

## **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.

## GrF43 Participating Laboratories

<b>Lab Code</b>	<b>Lab Name</b>	<b>Matrix Code</b>
ADEM01	Alabama Department of Environmental Management	GrF
AFOH01	USAFSAM/OEA	GrF
ARGO01	Idaho National Laboratory	GrF
ARPL01	Analytical Support Operations - Radiochemical Processing Lab	GrF
ARSA01	ARS Aleut Analytical, LLC (Luckey)	GrF
ARSL01	ARS Aleut Analytical, LLC	GrF
CDHS01	California Department of Public Health	GrF
CMRC01	Carlsbad Environmental Monitoring and Research Center	GrF
DEHS01	Department of Environmental Health & Safety	GrF
DLEA01	DLE Associates	GrF
ERCL01	Washington State Public Health Laboratories	GrF
ERHD99	Radiation Protection Bureau Health Canada RSD NMS	GrF
FDHE01	Florida Dept of Health Environmental Laboratory	GrF
FDOH01	Florida Dept. of Health, Mobile Environmental Radiological Lab	GrF
GENE01	GEL Laboratories, LLC	GrF
HECR01	SC Dept. Health and Environmental Control Radiological Laboratory	GrF
HPAL01	Los Alamos National Laboratory	GrF
IEMA01	Illinois Emergency Management Agency Radiochemistry Laboratory	GrF
ISUP01	ISU - Department of Physics/Health Physics/EAL	GrF
JAEC99	Research Laboratories and Information Directorate	GrF
JLNN01	Jefferson Laboratory	GrF
KSCF01	Kennedy Space Center, HP Laboratory	GrF
MALA99	Alypz Sdn. Bhd.	GrF
MART03	Radioactive Material Analysis Laboratory	GrF
MDPH01	MDPH-Radiation Control Program	GrF
NESI01	BWXT-Radioisotope & Analytical Chemistry Laboratory	GrF
ODHL01	Ohio Department of Health Laboratory	GrF
ORIS01	ORISE/IEAV	GrF
RAVR99	Radiactividad Ambiental y Vigilancia Radiologica	GrF
SEML01	SRS Environmental Monitoring Laboratory	GrF
SOUT01	Southwest Research Institute	GrF
TDHL01	Texas Department of State Health Services Laboratory	GrF
TELE01	Teledyne Brown Engineering - Environmental Services	GrF
TELE02	ATI Environmental, Inc., Midwest Lab	GrF
TMAO01	EBERLINE SERVICES OAK RIDGE LABORATORY	GrF
TNUT01	St. Louis USACE FUSRAP Laboratory	GrF
WEST04	PACE ANALYTICAL SERVICES, PITTSBURGH	GrF
WSHL01	Wisconsin State Laboratory of Hygiene	GrF
WSTP99	Cavendish Nuclear Limited	GrF

## Laboratories Not Reporting

<b>Lab Code</b>	<b>Lab Name</b>	<b>Matrix Code</b>
LAWR01	LAWRENCE BERKELEY NATIONAL LABORATORY	GrF
MSDH01	Mississippi State Dept of Health	GrF
NARL02	USEPA - NAREL - MERL	GrF
NJDH01	New Jersey Dept. of Health, PHEL, ECLS	GrF
SRPD01	Sandia National Laboratories, Radiation Protection Sample Diagnostics	GrF

## Study Reference Values

MAPEP-20-GrF43

*Radiological Reference Date: 08/01/2020*

Analyte	Ref Value	Ref Unc
Radiological	Units: (Bq/sample)	
Gross alpha	0.528	0.017
Gross beta	0.915	0.016

# Sample Statistical Summary

MAPEP-20-GrF43

Radiological Reference Date: 08/01/2020

Analyte	T(1)	A(2)	Grand(3) Mean	Std Dev	Ref Value	Ref Unc	Acceptance Range
Radiological							Units: (Bq/sample)
Gross alpha	38	37	0.442	0.189	0.528	0.017	0.158 - 0.898
Gross beta	39	37	0.931	0.080	0.915	0.016	0.458 - 1.373

- 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

## Flag Summary Report

MAPEP-20-GrF43

Radiological				
Analyte	A	W	RW	N
Gross alpha	37			1
Gross beta	37			2



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

Laboratory Results For MAPEP-20-GrF43  
 (ADEM01) Alabama Department of Environmental Management  
 1350 Coliseum Blvd.  
 Montgomery, Alabama 36110

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	NR	0.528				0.158 - 0.898		
Gross beta	0.96644	0.915	A		5.6	0.458 - 1.373	0.037962	A

*Radiological Reference Date: August 1, 2020*

**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-20-GrF43*

(AFOH01) USAFSAM/OEA

2510 Fifth Street, Area B

Wright-Patterson AFB, OH 45433-7913

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.73	0.528	A		38.3	0.158 - 0.898	0.11	W
Gross beta	0.920	0.915	A		0.5	0.458 - 1.373	0.055	A

*Radiological Reference Date: August 1, 2020*

**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-20-GrF43*

(ARGO01) Idaho National Laboratory  
 INL, Materials and Fuels Complex  
 Idaho Falls, ID 83415

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.590	0.528	A		11.7	0.158 - 0.898	0.018	A
Gross beta	0.918	0.915	A		0.3	0.458 - 1.373	0.028	A

*Radiological Reference Date: August 1, 2020*

**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-20-GrF43*

(ARPL01) Analytical Support Operations - Radiochemical Processing Lab

PO Box 999

Richland, WA 99354

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.208	0.528	A		-60.6	0.158 - 0.898	0.010	A
Gross beta	0.866	0.915	A		-5.4	0.458 - 1.373	0.031	A

*Radiological Reference Date: August 1, 2020*

**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-20-GrF43  
 (ARSA01) ARS Aleut Analytical, LLC (Luckey)  
 21200 Luckey Rd.  
 Luckey, OH 43443

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.284	0.528	A		-46.2	0.158 - 0.898	0.014	A
Gross beta	0.881	0.915	A		-3.7	0.458 - 1.373	0.035	A

Radiological Reference Date: August 1, 2020

**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-20-GrF43*

(ARSL01) ARS Aleut Analytical, LLC

2609 North River Road

Port Allen, LA 70767

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	.318	0.528	A		-39.8	0.158 - 0.898	.038	A
Gross beta	.990	0.915	A		8.2	0.458 - 1.373	.118	A

*Radiological Reference Date: August 1, 2020*

**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-20-GrF43  
 (CDHS01) California Department of Public Health  
 Drinking Water & Radiation Lab.  
 Richmond, CA 94804-6403

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.319	0.528	A		-39.6	0.158 - 0.898	0.0140	A
Gross beta	0.984	0.915	A		7.5	0.458 - 1.373	0.0150	N

Radiological Reference Date: August 1, 2020

**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-20-GrF43  
 (CMRC01) Carlsbad Environmental Monitoring and Research Center  
 1400 University Dr.  
 Carlsbad, NM 88220

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.291	0.528	A		-44.9	0.158 - 0.898	0.008	A
Gross beta	0.998	0.915	A		9.1	0.458 - 1.373	0.025	A

Radiological Reference Date: August 1, 2020

**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-20-GrF43  
 (DEHS01) Department of Environmental Health & Safety  
 North Carolina State Univ.  
 Raleigh, NC 27695-8007

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.37	0.528	A		-29.9	0.158 - 0.898	0.02	A
Gross beta	0.94	0.915	A		2.7	0.458 - 1.373	0.04	A

Radiological Reference Date: August 1, 2020

**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-20-GrF43*

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

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.85	0.528	A		61.0	0.158 - 0.898	0.10	A
Gross beta	0.94	0.915	A		2.7	0.458 - 1.373	0.07	A

*Radiological Reference Date: August 1, 2020*

**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-20-GrF43  
 (ERCL01) Washington State Public Health Laboratories  
 1610 N.E. 150th Street  
 Shoreline, WA 98155-9701

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.148	0.528	N		-72.0	0.158 - 0.898	0.017	A
Gross beta	0.910	0.915	A		-0.5	0.458 - 1.373	0.024	A

Radiological Reference Date: August 1, 2020

**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-20-GrF43  
 (ERHD99) Radiation Protection Bureau Health Canada RSD NMS  
 775 Brookfield Road AL6302D1  
 Ottawa, Ontario K1A 1C1

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.3005	0.528	A		-43.1	0.158 - 0.898	0.0206	A
Gross beta	0.9131	0.915	A		-0.2	0.458 - 1.373	0.0185	A

Radiological Reference Date: August 1, 2020

**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-20-GrF43**

(FDHE01) Florida Dept of Health Environmental Laboratory  
 PO Box 680069  
 Orlando, FL 32868-0069

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.549	0.528	A		4.0	0.158 - 0.898	0.023	A
Gross beta	1.022	0.915	A		11.7	0.458 - 1.373	0.020	N

*Radiological Reference Date: August 1, 2020*

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq \pm 70\%$  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  $> \pm 70\%$  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  $\leq \pm 50\%$  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  $> \pm 50\%$  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-20-GrF43**

(FDOH01) Florida Dept. of Health, Mobile Environmental Radiological Lab  
 PO Box 680069  
 Orlando, FL 32868-0069

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.71	0.528	A		34.5	0.158 - 0.898	0.01	N
Gross beta	0.9	0.915	A		-1.6	0.458 - 1.373	0.04	A

*Radiological Reference Date: August 1, 2020*

**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-20-GrF43  
 (GENE01) GEL Laboratories, LLC  
 2040 Savage Road  
 Charleston, SC 29407

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.611	0.528	A		15.7	0.158 - 0.898	0.129	W
Gross beta	0.902	0.915	A		-1.4	0.458 - 1.373	0.0461	A

Radiological Reference Date: August 1, 2020

**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-20-GrF43**

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

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.209	0.528	A		-60.4	0.158 - 0.898	0.0373	W
Gross beta	0.945	0.915	A		3.3	0.458 - 1.373	0.0574	A

*Radiological Reference Date: August 1, 2020*

**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-20-GrF43  
 (HPAL01) Los Alamos National Laboratory  
 Milan Gadd, MS G761  
 Los Alamos, NM 87545-1663

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.63	0.528	A		19.3	0.158 - 0.898	0.12	W
Gross beta	0.97	0.915	A		6.0	0.458 - 1.373	0.08	A

Radiological Reference Date: August 1, 2020

**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-20-GrF43**

(IEMA01) Illinois Emergency Management Agency Radiochemistry Laboratory  
 1301 Knotts St.  
 Springfield, IL 62703

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.226	0.528	A		-57.2	0.158 - 0.898	0.017	A
Gross beta	0.955	0.915	A		4.4	0.458 - 1.373	0.015	N

*Radiological Reference Date: August 1, 2020*

**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-20-GrF43**

(ISUP01) ISU - Department of Physics/Health Physics/EAL  
 785 S. 8th Ave, Rm 120  
 Pocatello, ID 83209-8106

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	.38	0.528	A		-28.0	0.158 - 0.898	.02	A
Gross beta	.81	0.915	A		-11.5	0.458 - 1.373	.02	A

*Radiological Reference Date: August 1, 2020*

**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-20-GrF43  
 (JAEC99) Research Laboratories and Information Directorate  
 Jordan Atomic Energy Commission  
 Amman, Jordan 70 (11934)

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.215	0.528	A		-59.3	0.158 - 0.898	0.015	A
Gross beta	1.611	0.915	N		76.1	0.458 - 1.373	0.06	A

Radiological Reference Date: August 1, 2020

**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-20-GrF43**

(JLNN01) Jefferson Laboratory  
 111 Hadron Drive  
 Newport News, VA 23606

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.166	0.528	A		-68.6	0.158 - 0.898	0.0102	A
Gross beta	1.39	0.915	N		51.9	0.458 - 1.373	0.450	N

Radiological Reference Date: August 1, 2020

**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-20-GrF43  
 (KSCF01) Kennedy Space Center, HP Laboratory  
 NEM-022  
 Kennedy Space Center, FL 32899

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.1632	0.528	A		-69.1	0.158 - 0.898	0.0069	A
Gross beta	0.8668	0.915	A		-5.3	0.458 - 1.373	0.0292	A

Radiological Reference Date: August 1, 2020

**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-20-GrF43*

(MALA99) Alypz Sdn. Bhd.

No. 14, JLN USJ 1/1

Subang Jaya, Selangor 47600

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.372	0.528	A		-29.5	0.158 - 0.898	0.016	A
Gross beta	0.924	0.915	A		1.0	0.458 - 1.373	0.037	A

*Radiological Reference Date: August 1, 2020*

**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-20-GrF43  
 (MART03) Radioactive Material Analysis Laboratory  
 ORNL  
 Oak Ridge, TN 37830

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.318	0.528	A		-39.8	0.158 - 0.898	0.014	A
Gross beta	1.045	0.915	A		14.2	0.458 - 1.373	0.023	A

Radiological Reference Date: August 1, 2020

**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-20-GrF43  
 (MDPH01) MDPH-Radiation Control Program  
 MERL-Room 002  
 Jamaica Plain, MA 02130-3597

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.765	0.528	A		44.9	0.158 - 0.898	0.08	A
Gross beta	0.931	0.915	A		1.7	0.458 - 1.373	0.03	A

Radiological Reference Date: August 1, 2020

**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-20-GrF43  
 (NESI01) BWXT-Radioisotope & Analytical Chemistry Laboratory  
 Lynchburg Technology Center  
 Lynchburg, VA 24504-5447

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.333	0.528	A		-36.9	0.158 - 0.898	0.018	A
Gross beta	0.751	0.915	A		-17.9	0.458 - 1.373	0.009	N

Radiological Reference Date: August 1, 2020

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq \pm 70\%$  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  $> \pm 70\%$  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  $\leq \pm 50\%$  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  $> \pm 50\%$  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-20-GrF43  
 (ODHL01) Ohio Department of Health Laboratory  
 8995 E Main Street  
 Reynoldsburg, OH 43068

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.780	0.528	A		47.7	0.158 - 0.898	0.059	A
Gross beta	0.836	0.915	A		-8.6	0.458 - 1.373	0.020	A

Radiological Reference Date: August 1, 2020

**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-20-GrF43

(ORIS01) ORISE/IEAV

PO Box 117

Oak Ridge, TN 37831-0117

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.613	0.528	A		16.1	0.158 - 0.898	0.023	A
Gross beta	0.955	0.915	A		4.4	0.458 - 1.373	0.014	N

Radiological Reference Date: August 1, 2020

**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-20-GrF43  
 (RAVR99) Radiactividad Ambiental y Vigilancia Radiologica  
 CIEMAT (Ed 70 P2 D11)  
 Madrid, Madrid 28040

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.286	0.528	A		-45.8	0.158 - 0.898	0.031	A
Gross beta	0.772	0.915	A		-15.6	0.458 - 1.373	0.059	A

Radiological Reference Date: August 1, 2020

**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-20-GrF43  
 (SEML01) SRS Environmental Monitoring Laboratory  
 Bldg 735-B  
 Aiken, SC 29808

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.52	0.528	A		-1.5	0.158 - 0.898	0.02	A
Gross beta	0.96	0.915	A		4.9	0.458 - 1.373	0.03	A

Radiological Reference Date: August 1, 2020

**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-20-GrF43  
 (SOUT01) Southwest Research Institute  
 6220 Culebra Rd.  
 San Antonio, TX 78228-0510

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.448	0.528	A		-15.2	0.158 - 0.898	0.0937	W
Gross beta	0.837	0.915	A		-8.5	0.458 - 1.373	0.122	A

Radiological Reference Date: August 1, 2020

**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-20-GrF43  
 (TDHL01) Texas Department of State Health Services Laboratory  
 1100 W 49th Street  
 Austin, TX 78756

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.592	0.528	A		12.1	0.158 - 0.898	0.021	A
Gross beta	0.923	0.915	A		0.9	0.458 - 1.373	0.020	A

Radiological Reference Date: August 1, 2020

**Gross Alpha Flags:**

A = Result acceptable, Bias  $\leq \pm 70\%$  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  $> \pm 70\%$  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  $\leq \pm 50\%$  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  $> \pm 50\%$  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-20-GrF43  
 (TELE01) Teledyne Brown Engineering - Environmental Services  
 2508 Quality Lane  
 Knoxville, TN 37931-6819

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.267	0.528	A		-49.4	0.158 - 0.898	0.0391	A
Gross beta	0.939	0.915	A		2.6	0.458 - 1.373	0.0593	A

Radiological Reference Date: August 1, 2020

**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-20-GrF43  
 (TELE02) ATI Environmental, Inc., Midwest Lab  
 700 Landwehr Road  
 Northbrook, IL 60062-

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.45	0.528	A		-14.8	0.158 - 0.898	0.06	A
Gross beta	0.97	0.915	A		6.0	0.458 - 1.373	0.04	A

Radiological Reference Date: August 1, 2020

**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-20-GrF43  
 (TMAO01) EBERLINE SERVICES OAK RIDGE LABORATORY  
 601 SCARBORO RD  
 OAK RIDGE, TN 37830-

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	.414	0.528	A		-21.6	0.158 - 0.898	.022	A
Gross beta	1.052	0.915	A		15.0	0.458 - 1.373	.037	A

Radiological Reference Date: August 1, 2020

**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-20-GrF43  
 (TNUT01) St. Louis USACE FUSRAP Laboratory  
 112 James S McDonnell Blvd  
 HAZELWOOD, MO 63042

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.5342	0.528	A		1.2	0.158 - 0.898	0.0215	A
Gross beta	.9436	0.915	A		3.1	0.458 - 1.373	0.0376	A

Radiological Reference Date: August 1, 2020

**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-20-GrF43  
 (WEST04) PACE ANALYTICAL SERVICES, PITTSBURGH  
 1638 Roseytown Road  
 Greensburg, PA 15601

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.435	0.528	A		-17.6	0.158 - 0.898	0.083	W
Gross beta	0.974	0.915	A		6.4	0.458 - 1.373	0.176	W

Radiological Reference Date: August 1, 2020

**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-20-GrF43  
 (WSHL01) Wisconsin State Laboratory of Hygiene  
 2601 Agriculture Drive  
 Madison, WI 53718

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.5168	0.528	A		-2.1	0.158 - 0.898	0.0345	A
Gross beta	0.8509	0.915	A		-7.0	0.458 - 1.373	0.0191	A

Radiological Reference Date: August 1, 2020

**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-20-GrF43*

(WSTP99) Cavendish Nuclear Limited

Greson Court

Cumbria, UK CA24 3HZ

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.58	0.528	A		9.8	0.158 - 0.898	0.11	W
Gross beta	1.18	0.915	A		29.0	0.458 - 1.373	0.29	W

*Radiological Reference Date: August 1, 2020*

**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%

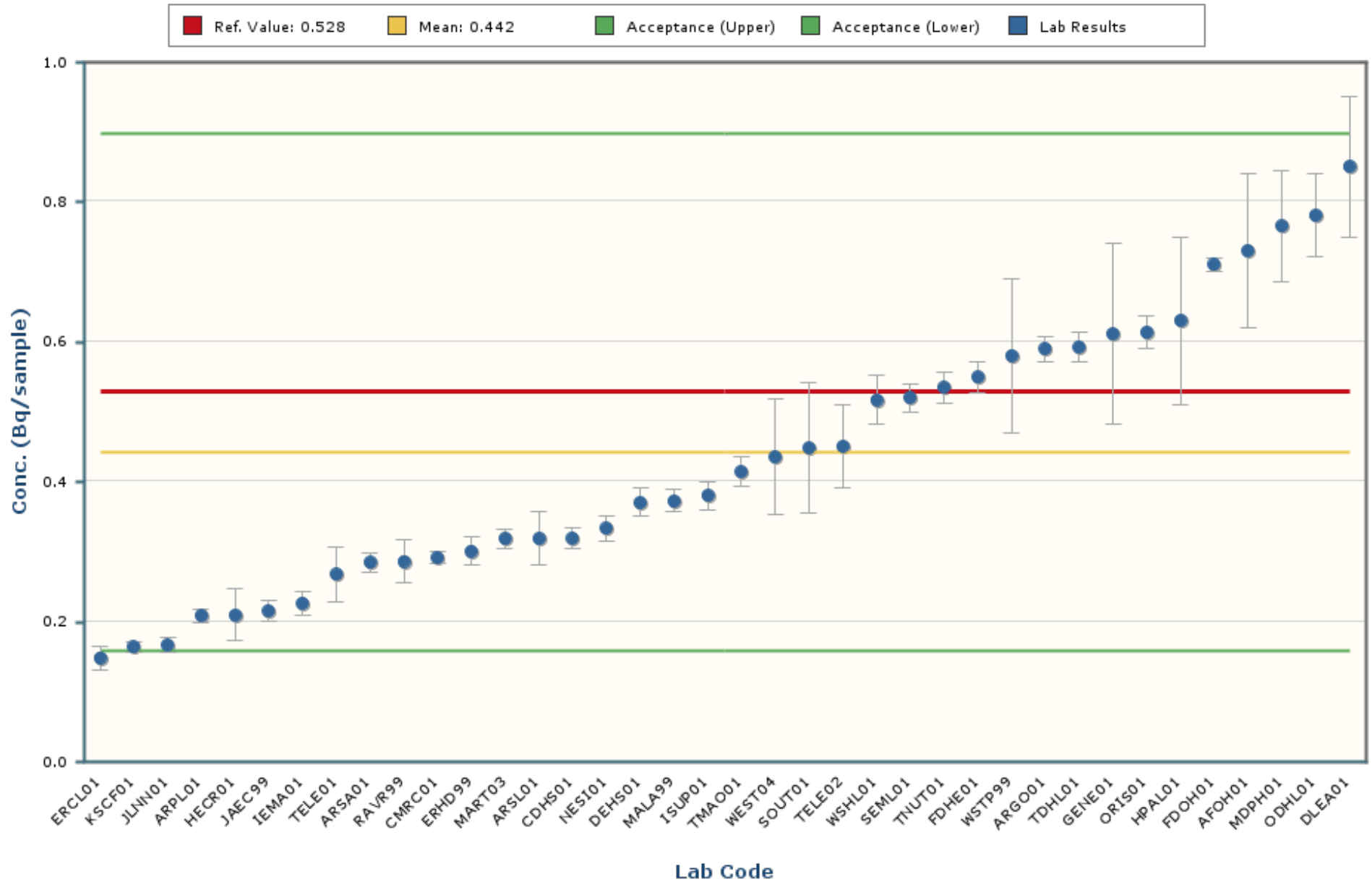
ACCEPTABLE WITH WARNING.....15%<RP $\leq$ 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision

# Gross alpha

## MAPEP-20-GrF43

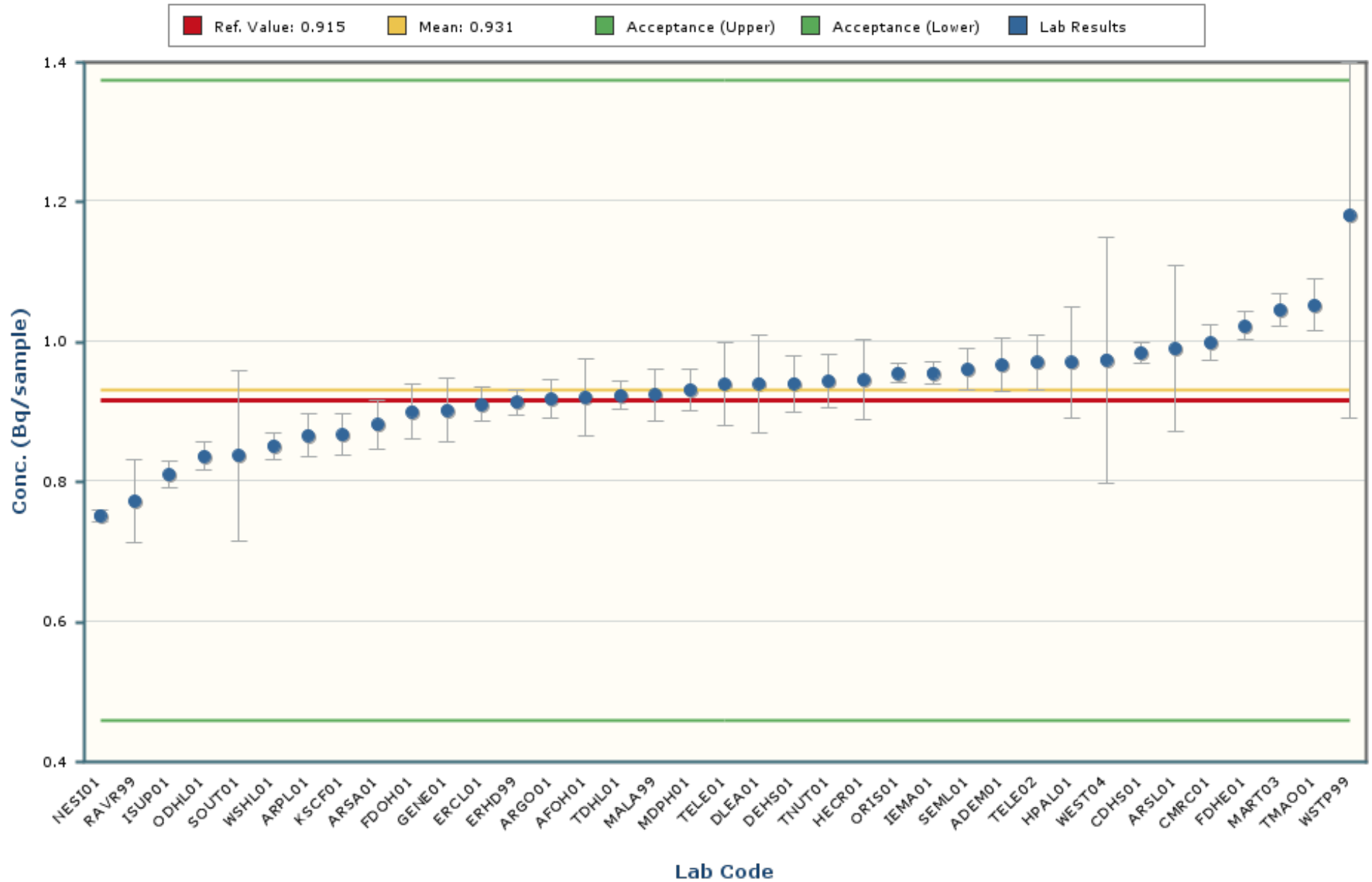


Notes:

The chart shows only data points with values between -0.503 and 1.386 ( $\pm 5$  Standard Deviations).

# Gross beta

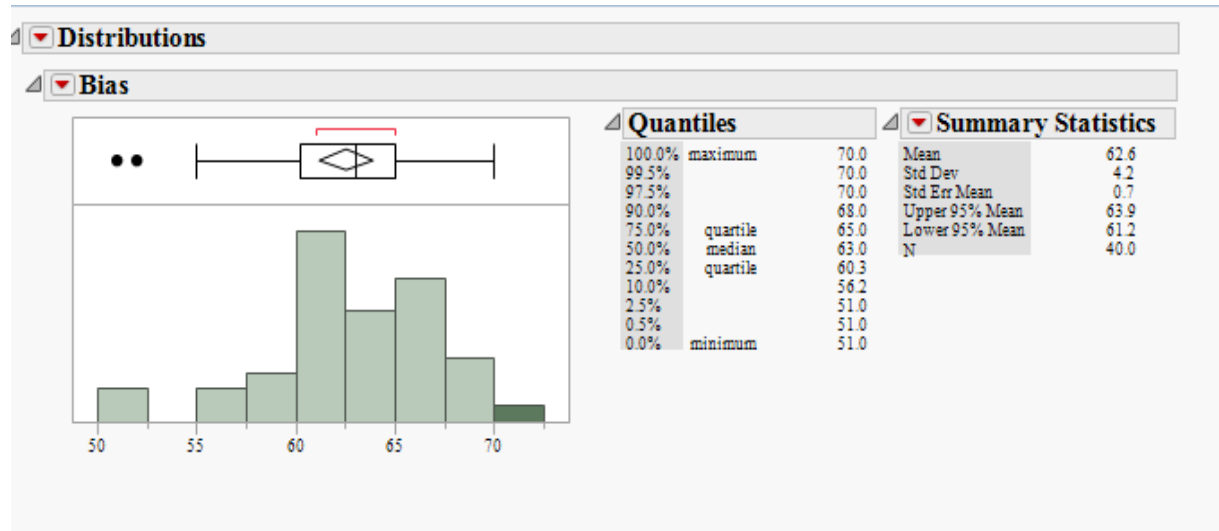
## MAPEP-20-GrF43



Notes:

The chart shows only data points with values between 0.533 and 1.329 ( $\pm 5$  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. Biases greater than +/- 100% have been screened from the data. 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 statistics for the distribution plot are provided adjacent to 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.

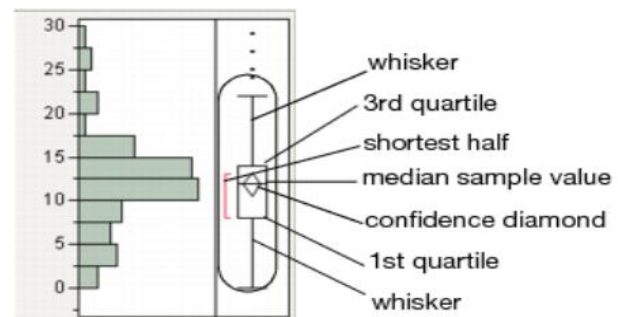


### Outlier Box Plot

The BLACK small vertical line inside the small rectangle at the top of the data distribution graph is the median of the population of the bias shown for that analyte in the matrix. The confidence diamond contains the mean and the upper and lower 95% of the mean. If you drew a line through the middle of the diamond, you would have the mean. The top and bottom points of the diamond represent the upper and lower 95% of the mean. The ends of the box represent the 25th and 75th quantiles, also expressed as 1<sup>st</sup> and 3<sup>rd</sup> quartile. The difference between the 1<sup>st</sup> and 3<sup>rd</sup> quartiles is called the interquartile range. Each box has lines that extend from each end, sometimes called whiskers. The whiskers extend from the ends of the box to the outermost data point that falls within the distances computed as follows:

3rd quartile + 1.5\*(interquartile range)

1st quartile - 1.5\*(interquartile range)



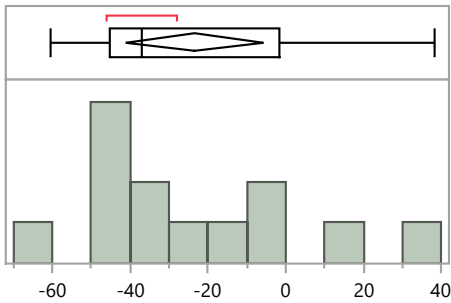
If the data points do not reach the computed ranges, then the whiskers are determined by the upper and lower data point values (not including outliers). The bracket outside of the box identifies the *shortest half*, which is the most dense 50% of the observations (Rousseuw and Leroy 1987).



**GrF Distribution by Detection Method**

**Distributions Analyte\_Detection=Gross alpha Gas Flow Proportional Counter**

**Bias**



**Quantiles**

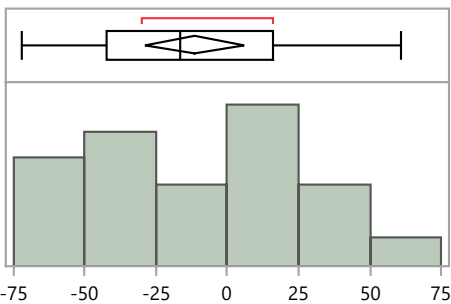
100.0%	maximum	38.3
99.5%		38.3
97.5%		38.3
90.0%		30.7
75.0%	quartile	-1.8
50.0%	median	-36.9
25.0%	quartile	-45.4
10.0%		-54.8
2.5%		-60.6
0.5%		-60.6
0.0%	minimum	-60.6

**Summary Statistics**

Mean	-23.5
Std Dev	29.4
Std Err Mean	8.2
Upper 95% Mean	-5.8
Lower 95% Mean	-41.3
N	13.0

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

**Bias**



**Quantiles**

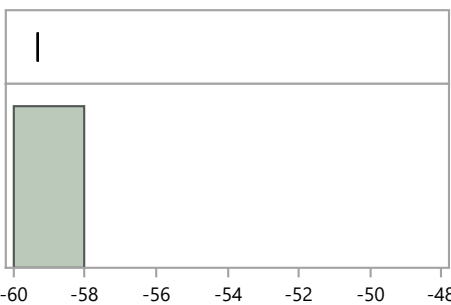
100.0%	maximum	61.0
99.5%		61.0
97.5%		61.0
90.0%		46.9
75.0%	quartile	15.8
50.0%	median	-16.4
25.0%	quartile	-42.2
10.0%		-66.5
2.5%		-72.0
0.5%		-72.0
0.0%	minimum	-72.0

**Summary Statistics**

Mean	-11.5
Std Dev	39.3
Std Err Mean	8.4
Upper 95% Mean	5.9
Lower 95% Mean	-28.9
N	22.0

**Distributions Analyte\_Detection=Gross alpha Liquid Scintillation Counter**

**Bias**



**Quantiles**

100.0%	maximum	-59.3
99.5%		-59.3
97.5%		-59.3
90.0%		-59.3
75.0%	quartile	-59.3
50.0%	median	-59.3
25.0%	quartile	-59.3
10.0%		-59.3
2.5%		-59.3
0.5%		-59.3
0.0%	minimum	-59.3

**Summary Statistics**

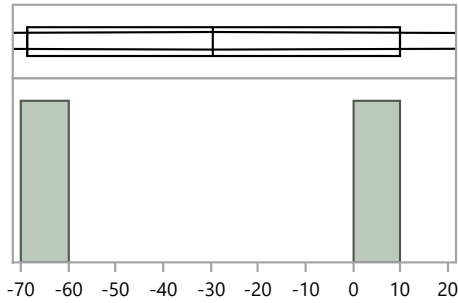
Mean	-59.3
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

GrF43 Distribution by Detection Method

**GrF Distribution by Detection Method**

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

**Bias**



**Quantiles**

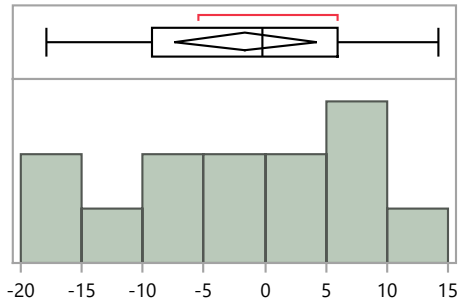
100.0%	maximum	9.8
99.5%		9.8
97.5%		9.8
90.0%		9.8
75.0%	quartile	9.8
50.0%	median	-29.4
25.0%	quartile	-68.6
10.0%		-68.6
2.5%		-68.6
0.5%		-68.6
0.0%	minimum	-68.6

**Summary Statistics**

Mean	-29.4
Std Dev	55.4
Std Err Mean	39.2
Upper 95% Mean	468.7
Lower 95% Mean	-527.5
N	2.0

**Distributions Analyte\_Detection=Gross beta Gas Flow Proportional Counter**

**Bias**



**Quantiles**

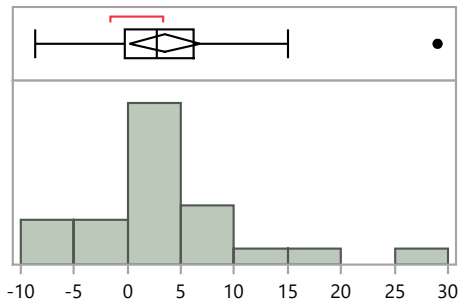
100.0%	maximum	14.2
99.5%		14.2
97.5%		14.2
90.0%		12.2
75.0%	quartile	6.0
50.0%	median	-0.2
25.0%	quartile	-9.3
10.0%		-17.0
2.5%		-17.9
0.5%		-17.9
0.0%	minimum	-17.9

**Summary Statistics**

Mean	-1.6
Std Dev	9.7
Std Err Mean	2.7
Upper 95% Mean	4.3
Lower 95% Mean	-7.5
N	13.0

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

**Bias**



**Quantiles**

100.0%	maximum	29.0
99.5%		29.0
97.5%		29.0
90.0%		13.4
75.0%	quartile	6.2
50.0%	median	2.7
25.0%	quartile	-0.3
10.0%		-6.9
2.5%		-8.6
0.5%		-8.6
0.0%	minimum	-8.6

**Summary Statistics**

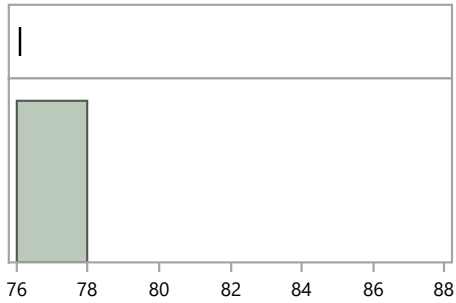
Mean	3.5
Std Dev	7.7
Std Err Mean	1.6
Upper 95% Mean	6.8
Lower 95% Mean	0.3
N	24.0

GrF43 Distribution by Detection Method

**GrF Distribution by Detection Method**

**Distributions Analyte\_Detection=Gross beta Liquid Scintillation Counter**

**Bias**



**Quantiles**

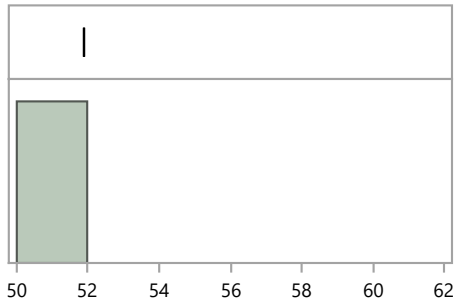
100.0%	maximum	76.1
99.5%		76.1
97.5%		76.1
90.0%		76.1
75.0%	quartile	76.1
50.0%	median	76.1
25.0%	quartile	76.1
10.0%		76.1
2.5%		76.1
0.5%		76.1
0.0%	minimum	76.1

**Summary Statistics**

Mean	76.1
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

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

**Bias**



**Quantiles**

100.0%	maximum	51.9
99.5%		51.9
97.5%		51.9
90.0%		51.9
75.0%	quartile	51.9
50.0%	median	51.9
25.0%	quartile	51.9
10.0%		51.9
2.5%		51.9
0.5%		51.9
0.0%	minimum	51.9

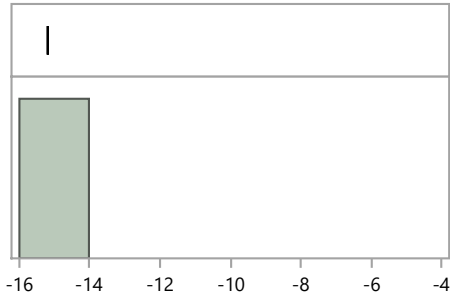
**Summary Statistics**

Mean	51.9
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

**GrF Distribution by Prep Method**

**Distributions Analyte\_Method=Gross alpha Acid dissolution with hydrofluoric acid**

**Bias**



**Quantiles**

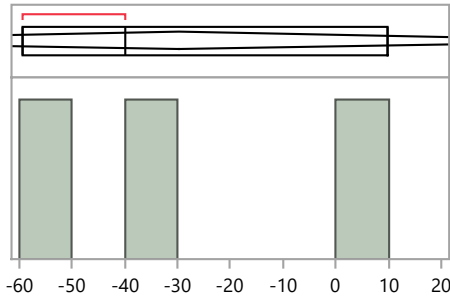
100.0%	maximum	-15.2
99.5%		-15.2
97.5%		-15.2
90.0%		-15.2
75.0%	quartile	-15.2
50.0%	median	-15.2
25.0%	quartile	-15.2
10.0%		-15.2
2.5%		-15.2
0.5%		-15.2
0.0%	minimum	-15.2

**Summary Statistics**

Mean	-15.2
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

**Distributions Analyte\_Method=Gross alpha Acid leaching without hydrofluoric acid**

**Bias**



**Quantiles**

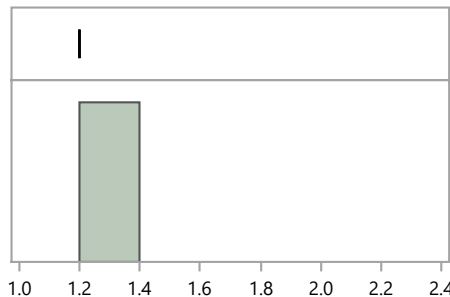
100.0%	maximum	9.8
99.5%		9.8
97.5%		9.8
90.0%		9.8
75.0%	quartile	9.8
50.0%	median	-39.8
25.0%	quartile	-59.3
10.0%		-59.3
2.5%		-59.3
0.5%		-59.3
0.0%	minimum	-59.3

**Summary Statistics**

Mean	-29.8
Std Dev	35.6
Std Err Mean	20.6
Upper 95% Mean	58.7
Lower 95% Mean	-118.3
N	3.0

**Distributions Analyte\_Method=Gross alpha Coprecipitation, acidified**

**Bias**



**Quantiles**

100.0%	maximum	1.2
99.5%		1.2
97.5%		1.2
90.0%		1.2
75.0%	quartile	1.2
50.0%	median	1.2
25.0%	quartile	1.2
10.0%		1.2
2.5%		1.2
0.5%		1.2
0.0%	minimum	1.2

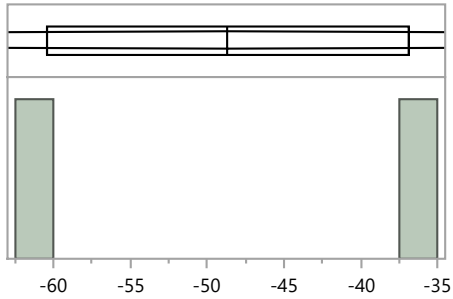
**Summary Statistics**

Mean	1.2
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

**GrF Distribution by Prep Method**

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

**Bias**



**Quantiles**

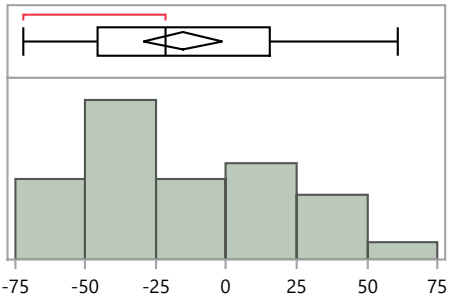
100.0%	maximum	-36.9
99.5%		-36.9
97.5%		-36.9
90.0%		-36.9
75.0%	quartile	-36.9
50.0%	median	-48.7
25.0%	quartile	-60.4
10.0%		-60.4
2.5%		-60.4
0.5%		-60.4
0.0%	minimum	-60.4

**Summary Statistics**

Mean	-48.7
Std Dev	16.6
Std Err Mean	11.8
Upper 95% Mean	100.6
Lower 95% Mean	-197.9
N	2.0

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

**Bias**



**Quantiles**

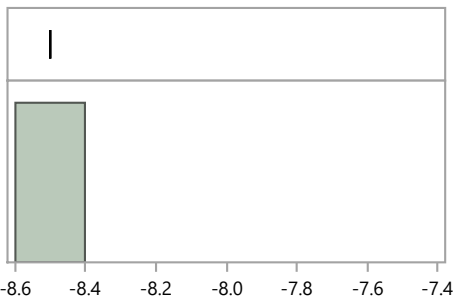
100.0%	maximum	61.0
99.5%		61.0
97.5%		61.0
90.0%		43.6
75.0%	quartile	15.7
50.0%	median	-21.6
25.0%	quartile	-45.8
10.0%		-67.0
2.5%		-72.0
0.5%		-72.0
0.0%	minimum	-72.0

**Summary Statistics**

Mean	-15.4
Std Dev	38.0
Std Err Mean	6.8
Upper 95% Mean	-1.4
Lower 95% Mean	-29.3
N	31.0

**Distributions Analyte\_Method=Gross beta Acid dissolution with hydrofluoric acid**

**Bias**



**Quantiles**

100.0%	maximum	-8.5
99.5%		-8.5
97.5%		-8.5
90.0%		-8.5
75.0%	quartile	-8.5
50.0%	median	-8.5
25.0%	quartile	-8.5
10.0%		-8.5
2.5%		-8.5
0.5%		-8.5
0.0%	minimum	-8.5

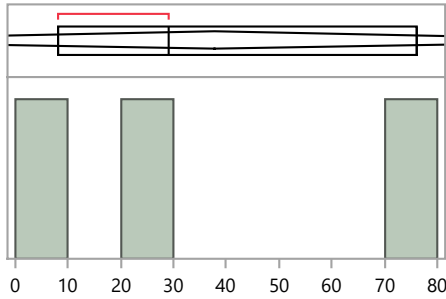
**Summary Statistics**

Mean	-8.5
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

**GrF Distribution by Prep Method**

**Distributions Analyte\_Method=Gross beta Acid leaching without hydrofluoric acid**

Bias



**Quantiles**

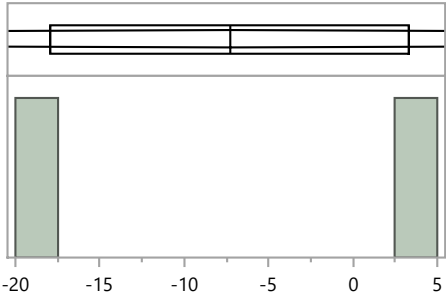
100.0%	maximum	76.1
99.5%		76.1
97.5%		76.1
90.0%		76.1
75.0%	quartile	76.1
50.0%	median	29.0
25.0%	quartile	8.2
10.0%		8.2
2.5%		8.2
0.5%		8.2
0.0%	minimum	8.2

**Summary Statistics**

Mean	37.8
Std Dev	34.8
Std Err Mean	20.1
Upper 95% Mean	124.2
Lower 95% Mean	-48.7
N	3.0

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

Bias



**Quantiles**

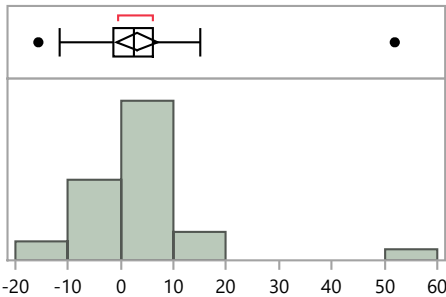
100.0%	maximum	3.3
99.5%		3.3
97.5%		3.3
90.0%		3.3
75.0%	quartile	3.3
50.0%	median	-7.3
25.0%	quartile	-17.9
10.0%		-17.9
2.5%		-17.9
0.5%		-17.9
0.0%	minimum	-17.9

**Summary Statistics**

Mean	-7.3
Std Dev	15.0
Std Err Mean	10.6
Upper 95% Mean	127.4
Lower 95% Mean	-142.0
N	2.0

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

Bias



**Quantiles**

100.0%	maximum	51.9
99.5%		51.9
97.5%		51.9
90.0%		13.2
75.0%	quartile	6.0
50.0%	median	2.6
25.0%	quartile	-1.5
10.0%		-8.0
2.5%		-15.6
0.5%		-15.6
0.0%	minimum	-15.6

**Summary Statistics**

Mean	3.1
Std Dev	11.0
Std Err Mean	1.9
Upper 95% Mean	7.0
Lower 95% Mean	-0.8
N	33.0