

## **RESL CUSTOMER EXPORT CONTROL AGREEMENT**

It is the Radiological and Environmental Sciences Laboratory's (RESL) policy to conduct business in accordance with all applicable U.S. export control laws and regulations. It is also RESL's policy that its Customers comply with U.S. export control laws and regulations. Therefore, Customer agrees to the following:

1. Because products, technical data, and technical assistance (i.e., services) provided to Customer by RESL may be subject to U.S. export control laws and regulations, (i) transactions with certain persons and companies and (ii) the export or reexport of certain types and levels of products, technical data, and services are prohibited or restricted.
2. Customer acknowledges that it is responsible for its own compliance with U.S. export control laws and regulations. Customer further agrees that it assumes the responsibility to obtain all necessary U.S. export licenses or other U.S. governmental authorizations, as well as all liability for the failure to do so.
3. Customer acknowledges that export control requirements may change and that the export or reexport of RESL products, technical data, and services without an export license or other appropriate governmental authorization may result in criminal and/or civil liability.
4. The obligations and requirements described herein shall survive the expiration or termination of any agreement or contract between RESL and Customer.

### GrW34 Participating Laboratories

Lab Code	Lab Name	Matrix Code
ADEM01	Alabama Department of Environmental Management	GrW
ADFC99	Abu Dhabi Quality and Conformity Council-Central Testing Lab	GrW
AFOH01	USAFSAM/OEA	GrW
ANTE01	ALS Environmental - Fort Collins, CO	GrW
ARGO01	Idaho National Laboratory	GrW
ARSL01	ARS International, LLC	GrW
ASUK99	NAS Radiochemistry Group	GrW
AY1201	Consolidated Nuclear Security, LLC, Analytical Chemistry Organization Lab	GrW
BY1201	Consolidated Nuclear Security, LLC, Analytical Chemistry Organization Lab	GrW
CESL01	Lawrence Livermore National Laboratory - EMRL	GrW
CHMH01	222-S Laboratory	GrW
CRCE99	Centre for Radiation, Chemical and Environmental Hazards	GrW
DEHS01	Department of Environmental Health & Safety	GrW
DINL99	Departamento Ingeniería Nuclear y Mecánica de Fluidos	GrW
DLEA01	DLE Associates	GrW
DPHE01	Colorado Dept. of Public Health & Env. / Laboratory Services Div.	GrW
ELCS01	Energy Labs - College Station	GrW
ELIW01	Energy Laboratories, Inc.	GrW
ERCL01	Washington State Public Health Laboratories	GrW
ERHD99	Radiation Protection Bureau RSD NMS	GrW
ESGL99	Environmental Scientifics Group	GrW
FDHE01	Florida Dept of Health Environmental Laboratory	GrW
GENE01	GEL Laboratories, LLC	GrW
GROW01	FGL Environmental	GrW
HCAL01	Lawrence Livermore National Laboratory	GrW
HECR01	SC Dept. Health and Environmental Control Radiological Laboratory	GrW
HPAC99	PHE, CRCE Glasgow	GrW
ISUE01	ISU Environmental Monitoring Laboratory	GrW
ISUP01	ISU - Department of Physics/Health Physics/EAL	GrW
JAEC99	Research Laboratories and Information Directorate	GrW
LAWR01	LAWRENCE BERKELEY NATIONAL LABORATORY	GrW
LERL99	LARUEX Environmental Radioactivity Laboratory	GrW
LGCL99	LGC Ltd	GrW
LOCK03	Advanced Test Reactor (ATR) Complex Radioanalytical Laboratory	GrW
LZCA01	ACZ Laboratories, Inc	GrW
MAHP59	Materials Assessment and Health Physics Group	GrW
MALA99	Asia Lab (M) Sdn. Bhd.	GrW
MART01	Fluor B&W Ports Analytical Laboratory	GrW
NARL01	National Analytical Radiation Environmental Laboratory	GrW
NESI01	B&W Technical Services-Radioisotope & Analytical Chemistry Lab	GrW
NOCS99	National Oceanography Centre, Southampton	GrW
NRLL99	Environmental Radioactivity - National Centre for Radiation Science	GrW
ODHL01	Ohio Department of Health Laboratory	GrW
ORIS01	ORISE/IEAV	GrW
OTLI01	Outreach Laboratory, a Division of ESC Lab Sciences	GrW
QUAN01	TestAmerica St. Louis	GrW
QUAN03	TestAmerica Laboratories - Richland	GrW
RAVR99	Radiactividad Ambiental y Vigilancia Radiologica	GrW
RPSC01	Radiation Protection Service	GrW
SANC99	RadioAnalysis, South Africa Nuclear Energy Corp.	GrW
SEML01	SRS Environmental Monitoring Laboratory	GrW
SNRC99	Soreq NRC	GrW

SOUT01	Southwest Research Institute	GrW
TDHL01	Texas Department of State Health Services Laboratory	GrW
TELE02	ATI Environmental, Inc., Midwest Lab	GrW
TMAO01	EBERLINE SERVICES OAK RIDGE LABORATORY	GrW
TNUT01	St. Louis USACE FUSRAP Laboratory	GrW
ULFM99	University of La Laguna FISICA Medica	GrW
UPVL99	Lab Radiactividad Ambiental. Univ. Politecnica Valencia	GrW
WEST04	PACE ANALYTICAL SERVICES, PITTSBURGH	GrW
WSHL01	Wisconsin State Laboratory of Hygiene	GrW
WVDP01	WVDP Environmental Laboratory	GrW

**Laboratories Not Reporting GrW34**

<b>Lab Code</b>	<b>Lab Name</b>	<b>Matrix Code</b>
DRMG01	CNS Pantex - D&RMG	GrW
KSCF01	Kennedy Space Center, HP Laboratory	GrW
MART03	Radioactive Material Analysis Laboratory	GrW
MDPH01	MDPH-Radiation Control Program	GrW
RSAL01	RSA Laboratories, Inc.	GrW
ZIOS99	ZVD Institute of Occupational Safety	GrW

## Study Reference Values

MAPEP-16-GrW34

*Radiological Reference Date: 02/01/2016*

Analyte	Ref Value	Ref Unc
Radiological	Units: (Bq/L)	
Gross alpha	0.673	0.011
Gross beta	2.15	0.05

## Flag Summary Report

MAPEP-16-GrW34

Radiological

<b>Analyte</b>	<b>A</b>	<b>W</b>	<b>RW</b>	<b>N</b>
Gross alpha	59			3
Gross beta	60			2

## Sample Statistical Summary

MAPEP-16-GrW34

Radiological Reference Date: 02/01/2016

Analyte	T(1)	A(2)	Grand(3) Mean	Std Dev	Ref Value	Ref Unc	Acceptance Range
Radiological							Units: (Bq/L)
Gross alpha	62	59	0.675	0.159	0.673	0.011	0.202 - 1.144
Gross beta	62	60	2.23	0.26	2.15	0.05	1.08 - 3.23

- Note:** (1) T = Total number of laboratories reporting analyte.  
 (2) A = Number of laboratories with 'Acceptable' performance.  
 (3) Mean excludes values derived as total metals and values indicated as "Not Acceptable".

### Gross Alpha Flags:

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $>$  2, i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq$  2, i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

### Gross Beta Flags:

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $>$  2, i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq$  2, i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

### Uncertainty Flags:

- NOT ACCEPTABLE.....RP $<$ 2%  
 ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%  
 ACCEPTABLE WITH WARNING.....15% $<$ RP $\leq$ 30%  
 NOT ACCEPTABLE.....RP $>$ 30%  
 RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (ADEM01) Alabama Department of Environmental Management  
 Montgomery Laboratory  
 Montgomery, AL 36110

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.55	0.673	A		-18.3	0.202 - 1.144	0.05	A
Gross beta	3.09	2.15	A		43.7	1.08 - 3.23	0.22	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (ADFC99) Abu Dhabi Quality and Conformity Council-Central Testing Lab  
 Radiation Lab  
 Abu Dhabi, - -

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.87	0.673	A		29.3	0.202 - 1.144	0.28	N
Gross beta	1.96	2.15	A		-8.8	1.08 - 3.23	0.13	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (AFOH01) USAFSAM/OEA  
 2510 Fifth Street, Area B  
 Wright-Patterson AFB, OH 45433-7913

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.78	0.673	A		15.9	0.202 - 1.144	0.08	A
Gross beta	2.28	2.15	A		6.0	1.08 - 3.23	0.08	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (ANTE01) ALS Environmental - Fort Collins, CO  
 225 Commerce Drive  
 Fort Collins, CO 80524-1416

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.751	0.673	A		11.6	0.202 - 1.144	0.065	A
Gross beta	2.09	2.15	A		-2.8	1.08 - 3.23	0.17	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (ARGO01) Idaho National Laboratory  
 INL, Materials and Fuels Complex  
 Idaho Falls, ID 83415

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	1.3	0.673	N		93.2	0.202 - 1.144	1.3	N
Gross beta	2.4	2.15	A		11.6	1.08 - 3.23	0.25	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (ARSL01) ARS International, LLC  
 2609 North River Road  
 Port Allen, LA 70767

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	.597	0.673	A		-11.3	0.202 - 1.144	.149	W
Gross beta	2.173	2.15	A		1.1	1.08 - 3.23	.510	W

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (ASUK99) NAS Radiochemistry Group  
 A38.1 AWE,  
 Reading, Berkshire RG7 4PR

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.321	0.673	A		-52.3	0.202 - 1.144	0.087	W
Gross beta	2.53	2.15	A		17.7	1.08 - 3.23	0.58	W

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

**Laboratory Results For MAPEP-16-GrW34**

(AY1201) Consolidated Nuclear Security, LLC, Analytical Chemistry Organization Laboratory  
 Y12, NSC, Bldg. 9995, Rm 142  
 Oak Ridge, TN 37831-8189

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.665	0.673	A		-1.2	0.202 - 1.144	0.12	W
Gross beta	2.17	2.15	A		0.9	1.08 - 3.23	0.18	A

*Radiological Reference Date: February 1, 2016*

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

**Laboratory Results For MAPEP-16-GrW34**

(BY1201) Consolidated Nuclear Security, LLC, Analytical Chemistry Organization Laboratory  
 Y12, NSC, Bldg. 9995, Rm 142  
 Oak Ridge, TN 37831-8189

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.61	0.673	A		-9.4	0.202 - 1.144	0.22	N
Gross beta	2.08	2.15	A		-3.3	1.08 - 3.23	0.28	A

*Radiological Reference Date: February 1, 2016*

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (CESL01) Lawrence Livermore National Laboratory - EMRL  
 7000 East Avenue  
 Livermore, CA 94551

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	3.06E-01	0.673	A		-54.5	0.202 - 1.144	1.41E-01	N
Gross beta	2.30E+00	2.15	A		7.0	1.08 - 3.23	5.50E-01	W

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (CHMH01) 222-S Laboratory  
 1955 Jadwin Ave Suite 330  
 Richland, WA 99354

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	8.08E-01	0.673	A		20.1	0.202 - 1.144	25.4	N
Gross beta	2.51	2.15	A		16.7	1.08 - 3.23	12.0	N

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (CRCE99) Centre for Radiation, Chemical and Environmental Hazards  
 Public Health England  
 Didcot, OXON OX11 0RQ

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.69	0.673	A		2.5	0.202 - 1.144	0.05	A
Gross beta	2.12	2.15	A		-1.4	1.08 - 3.23	0.25	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (DEHS01) Department of Environmental Health & Safety  
 North Carolina State Univ.  
 Raleigh, NC 27695-8007

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.22	0.673	A		-67.3	0.202 - 1.144	0.08	N
Gross beta	2.04	2.15	A		-5.1	1.08 - 3.23	0.24	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (DINL99) Departamento Ingeniería Nuclear y Mecánica de Fluidos  
 Alameda de Urquijo s/n  
 Bilbao, Vizcaya 48013

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.541	0.673	A		-19.6	0.202 - 1.144	0.032	A
Gross beta	2.045	2.15	A		-4.9	1.08 - 3.23	0.064	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

- NOT ACCEPTABLE.....RP<2%
- ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%
- ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%
- NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

**Laboratory Results For MAPEP-16-GrW34**

(DLEA01) DLE Associates  
 730 Alfred Nobel Drive  
 Hercules, CA 94547

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.91	0.673	A		35.2	0.202 - 1.144	0.05	A
Gross beta	1.91	2.15	A		-11.2	1.08 - 3.23	0.11	A

*Radiological Reference Date: February 1, 2016*

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (DPHE01) Colorado Dept. of Public Health & Env. / Laboratory Services Div.  
 8100 Lowry Blvd  
 Denver, CO 80230

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	1.00	0.673	A		48.6	0.202 - 1.144	0.18	W
Gross beta	2.70	2.15	A		25.6	1.08 - 3.23	0.22	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (ELCS01) Energy Labs - College Station  
 415 Graham RD  
 College Station, Tx 77845

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.73	0.673	A		8.5	0.202 - 1.144	0.08	A
Gross beta	1.80	2.15	A		-16.3	1.08 - 3.23	0.13	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

**Laboratory Results For MAPEP-16-GrW34**

(ELIW01) Energy Laboratories, Inc.

2393 Salt Creek HWY

Casper, Wy 82601

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.8	0.673	A		18.9	0.202 - 1.144	0.2	W
Gross beta	2.1	2.15	A		-2.3	1.08 - 3.23	0.2	A

*Radiological Reference Date: February 1, 2016*

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (ERCL01) Washington State Public Health Laboratories  
 1610 N.E. 150th Street  
 Shoreline, WA 98155-9701

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.70	0.673	A		4.0	0.202 - 1.144	0.14	W
Gross beta	2.17	2.15	A		0.9	1.08 - 3.23	0.12	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (ERHD99) Radiation Protection Bureau RSD NMS  
 775 Brookfield Road AL6302D1  
 Ottawa, Ontario K1A 1C1

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.658	0.673	A		-2.2	0.202 - 1.144	0.118	W
Gross beta	2.286	2.15	A		6.3	1.08 - 3.23	0.045	N

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (ESGL99) Environmental Scientifics Group  
 Unit 12 Moorbrook  
 Didcot, Oxfordshire OX11 8QT

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.583	0.673	A		-13.4	0.202 - 1.144	0.055	A
Gross beta	2.52	2.15	A		17.2	1.08 - 3.23	0.19	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (FDHE01) Florida Dept of Health Environmental Laboratory  
 PO Box 680069  
 Orlando, FL 32868-0069

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.81	0.673	A		20.4	0.202 - 1.144	0.10	A
Gross beta	2.31	2.15	A		7.4	1.08 - 3.23	0.11	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (GENE01) GEL Laboratories, LLC  
 2040 Savage Road  
 Charleston, SC 29407

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.957	0.673	A		42.2	0.202 - 1.144	0.0991	A
Gross beta	2.39	2.15	A		11.2	1.08 - 3.23	0.206	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (GROW01) FGL Environmental  
 853 Corporation St.  
 Santa Paula, CA 93060

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	1.01	0.673	A		50.1	0.202 - 1.144	0.2	W
Gross beta	2.06	2.15	A		-4.2	1.08 - 3.23	0.3	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (HCAL01) Lawrence Livermore National Laboratory  
 Analytical Services and Instrumentation Analytical Lab  
 Livermore, CA 94550

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.526	0.673	A		-21.8	0.202 - 1.144	0.0755	A
Gross beta	2.12	2.15	A		-1.4	1.08 - 3.23	0.129	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

*Laboratory Results For MAPEP-16-GrW34*

(HECR01) SC Dept. Health and Environmental Control Radiological Laboratory  
 8231 Parklane Road  
 Columbia, SC 29223

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.614	0.673	A		-8.8	0.202 - 1.144	0.146	W
Gross beta	2.16	2.15	A		0.5	1.08 - 3.23	0.169	A

*Radiological Reference Date: February 1, 2016*

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (HPAC99) PHE, CRCE Glasgow  
 155 Hardgate Road  
 Glasgow, Scotland G514LS

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.564	0.673	A		-16.2	0.202 - 1.144	0.074	A
Gross beta	2.07	2.15	A		-3.7	1.08 - 3.23	0.12	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (ISUE01) ISU Environmental Monitoring Laboratory  
 785 5th 8th Ave Rm B107  
 Pocatello, Idaho 83209

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.54	0.673	A		-19.8	0.202 - 1.144	.03	A
Gross beta	2.41	2.15	A		12.1	1.08 - 3.23	.07	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

**Laboratory Results For MAPEP-16-GrW34**

(ISUP01) ISU - Department of Physics/Health Physics/EAL

785 S. 8th Ave, Rm 120

Pocatello, ID 83209-8106

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.93	0.673	A		38.2	0.202 - 1.144	0.10	A
Gross beta	2.44	2.15	A		13.5	1.08 - 3.23	0.10	A

*Radiological Reference Date: February 1, 2016*

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (JAEC99) Research Laboratories and Information Directorate  
 Jordan Atomic Energy Commission  
 Amman, Jordan 70 (11934)

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.594	0.673	A		-11.7	0.202 - 1.144	0.139	W
Gross beta	2.533	2.15	A		17.8	1.08 - 3.23	0.139	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (LAWR01) LAWRENCE BERKELEY NATIONAL LABORATORY  
 1 CYCLOTRON RD.  
 BERKELEY, CA 94720

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	.62	0.673	A		-7.9	0.202 - 1.144	.17	W
Gross beta	2.16	2.15	A		0.5	1.08 - 3.23	.09	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (LERL99) LARUEX Environmental Radioactivity Laboratory  
 Dpt. Applied Physics, Faculty of Vet. Sciences  
 Caceres, Caceres 10003

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.580	0.673	A		-13.8	0.202 - 1.144	0.140	W
Gross beta	2.04	2.15	A		-5.1	1.08 - 3.23	0.12	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34

(LGCL99) LGC Ltd

Queens Road

Teddington, Middlesex TW11 0LY

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.613	0.673	A		-8.9	0.202 - 1.144	0.088	A
Gross beta	2.28	2.15	A		6.0	1.08 - 3.23	0.18	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (LOCK03) Advanced Test Reactor (ATR) Complex Radioanalytical Laboratory  
 INL/Battelle Energy Alliance, LLC  
 Idaho Falls, ID 83415-7111

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.18	0.673	N		-73.3	0.202 - 1.144	0.07	N
Gross beta	2.41	2.15	A		12.1	1.08 - 3.23	0.25	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (LZCA01) ACZ Laboratories, Inc  
 2273 Downhill Drive  
 Steamboat Springs, CO 80487

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.725	0.673	A		7.7	0.202 - 1.144	0.190	W
Gross beta	2.43	2.15	A		13.0	1.08 - 3.23	0.23	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (MAHP59) Materials Assessment and Health Physics Group  
 Imperial College Reactor Centre  
 Ascot, Berkshire SL5 7TE

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.63	0.673	A		-6.4	0.202 - 1.144	0.17	W
Gross beta	2.19	2.15	A		1.9	1.08 - 3.23	0.20	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34

(MALA99) Asia Lab (M) Sdn. Bhd.

No. 14, JLN USJ 1/1

Subang Jaya, Selangor 47600

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.579	0.673	A		-14.0	0.202 - 1.144	0.26	N
Gross beta	1.987	2.15	A		-7.6	1.08 - 3.23	0.07	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (MART01) Fluor B&W Ports Analytical Laboratory  
 Lab COC, Bldg. X-710, Rm 222  
 Piketon, OH 45661-

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.66	0.673	A		-1.9	0.202 - 1.144	0.19	W
Gross beta	3.23	2.15	N		50.2	1.08 - 3.23	0.34	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (NARL01) National Analytical Radiation Environmental Laboratory  
 540 S. Morris Ave.  
 Montgomery, AL 36115-2601

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.971	0.673	A		44.3	0.202 - 1.144	0.177	W
Gross beta	2.23	2.15	A		3.7	1.08 - 3.23	0.157	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

*Laboratory Results For MAPEP-16-GrW34*

(NESI01) B&W Technical Services-Radioisotope & Analytical Chemistry Laboratory  
 Lynchburg Technology Center  
 Lynchburg, VA 24504-5447

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.539	0.673	A		-19.9	0.202 - 1.144	0.028	A
Gross beta	2.26	2.15	A		5.1	1.08 - 3.23	0.038	N

*Radiological Reference Date: February 1, 2016*

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (NOCS99) National Oceanography Centre, Southampton  
 GAU-Radioanalytical  
 Southampton, Hampshire SO14 3ZH

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.7	0.673	A		4.0	0.202 - 1.144	0.2	W
Gross beta	3.5	2.15	N		62.8	1.08 - 3.23	0.3	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias <= +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty > 2, i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias > +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty <= 2, i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias <= +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty > 2, i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias > +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty <= 2, i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2%<=RP<=15%

ACCEPTABLE WITH WARNING.....15%<RP<=30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34

(NRL99) Environmental Radioactivity - National Centre for Radiation Science

PO Box 29181

Christchurch, Christchurch 8540

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.679	0.673	A		0.9	0.202 - 1.144	0.076	A
Gross beta	1.94	2.15	A		-9.8	1.08 - 3.23	0.17	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (ODHL01) Ohio Department of Health Laboratory  
 8995 E Main Street  
 Reynoldsburg, OH 43068

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	.93	0.673	A		38.2	0.202 - 1.144	.11	A
Gross beta	2.30	2.15	A		7.0	1.08 - 3.23	0.14	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34

(ORIS01) ORISE/IEAV

PO Box 117

Oak Ridge, TN 37831-0117

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.721	0.673	A		7.1	0.202 - 1.144	0.043	A
Gross beta	2.257	2.15	A		5.0	1.08 - 3.23	0.096	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (OTLI01) Outreach Laboratory, a Division of ESC Lab Sciences  
 311 N. Aspen  
 Broken Arrow, OK 74012-

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.651	0.673	A		-3.3	0.202 - 1.144	0.070	A
Gross beta	1.83	2.15	A		-14.9	1.08 - 3.23	.076	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34

(QUAN01) TestAmerica St. Louis

13715 Rider Trail North

Earth City, MO 63045-1205

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.655	0.673	A		-2.7	0.202 - 1.144	0.0675	A
Gross beta	2.07	2.15	A		-3.7	1.08 - 3.23	0.114	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (QUAN03) TestAmerica Laboratories - Richland  
 2800 GEORGE WASHINGTON WAY  
 RICHLAND, WA 99354-

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	.601	0.673	A		-10.7	0.202 - 1.144	.0786	A
Gross beta	2.54	2.15	A		18.1	1.08 - 3.23	.164	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (RAVR99) Radiactividad Ambiental y Vigilancia Radiologica  
 CIEMAT (Ed 70 P2 D11)  
 Madrid, Madrid 28040

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.615	0.673	A		-8.6	0.202 - 1.144	0.044	A
Gross beta	2.16	2.15	A		0.5	1.08 - 3.23	0.08	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

- NOT ACCEPTABLE.....RP<2%
- ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%
- ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%
- NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (RPSC01) Radiation Protection Service  
 Ontario Ministry of Labour  
 Weston, Ontario M9P 3T1

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.8	0.673	A		18.9	0.202 - 1.144	0.16	W
Gross beta	1.62	2.15	A		-24.7	1.08 - 3.23	0.16	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (SANC99) RadioAnalysis, South Africa Nuclear Energy Corp.  
 Sample Receipt Gate 1  
 Pretoria, Gauteng 0001

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.14	0.673	N		-79.2	0.202 - 1.144	0.14	N
Gross beta	2.34	2.15	A		8.8	1.08 - 3.23	0.24	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (SEML01) SRS Environmental Monitoring Laboratory  
 Bldg 735-B  
 Aiken, SC 29808

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.64	0.673	A		-4.9	0.202 - 1.144	0.145	W
Gross beta	2.24	2.15	A		4.2	1.08 - 3.23	0.22	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

- NOT ACCEPTABLE.....RP<2%
- ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%
- ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%
- NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (SNRC99) Soreq NRC  
 Radioactivity Measurement Section  
 Yavne, Israel 81800

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.68	0.673	A		1.0	0.202 - 1.144	0.13	W
Gross beta	2.50	2.15	A		16.3	1.08 - 3.23	0.22	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (SOUT01) Southwest Research Institute  
 6220 Culebra Rd.  
 San Antonio, TX 78228-0510

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.548	0.673	A		-18.6	0.202 - 1.144	0.0674	A
Gross beta	2.10	2.15	A		-2.3	1.08 - 3.23	0.150	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (TDHL01) Texas Department of State Health Services Laboratory  
 1100 W 49th Street  
 Austin, TX 78756

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.596	0.673	A		-11.4	0.202 - 1.144	0.041	A
Gross beta	2.211	2.15	A		2.8	1.08 - 3.23	0.073	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (TELE02) ATI Environmental, Inc., Midwest Lab  
 700 Landwehr Road  
 Northbrook, IL 60062-

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.60	0.673	A		-10.8	0.202 - 1.144	0.05	A
Gross beta	2.10	2.15	A		-2.3	1.08 - 3.23	0.06	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (TMAO01) EBERLINE SERVICES OAK RIDGE LABORATORY  
 601 SCARBORO RD  
 OAK RIDGE, TN 37830-

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.939	0.673	A		39.5	0.202 - 1.144	0.184	W
Gross beta	2.191	2.15	A		1.9	1.08 - 3.23	0.188	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (TNUT01) St. Louis USACE FUSRAP Laboratory  
 8945 LATTY AVE  
 BERKELEY, MO 63134-

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.6830	0.673	A		1.5	0.202 - 1.144	0.0843	A
Gross beta	3.0737	2.15	A		43.0	1.08 - 3.23	.4381	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (ULFM99) University of La Laguna FISICA Medica  
 Faculty of Medicine -Univ. of La Laguna  
 Tenerife, Canary Islands 38296

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.578	0.673	A		-14.1	0.202 - 1.144	0.037	A
Gross beta	2.19	2.15	A		1.9	1.08 - 3.23	0.07	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (UPVL99) Lab Radiactividad Ambiental. Univ. Politecnica Valencia  
 CAMINO DE VERA, 14  
 VALENCIA, VALENCIA 46022

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.65	0.673	A		-3.4	0.202 - 1.144	0.04	A
Gross beta	2.2	2.15	A		2.3	1.08 - 3.23	0.1	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (WEST04) PACE ANALYTICAL SERVICES, PITTSBURGH  
 1638 Roseytown Road  
 Greensburg, PA 15601

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	.714	0.673	A		6.1	0.202 - 1.144	.176	W
Gross beta	1.73	2.15	A		-19.5	1.08 - 3.23	.333	W

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (WSHL01) Wisconsin State Laboratory of Hygiene  
 2601 Agriculture Drive  
 Madison, WI 53718

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	.718	0.673	A		6.7	0.202 - 1.144	.0563	A
Gross beta	2.209	2.15	A		2.7	1.08 - 3.23	.0608	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision



Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-16-GrW34  
 (WVDP01) WVDP Environmental Laboratory  
 10282 Rock Springs Road  
 West Valley, NY 14171

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.564	0.673	A		-16.2	0.202 - 1.144	0.110	W
Gross beta	2.35	2.15	A		9.3	1.08 - 3.23	0.113	A

Radiological Reference Date: February 1, 2016

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq$  +/- 70% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 70% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Gross Beta Flags:**

A = Result acceptable, Bias  $\leq$  +/- 50% with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $>$  +/- 50% or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

**Uncertainty Flags:**

NOT ACCEPTABLE.....RP<2%

ACCEPTABLE.....2% $\leq$ RP $\leq$ 15%

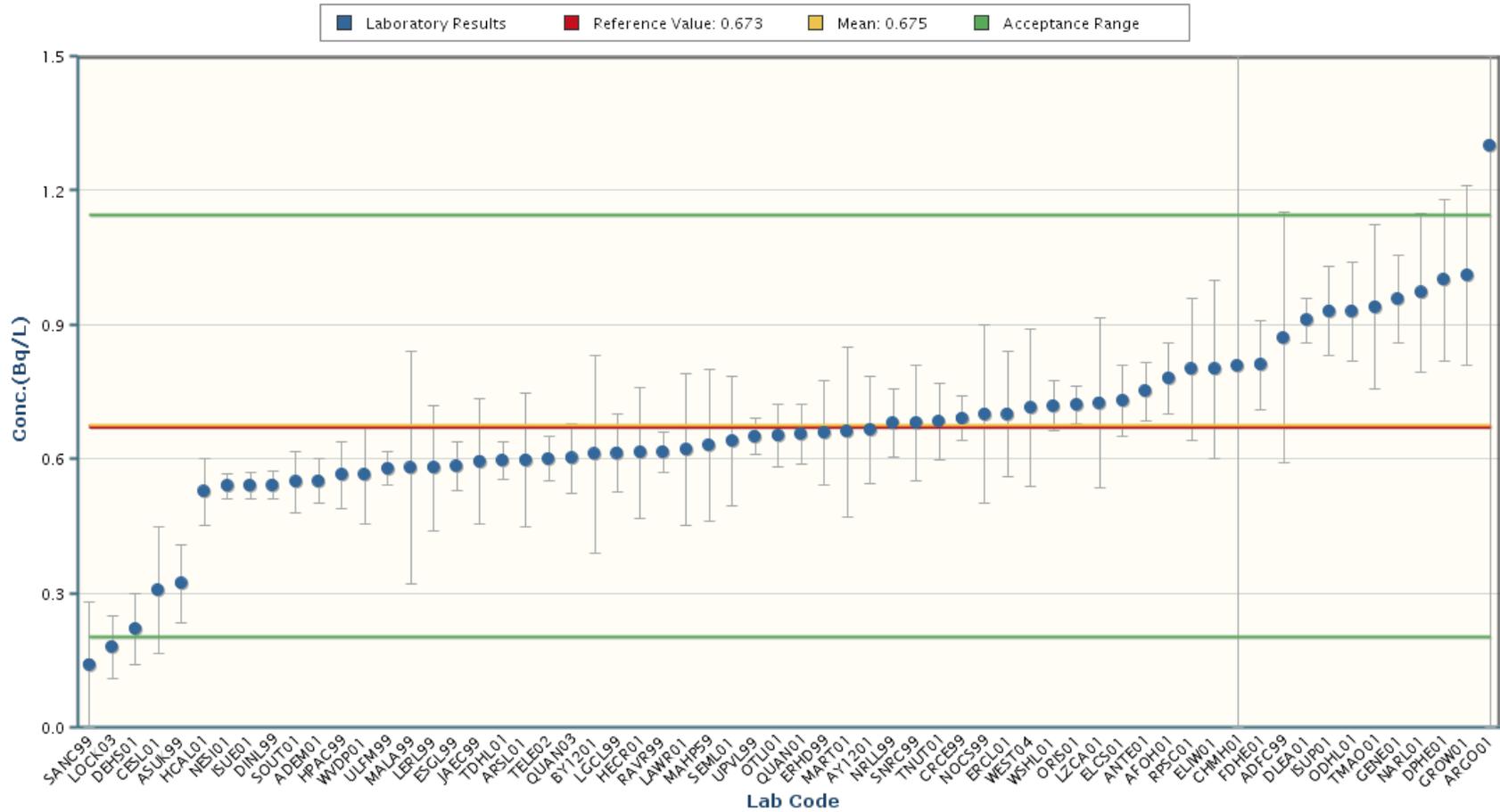
ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision

# Gross alpha

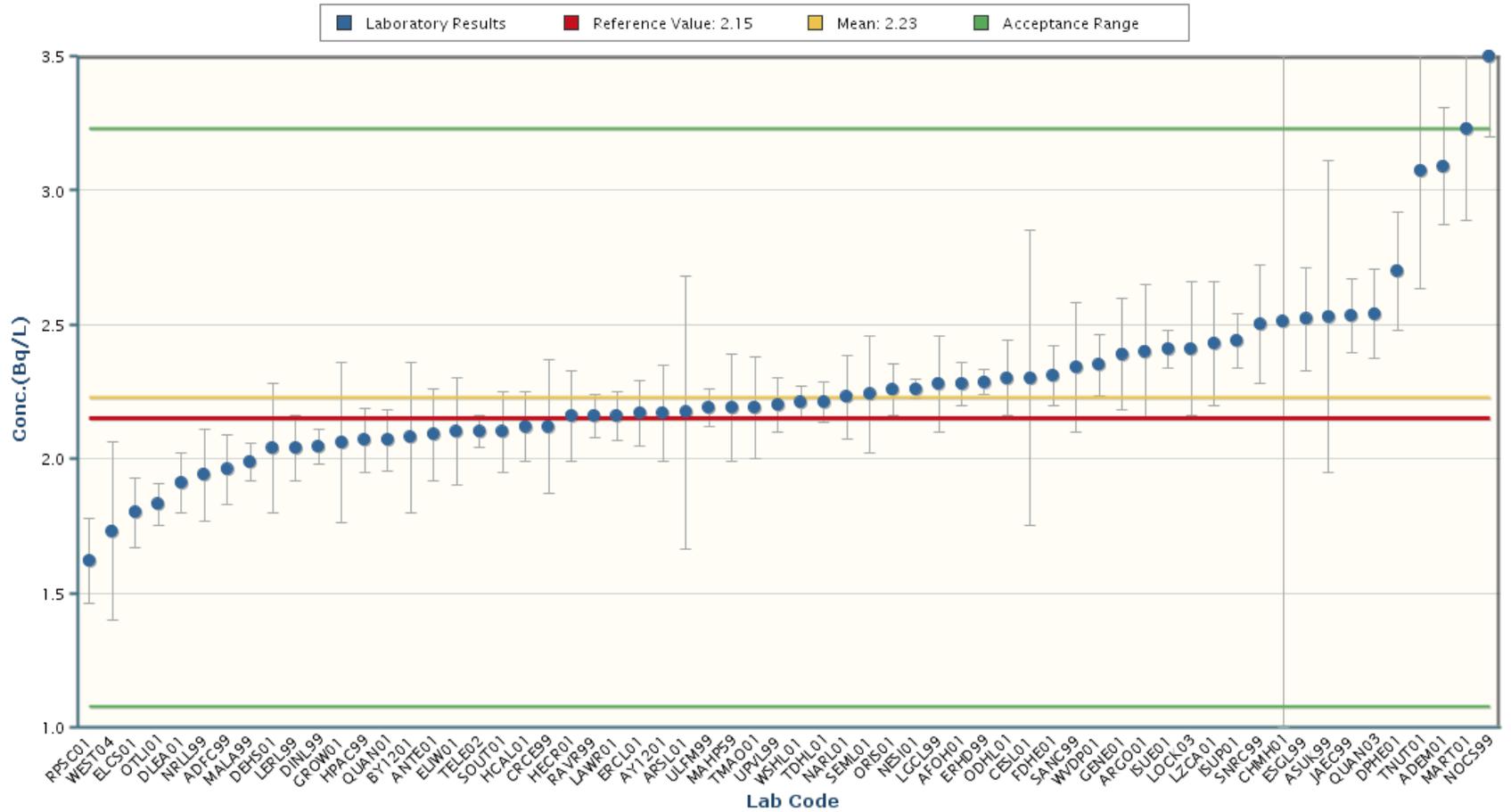
## MAPEP-16-GrW34



Notes:  
The chart shows only data points with values between -0.120 and 1.470 ( $\pm 5$  Standard Deviations).

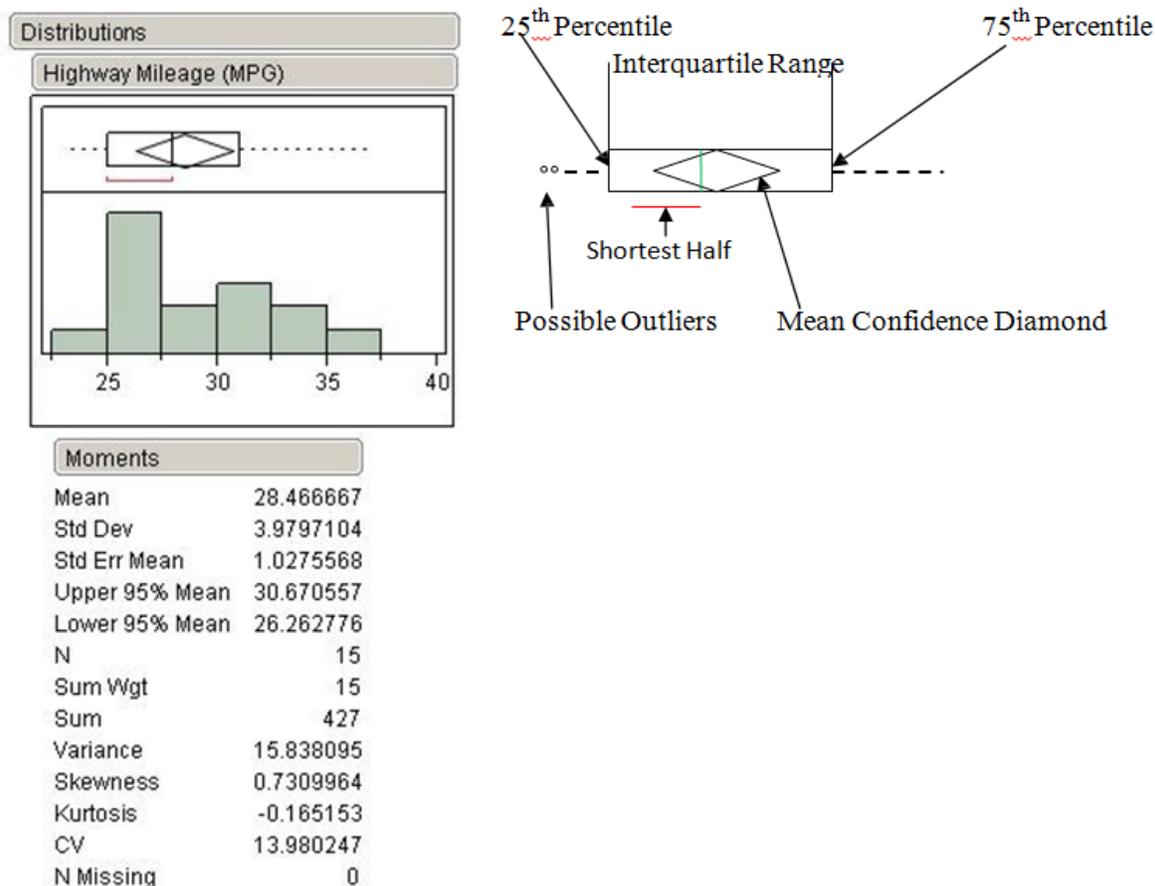
# Gross beta

## MAPEP-16-GrW34



Notes:  
The chart shows only data points with values between 0.92 and 3.54 ( $\pm 5$  Standard Deviations).

The intent of the distribution graphs contained within this report is to graphically demonstrate to users how % Bias data within the current MAPEP Series appears when examined by matrix, by analyte, by method of sample preparation or by method of detection. The data points (small 'dots') plot the bias (or z-score for organic constituents) of each of the analytes in each of the matrices. Biases greater than +/- 100% have been screened from the data. The BLACK small vertical line inside the small rectangle at the top of the data distribution graph is the mean of the population of the bias shown for that analyte in the matrix.



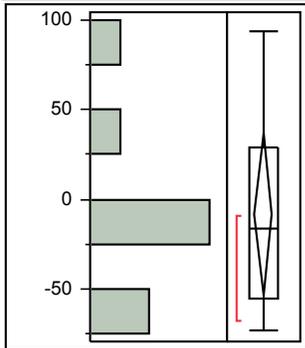
The box plots summarize the distribution of points for each analyte. The ends of the box are the 25th and 75th quantiles. The difference between the quartiles is the interquartile range. The line across the middle of the box identifies the median bias value. Each box has lines, sometimes called whiskers, which extend from each end. The whiskers extend from the ends of the small box to the outermost data point that falls within the distances computed. The bracket along the edge of the box identified the shortest half, which is the most dense 50% of the observations. Potential outliers are represented as small black dots.

The box plot of the bias data points and the mean visually illustrate the breadth of the distribution and where potential outliers in the distribution might lie. The moments for the distribution plot are provided below the Bias plot. In some cases, N becomes very small and thus developed statistics may not accurately reflect estimates of the population if N were a significantly larger value.

### GrW Distribution by Detection Method

Distributions Analyte\_Detection=Gross alpha  
Beta Counting - 2 pi gas flow proportional counter

#### Bias



#### Quantiles

100.0%	maximum	93.2
99.5%		93.2
97.5%		93.2
90.0%		93.2
75.0%	quartile	29.3
50.0%	median	-16.2
25.0%	quartile	-55.4
10.0%		-73.3
2.5%		-73.3
0.5%		-73.3
0.0%	minimum	-73.3

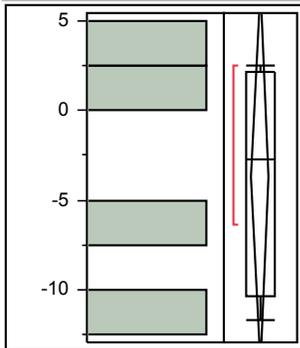
#### Summary Statistics

Mean	-8.3
Std Dev	54.5
Std Err Mean	19.3
Upper 95% Mean	37.3
Lower 95% Mean	-53.9
N	8.0

**GrW Distribution by Detection Method**

**Distributions Analyte\_Detection=Gross alpha  
Beta Counting - liquid scintillation counter**

**Bias**



**Quantiles**

100.0%	maximum	2.5
99.5%		2.5
97.5%		2.5
90.0%		2.5
75.0%	quartile	2.1
50.0%	median	-2.8
25.0%	quartile	-10.4
10.0%		-11.7
2.5%		-11.7
0.5%		-11.7
0.0%	minimum	-11.7

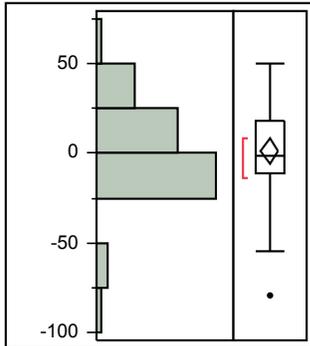
**Summary Statistics**

Mean	-3.7
Std Dev	6.6
Std Err Mean	3.3
Upper 95% Mean	6.8
Lower 95% Mean	-14.2
N	4.0

**GrW Distribution by Detection Method**

Distributions Analyte\_Detection=Gross alpha Gross  
Alpha/Beta - 2 pi gas flow proportional counter

**Bias**



**Quantiles**

100.0%	maximum	50.1
99.5%		50.1
97.5%		49.8
90.0%		38.3
75.0%	quartile	18.2
50.0%	median	-1.6
25.0%	quartile	-11.4
10.0%		-20.1
2.5%		-73.6
0.5%		-79.2
0.0%	minimum	-79.2

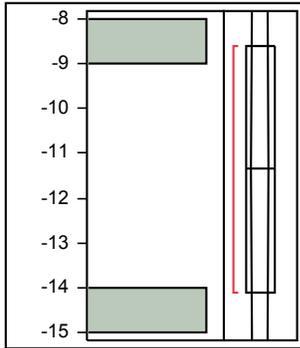
**Summary Statistics**

Mean	1.3
Std Dev	25.6
Std Err Mean	3.7
Upper 95% Mean	8.7
Lower 95% Mean	-6.2
N	48.0

**GrW Distribution by Detection Method**

**Distributions**  
Analyte\_Detection=Gross alpha Other

**Bias**



**Quantiles**

100.0%	maximum	-8.6
99.5%		-8.6
97.5%		-8.6
90.0%		-8.6
75.0%	quartile	-8.6
50.0%	median	-11.4
25.0%	quartile	-14.1
10.0%		-14.1
2.5%		-14.1
0.5%		-14.1
0.0%	minimum	-14.1

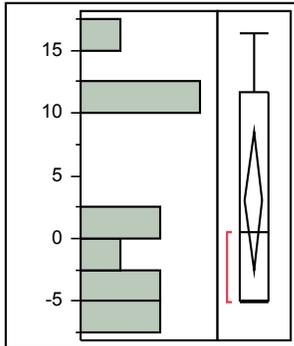
**Summary Statistics**

Mean	-11.4
Std Dev	3.9
Std Err Mean	2.8
Upper 95% Mean	23.6
Lower 95% Mean	-46.3
N	2.0

## GrW Distribution by Detection Method

Distributions Analyte\_Detection=Gross beta Beta  
Counting - 2 pi gas flow proportional counter

### Bias



### Quantiles

100.0%	maximum	16.3
99.5%		16.3
97.5%		16.3
90.0%		15.5
75.0%	quartile	11.6
50.0%	median	0.5
25.0%	quartile	-4.9
10.0%		-5.1
2.5%		-5.1
0.5%		-5.1
0.0%	minimum	-5.1

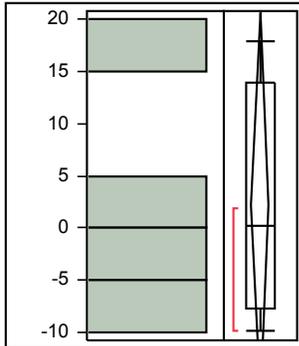
### Summary Statistics

Mean	3.0
Std Dev	8.2
Std Err Mean	2.5
Upper 95% Mean	8.5
Lower 95% Mean	-2.5
N	11.0

## GrW Distribution by Detection Method

Distributions Analyte\_Detection=Gross beta  
Beta Counting - liquid scintillation counter

### Bias



### Quantiles

100.0%	maximum	17.8
99.5%		17.8
97.5%		17.8
90.0%		17.8
75.0%	quartile	13.8
50.0%	median	0.3
25.0%	quartile	-7.7
10.0%		-9.8
2.5%		-9.8
0.5%		-9.8
0.0%	minimum	-9.8

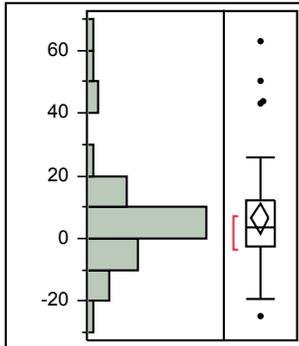
### Summary Statistics

Mean	2.1
Std Dev	11.6
Std Err Mean	5.8
Upper 95% Mean	20.5
Lower 95% Mean	-16.3
N	4.0

## GrW Distribution by Detection Method

Distributions Analyte\_Detection=Gross beta Gross  
Alpha/Beta - 2 pi gas flow proportional counter

### Bias



### Quantiles

100.0%	maximum	62.8
99.5%		62.8
97.5%		60.3
90.0%		29.1
75.0%	quartile	12.1
50.0%	median	3.7
25.0%	quartile	-2.3
10.0%		-11.9
2.5%		-23.7
0.5%		-24.7
0.0%	minimum	-24.7

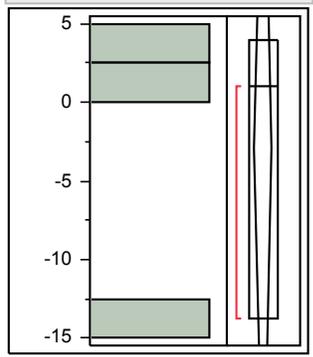
### Summary Statistics

Mean	6.4
Std Dev	16.8
Std Err Mean	2.5
Upper 95% Mean	11.3
Lower 95% Mean	1.4
N	47.0

**GrW Distribution by Prep Method**

Distributions Analyte\_Method=Gross  
alpha Coprecipitation, acidified

**Bias**



**Quantiles**

100.0%	maximum	4.0
99.5%		4.0
97.5%		4.0
90.0%		4.0
75.0%	quartile	4.0
50.0%	median	1.0
25.0%	quartile	-13.8
10.0%		-13.8
2.5%		-13.8
0.5%		-13.8
0.0%	minimum	-13.8

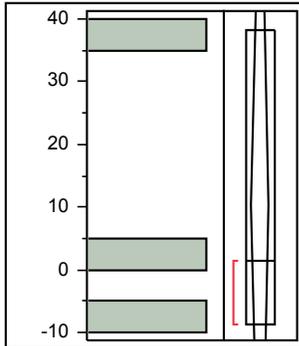
**Summary Statistics**

Mean	-2.9
Std Dev	9.5
Std Err Mean	5.5
Upper 95% Mean	20.7
Lower 95% Mean	-26.6
N	3.0

## GrW Distribution by Prep Method

Distributions Analyte\_Method=Gross  
alpha Coprecipitation, straight

### Bias



### Quantiles

100.0%	maximum	38.2
99.5%		38.2
97.5%		38.2
90.0%		38.2
75.0%	quartile	38.2
50.0%	median	1.5
25.0%	quartile	-8.6
10.0%		-8.6
2.5%		-8.6
0.5%		-8.6
0.0%	minimum	-8.6

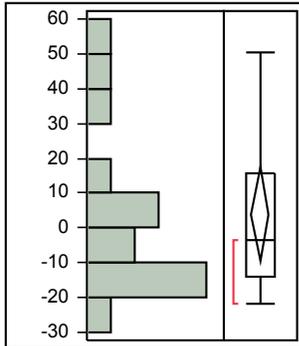
### Summary Statistics

Mean	10.4
Std Dev	24.6
Std Err Mean	14.2
Upper 95% Mean	71.5
Lower 95% Mean	-50.8
N	3.0

## GrW Distribution by Prep Method

Distributions Analyte\_Method=Gross alpha EPA 900,  
Radioactivity, Gross Alpha/Beta Screening, 600/4-80-032

### Bias



### Quantiles

100.0%	maximum	50.1
99.5%		50.1
97.5%		50.1
90.0%		49.2
75.0%	quartile	15.9
50.0%	median	-3.3
25.0%	quartile	-14.0
10.0%		-20.7
2.5%		-21.8
0.5%		-21.8
0.0%	minimum	-21.8

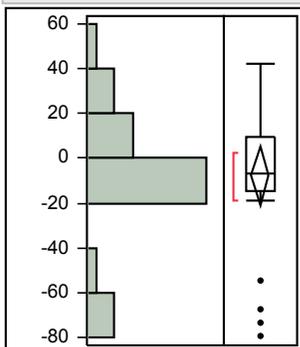
### Summary Statistics

Mean	4.0
Std Dev	24.0
Std Err Mean	6.2
Upper 95% Mean	17.3
Lower 95% Mean	-9.3
N	15.0

## GrW Distribution by Prep Method

Distributions Analyte\_Method=Gross  
alpha Evaporation, acidified

### Bias



### Quantiles

100.0%	maximum	42.2
99.5%		42.2
97.5%		42.2
90.0%		38.6
75.0%	quartile	9.3
50.0%	median	-6.9
25.0%	quartile	-14.6
10.0%		-69.1
2.5%		-79.2
0.5%		-79.2
0.0%	minimum	-79.2

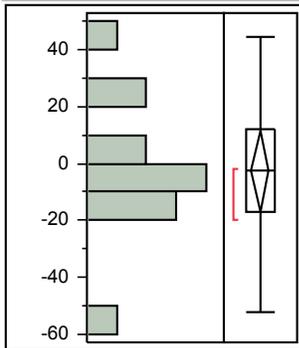
### Summary Statistics

Mean	-7.8
Std Dev	31.9
Std Err Mean	6.3
Upper 95% Mean	5.1
Lower 95% Mean	-20.7
N	26.0

## GrW Distribution by Prep Method

Distributions Analyte\_Method=Gross  
alpha Evaporation, straight

### Bias



### Quantiles

100.0%	maximum	44.3
99.5%		44.3
97.5%		44.3
90.0%		34.7
75.0%	quartile	12.1
50.0%	median	-2.7
25.0%	quartile	-17.3
10.0%		-39.2
2.5%		-52.3
0.5%		-52.3
0.0%	minimum	-52.3

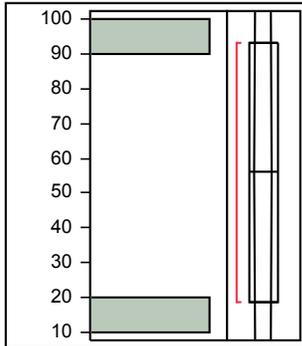
### Summary Statistics

Mean	-2.8
Std Dev	23.3
Std Err Mean	6.5
Upper 95% Mean	11.3
Lower 95% Mean	-16.9
N	13.0

## GrW Distribution by Prep Method

Distributions Analyte\_Method=Gross alpha  
No preparation - analyzed as received

### Bias



### Quantiles

100.0%	maximum	93.2
99.5%		93.2
97.5%		93.2
90.0%		93.2
75.0%	quartile	93.2
50.0%	median	56.1
25.0%	quartile	18.9
10.0%		18.9
2.5%		18.9
0.5%		18.9
0.0%	minimum	18.9

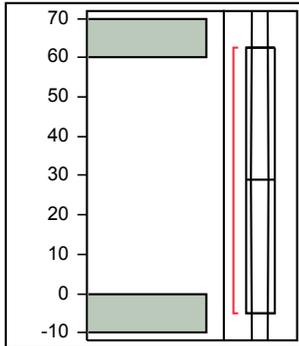
### Summary Statistics

Mean	56.1
Std Dev	52.5
Std Err Mean	37.2
Upper 95% Mean	528.1
Lower 95% Mean	-416.0
N	2.0

## GrW Distribution by Prep Method

Distributions Analyte\_Method=Gross  
beta Coprecipitation, acidified

### Bias



### Quantiles

100.0%	maximum	62.8
99.5%		62.8
97.5%		62.8
90.0%		62.8
75.0%	quartile	62.8
50.0%	median	28.9
25.0%	quartile	-5.1
10.0%		-5.1
2.5%		-5.1
0.5%		-5.1
0.0%	minimum	-5.1

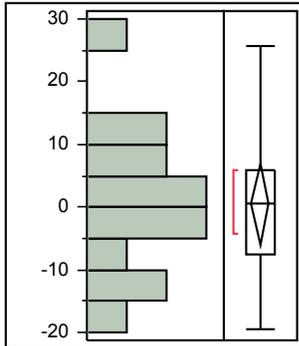
### Summary Statistics

Mean	28.9
Std Dev	48.0
Std Err Mean	34.0
Upper 95% Mean	460.2
Lower 95% Mean	-402.5
N	2.0

## GrW Distribution by Prep Method

Distributions Analyte\_Method=Gross beta EPA 900,  
Radioactivity, Gross Alpha/Beta Screening, 600/4-80-032

### Bias



### Quantiles

100.0%	maximum	25.6
99.5%		25.6
97.5%		25.6
90.0%		18.0
75.0%	quartile	6.0
50.0%	median	0.5
25.0%	quartile	-7.6
10.0%		-16.7
2.5%		-19.5
0.5%		-19.5
0.0%	minimum	-19.5

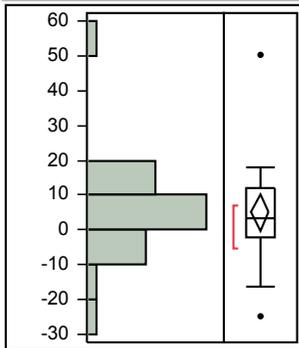
### Summary Statistics

Mean	0.4
Std Dev	11.5
Std Err Mean	3.0
Upper 95% Mean	6.8
Lower 95% Mean	-5.9
N	15.0

## GrW Distribution by Prep Method

Distributions Analyte\_Method=Gross  
beta Evaporation, acidified

### Bias



### Quantiles

100.0%	maximum	50.2
99.5%		50.2
97.5%		50.2
90.0%		17.8
75.0%	quartile	11.9
50.0%	median	3.3
25.0%	quartile	-2.1
10.0%		-9.5
2.5%		-24.7
0.5%		-24.7
0.0%	minimum	-24.7

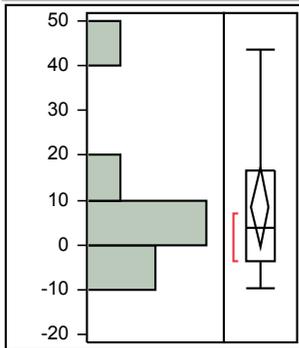
### Summary Statistics

Mean	5.0
Std Dev	13.3
Std Err Mean	2.5
Upper 95% Mean	10.2
Lower 95% Mean	-0.1
N	28.0

## GrW Distribution by Prep Method

Distributions Analyte\_Method=Gross  
beta Evaporation, straight

### Bias



### Quantiles

100.0%	maximum	43.7
99.5%		43.7
97.5%		43.7
90.0%		43.3
75.0%	quartile	16.7
50.0%	median	3.7
25.0%	quartile	-3.7
10.0%		-6.9
2.5%		-9.8
0.5%		-9.8
0.0%	minimum	-9.8

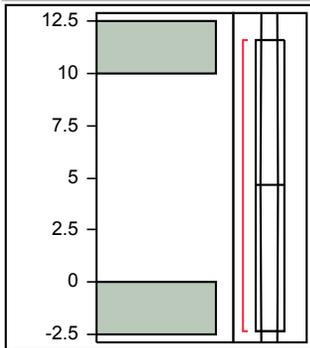
### Summary Statistics

Mean	8.4
Std Dev	16.0
Std Err Mean	4.1
Upper 95% Mean	17.3
Lower 95% Mean	-0.4
N	15.0

**GrW Distribution by Prep Method**

**Distributions Analyte\_Method=Gross beta  
No preparation - analyzed as received**

**Bias**



**Quantiles**

100.0%	maximum	11.6
99.5%		11.6
97.5%		11.6
90.0%		11.6
75.0%	quartile	11.6
50.0%	median	4.7
25.0%	quartile	-2.3
10.0%		-2.3
2.5%		-2.3
0.5%		-2.3
0.0%	minimum	-2.3

**Summary Statistics**

Mean	4.7
Std Dev	9.8
Std Err Mean	7.0
Upper 95% Mean	93.0
Lower 95% Mean	-83.7
N	2.0