0.6116	0.6354	0.6592
LB4110A - D4	Beta	10/20/2015	2/16/2016	0.4556	W	0.4550	0.4752	0.4954
LB4110A - E1	Beta	10/20/2015	4/19/2016	0.5569	P	0.5444	0.5619	0.5794
LB4110A - E2	Beta	10/20/2015	4/19/2016	0.5144	P	0.4931	0.5140	0.5350
LB4110A - E3	Beta	10/20/2015	4/19/2016	0.5173	P	0.4997	0.5144	0.5292
LB4110A - E4	Beta	10/20/2015	4/19/2016	0.6121	P	0.5925	0.6097	0.6269
LB4110A - F1	Beta	10/20/2015	4/19/2016	0.4715	P	0.3704	0.4768	0.5833
LB4110A - F2	Beta	10/20/2015	4/19/2016	0.4768	P	0.3624	0.4738	0.5851
LB4110A - F3	Beta	10/20/2015	4/19/2016	0.5870	P	0.4566	0.5963	0.7360
LB4110A - F4	Beta	10/20/2015	4/19/2016	0.5236	P	0.4056	0.5288	0.6519
LB4110A - G1	Beta	10/20/2015	4/19/2016	0.4637	P	0.4571	0.4707	0.4843
LB4110A - G2	Beta	10/20/2015	4/19/2016	0.4990	P	0.4925	0.5047	0.5169
LB4110A - G3	Beta	10/20/2015	4/19/2016	0.5541	P	0.5463	0.5613	0.5764
LB4110A - G4	Beta	10/20/2015	4/19/2016	0.4972	P	0.4920	0.5056	0.5192

00054