

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.

GrF41 Participating Laboratories

Lab Code	Lab Name	Matrix Code
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
ERCL01	Washington State Public Health Laboratories	GrF
FDHE01	Florida Dept of Health Environmental Laboratory	GrF
FDOH01	Florida Dept. of Health, Mobile Environmental Radiological Lab	GrF
GENE01	GEL Laboratories, LLC	GrF
HCAL01	Lawrence Livermore National Laboratory	GrF
HECR01	SC Dept. Health and Environmental Control Radiological Laboratory	GrF
HPAC99	PHE, CRCE Glasgow	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
LAWR01	LAWRENCE BERKELEY NATIONAL LABORATORY	GrF
MART03	Radioactive Material Analysis Laboratory	GrF
NARL02	USEPA - NAREL - MERL	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
URSL01	UNLV Radioanalytical Services Laboratory	GrF
WEST04	PACE ANALYTICAL SERVICES, PITTSBURGH	GrF
WSHL01	Wisconsin State Laboratory of Hygiene	GrF
WSTP99	Cavendish Nuclear Limited	GrF

Laboratories Not Reporting

Lab Code	Lab Name	Matrix Code
CSSL99	Chemistry Support Services	GrF
DLEA01	DLE Associates	GrF
DRMG01	CNS Pantex - D&RMG	GrF
FMEC99	Foods and Water Laboratories Center	GrF
KSCF01	Kennedy Space Center, HP Laboratory	GrF
LDRA99	Laboratori de Radiologia Ambiental-Universitat de Barcelona	GrF
MSDH01	Mississippi State Dept of Health	GrF
NJDH01	New Jersey Dept. of Health, PHEL, ECLS	GrF
QUAN01	TestAmerica St. Louis	GrF
RPSC01	Radiation Protection Service	GrF
SRPD01	Sandia National Laboratories, Radiation Protection Sample Diagnostics	GrF

Study Reference Values

MAPEP-19-GrF41

Radiological Reference Date: 08/01/2019

Analyte	Ref Value	Ref Unc
Radiological	Units: (Bq/sample)	
Gross alpha	0.528	0.017
Gross beta	0.937	0.016

Sample Statistical Summary

MAPEP-19-GrF41

Radiological Reference Date: 08/01/2019

Analyte	T(1)	A(2)	Grand(3) Mean	Std Dev	Ref Value	Ref Unc	Acceptance Range
							Units: (Bq/sample)
Radiological							
Gross alpha	39	32	0.395	0.175	0.528	0.017	0.158 - 0.898
Gross beta	39	38	0.925	0.095	0.937	0.016	0.469 - 1.406

- 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 ≤ 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 ≤ 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-19-GrF41

Radiological

Analyte	A	W	RW	N
Gross alpha	32			7
Gross beta	38			1



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

Laboratory Results For MAPEP-19-GrF41
 (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	0.194	0.528	A		-63.3	0.158 - 0.898	0.005	A
Gross beta	0.957	0.937	A		2.1	0.469 - 1.406	0.005	N

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41

(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	0.557	0.528	A		5.5	0.158 - 0.898	0.039	A
Gross beta	0.935	0.937	A		-0.2	0.469 - 1.406	0.045	A

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41
 (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	0.492	0.528	A		-6.8	0.158 - 0.898	0.015	A
Gross beta	0.889	0.937	A		-5.1	0.469 - 1.406	0.027	A

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41

(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	0.167	0.528	A		-68.4	0.158 - 0.898	0.009	A
Gross beta	0.842	0.937	A		-10.1	0.469 - 1.406	0.030	A

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41
 (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	0.119	0.528	N		-77.5	0.158 - 0.898	0.005	A
Gross beta	0.844	0.937	A		-9.9	0.469 - 1.406	0.033	A

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41

(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	.203	0.528	A		-61.6	0.158 - 0.898	.025	A
Gross beta	.986	0.937	A		5.2	0.469 - 1.406	.118	A

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41
 (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	0.305	0.528	A		-42.2	0.158 - 0.898	0.0148	A
Gross beta	1.001	0.937	A		6.8	0.469 - 1.406	0.0151	N

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41
 (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	0.358	0.528	A		-32.2	0.158 - 0.898	0.010	A
Gross beta	1.010	0.937	A		7.8	0.469 - 1.406	0.013	N

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41
 (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	0.387	0.528	A		-26.7	0.158 - 0.898	0.024	A
Gross beta	0.942	0.937	A		0.5	0.469 - 1.406	0.022	A

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41
 (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	0.633	0.528	A		19.9	0.158 - 0.898	0.047	A
Gross beta	0.884	0.937	A		-5.7	0.469 - 1.406	0.023	A

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41
 (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	0.68	0.528	A		28.8	0.158 - 0.898	0.06	A
Gross beta	1.13	0.937	A		20.6	0.469 - 1.406	0.06	A

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41

(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	0.583	0.528	A		10.4	0.158 - 0.898	0.014	A
Gross beta	0.926	0.937	A		-1.2	0.469 - 1.406	0.009	N

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41
 (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	0.531	0.528	A		0.6	0.158 - 0.898	0.130	W
Gross beta	0.891	0.937	A		-4.9	0.469 - 1.406	0.0494	A

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41
 (HCAL01) Lawrence Livermore National Laboratory
 Analytical Services and Instrumentation Analytical Lab
 Livermore, CA 94550

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.0970	0.528	N		-81.6	0.158 - 0.898	0.027	W
Gross beta	0.918	0.937	A		-2.0	0.469 - 1.406	0.080	A

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41

(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	0.158	0.528	N		-70.1	0.158 - 0.898	0.0332	W
Gross beta	0.962	0.937	A		2.7	0.469 - 1.406	0.0578	A

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41

(HPAC99) PHE, CRCE Glasgow

155 Hardgate Road

Glasgow, Scotland G514LS

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.34	0.528	A		-35.6	0.158 - 0.898	0.04	A
Gross beta	0.75	0.937	A		-20.0	0.469 - 1.406	0.06	A

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41
 (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	0.41	0.528	A		-22.3	0.158 - 0.898	0.06	A
Gross beta	0.93	0.937	A		-0.7	0.469 - 1.406	0.05	A

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41

(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	0.405	0.528	A		-23.3	0.158 - 0.898	0.021	A
Gross beta	0.998	0.937	A		6.5	0.469 - 1.406	0.016	N

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41
 (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	0.37	0.528	A		-29.9	0.158 - 0.898	0.02	A
Gross beta	0.77	0.937	A		-17.8	0.469 - 1.406	0.01	N

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41
 (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	0.0535	0.528	N		-89.9	0.158 - 0.898	0.00954	W
Gross beta	0.8627	0.937	A		-7.9	0.469 - 1.406	0.04086	A

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41

(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	8.82E-02	0.528	N		-83.3	0.158 - 0.898	6.53E-03	A
Gross beta	1.04	0.937	A		11.0	0.469 - 1.406	1.4E-01	A

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41
 (LAWR01) LAWRENCE BERKELEY NATIONAL LABORATORY
 1 CYCLOTRON RD.
 BERKELEY, CA 94720

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	.175	0.528	A		-66.9	0.158 - 0.898	.0117	A
Gross beta	.967	0.937	A		3.2	0.469 - 1.406	.0208	A

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41
 (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	0.131	0.528	N		-75.2	0.158 - 0.898	0.011	A
Gross beta	0.915	0.937	A		-2.3	0.469 - 1.406	0.054	A

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41

(NARL02) USEPA - NAREL - MERL

540 S Morris Ave

Montgomery, AL 36115

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.165	0.528	A		-68.8	0.158 - 0.898	0.0110	A
Gross beta	0.961	0.937	A		2.6	0.469 - 1.406	0.0390	A

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41
 (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	0.387	0.528	A		-26.7	0.158 - 0.898	0.033	A
Gross beta	0.834	0.937	A		-11.0	0.469 - 1.406	0.027	A

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41
 (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	0.631	0.528	A		19.5	0.158 - 0.898	0.037	A
Gross beta	0.857	0.937	A		-8.5	0.469 - 1.406	0.015	N

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41

(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	0.335	0.528	A		-36.6	0.158 - 0.898	0.015	A
Gross beta	0.943	0.937	A		0.6	0.469 - 1.406	0.020	A

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41
 (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	0.168	0.528	A		-68.2	0.158 - 0.898	0.018	A
Gross beta	0.785	0.937	A		-16.2	0.469 - 1.406	0.057	A

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41
 (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	0.43	0.528	A		-18.6	0.158 - 0.898	0.035	A
Gross beta	0.947	0.937	A		1.1	0.469 - 1.406	0.026	A

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41
 (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	0.164	0.528	A		-68.9	0.158 - 0.898	0.0207	A
Gross beta	0.396	0.937	N		-57.7	0.469 - 1.406	0.0292	A

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41
 (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	0.374	0.528	A		-29.2	0.158 - 0.898	0.017	A
Gross beta	0.944	0.937	A		0.7	0.469 - 1.406	0.020	A

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41
 (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	.192	0.528	A		-63.6	0.158 - 0.898	.0349	W
Gross beta	.722	0.937	A		-22.9	0.469 - 1.406	.051	A

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41
 (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	0.13	0.528	N		-75.4	0.158 - 0.898	0.03	W
Gross beta	1.06	0.937	A		13.1	0.469 - 1.406	0.07	A

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41
 (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	.6869	0.528	A		30.1	0.158 - 0.898	.029	A
Gross beta	.9464	0.937	A		1.0	0.469 - 1.406	.046	A

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41
 (TNUT01) St. Louis USACE FUSRAP Laboratory
 8945 LATTY AVE
 BERKELEY, MO 63134-1024

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	.5386	0.528	A		2.0	0.158 - 0.898	0.0215	A
Gross beta	.9543	0.937	A		1.8	0.469 - 1.406	0.0381	A

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41
 (URSL01) UNLV Radioanalytical Services Laboratory
 Campus Mail Stop 453037
 Las Vegas, NV 89154-3037

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.77	0.528	A		45.8	0.158 - 0.898	0.03	A
Gross beta	0.84	0.937	A		-10.4	0.469 - 1.406	0.04	A

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41
 (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	0.237	0.528	A		-55.1	0.158 - 0.898	0.045	W
Gross beta	1.032	0.937	A		10.1	0.469 - 1.406	0.186	W

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41
 (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	0.3544	0.528	A		-32.9	0.158 - 0.898	0.0297	A
Gross beta	0.8299	0.937	A		-11.4	0.469 - 1.406	0.0190	A

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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-19-GrF41
 (WSTP99) Cavendish Nuclear Limited
 Greeson Court
 Cumbria, UK CA24 3HZ

Radiological						Units: (Bq/sample)		
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.43	0.528	A		-18.6	0.158 - 0.898	0.08	W
Gross beta	1.16	0.937	A		23.8	0.469 - 1.406	0.27	W

Radiological Reference Date: August 1, 2019

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 ≤ 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 ≤ 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%

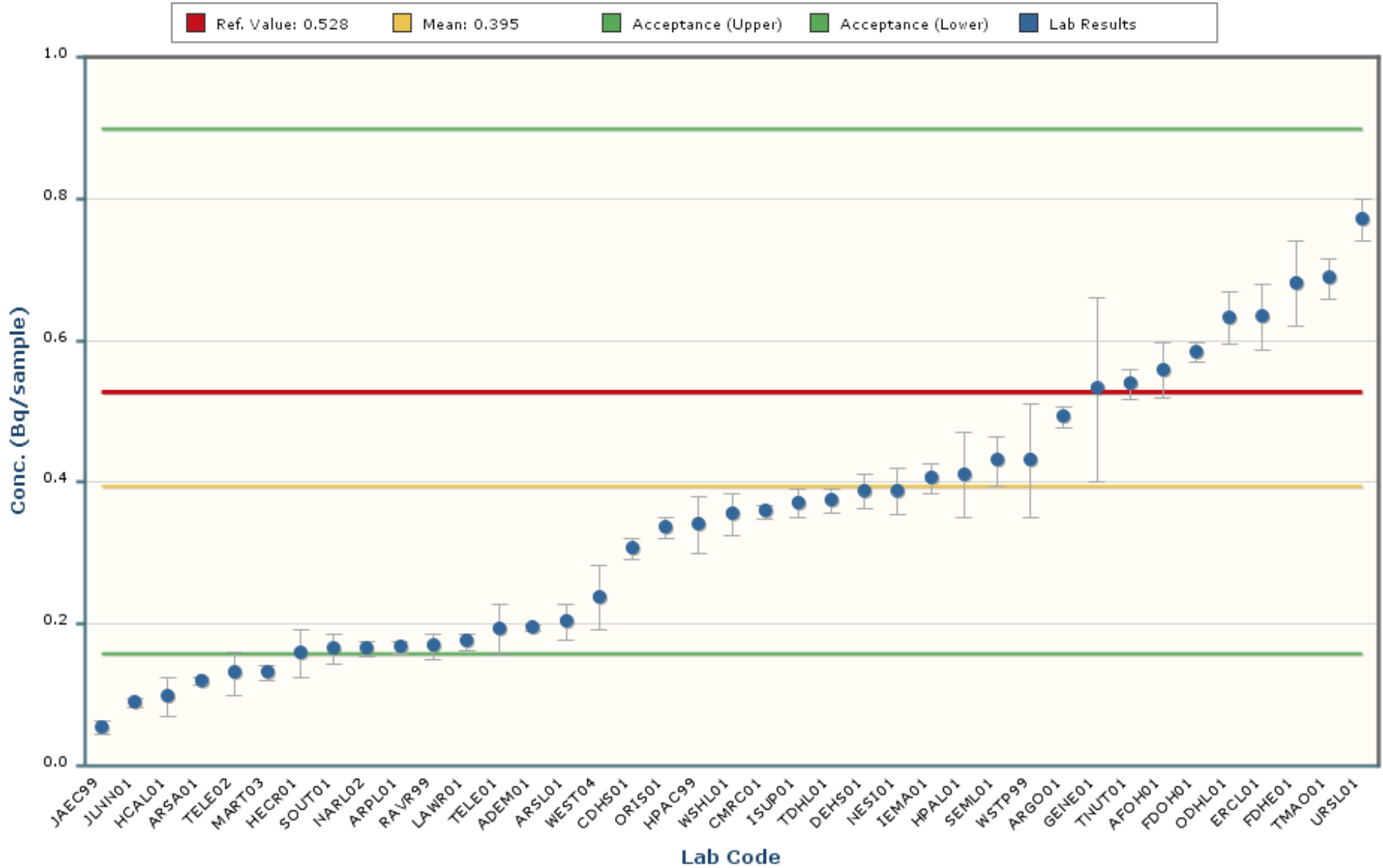
ACCEPTABLE WITH WARNING.....15%<RP \leq 30%

NOT ACCEPTABLE.....RP>30%

RP = Relative Precision

Gross alpha

MAPEP-19-GrF41

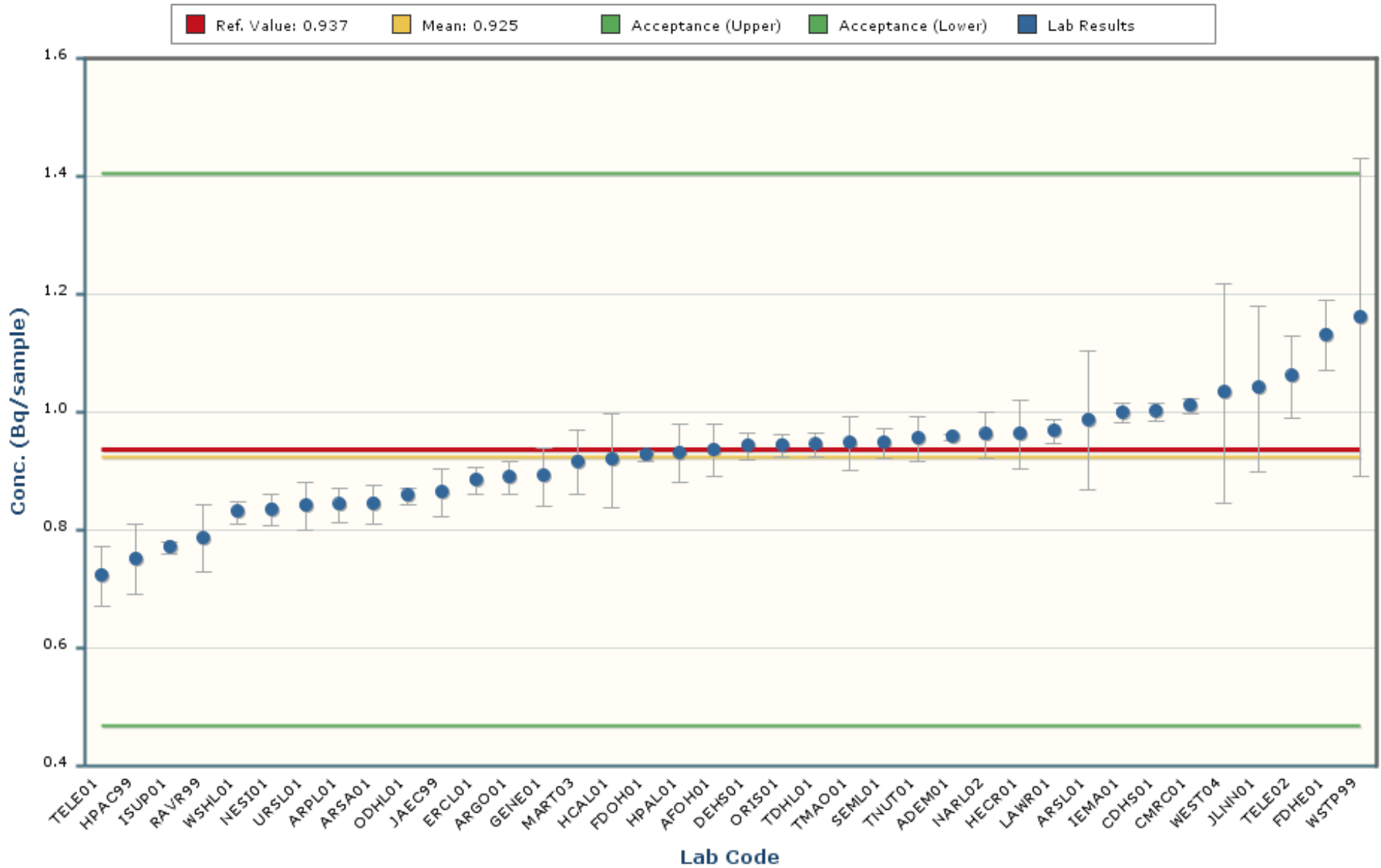


Notes:

The chart shows only data points with values between -0.481 and 1.272 (± 5 Standard Deviations).

Gross beta

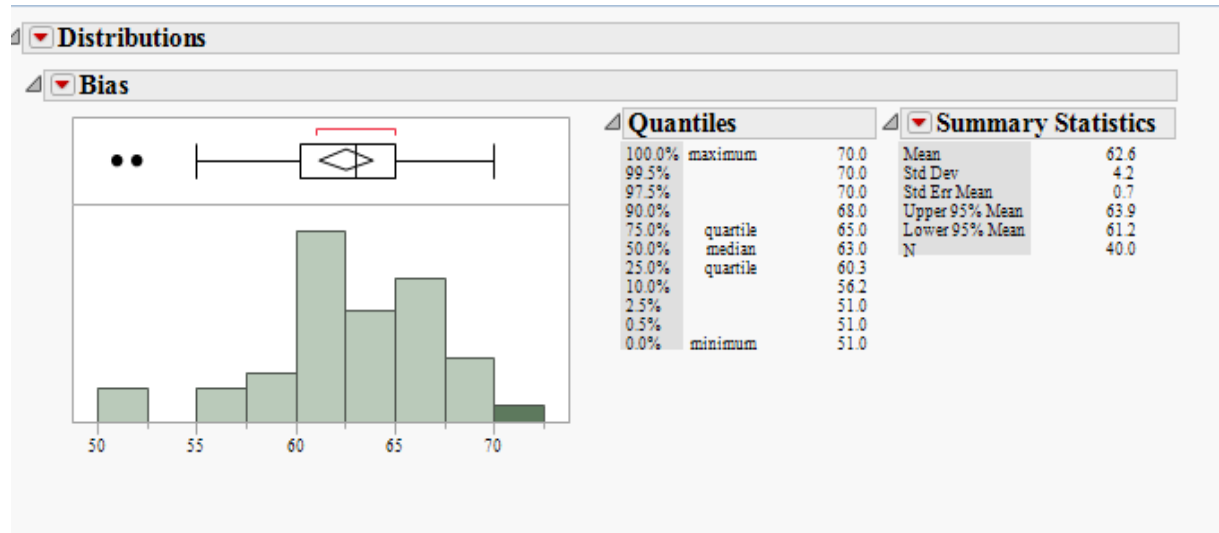
MAPEP-19-GrF41



Notes:

The chart shows only data points with values between 0.448 and 1.402 (± 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.

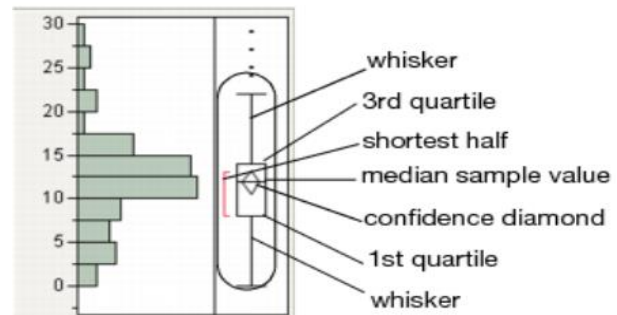


Outlier Box Plot

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 1st and 3rd quartile. The difference between the 1st and 3rd 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)



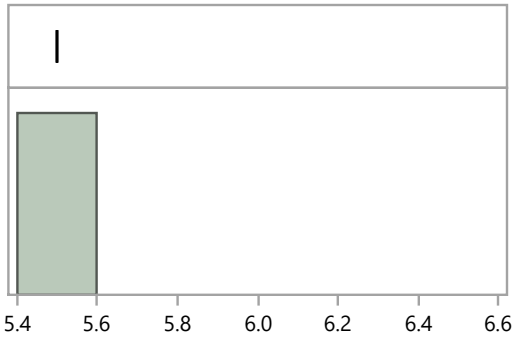
If the data points do not reach the computed ranges, then the whiskers are determined by the upper and lower data point values (not including outliers). The bracket outside of the box identifies the *shortest half*, which is the most dense 50% of the observations (Rousseuw and Leroy 1987).

GrF41 Distribution by Detection Method

GrF Distribution by Detection Method

Distributions Analyte_Detection=Gross alpha Alpha Spectrometry

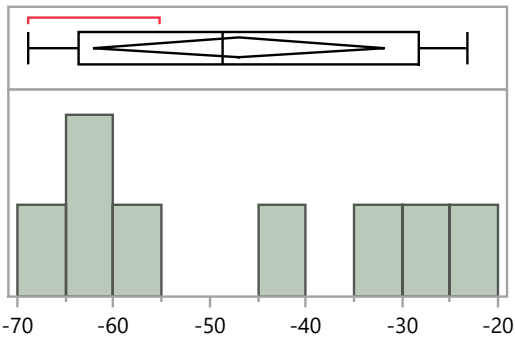
Bias



Quantiles			Summary Statistics	
100.0%	maximum	5.5	Mean	5.5
99.5%		5.5	Std Dev	.
97.5%		5.5	Std Err Mean	.
90.0%		5.5	Upper 95% Mean	.
75.0%	quartile	5.5	Lower 95% Mean	.
50.0%	median	5.5	N	1.0
25.0%	quartile	5.5		
10.0%		5.5		
2.5%		5.5		
0.5%		5.5		
0.0%	minimum	5.5		

Distributions Analyte_Detection=Gross alpha Beta Counting - 2 pi gas flow proportional counter

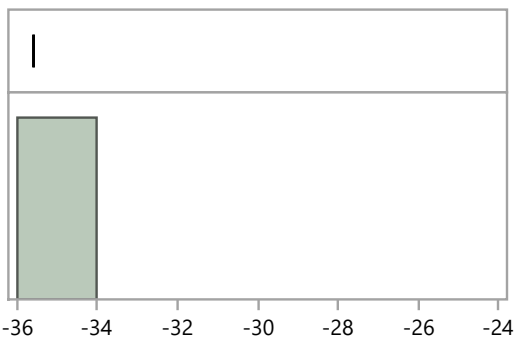
Bias



Quantiles			Summary Statistics	
100.0%	maximum	-23.3	Mean	-47.0
99.5%		-23.3	Std Dev	18.1
97.5%		-23.3	Std Err Mean	6.4
90.0%		-23.3	Upper 95% Mean	-31.9
75.0%	quartile	-28.3	Lower 95% Mean	-62.1
50.0%	median	-48.7	N	8.0
25.0%	quartile	-63.5		
10.0%		-68.9		
2.5%		-68.9		
0.5%		-68.9		
0.0%	minimum	-68.9		

Distributions Analyte_Detection=Gross alpha Beta Counting - liquid scintillation counter

Bias



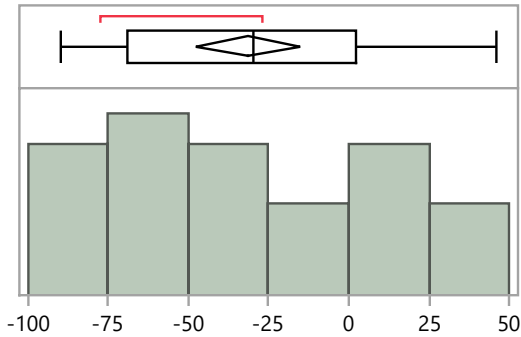
Quantiles			Summary Statistics	
100.0%	maximum	-35.6	Mean	-35.6
99.5%		-35.6	Std Dev	.
97.5%		-35.6	Std Err Mean	.
90.0%		-35.6	Upper 95% Mean	.
75.0%	quartile	-35.6	Lower 95% Mean	.
50.0%	median	-35.6	N	1.0
25.0%	quartile	-35.6		
10.0%		-35.6		
2.5%		-35.6		
0.5%		-35.6		
0.0%	minimum	-35.6		

GrF41 Distribution by Detection Method

GrF Distribution by Detection Method

Distributions Analyte_Detection=Gross alpha Gross Alpha/Beta - 2 pi gas flow proportional counter

Bias

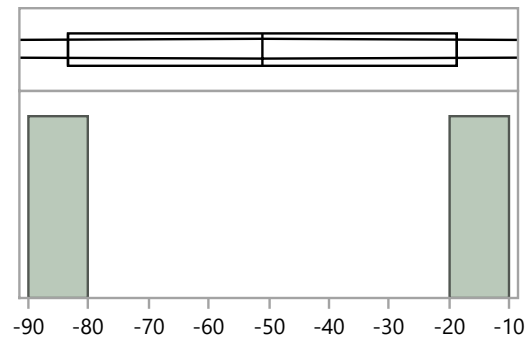


Quantiles		
100.0%	maximum	45.8
99.5%		45.8
97.5%		45.8
90.0%		29.1
75.0%	quartile	2.0
50.0%	median	-29.9
25.0%	quartile	-68.8
10.0%		-78.3
2.5%		-89.9
0.5%		-89.9
0.0%	minimum	-89.9

Summary Statistics	
Mean	-31.4
Std Dev	40.7
Std Err Mean	7.8
Upper 95% Mean	-15.3
Lower 95% Mean	-47.5
N	27.0

Distributions Analyte_Detection=Gross alpha Other

Bias

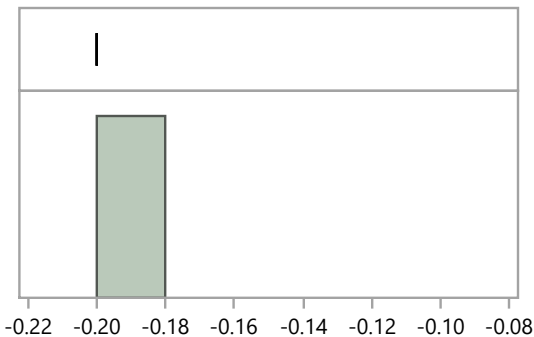


Quantiles		
100.0%	maximum	-18.6
99.5%		-18.6
97.5%		-18.6
90.0%		-18.6
75.0%	quartile	-18.6
50.0%	median	-51.0
25.0%	quartile	-83.3
10.0%		-83.3
2.5%		-83.3
0.5%		-83.3
0.0%	minimum	-83.3

Summary Statistics	
Mean	-51.0
Std Dev	45.7
Std Err Mean	32.4
Upper 95% Mean	360.1
Lower 95% Mean	-462.0
N	2.0

Distributions Analyte_Detection=Gross beta Alpha Spectrometry

Bias



Quantiles		
100.0%	maximum	-0.2
99.5%		-0.2
97.5%		-0.2
90.0%		-0.2
75.0%	quartile	-0.2
50.0%	median	-0.2
25.0%	quartile	-0.2
10.0%		-0.2
2.5%		-0.2
0.5%		-0.2
0.0%	minimum	-0.2

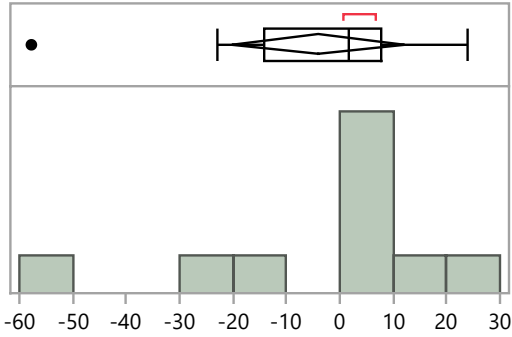
Summary Statistics	
Mean	-0.2
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

GrF41 Distribution by Detection Method

GrF Distribution by Detection Method

Distributions Analyte_Detection=Gross beta Beta Counting - 2 pi gas flow proportional counter

Bias

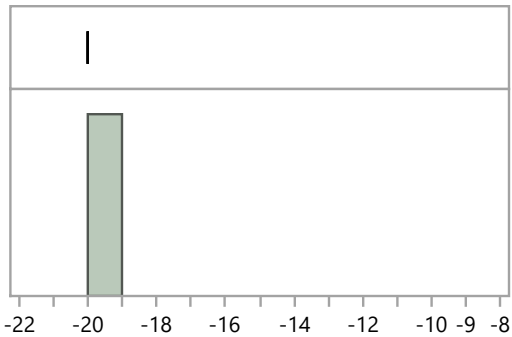


Quantiles		
100.0%	maximum	23.8
99.5%		23.8
97.5%		23.8
90.0%		22.4
75.0%	quartile	7.6
50.0%	median	1.6
25.0%	quartile	-14.3
10.0%		-54.2
2.5%		-57.7
0.5%		-57.7
0.0%	minimum	-57.7

Summary Statistics	
Mean	-4.1
Std Dev	22.5
Std Err Mean	7.1
Upper 95% Mean	12.0
Lower 95% Mean	-20.3
N	10.0

Distributions Analyte_Detection=Gross beta Beta Counting - liquid scintillation counter

Bias

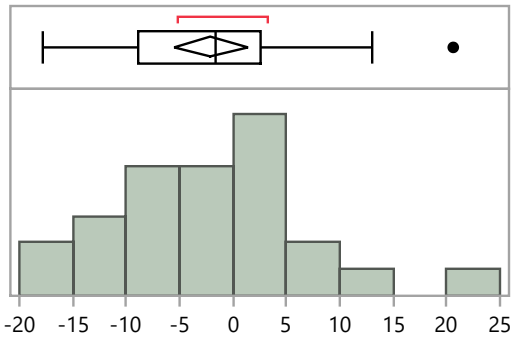


Quantiles		
100.0%	maximum	-20.0
99.5%		-20.0
97.5%		-20.0
90.0%		-20.0
75.0%	quartile	-20.0
50.0%	median	-20.0
25.0%	quartile	-20.0
10.0%		-20.0
2.5%		-20.0
0.5%		-20.0
0.0%	minimum	-20.0

Summary Statistics	
Mean	-20.0
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

Distributions Analyte_Detection=Gross beta Gross Alpha/Beta - 2 pi gas flow proportional counter

Bias



Quantiles		
100.0%	maximum	20.6
99.5%		20.6
97.5%		20.6
90.0%		9.4
75.0%	quartile	2.6
50.0%	median	-1.6
25.0%	quartile	-8.9
10.0%		-12.6
2.5%		-17.8
0.5%		-17.8
0.0%	minimum	-17.8

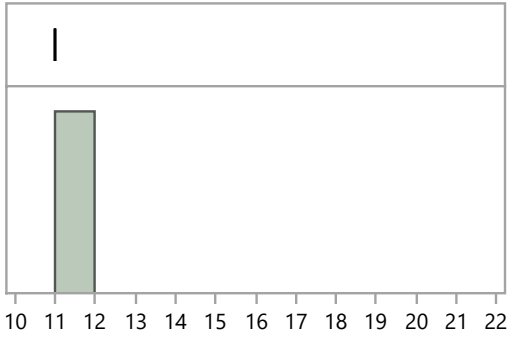
Summary Statistics	
Mean	-2.1
Std Dev	8.6
Std Err Mean	1.7
Upper 95% Mean	1.4
Lower 95% Mean	-5.6
N	26.0

GrF41 Distribution by Detection Method

GrF Distribution by Detection Method

Distributions Analyte_Detection=Gross beta Other

Bias

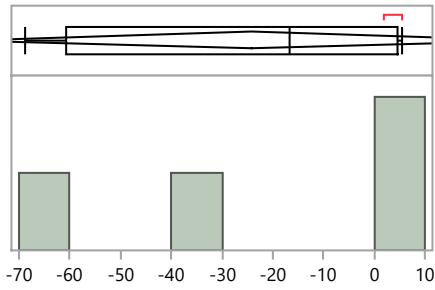


Quantiles			Summary Statistics	
100.0%	maximum	11.0	Mean	11.0
99.5%		11.0	Std Dev	.
97.5%		11.0	Std Err Mean	.
90.0%		11.0	Upper 95% Mean	.
75.0%	quartile	11.0	Lower 95% Mean	.
50.0%	median	11.0	N	1.0
25.0%	quartile	11.0		
10.0%		11.0		
2.5%		11.0		
0.5%		11.0		
0.0%	minimum	11.0		

GrF Distribution by Prep Method

Distributions Analyte_Method=Gross alpha Acid dissolution by strong Aqua Regia, hydrofluoric acid, etc.

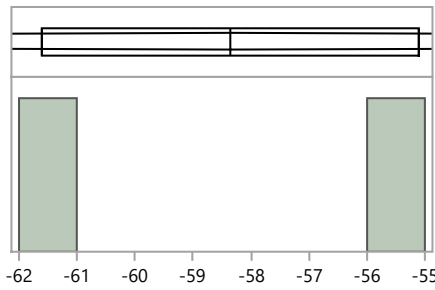
Bias



Quantiles			Summary Statistics	
100.0%	maximum	5.5	Mean	-24.3
99.5%		5.5	Std Dev	35.1
97.5%		5.5	Std Err Mean	17.6
90.0%		5.5	Upper 95% Mean	31.6
75.0%	quartile	4.6	Lower 95% Mean	-80.1
50.0%	median	-16.8	N	4.0
25.0%	quartile	-60.6		
10.0%		-68.9		
2.5%		-68.9		
0.5%		-68.9		
0.0%	minimum	-68.9		

Distributions Analyte_Method=Gross alpha Acid leaching without hydrofluoric acid

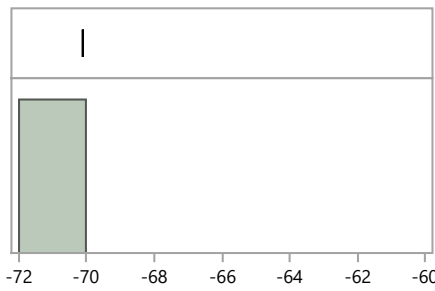
Bias



Quantiles			Summary Statistics	
100.0%	maximum	-55.1	Mean	-58.4
99.5%		-55.1	Std Dev	4.6
97.5%		-55.1	Std Err Mean	3.3
90.0%		-55.1	Upper 95% Mean	-17.1
75.0%	quartile	-55.1	Lower 95% Mean	-99.6
50.0%	median	-58.4	N	2.0
25.0%	quartile	-61.6		
10.0%		-61.6		
2.5%		-61.6		
0.5%		-61.6		
0.0%	minimum	-61.6		

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

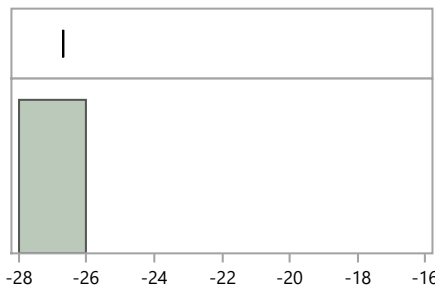
Bias



Quantiles			Summary Statistics	
100.0%	maximum	-70.1	Mean	-70.1
99.5%		-70.1	Std Dev	.
97.5%		-70.1	Std Err Mean	.
90.0%		-70.1	Upper 95% Mean	.
75.0%	quartile	-70.1	Lower 95% Mean	.
50.0%	median	-70.1	N	1.0
25.0%	quartile	-70.1		
10.0%		-70.1		
2.5%		-70.1		
0.5%		-70.1		
0.0%	minimum	-70.1		

Distributions Analyte_Method=Gross alpha Evaporation, acidified

Bias

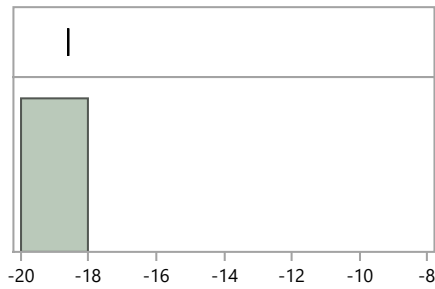


Quantiles			Summary Statistics	
100.0%	maximum	-26.7	Mean	-26.7
99.5%		-26.7	Std Dev	.
97.5%		-26.7	Std Err Mean	.
90.0%		-26.7	Upper 95% Mean	.
75.0%	quartile	-26.7	Lower 95% Mean	.
50.0%	median	-26.7	N	1.0
25.0%	quartile	-26.7		
10.0%		-26.7		
2.5%		-26.7		
0.5%		-26.7		
0.0%	minimum	-26.7		

GrF Distribution by Prep Method

Distributions Analyte_Method=Gross alpha Evaporation, straight

Bias

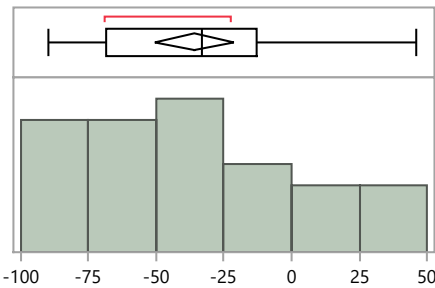


Quantiles		
100.0%	maximum	-18.6
99.5%		-18.6
97.5%		-18.6
90.0%		-18.6
75.0%	quartile	-18.6
50.0%	median	-18.6
25.0%	quartile	-18.6
10.0%		-18.6
2.5%		-18.6
0.5%		-18.6
0.0%	minimum	-18.6

Summary Statistics	
Mean	-18.6
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

Distributions Analyte_Method=Gross alpha No preparation - analyzed as received

Bias

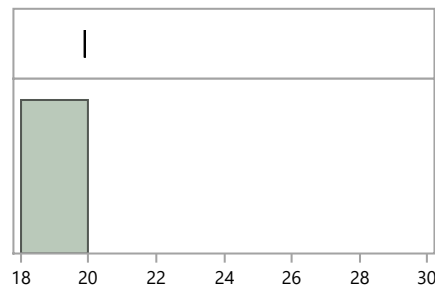


Quantiles		
100.0%	maximum	45.8
99.5%		45.8
97.5%		45.8
90.0%		28.8
75.0%	quartile	-12.7
50.0%	median	-32.9
25.0%	quartile	-68.6
10.0%		-81.6
2.5%		-89.9
0.5%		-89.9
0.0%	minimum	-89.9

Summary Statistics	
Mean	-36.1
Std Dev	38.4
Std Err Mean	7.1
Upper 95% Mean	-21.5
Lower 95% Mean	-50.7
N	29.0

Distributions Analyte_Method=Gross alpha Other

Bias

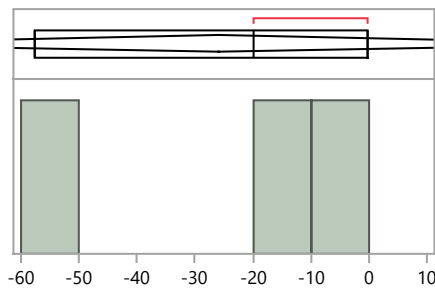


Quantiles		
100.0%	maximum	19.9
99.5%		19.9
97.5%		19.9
90.0%		19.9
75.0%	quartile	19.9
50.0%	median	19.9
25.0%	quartile	19.9
10.0%		19.9
2.5%		19.9
0.5%		19.9
0.0%	minimum	19.9

Summary Statistics	
Mean	19.9
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

Distributions Analyte_Method=Gross beta Acid dissolution by strong Aqua Regia, hydrofluoric acid, etc.

Bias



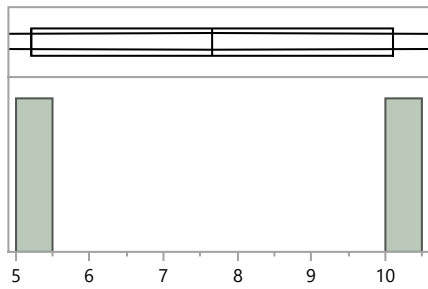
Quantiles		
100.0%	maximum	-0.2
99.5%		-0.2
97.5%		-0.2
90.0%		-0.2
75.0%	quartile	-0.2
50.0%	median	-20.0
25.0%	quartile	-57.7
10.0%		-57.7
2.5%		-57.7
0.5%		-57.7
0.0%	minimum	-57.7

Summary Statistics	
Mean	-26.0
Std Dev	29.2
Std Err Mean	16.9
Upper 95% Mean	46.6
Lower 95% Mean	-98.5
N	3.0

GrF Distribution by Prep Method

Distributions Analyte_Method=Gross beta Acid leaching without hydrofluoric acid

Bias



Quantiles

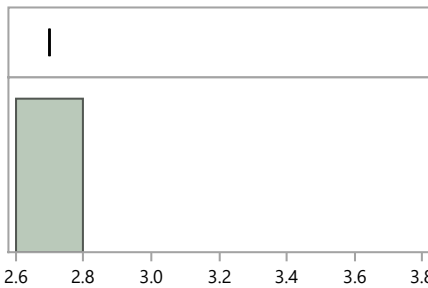
100.0%	maximum	10.1
99.5%		10.1
97.5%		10.1
90.0%		10.1
75.0%	quartile	10.1
50.0%	median	7.7
25.0%	quartile	5.2
10.0%		5.2
2.5%		5.2
0.5%		5.2
0.0%	minimum	5.2

Summary Statistics

Mean	7.7
Std Dev	3.5
Std Err Mean	2.5
Upper 95% Mean	38.8
Lower 95% Mean	-23.5
N	2.0

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

Bias



Quantiles

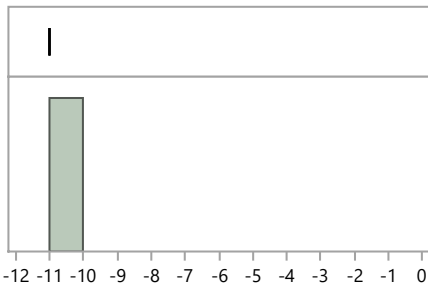
100.0%	maximum	2.7
99.5%		2.7
97.5%		2.7
90.0%		2.7
75.0%	quartile	2.7
50.0%	median	2.7
25.0%	quartile	2.7
10.0%		2.7
2.5%		2.7
0.5%		2.7
0.0%	minimum	2.7

Summary Statistics

Mean	2.7
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

Distributions Analyte_Method=Gross beta Evaporation, acidified

Bias



Quantiles

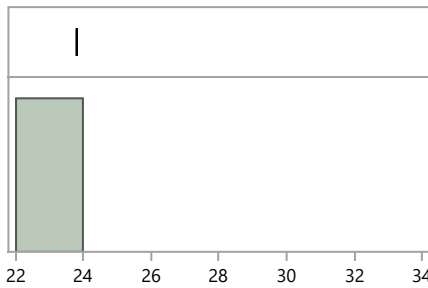
100.0%	maximum	-11.0
99.5%		-11.0
97.5%		-11.0
90.0%		-11.0
75.0%	quartile	-11.0
50.0%	median	-11.0
25.0%	quartile	-11.0
10.0%		-11.0
2.5%		-11.0
0.5%		-11.0
0.0%	minimum	-11.0

Summary Statistics

Mean	-11.0
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

Distributions Analyte_Method=Gross beta Evaporation, straight

Bias



Quantiles

100.0%	maximum	23.8
99.5%		23.8
97.5%		23.8
90.0%		23.8
75.0%	quartile	23.8
50.0%	median	23.8
25.0%	quartile	23.8
10.0%		23.8
2.5%		23.8
0.5%		23.8
0.0%	minimum	23.8

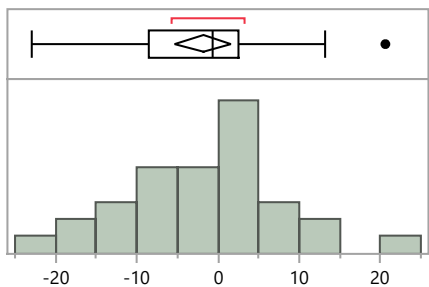
Summary Statistics

Mean	23.8
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

GrF Distribution by Prep Method

Distributions Analyte_Method=Gross beta No preparation - analyzed as received

Bias



Quantiles			Summary Statistics	
100.0%	maximum	20.6	Mean	-1.9
99.5%		20.6	Std Dev	9.2
97.5%		20.6	Std Err Mean	1.7
90.0%		10.4	Upper 95% Mean	1.5
75.0%	quartile	2.6	Lower 95% Mean	-5.2
50.0%	median	-0.7	N	31.0
25.0%	quartile	-8.5		
10.0%		-15.2		
2.5%		-22.9		
0.5%		-22.9		
0.0%	minimum	-22.9		