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XrM43 Participating Laboratories

Lab Code	Lab Name	Matrix Code
CMRC01	Carlsbad Environmental Monitoring and Research Center	XrM
DINL99	Departamento Ingeniería Energética	XrM
ERHD99	Radiation Protection Bureau Health Canada RSD NMS	XrM
EULC01	EnergySolutions, LLC	XrM
FDHE01	Florida Dept of Health Environmental Laboratory	XrM
FDOH01	Florida Dept. of Health, Mobile Environmental Radiological Lab	XrM
GENE01	GEL Laboratories, LLC	XrM
IEMA01	Illinois Emergency Management Agency Radiochemistry Laboratory	XrM
JAEC99	Research Laboratories and Information Directorate	XrM
JLNN01	Jefferson Laboratory	XrM
LAWR01	LAWRENCE BERKELEY NATIONAL LABORATORY	XrM
MALA99	Alypz Sdn. Bhd.	XrM
NOCS99	National Oceanography Centre, Southampton	XrM
ODHL01	Ohio Department of Health Laboratory	XrM
RAVR99	Radiactividad Ambiental y Vigilancia Radiologica	XrM
SEML01	SRS Environmental Monitoring Laboratory	XrM
SRPD01	Sandia National Laboratories, Radiation Protection Sample Diagnostics	XrM
TELE02	ATI Environmental, Inc., Midwest Lab	XrM
WSTP99	Cavendish Nuclear Limited	XrM

Laboratories Not Reporting

Lab Code	Lab Name	Matrix Code
AMEC99	Jacobs Clean Energy Limited - Analytical Services	XrM
HPAC99	PHE, CRCE Glasgow	XrM
IAEA99	International Atomic Energy Agency	XrM
MART03	Radioactive Material Analysis Laboratory	XrM
NARL01	National Analytical Radiation Environmental Laboratory	XrM
NARL02	USEPA - NAREL - MERL	XrM
RPSC01	Radiation Protection Service	XrM
SOUT01	Southwest Research Institute	XrM

Study Reference Values

MAPEP-20-XrM43

Radiological Reference Date: 08/01/2020

Analyte	Ref Value	Ref Unc
Radiological	Units: (Bq/sample)	
Americium-241	0.0477	0.0012
Cesium-134	0.159	0.004
Cesium-137	1.118	0.018
Cobalt-57	0.0144	0.0003
Cobalt-60	0.504	0.016
Curium-244	0.0543	0.0007
Manganese-54	0.0177	0.0004
Plutonium-238	0.0587	0.0012
Plutonium-239/240	0.0483	0.0012
Strontium-90	0.657	0.015
Technetium-99	0.694	0.015
Uranium-234	0.00804	0.00017
Uranium-238	0.0610	0.0012
Zinc-65	0.00399	0.00009

The XrM43 is a Chicken Nugget with sauce sample matrix.

MAPEP Mixed Analyte Performance Evaluation Program

Sample Statistical Summary

MAPEP-20-XrM43

Radiological Reference Date: 08/01/2020

Analyte	T(1)	Grand(2) Mean	Std Dev	Ref Value	Ref Unc
Radiological				Units: (Bq/sample)	
Americium-241	12	0.0430	0.0027	0.0477	0.0012
Cesium-134	14	0.179	0.012	0.159	0.004
Cesium-137	18	1.133	0.199	1.118	0.018
Cobalt-57	6			0.0144	0.0003
Cobalt-60	18	0.521	0.054	0.504	0.016
Curium-244	6			0.0543	0.0007
Manganese-54	6			0.0177	0.0004
Plutonium-238	9	0.0573	0.0064	0.0587	0.0012
Plutonium-239/240	9	0.0464	0.0042	0.0483	0.0012
Strontium-90	7	0.618	0.049	0.657	0.015
Technetium-99				0.694	0.015
Uranium-234	8			0.00804	0.00017
Uranium-238	8	0.0587	0.0068	0.0610	0.0012
Zinc-65	5			0.00399	0.00009

Note: (1) T = Total number of laboratories reporting analyte.
(2) Mean excludes values outside of a bias range of +/- 30%.

The XrM43 is a Chicken Nugget with sauce sample matrix.

MAPEP Mixed Analyte Performance Evaluation Program
Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-20-XrM43
(CMRC01) Carlsbad Environmental Monitoring and Research Center
1400 University Dr.
Carlsbad, NM 88220

Radiological

Sample ID	Nuclide	Known Activity	Experimental Activity	Bias (%)
MAPEP-20-XrM43	Am-241	0.0477 +/- 0.0012 Bq/sample	4.60E-02 +/- 3.46E-03	-3.6
MAPEP-20-XrM43	Cs-134	0.159 +/- 0.004 Bq/sample	1.73E-01 +/- 3.25E-02	8.8
MAPEP-20-XrM43	Cs-137	1.118 +/- 0.018 Bq/sample	1.52E+00 +/- 7.92E-02	36.0
MAPEP-20-XrM43	Co-57	0.0144 +/- 0.0003 Bq/sample	1.88E-02 +/- 2.57E-02	30.6
MAPEP-20-XrM43	Co-60	0.504 +/- 0.016 Bq/sample	6.20E-01 +/- 4.32E-02	23.0
MAPEP-20-XrM43	Cm-244	0.0543 +/- 0.0007 Bq/sample	4.68E-02 +/- 3.52E-03	-13.8
MAPEP-20-XrM43	Mn-54	0.0177 +/- 0.0004 Bq/sample	1.56E-02 +/- 2.13E-02	-11.9
MAPEP-20-XrM43	Pu-238	0.0587 +/- 0.0012 Bq/sample	5.66E-02 +/- 4.57E-03	-3.6
MAPEP-20-XrM43	Pu-239	0.0483 +/- 0.0012 Bq/sample	4.73E-02 +/- 3.92E-03	-2.1
MAPEP-20-XrM43	K-40		3.47E+00 +/- 5.03E-01	
MAPEP-20-XrM43	Sr-90	0.657 +/- 0.015 Bq/sample		
MAPEP-20-XrM43	Tc-99	0.694 +/- 0.015 Bq/sample		
MAPEP-20-XrM43	U-234	0.00804 +/- 0.00017 Bq/sample	8.64E-03 +/- 1.35E-03	7.5
MAPEP-20-XrM43	U-235		1.08E-03 +/- 4.92E-04	
MAPEP-20-XrM43	U-238	0.0610 +/- 0.0012 Bq/sample	5.90E-02 +/- 5.66E-03	-3.3
MAPEP-20-XrM43	Zn-65	0.00399 +/- 0.00009 Bq/sample	2.22E-02 +/- 2.43E-02	

Radiological Reference Date: August 1, 2020

MAPEP Mixed Analyte Performance Evaluation Program

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

Laboratory Results For MAPEP-20-XrM43
(DINL99) Departamento Ingeniería Energética
Escuela de Ingeniería de Bilbao
Bilbao, Vizcaya 48013

Radiological

Sample ID	Nuclide	Known Activity	Experimental Activity	Bias (%)
MAPEP-20-XrM43	Am-241	0.0477 +/- 0.0012 Bq/sample	0.04213 +/- 0.003229	-11.7
MAPEP-20-XrM43	Cs-134	0.159 +/- 0.004 Bq/sample	0.1751 +/- 0.01561 Bq/sample	10.1
MAPEP-20-XrM43	Cs-137	1.118 +/- 0.018 Bq/sample	1.154 +/- 0.06285 Bq/sample	3.2
MAPEP-20-XrM43	Co-57	0.0144 +/- 0.0003 Bq/sample		
MAPEP-20-XrM43	Co-60	0.504 +/- 0.016 Bq/sample	0.5325 +/- 0.03084 Bq/sample	5.7
MAPEP-20-XrM43	Cm-244	0.0543 +/- 0.0007 Bq/sample	0.03339 +/- 0.002731	-38.5
MAPEP-20-XrM43	Fe-55		0.1035 +/- 0.1035 Bq/sample	
MAPEP-20-XrM43	Mn-54	0.0177 +/- 0.0004 Bq/sample	0.0346 +/- 0.0346 Bq/sample	95.5
MAPEP-20-XrM43	Ni-63		0.0708 +/- 0.0708 Bq/sample	
MAPEP-20-XrM43	Pu-238	0.0587 +/- 0.0012 Bq/sample	0.05848 +/- 0.002984	-0.4
MAPEP-20-XrM43	Pu-239	0.0483 +/- 0.0012 Bq/sample	0.04866 +/- 0.002567	0.7
MAPEP-20-XrM43	K-40		2.837 +/- 0.2578 Bq/sample	
MAPEP-20-XrM43	Sr-90	0.657 +/- 0.015 Bq/sample		
MAPEP-20-XrM43	Tc-99	0.694 +/- 0.015 Bq/sample		
MAPEP-20-XrM43	U-234	0.00804 +/- 0.00017 Bq/sample		
MAPEP-20-XrM43	U-238	0.0610 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	Zn-65	0.00399 +/- 0.00009 Bq/sample		

Radiological Reference Date: August 1, 2020

MAPEP Mixed Analyte Performance Evaluation Program
Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-20-XrM43

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

Radiological

Sample ID	Nuclide	Known Activity	Experimental Activity	Bias (%)
MAPEP-20-XrM43	Am-241	0.0477 +/- 0.0012 Bq/sample	0.0450 +/- 0.0018 Bq/sample	-5.7
MAPEP-20-XrM43	Cs-134	0.159 +/- 0.004 Bq/sample		
MAPEP-20-XrM43	Cs-137	1.118 +/- 0.018 Bq/sample		
MAPEP-20-XrM43	Co-57	0.0144 +/- 0.0003 Bq/sample		
MAPEP-20-XrM43	Co-60	0.504 +/- 0.016 Bq/sample		
MAPEP-20-XrM43	Cm-244	0.0543 +/- 0.0007 Bq/sample	0.0513 +/- 0.0020 Bq/sample	-5.5
MAPEP-20-XrM43	Mn-54	0.0177 +/- 0.0004 Bq/sample		
MAPEP-20-XrM43	Pu-238	0.0587 +/- 0.0012 Bq/sample	0.0625 +/- 0.0020 Bq/sample	6.5
MAPEP-20-XrM43	Pu-239	0.0483 +/- 0.0012 Bq/sample	0.0507 +/- 0.0020 Bq/sample	5.0
MAPEP-20-XrM43	Sr-90	0.657 +/- 0.015 Bq/sample	0.7004 +/- 0.0143 Bq/sample	6.6
MAPEP-20-XrM43	Tc-99	0.694 +/- 0.015 Bq/sample		
MAPEP-20-XrM43	U-234	0.00804 +/- 0.00017 Bq/sample	0.0108 +/- 0.0001 Bq/sample	34.3
MAPEP-20-XrM43	U-238	0.0610 +/- 0.0012 Bq/sample	0.0558 +/- 0.0022 Bq/sample	-8.5
MAPEP-20-XrM43	Zn-65	0.00399 +/- 0.00009 Bq/sample		

Radiological Reference Date: August 1, 2020

MAPEP Mixed Analyte Performance Evaluation Program

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

Laboratory Results For MAPEP-20-XrM43
(EULC01) EnergySolutions, LLC
I-80, Exit 49
Clive, UT 84029

Radiological

Sample ID	Nuclide	Known Activity	Experimental Activity	Bias (%)
MAPEP-20-XrM43	Am-241	0.0477 +/- 0.0012 Bq/sample	479.96 +/- 158.29 Bq/sample	1006105.5
MAPEP-20-XrM43	Cs-134	0.159 +/- 0.004 Bq/sample		
MAPEP-20-XrM43	Cs-137	1.118 +/- 0.018 Bq/sample	1021.2 +/- 160.73 Bq/sample	91241.7
MAPEP-20-XrM43	Co-57	0.0144 +/- 0.0003 Bq/sample		
MAPEP-20-XrM43	Co-60	0.504 +/- 0.016 Bq/sample	458.43 +/- 66.84 Bq/sample	90858.3
MAPEP-20-XrM43	Cm-244	0.0543 +/- 0.0007 Bq/sample		
MAPEP-20-XrM43	Mn-54	0.0177 +/- 0.0004 Bq/sample		
MAPEP-20-XrM43	Pu-238	0.0587 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	Pu-239	0.0483 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	K-40		2837.16 +/- 790.76 Bq/sample	
MAPEP-20-XrM43	Sr-90	0.657 +/- 0.015 Bq/sample		
MAPEP-20-XrM43	Tc-99	0.694 +/- 0.015 Bq/sample		
MAPEP-20-XrM43	U-234	0.00804 +/- 0.00017 Bq/sample		
MAPEP-20-XrM43	U-238	0.0610 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	Zn-65	0.00399 +/- 0.00009 Bq/sample		

Radiological Reference Date: August 1, 2020

MAPEP Mixed Analyte Performance Evaluation Program
Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-20-XrM43
(FDHE01) Florida Dept of Health Environmental Laboratory
PO Box 680069
Orlando, FL 32868-0069

Radiological

Sample ID	Nuclide	Known Activity	Experimental Activity	Bias (%)
MAPEP-20-XrM43	Am-241	0.0477 +/- 0.0012 Bq/sample	0.03 +/- 0.14 Bq/sample	-37.1
MAPEP-20-XrM43	Cs-134	0.159 +/- 0.004 Bq/sample	0.18 +/- 0.02 Bq/sample	13.2
MAPEP-20-XrM43	Cs-137	1.118 +/- 0.018 Bq/sample	1.04 +/- 0.04 Bq/sample	-7.0
MAPEP-20-XrM43	Co-57	0.0144 +/- 0.0003 Bq/sample		
MAPEP-20-XrM43	Co-60	0.504 +/- 0.016 Bq/sample	0.42 +/- 0.02 Bq/sample	-16.7
MAPEP-20-XrM43	Cm-244	0.0543 +/- 0.0007 Bq/sample		
MAPEP-20-XrM43	Mn-54	0.0177 +/- 0.0004 Bq/sample		
MAPEP-20-XrM43	Pu-238	0.0587 +/- 0.0012 Bq/sample	0.0436 +/- 0.0053 Bq/sample	-25.7
MAPEP-20-XrM43	Pu-239	0.0483 +/- 0.0012 Bq/sample	0.03724 +/- 0.0049 Bq/sample	-22.9
MAPEP-20-XrM43	K-40		1.85 +/- 0.13 Bq/sample	
MAPEP-20-XrM43	Sr-90	0.657 +/- 0.015 Bq/sample	0.3848 +/- 0.03885 Bq/sample	-41.4
MAPEP-20-XrM43	Tc-99	0.694 +/- 0.015 Bq/sample		
MAPEP-20-XrM43	U-234	0.00804 +/- 0.00017 Bq/sample	0.0033 +/- 0.00066 Bq/sample	-59.0
MAPEP-20-XrM43	U-238	0.0610 +/- 0.0012 Bq/sample	0.03911 +/- 0.0027 Bq/sample	-35.9
MAPEP-20-XrM43	Zn-65	0.00399 +/- 0.00009 Bq/sample		

Radiological Reference Date: August 1, 2020

MAPEP Mixed Analyte Performance Evaluation Program

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

Laboratory Results For MAPEP-20-XrM43

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

Radiological

Sample ID	Nuclide	Known Activity	Experimental Activity	Bias (%)
MAPEP-20-XrM43	Am-241	0.0477 +/- 0.0012 Bq/sample	0.04 +/- 0.01 Bq/sample	-16.1
MAPEP-20-XrM43	Cs-134	0.159 +/- 0.004 Bq/sample	0.18 +/- 0.01 Bq/sample	13.2
MAPEP-20-XrM43	Cs-137	1.118 +/- 0.018 Bq/sample	1.07 +/- 0.04 Bq/sample	-4.3
MAPEP-20-XrM43	Co-57	0.0144 +/- 0.0003 Bq/sample		
MAPEP-20-XrM43	Co-60	0.504 +/- 0.016 Bq/sample	0.43 +/- 0.02 Bq/sample	-14.7
MAPEP-20-XrM43	Cm-244	0.0543 +/- 0.0007 Bq/sample		
MAPEP-20-XrM43	Mn-54	0.0177 +/- 0.0004 Bq/sample		
MAPEP-20-XrM43	Pu-238	0.0587 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	Pu-239	0.0483 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	K-40		2.08 +/- 0.2 Bq/sample	
MAPEP-20-XrM43	Sr-90	0.657 +/- 0.015 Bq/sample		
MAPEP-20-XrM43	Tc-99	0.694 +/- 0.015 Bq/sample		
MAPEP-20-XrM43	U-234	0.00804 +/- 0.00017 Bq/sample		
MAPEP-20-XrM43	U-238	0.0610 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	Zn-65	0.00399 +/- 0.00009 Bq/sample		

Radiological Reference Date: August 1, 2020

MAPEP Mixed Analyte Performance Evaluation Program

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

Laboratory Results For MAPEP-20-XrM43
(GENE01) GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407

Radiological

Sample ID	Nuclide	Known Activity	Experimental Activity	Bias (%)
MAPEP-20-XrM43	Am-241	0.0477 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	Cs-134	0.159 +/- 0.004 Bq/sample	0.219 +/- 0.0483 Bq/sample	37.7
MAPEP-20-XrM43	Cs-137	1.118 +/- 0.018 Bq/sample	1.16 +/- 0.0754 Bq/sample	3.8
MAPEP-20-XrM43	Co-57	0.0144 +/- 0.0003 Bq/sample		
MAPEP-20-XrM43	Co-60	0.504 +/- 0.016 Bq/sample	0.528 +/- 0.0628 Bq/sample	4.8
MAPEP-20-XrM43	Cm-244	0.0543 +/- 0.0007 Bq/sample		
MAPEP-20-XrM43	Mn-54	0.0177 +/- 0.0004 Bq/sample		
MAPEP-20-XrM43	Pu-238	0.0587 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	Pu-239	0.0483 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	Sr-90	0.657 +/- 0.015 Bq/sample		
MAPEP-20-XrM43	Tc-99	0.694 +/- 0.015 Bq/sample		
MAPEP-20-XrM43	U-234	0.00804 +/- 0.00017 Bq/sample		
MAPEP-20-XrM43	U-238	0.0610 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	Zn-65	0.00399 +/- 0.00009 Bq/sample		

Radiological Reference Date: August 1, 2020

Mixed Analyte Performance Evaluation Program
Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-20-XrM43
(IEMA01) Illinois Emergency Management Agency Radiochemistry Laboratory
1301 Knotts St.
Springfield, IL 62703

Radiological

Sample ID	Nuclide	Known Activity	Experimental Activity	Bias (%)
MAPEP-20-XrM43	Am-241	0.0477 +/- 0.0012 Bq/sample	0.0482 +/- 0.0024 Bq/sample	1.0
MAPEP-20-XrM43	Cs-134	0.159 +/- 0.004 Bq/sample	0.175 +/- 0.028 Bq/sample	10.1
MAPEP-20-XrM43	Cs-137	1.118 +/- 0.018 Bq/sample	1.160 +/- 0.076 Bq/sample	3.8
MAPEP-20-XrM43	Co-57	0.0144 +/- 0.0003 Bq/sample		
MAPEP-20-XrM43	Co-60	0.504 +/- 0.016 Bq/sample	0.531 +/- 0.053 Bq/sample	5.4
MAPEP-20-XrM43	Cm-244	0.0543 +/- 0.0007 Bq/sample		
MAPEP-20-XrM43	Mn-54	0.0177 +/- 0.0004 Bq/sample		
MAPEP-20-XrM43	Pu-238	0.0587 +/- 0.0012 Bq/sample	0.0629 +/- 0.0054 Bq/sample	7.2
MAPEP-20-XrM43	Pu-239	0.0483 +/- 0.0012 Bq/sample	0.0455 +/- 0.0044 Bq/sample	-5.8
MAPEP-20-XrM43	K-40		2.27 +/- 0.78 Bq/sample	
MAPEP-20-XrM43	Sr-90	0.657 +/- 0.015 Bq/sample	0.631 +/- 0.039 Bq/sample	-4.0
MAPEP-20-XrM43	Tc-99	0.694 +/- 0.015 Bq/sample		
MAPEP-20-XrM43	U-234	0.00804 +/- 0.00017 Bq/sample	0.0120 +/- 0.0010 Bq/sample	49.3
MAPEP-20-XrM43	U-238	0.0610 +/- 0.0012 Bq/sample	0.0536 +/- 0.0024 Bq/sample	-12.1
MAPEP-20-XrM43	Zn-65	0.00399 +/- 0.00009 Bq/sample		

Radiological Reference Date: August 1, 2020

MAPEP Mixed Analyte Performance Evaluation Program

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

Laboratory Results For MAPEP-20-XrM43
(JAEC99) Research Laboratories and Information Directorate
Jordan Atomic Energy Commission
Amman, Jordan 70 (11934)

Radiological

Sample ID	Nuclide	Known Activity	Experimental Activity	Bias (%)
MAPEP-20-XrM43	Am-241	0.0477 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	Cs-134	0.159 +/- 0.004 Bq/sample		
MAPEP-20-XrM43	Cs-137	1.118 +/- 0.018 Bq/sample	1.18 +/- 0.09 Bq/sample	5.5
MAPEP-20-XrM43	Co-57	0.0144 +/- 0.0003 Bq/sample		
MAPEP-20-XrM43	Co-60	0.504 +/- 0.016 Bq/sample	0.52 +/- 0.04 Bq/sample	3.2
MAPEP-20-XrM43	Cm-244	0.0543 +/- 0.0007 Bq/sample		
MAPEP-20-XrM43	Mn-54	0.0177 +/- 0.0004 Bq/sample		
MAPEP-20-XrM43	Pu-238	0.0587 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	Pu-239	0.0483 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	K-40		3.2 +/- 0.51 Bq/sample	
MAPEP-20-XrM43	Sr-90	0.657 +/- 0.015 Bq/sample		
MAPEP-20-XrM43	Tc-99	0.694 +/- 0.015 Bq/sample		
MAPEP-20-XrM43	U-234	0.00804 +/- 0.00017 Bq/sample		
MAPEP-20-XrM43	U-238	0.0610 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	Zn-65	0.00399 +/- 0.00009 Bq/sample		

Radiological Reference Date: August 1, 2020

MAPEP Mixed Analyte Performance Evaluation Program
Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-20-XrM43
(JLNN01) Jefferson Laboratory
111 Hadron Drive
Newport News, VA 23606

Radiological

Sample ID	Nuclide	Known Activity	Experimental Activity	Bias (%)
MAPEP-20-XrM43	Am-241	0.0477 +/- 0.0012 Bq/sample	0.123 +/- 0.0252 Bq/sample	157.9
MAPEP-20-XrM43	Cs-134	0.159 +/- 0.004 Bq/sample	0.412 +/- 0.0647 Bq/sample	159.1
MAPEP-20-XrM43	Cs-137	1.118 +/- 0.018 Bq/sample	2.84 +/- 0.608 Bq/sample	154.0
MAPEP-20-XrM43	Co-57	0.0144 +/- 0.0003 Bq/sample		
MAPEP-20-XrM43	Co-60	0.504 +/- 0.016 Bq/sample	1.31 +/- 0.668 Bq/sample	159.9
MAPEP-20-XrM43	Cm-244	0.0543 +/- 0.0007 Bq/sample		
MAPEP-20-XrM43	Mn-54	0.0177 +/- 0.0004 Bq/sample		
MAPEP-20-XrM43	Pu-238	0.0587 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	Pu-239	0.0483 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	K-40		2.47 +/- 2.48 Bq/sample	
MAPEP-20-XrM43	Sr-90	0.657 +/- 0.015 Bq/sample		
MAPEP-20-XrM43	Tc-99	0.694 +/- 0.015 Bq/sample		
MAPEP-20-XrM43	U-234	0.00804 +/- 0.00017 Bq/sample		
MAPEP-20-XrM43	U-238	0.0610 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	Zn-65	0.00399 +/- 0.00009 Bq/sample		

Radiological Reference Date: August 1, 2020

MAPEP Mixed Analyte Performance Evaluation Program
Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-20-XrM43
(LAWR01) LAWRENCE BERKELEY NATIONAL LABORATORY
1 CYCLOTRON RD.
BERKELEY, CA 94720

Radiological

Sample ID	Nuclide	Known Activity	Experimental Activity	Bias (%)
MAPEP-20-XrM43	Am-241	0.0477 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	Cs-134	0.159 +/- 0.004 Bq/sample	.1846 +/- .02731 Bq/sample	16.1
MAPEP-20-XrM43	Cs-137	1.118 +/- 0.018 Bq/sample	1.666 +/- .05856 Bq/sample	49.0
MAPEP-20-XrM43	Co-57	0.0144 +/- 0.0003 Bq/sample		
MAPEP-20-XrM43	Co-60	0.504 +/- 0.016 Bq/sample	.7738 +/- .0469 Bq/sample	53.5
MAPEP-20-XrM43	Cm-244	0.0543 +/- 0.0007 Bq/sample		
MAPEP-20-XrM43	Mn-54	0.0177 +/- 0.0004 Bq/sample		
MAPEP-20-XrM43	Pu-238	0.0587 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	Pu-239	0.0483 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	K-40		3.159 +/- .4674 Bq/sample	
MAPEP-20-XrM43	Sr-90	0.657 +/- 0.015 Bq/sample		
MAPEP-20-XrM43	Tc-99	0.694 +/- 0.015 Bq/sample		
MAPEP-20-XrM43	U-234	0.00804 +/- 0.00017 Bq/sample		
MAPEP-20-XrM43	U-238	0.0610 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	Zn-65	0.00399 +/- 0.00009 Bq/sample		

Radiological Reference Date: August 1, 2020

MAPEP Mixed Analyte Performance Evaluation Program
Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-20-XrM43

(MALA99) Alypz Sdn. Bhd.
No. 14, JLN USJ 1/1
Subang Jaya, Selangor 47600

Radiological

Sample ID	Nuclide	Known Activity	Experimental Activity	Bias (%)
MAPEP-20-XrM43	Am-241	0.0477 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	Cs-134	0.159 +/- 0.004 Bq/sample		
MAPEP-20-XrM43	Cs-137	1.118 +/- 0.018 Bq/sample	2.30 +/- 0.22 Bq/sample	105.7
MAPEP-20-XrM43	Co-57	0.0144 +/- 0.0003 Bq/sample		
MAPEP-20-XrM43	Co-60	0.504 +/- 0.016 Bq/sample	0.59 +/- 0.13 Bq/sample	17.1
MAPEP-20-XrM43	Cm-244	0.0543 +/- 0.0007 Bq/sample		
MAPEP-20-XrM43	Mn-54	0.0177 +/- 0.0004 Bq/sample		
MAPEP-20-XrM43	Pu-238	0.0587 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	Pu-239	0.0483 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	K-40		4.84 +/- 2.68 Bq/sample	
MAPEP-20-XrM43	Sr-90	0.657 +/- 0.015 Bq/sample		
MAPEP-20-XrM43	Tc-99	0.694 +/- 0.015 Bq/sample		
MAPEP-20-XrM43	U-234	0.00804 +/- 0.00017 Bq/sample		
MAPEP-20-XrM43	U-238	0.0610 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	Zn-65	0.00399 +/- 0.00009 Bq/sample		

Radiological Reference Date: August 1, 2020

MAPEP Mixed Analyte Performance Evaluation Program
Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-20-XrM43

(NOCS99) National Oceanography Centre, Southampton
GAU-Radioanalytical
Southampton, Hampshire SO14 3ZH

Radiological

Sample ID	Nuclide	Known Activity	Experimental Activity	Bias (%)
MAPEP-20-XrM43	Am-241	0.0477 +/- 0.0012 Bq/sample	0.042 +/- 0.003 Bq/sample	-12.0
MAPEP-20-XrM43	Cs-134	0.159 +/- 0.004 Bq/sample	0.17 +/- 0.01 Bq/sample	6.9
MAPEP-20-XrM43	Cs-137	1.118 +/- 0.018 Bq/sample	1.08 +/- 0.03 Bq/sample	-3.4
MAPEP-20-XrM43	Co-57	0.0144 +/- 0.0003 Bq/sample		
MAPEP-20-XrM43	Co-60	0.504 +/- 0.016 Bq/sample	0.52 +/- 0.02 Bq/sample	3.2
MAPEP-20-XrM43	Cm-244	0.0543 +/- 0.0007 Bq/sample	0.046 +/- 0.003 Bq/sample	-15.3
MAPEP-20-XrM43	Mn-54	0.0177 +/- 0.0004 Bq/sample		
MAPEP-20-XrM43	Pu-238	0.0587 +/- 0.0012 Bq/sample	0.055 +/- 0.004 Bq/sample	-6.3
MAPEP-20-XrM43	Pu-239	0.0483 +/- 0.0012 Bq/sample	0.045 +/- 0.003 Bq/sample	-6.8
MAPEP-20-XrM43	Sr-90	0.657 +/- 0.015 Bq/sample	0.60 +/- 0.05 Bq/sample	-8.7
MAPEP-20-XrM43	Tc-99	0.694 +/- 0.015 Bq/sample		
MAPEP-20-XrM43	U-234	0.00804 +/- 0.00017 Bq/sample	0.1 +/- 0.1 Bq/sample	1143.8
MAPEP-20-XrM43	U-238	0.0610 +/- 0.0012 Bq/sample	0.072 +/- 0.007 Bq/sample	18.0
MAPEP-20-XrM43	Zn-65	0.00399 +/- 0.00009 Bq/sample		

Radiological Reference Date: August 1, 2020

MAPEP Mixed Analyte Performance Evaluation Program
Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-20-XrM43
(ODHL01) Ohio Department of Health Laboratory
8995 E Main Street
Reynoldsburg, OH 43068

Radiological

Sample ID	Nuclide	Known Activity	Experimental Activity	Bias (%)
MAPEP-20-XrM43	Am-241	0.0477 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	Cs-134	0.159 +/- 0.004 Bq/sample	0.212 +/- 0.0194 Bq/sample	33.3
MAPEP-20-XrM43	Cs-137	1.118 +/- 0.018 Bq/sample	1.44 +/- 0.0976 Bq/sample	28.8
MAPEP-20-XrM43	Co-57	0.0144 +/- 0.0003 Bq/sample	0.0165 +/- 0.0142 Bq/sample	14.6
MAPEP-20-XrM43	Co-60	0.504 +/- 0.016 Bq/sample	0.554 +/- 0.0329 Bq/sample	9.9
MAPEP-20-XrM43	Cm-244	0.0543 +/- 0.0007 Bq/sample		
MAPEP-20-XrM43	Mn-54	0.0177 +/- 0.0004 Bq/sample	0.00836 +/- 0.0231 Bq/sample	-52.8
MAPEP-20-XrM43	Pu-238	0.0587 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	Pu-239	0.0483 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	K-40		2.96 +/- 0.408 Bq/sample	
MAPEP-20-XrM43	Sr-90	0.657 +/- 0.015 Bq/sample		
MAPEP-20-XrM43	Tc-99	0.694 +/- 0.015 Bq/sample		
MAPEP-20-XrM43	U-234	0.00804 +/- 0.00017 Bq/sample		
MAPEP-20-XrM43	U-238	0.0610 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	Zn-65	0.00399 +/- 0.00009 Bq/sample	0.020 +/- 0.0486 Bq/sample	

Radiological Reference Date: August 1, 2020

MAPEP Mixed Analyte Performance Evaluation Program
Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP-20-XrM43
(RAVR99) Radiactividad Ambiental y Vigilancia Radiologica
CIEMAT (Ed 70 P2 D11)
Madrid, Madrid 28040

Mass

Sample ID	Nuclide	Known Activity	Experimental Activity	Bias (%)
MAPEP-20-XrM43	U-Total		4.4 +/- 0.2 ug/sample	

Radiological

Sample ID	Nuclide	Known Activity	Experimental Activity	Bias (%)
MAPEP-20-XrM43	Am-241	0.0477 +/- 0.0012 Bq/sample	0.0407 +/- 0.0028 Bq/sample	-14.7
MAPEP-20-XrM43	Cs-134	0.159 +/- 0.004 Bq/sample	0.0844 +/- 0.0080 Bq/sample	-46.9
MAPEP-20-XrM43	Cs-137	1.118 +/- 0.018 Bq/sample	0.789 +/- 0.032 Bq/sample	-29.4
MAPEP-20-XrM43	Co-57	0.0144 +/- 0.0003 Bq/sample	0.0145 +/- 0.0063 Bq/sample	0.7
MAPEP-20-XrM43	Co-60	0.504 +/- 0.016 Bq/sample	0.562 +/- 0.027 Bq/sample	11.5
MAPEP-20-XrM43	Cm-244	0.0543 +/- 0.0007 Bq/sample	0.0457 +/- 0.0034 Bq/sample	-15.8
MAPEP-20-XrM43	Mn-54	0.0177 +/- 0.0004 Bq/sample		
MAPEP-20-XrM43	Pu-238	0.0587 +/- 0.0012 Bq/sample	0.0208 +/- 0.0016 Bq/sample	-64.6
MAPEP-20-XrM43	Pu-239	0.0483 +/- 0.0012 Bq/sample	0.0157 +/- 0.0014 Bq/sample	-67.5
MAPEP-20-XrM43	K-40		3.06 +/- 0.41 Bq/sample	
MAPEP-20-XrM43	Ra-226		0.099 +/- 0.015 Bq/sample	
MAPEP-20-XrM43	Sr-90	0.657 +/- 0.015 Bq/sample	0.55 +/- 0.04 Bq/sample	-16.3
MAPEP-20-XrM43	Tc-99	0.694 +/- 0.015 Bq/sample		
MAPEP-20-XrM43	U-234	0.00804 +/- 0.00017 Bq/sample	0.746 +/- 0.054 Bq/sample	9178.6
MAPEP-20-XrM43	U-235		0.0237 +/- 0.0041 Bq/sample	
MAPEP-20-XrM43	U-238	0.0610 +/- 0.0012 Bq/sample	0.785 +/- 0.065 Bq/sample	1186.9
MAPEP-20-XrM43	Zn-65	0.00399 +/- 0.00009 Bq/sample		

Radiological Reference Date: August 1, 2020

MAPEP Mixed Analyte Performance Evaluation Program

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

Laboratory Results For MAPEP-20-XrM43
(SEML01) SRS Environmental Monitoring Laboratory
Bldg 735-B
Aiken, SC 29808

Radiological

Sample ID	Nuclide	Known Activity	Experimental Activity	Bias (%)
MAPEP-20-XrM43	Am-241	0.0477 +/- 0.0012 Bq/sample	0.0418 +/- 0.0033 Bq/sample	-12.4
MAPEP-20-XrM43	Sb-124		0.23 +/- 0.12 Bq/sample	
MAPEP-20-XrM43	Cs-134	0.159 +/- 0.004 Bq/sample		
MAPEP-20-XrM43	Cs-137	1.118 +/- 0.018 Bq/sample	0.791 +/- 0.081 Bq/sample	-29.2
MAPEP-20-XrM43	Co-57	0.0144 +/- 0.0003 Bq/sample		
MAPEP-20-XrM43	Co-60	0.504 +/- 0.016 Bq/sample	0.514 +/- 0.049 Bq/sample	2.0
MAPEP-20-XrM43	Cm-244	0.0543 +/- 0.0007 Bq/sample		
MAPEP-20-XrM43	Mn-54	0.0177 +/- 0.0004 Bq/sample		
MAPEP-20-XrM43	Pu-238	0.0587 +/- 0.0012 Bq/sample	0.0566 +/- 0.0044 Bq/sample	-3.6
MAPEP-20-XrM43	Pu-239	0.0483 +/- 0.0012 Bq/sample	0.0465 +/- 0.0037 Bq/sample	-3.7
MAPEP-20-XrM43	Sr-90	0.657 +/- 0.015 Bq/sample	0.615 +/- 0.038 Bq/sample	-6.4
MAPEP-20-XrM43	Tc-99	0.694 +/- 0.015 Bq/sample		
MAPEP-20-XrM43	U-234	0.00804 +/- 0.00017 Bq/sample	0.00749 +/- 0.00096 Bq/sample	-6.8
MAPEP-20-XrM43	U-238	0.0610 +/- 0.0012 Bq/sample	0.0547 +/- 0.0041 Bq/sample	-10.3
MAPEP-20-XrM43	Zn-65	0.00399 +/- 0.00009 Bq/sample		

Radiological Reference Date: August 1, 2020

MAPEP Mixed Analyte Performance Evaluation Program

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

Laboratory Results For MAPEP-20-XrM43

(SRPD01) Sandia National Laboratories, Radiation Protection Sample Diagnostics
PO Box 5800, MS1103
Albuquerque, NM 87185-1103

Radiological

Sample ID	Nuclide	Known Activity	Experimental Activity	Bias (%)
MAPEP-20-XrM43	Am-241	0.0477 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	Cs-134	0.159 +/- 0.004 Bq/sample	0.268 +/- 0.0801 Bq/sample	68.6
MAPEP-20-XrM43	Cs-137	1.118 +/- 0.018 Bq/sample	1.43 +/- 0.127 Bq/sample	27.9
MAPEP-20-XrM43	Co-57	0.0144 +/- 0.0003 Bq/sample	-0.0755 +/- 0.0609 Bq/sample	-624.3
MAPEP-20-XrM43	Co-60	0.504 +/- 0.016 Bq/sample	0.500 +/- 0.0713 Bq/sample	-0.8
MAPEP-20-XrM43	Cm-244	0.0543 +/- 0.0007 Bq/sample		
MAPEP-20-XrM43	Mn-54	0.0177 +/- 0.0004 Bq/sample	-0.0421 +/- 0.0784 Bq/sample	-337.9
MAPEP-20-XrM43	Pu-238	0.0587 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	Pu-239	0.0483 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	K-40		3.25 +/- 0.771 Bq/sample	
MAPEP-20-XrM43	Sr-90	0.657 +/- 0.015 Bq/sample		
MAPEP-20-XrM43	Tc-99	0.694 +/- 0.015 Bq/sample		
MAPEP-20-XrM43	U-234	0.00804 +/- 0.00017 Bq/sample		
MAPEP-20-XrM43	U-238	0.0610 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	Zn-65	0.00399 +/- 0.00009 Bq/sample	0.0495 +/- 0.167 Bq/sample	

Radiological Reference Date: August 1, 2020

MAPEP Mixed Analyte Performance Evaluation Program

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

Laboratory Results For MAPEP-20-XrM43
(TELE02) ATI Environmental, Inc., Midwest Lab
700 Landwehr Road
Northbrook, IL 60062-

Radiological

Sample ID	Nuclide	Known Activity	Experimental Activity	Bias (%)
MAPEP-20-XrM43	Am-241	0.0477 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	Cs-134	0.159 +/- 0.004 Bq/sample	0.165 +/- 0.055 Bq/sample	3.8
MAPEP-20-XrM43	Cs-137	1.118 +/- 0.018 Bq/sample	1.33 +/- 0.12 Bq/sample	19.0
MAPEP-20-XrM43	Co-57	0.0144 +/- 0.0003 Bq/sample	0.062 +/- 0.065 Bq/sample	330.6
MAPEP-20-XrM43	Co-60	0.504 +/- 0.016 Bq/sample	0.682 +/- 0.080 Bq/sample	35.3
MAPEP-20-XrM43	Cm-244	0.0543 +/- 0.0007 Bq/sample		
MAPEP-20-XrM43	Mn-54	0.0177 +/- 0.0004 Bq/sample	0.018 +/- 0.049 Bq/sample	1.7
MAPEP-20-XrM43	Pu-238	0.0587 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	Pu-239	0.0483 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	K-40		3.10 +/- 1.27 Bq/sample	
MAPEP-20-XrM43	Sr-90	0.657 +/- 0.015 Bq/sample		
MAPEP-20-XrM43	Tc-99	0.694 +/- 0.015 Bq/sample		
MAPEP-20-XrM43	U-234	0.00804 +/- 0.00017 Bq/sample		
MAPEP-20-XrM43	U-238	0.0610 +/- 0.0012 Bq/sample		
MAPEP-20-XrM43	Zn-65	0.00399 +/- 0.00009 Bq/sample	0.016 +/- 0.098 Bq/sample	

Radiological Reference Date: August 1, 2020

Mixed Analyte Performance Evaluation Program

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

Laboratory Results For MAPEP-20-XrM43
(WSTP99) Cavendish Nuclear Limited
Greeson Court
Cumbria, UK CA24 3HZ

Mass

Sample ID	Nuclide	Known Activity	Experimental Activity	Bias (%)
MAPEP-20-XrM43	U-235		0.00884 +/- 0.00040 ug/sample	
MAPEP-20-XrM43	U-238		4.61 +/- 0.15 ug/sample	
MAPEP-20-XrM43	U-Total		4.90 +/- 0.16 ug/sample	

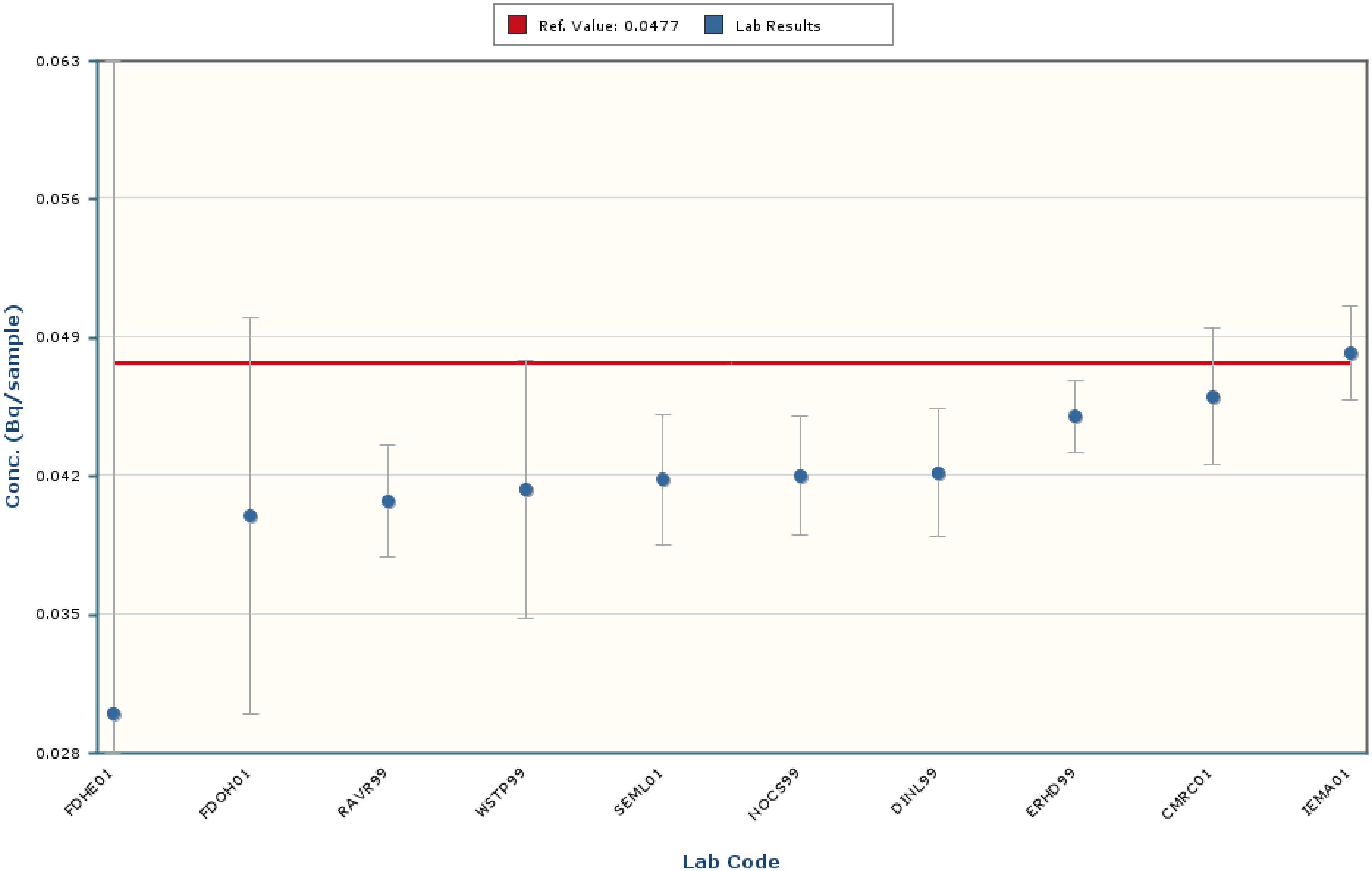
Radiological

Sample ID	Nuclide	Known Activity	Experimental Activity	Bias (%)
MAPEP-20-XrM43	Am-241	0.0477 +/- 0.0012 Bq/sample	0.0413 +/- 0.0065 Bq/sample	-13.4
MAPEP-20-XrM43	Cs-134	0.159 +/- 0.004 Bq/sample	0.206 +/- 0.027 Bq/sample	29.6
MAPEP-20-XrM43	Cs-137	1.118 +/- 0.018 Bq/sample	1.099 +/- 0.084 Bq/sample	-1.7
MAPEP-20-XrM43	Co-57	0.0144 +/- 0.0003 Bq/sample	0.015 +/- 0.017 Bq/sample	4.2
MAPEP-20-XrM43	Co-60	0.504 +/- 0.016 Bq/sample	0.476 +/- 0.028 Bq/sample	-5.6
MAPEP-20-XrM43	Cm-242		0.00135 +/- 0.00097 Bq/sample	
MAPEP-20-XrM43	Cm-244	0.0543 +/- 0.0007 Bq/sample	0.0467 +/- 0.0071 Bq/sample	-14.0
MAPEP-20-XrM43	Mn-54	0.0177 +/- 0.0004 Bq/sample	0.007 +/- 0.018 Bq/sample	-60.5
MAPEP-20-XrM43	Pu-238	0.0587 +/- 0.0012 Bq/sample	0.0628 +/- 0.0056 Bq/sample	7.0
MAPEP-20-XrM43	Pu-239	0.0483 +/- 0.0012 Bq/sample	0.0503 +/- 0.0048 Bq/sample	4.1
MAPEP-20-XrM43	K-40		1.73 +/- 0.36 Bq/sample	
MAPEP-20-XrM43	Sr-90	0.657 +/- 0.015 Bq/sample	0.609 +/- 0.026 Bq/sample	-7.3
MAPEP-20-XrM43	Tc-99	0.694 +/- 0.015 Bq/sample		
MAPEP-20-XrM43	U-234	0.00804 +/- 0.00017 Bq/sample	0.0081 +/- 0.0011 Bq/sample	0.7
MAPEP-20-XrM43	U-238	0.0610 +/- 0.0012 Bq/sample	0.0573 +/- 0.0018 Bq/sample	-6.1
MAPEP-20-XrM43	Zn-65	0.00399 +/- 0.00009 Bq/sample	-0.039 +/- 0.045 Bq/sample	

Radiological Reference Date: August 1, 2020

Americium-241

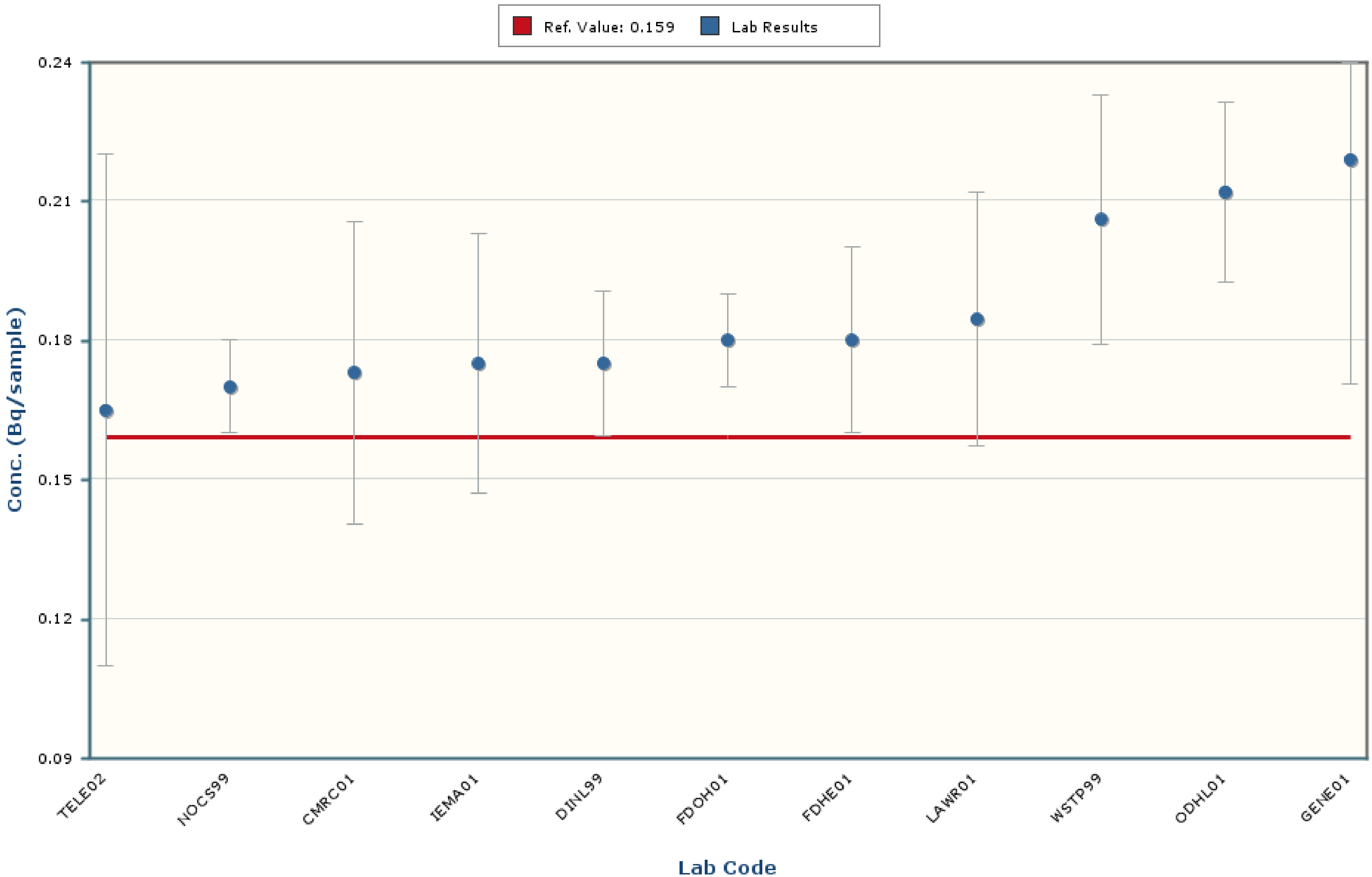
MAPEP-20-XrM43



Notes:
The error bars encompassing each result are plotted at ± one standard deviation.

Cesium-134

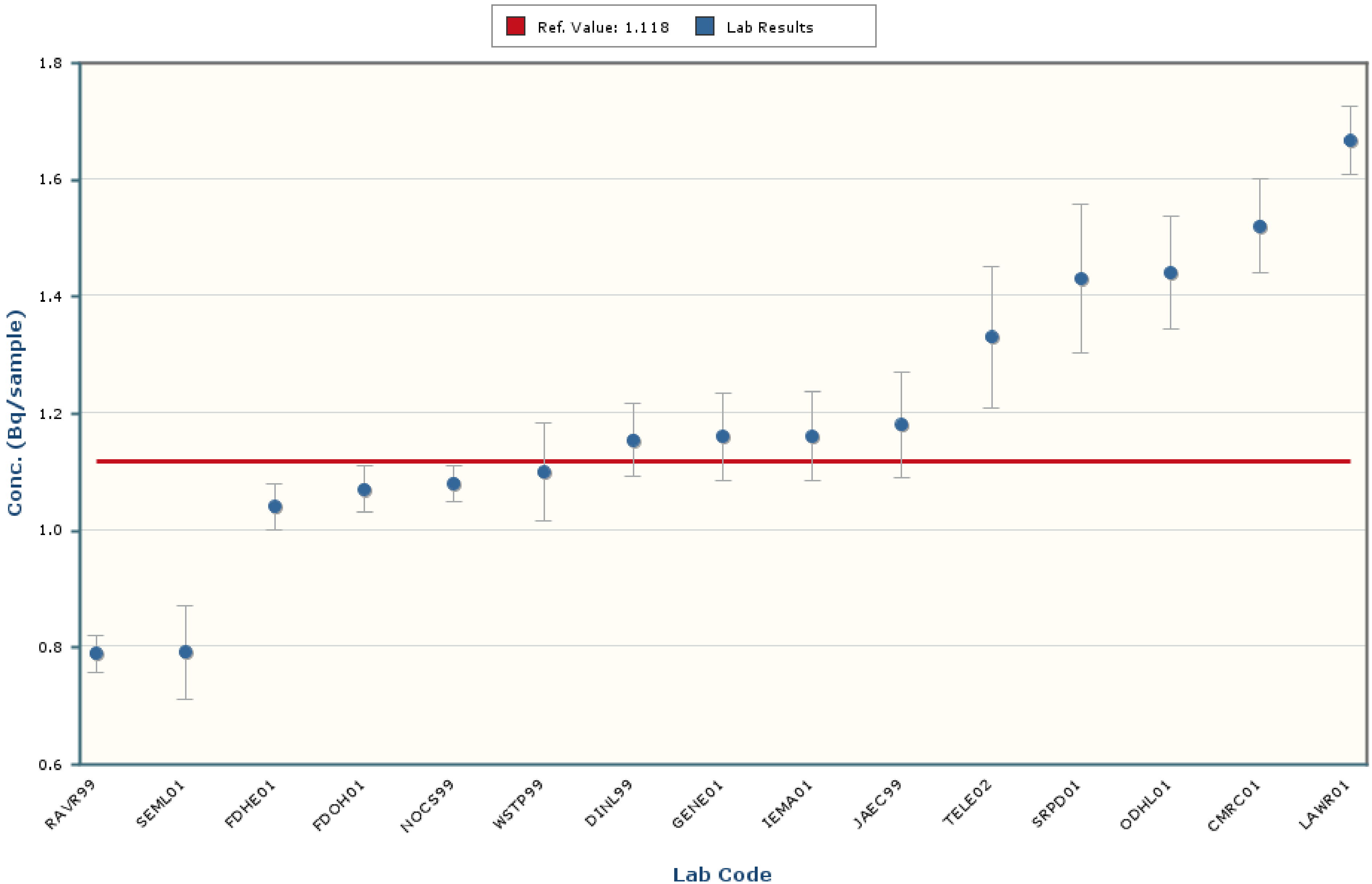
MAPEP-20-XrM43



Notes:
The error bars encompassing each result are plotted at ± one standard deviation.

Cesium-137

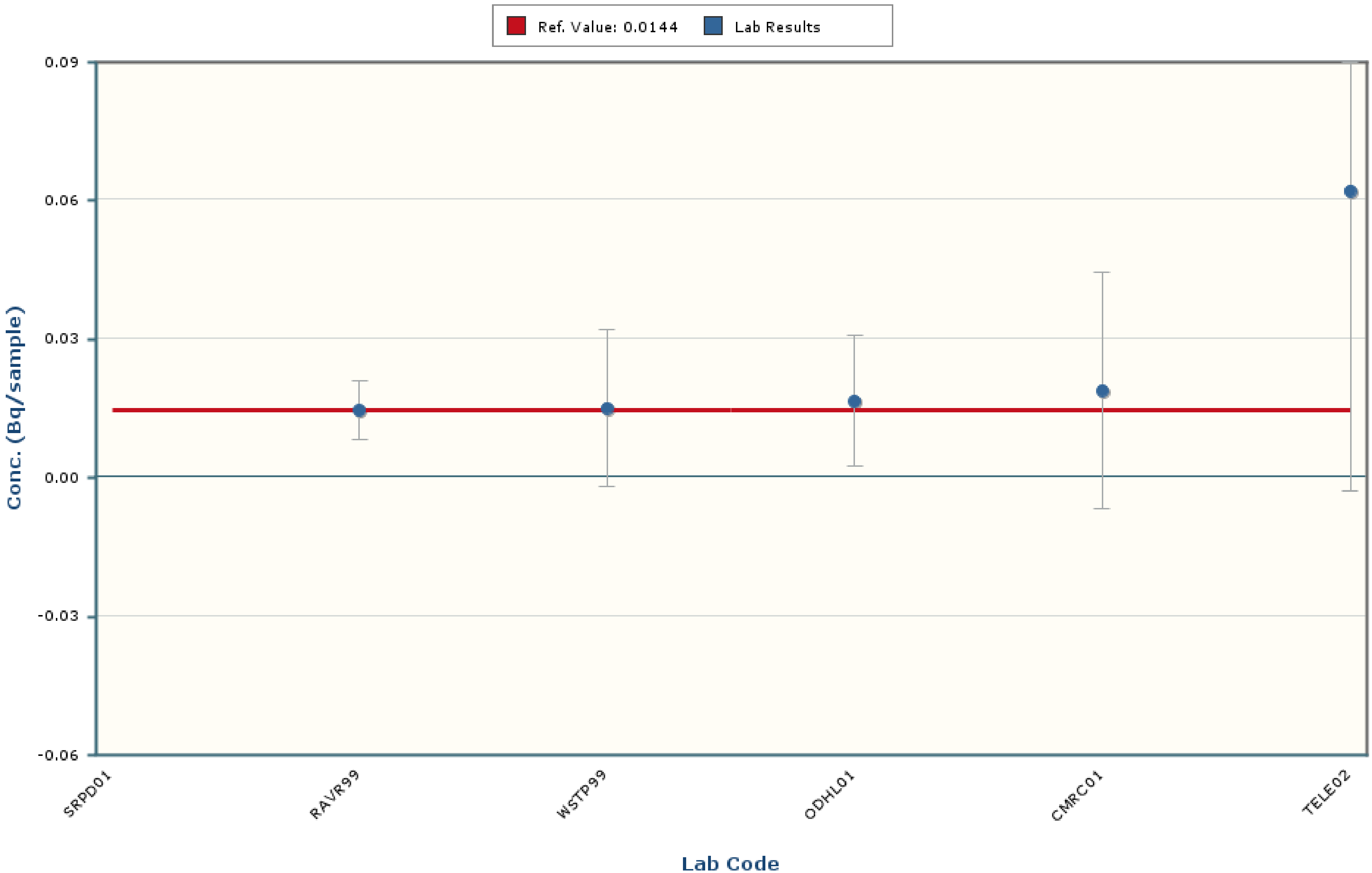
MAPEP-20-XrM43



Notes:
The error bars encompassing each result are plotted at ± one standard deviation.

Cobalt-57

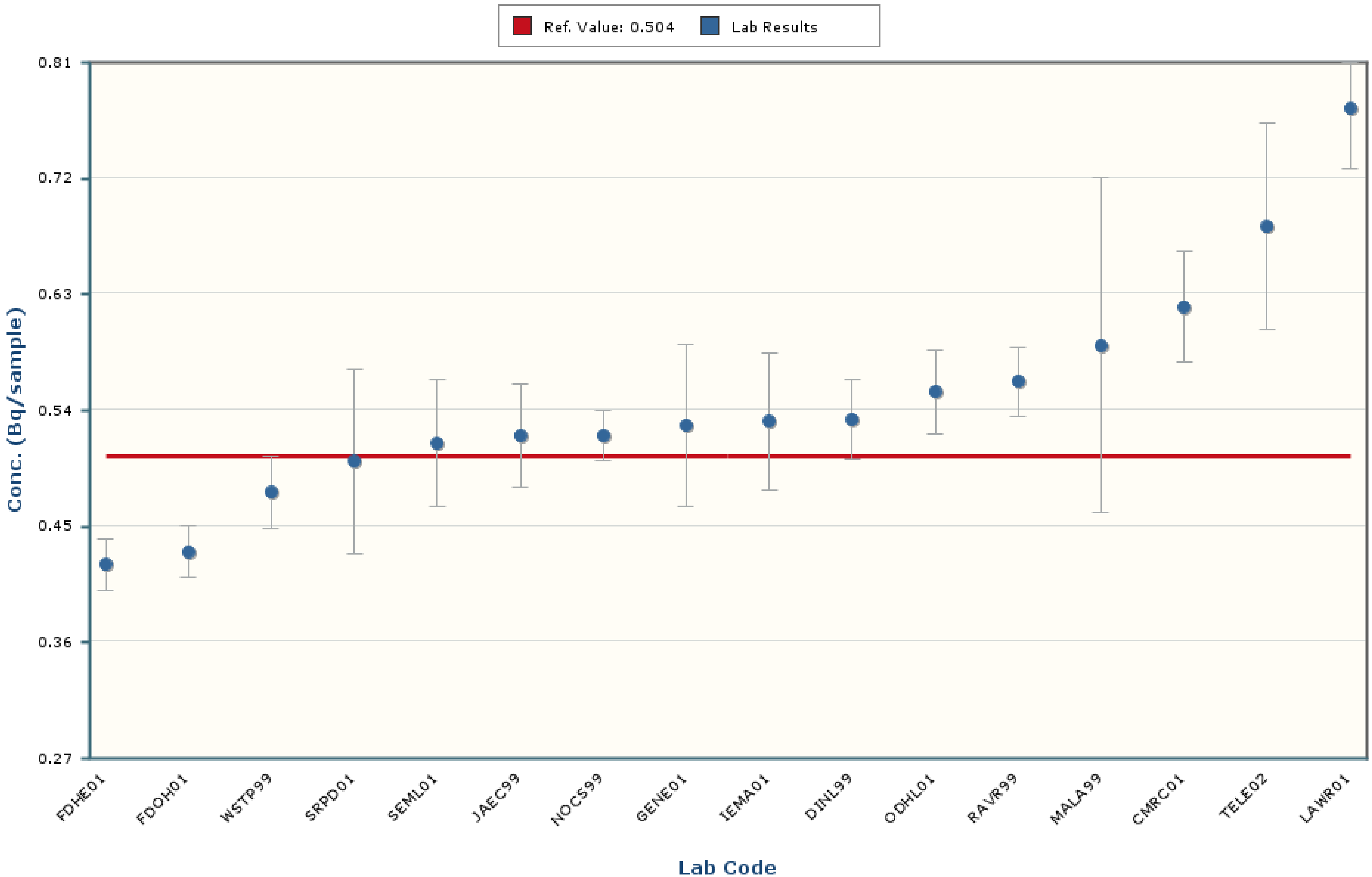
MAPEP-20-XrM43



Notes:
The error bars encompassing each result are plotted at ± one standard deviation.

Cobalt-60

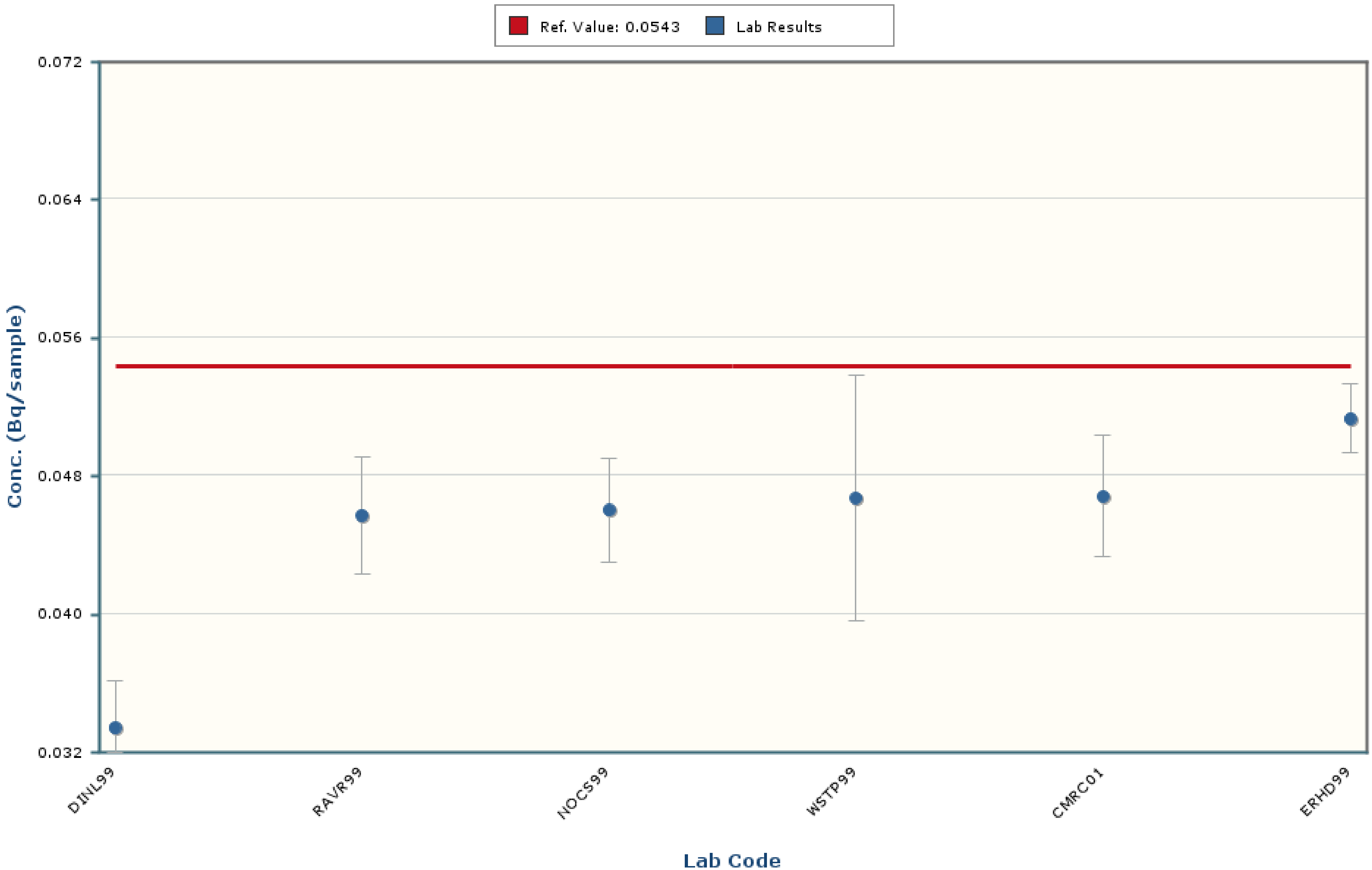
MAPEP-20-XrM43



Notes:
The error bars encompassing each result are plotted at ± one standard deviation.

Curium-244

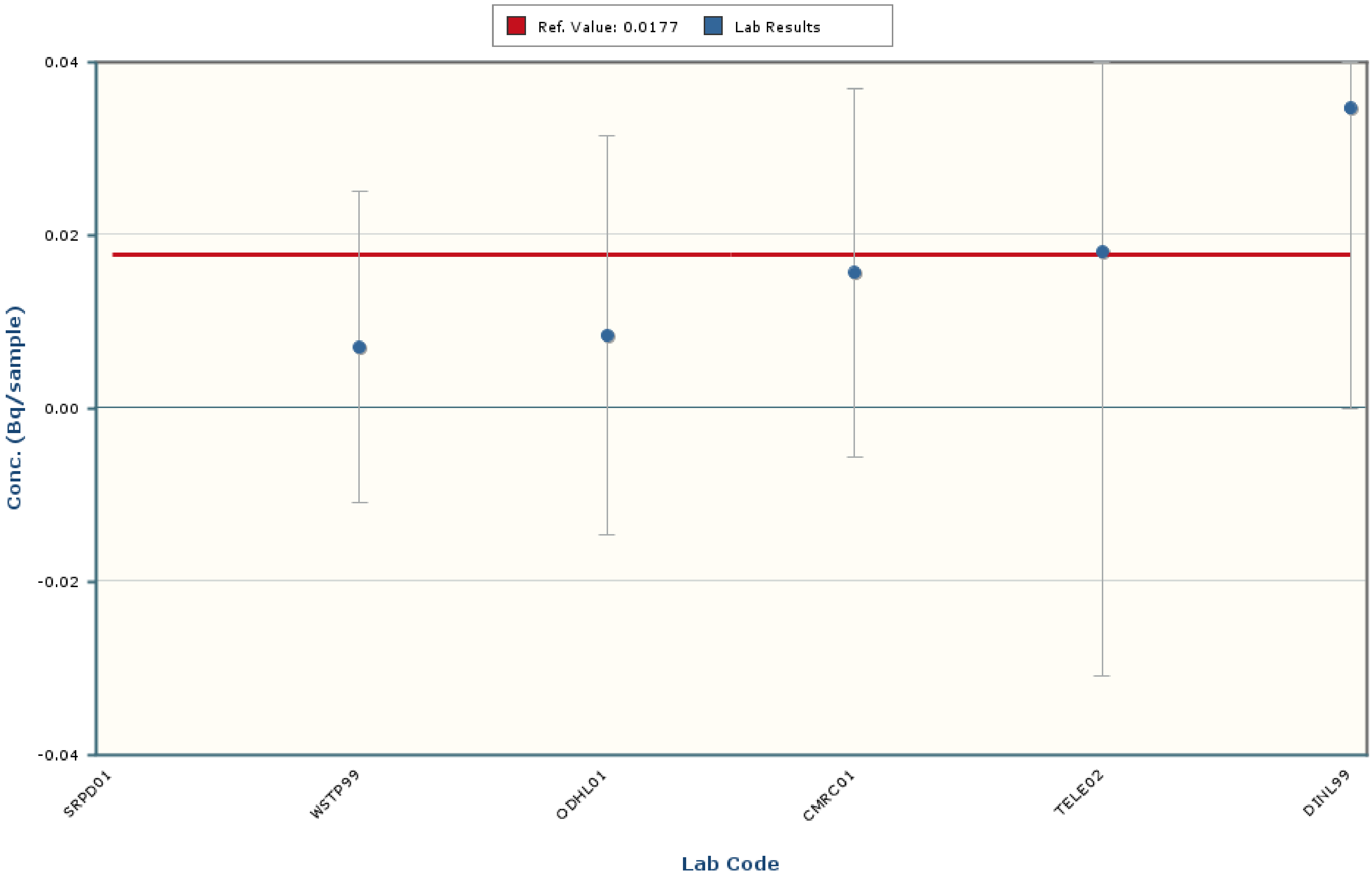
MAPEP-20-XrM43



Notes:
The error bars encompassing each result are plotted at ± one standard deviation.

Manganese-54

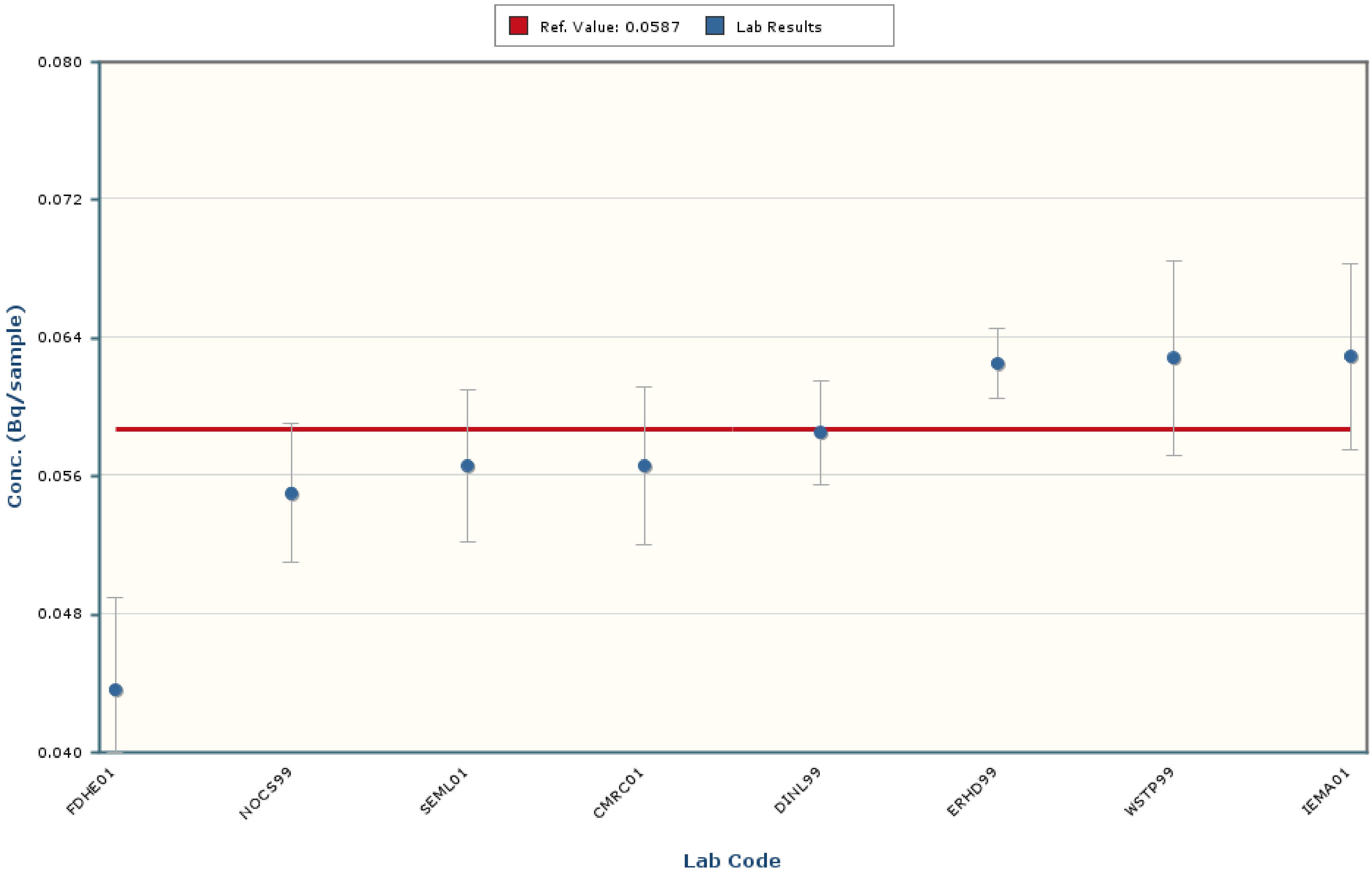
MAPEP-20-XrM43



Notes:
The error bars encompassing each result are plotted at ± one standard deviation.

Plutonium-238

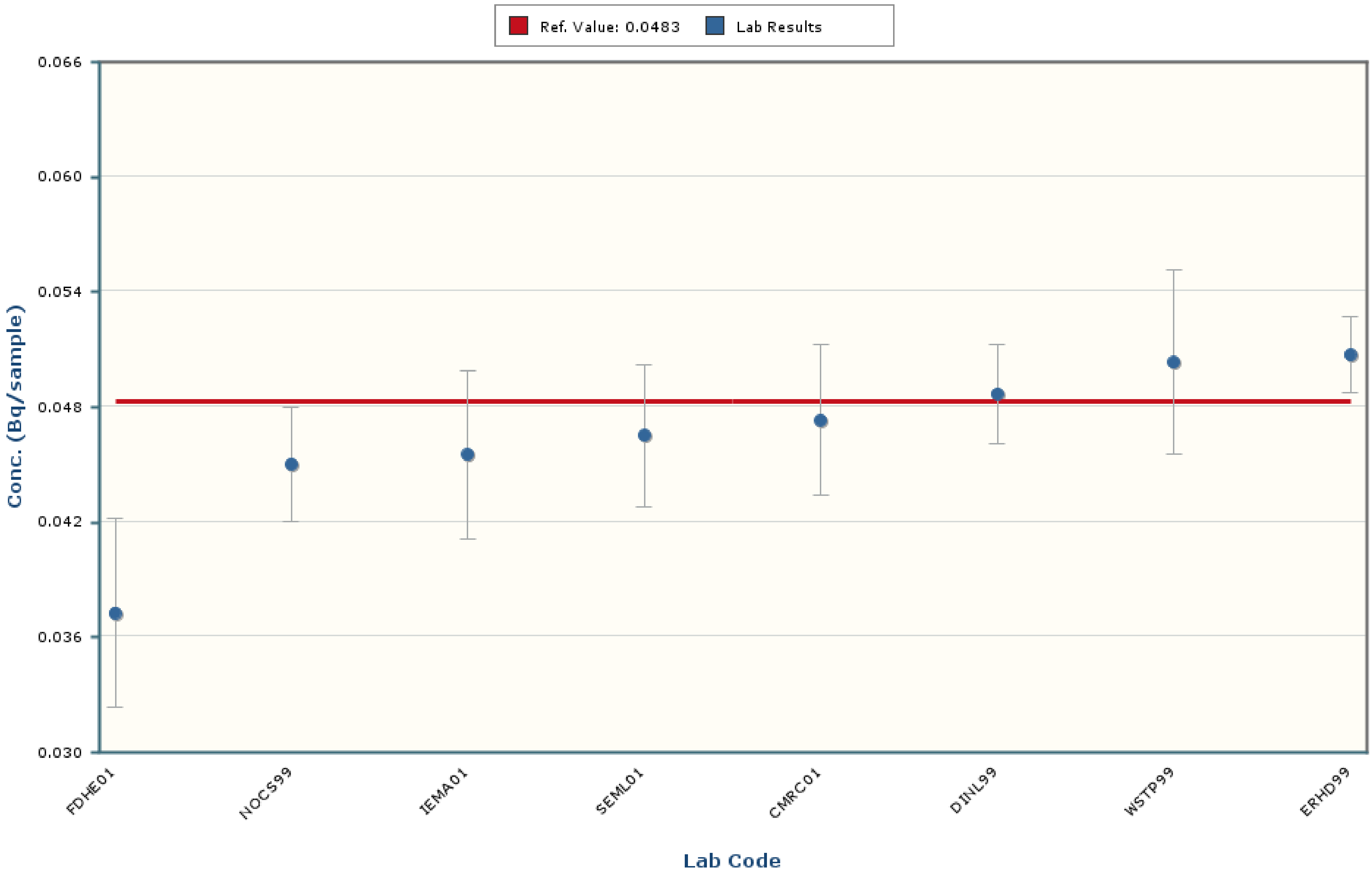
MAPEP-20-XrM43



Notes:
The error bars encompassing each result are plotted at ± one standard deviation.

Plutonium-239/240

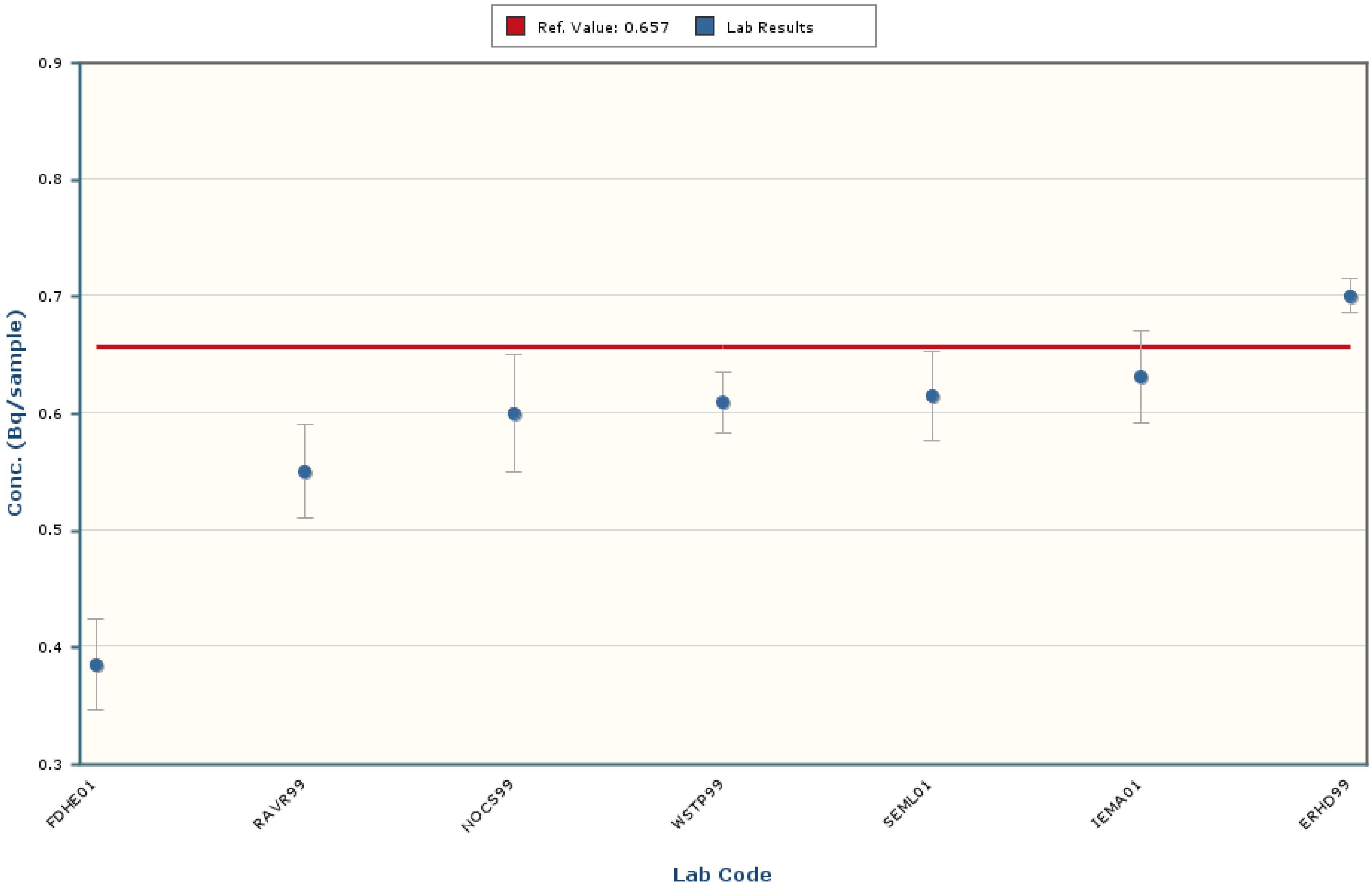
MAPEP-20-XrM43



Notes:
The error bars encompassing each result are plotted at ± one standard deviation.

Strontium-90

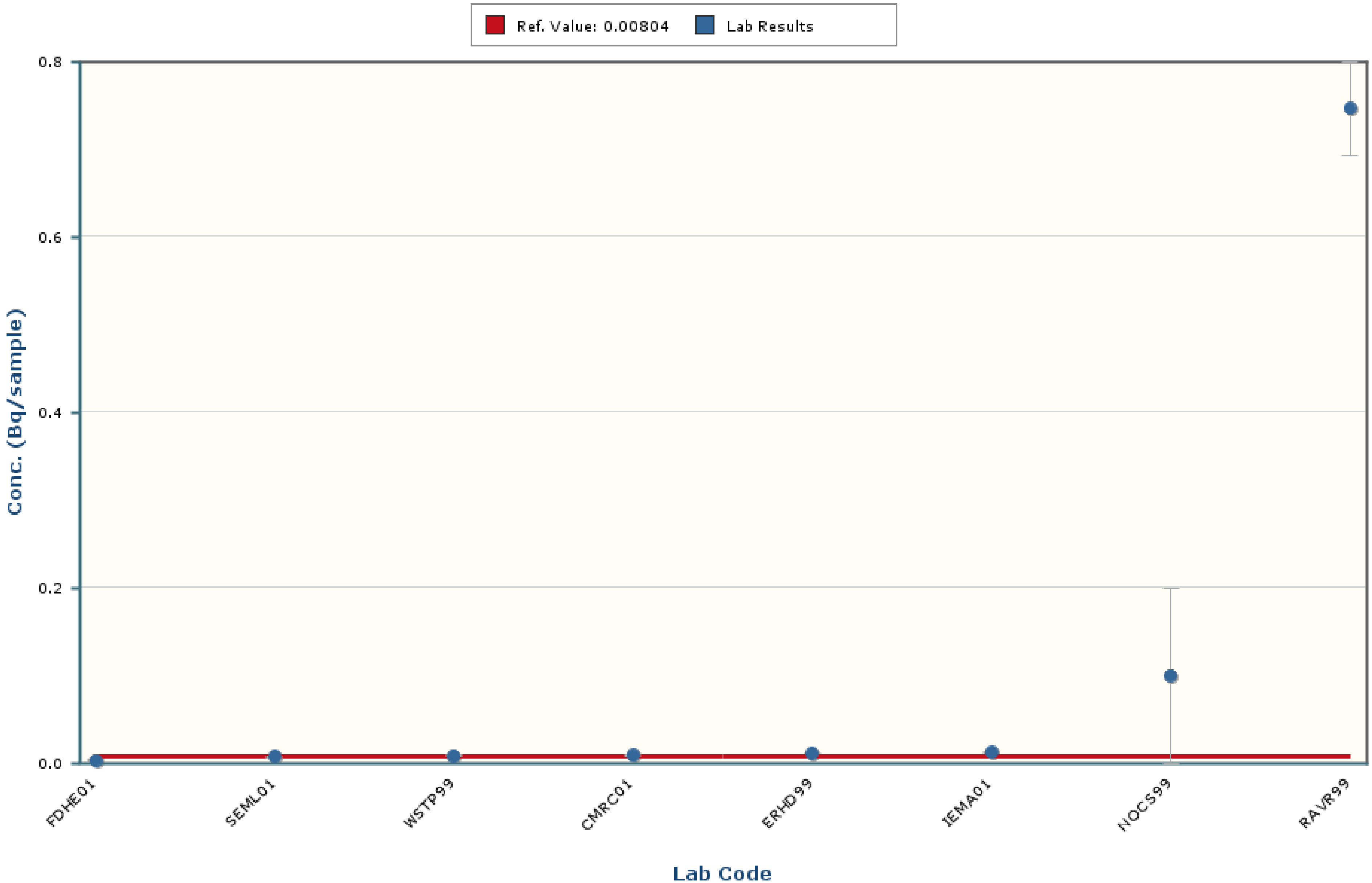
MAPEP-20-XrM43



Notes:
The error bars encompassing each result are plotted at ± one standard deviation.

Uranium-234

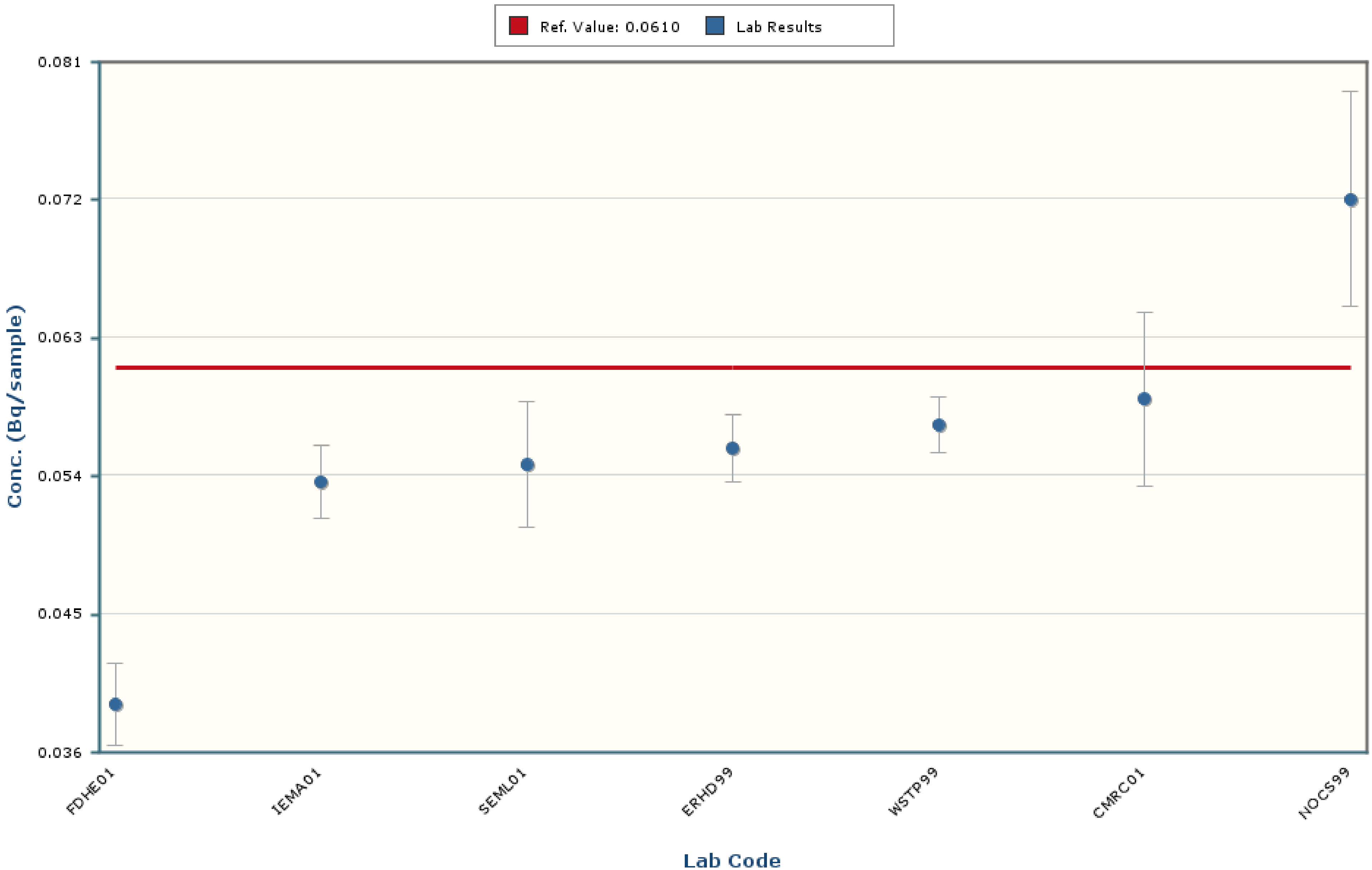
MAPEP-20-XrM43



Notes:
The error bars encompassing each result are plotted at ± one standard deviation.

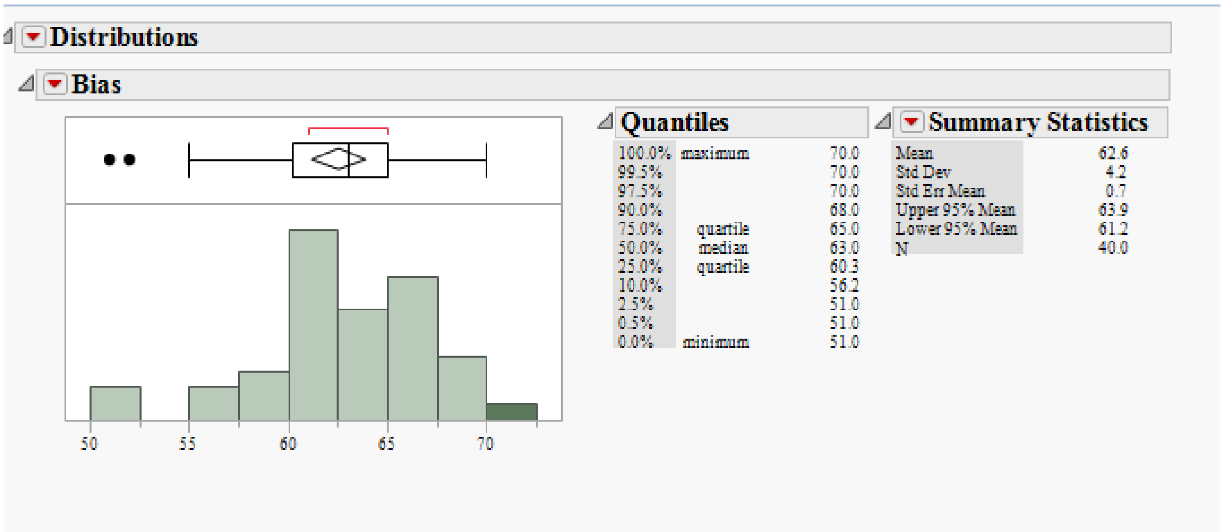
Uranium-238

MAPEP-20-XrM43



Notes:
The error bars encompassing each result are plotted at ± one standard deviation.

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.

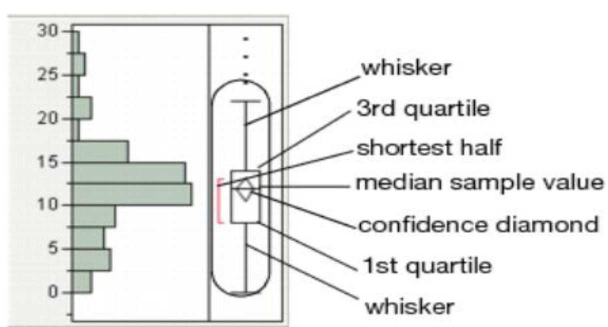


Outlier Box Plot

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).

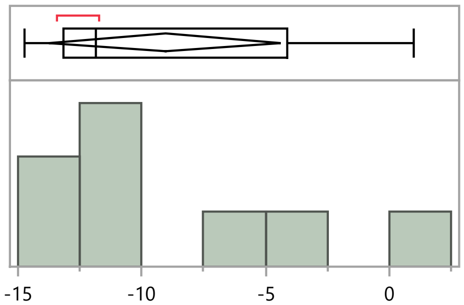
Ref. "SAS Institute Inc. 2016. JMP® 13 Basic Analysis. Cary, NC: SAS Institute Inc."

XrM43 Distribution by Detection Method

XrM Distribution by Detection Method

Distributions Analyte_Detection=Americium-241 Alpha Spectrometry

Bias



Quantiles

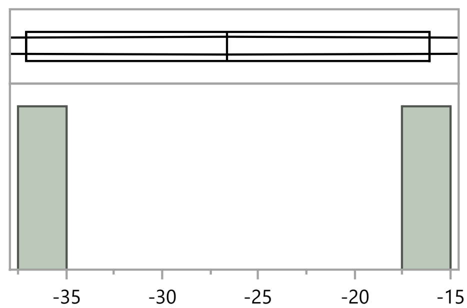
100.0%	maximum	1.0
99.5%		1.0
97.5%		1.0
90.0%		1.0
75.0%	quartile	-4.1
50.0%	median	-11.9
25.0%	quartile	-13.2
10.0%		-14.7
2.5%		-14.7
0.5%		-14.7
0.0%	minimum	-14.7

Summary Statistics

Mean	-9.1
Std Dev	5.6
Std Err Mean	2.0
Upper 95% Mean	-4.4
Lower 95% Mean	-13.7
N	8.0

Distributions Analyte_Detection=Americium-241 Gamma Spectrometry

Bias



Quantiles

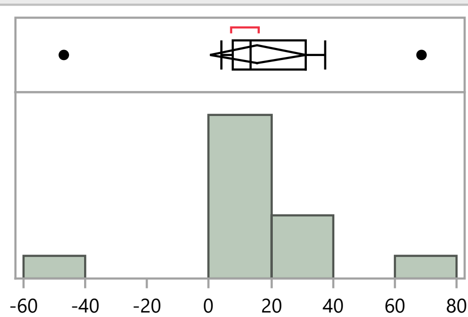
100.0%	maximum	-16.1
99.5%		-16.1
97.5%		-16.1
90.0%		-16.1
75.0%	quartile	-16.1
50.0%	median	-26.6
25.0%	quartile	-37.1
10.0%		-37.1
2.5%		-37.1
0.5%		-37.1
0.0%	minimum	-37.1

Summary Statistics

Mean	-26.6
Std Dev	14.8
Std Err Mean	10.5
Upper 95% Mean	106.8
Lower 95% Mean	-160.0
N	2.0

Distributions Analyte_Detection=Cesium-134 Gamma Spectrometry

Bias



Quantiles

100.0%	maximum	68.6
99.5%		68.6
97.5%		68.6
90.0%		56.2
75.0%	quartile	31.5
50.0%	median	13.2
25.0%	quartile	7.9
10.0%		-26.6
2.5%		-46.9
0.5%		-46.9
0.0%	minimum	-46.9

Summary Statistics

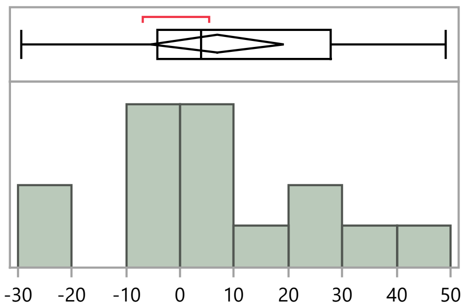
Mean	15.7
Std Dev	25.9
Std Err Mean	7.2
Upper 95% Mean	31.4
Lower 95% Mean	0.1
N	13.0

XrM43 Distribution by Detection Method

XrM Distribution by Detection Method

Distributions Analyte_Detection=Cesium-137 Gamma Spectrometry

Bias



Quantiles

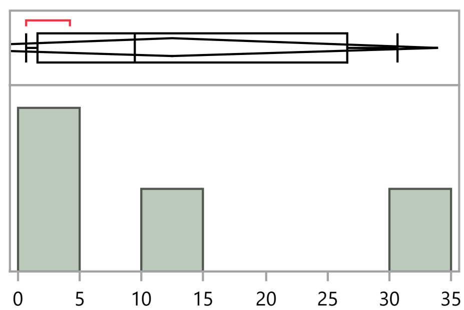
100.0%	maximum	49.0
99.5%		49.0
97.5%		49.0
90.0%		41.2
75.0%	quartile	27.9
50.0%	median	3.8
25.0%	quartile	-4.3
10.0%		-29.3
2.5%		-29.4
0.5%		-29.4
0.0%	minimum	-29.4

Summary Statistics

Mean	6.8
Std Dev	22.1
Std Err Mean	5.7
Upper 95% Mean	19.0
Lower 95% Mean	-5.4
N	15.0

Distributions Analyte_Detection=Cobalt-57 Gamma Spectrometry

Bias



Quantiles

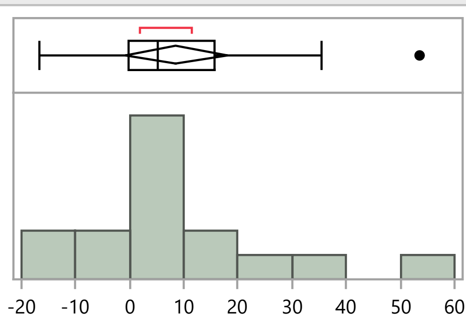
100.0%	maximum	30.6
99.5%		30.6
97.5%		30.6
90.0%		30.6
75.0%	quartile	26.6
50.0%	median	9.4
25.0%	quartile	1.6
10.0%		0.7
2.5%		0.7
0.5%		0.7
0.0%	minimum	0.7

Summary Statistics

Mean	12.5
Std Dev	13.4
Std Err Mean	6.7
Upper 95% Mean	33.9
Lower 95% Mean	-8.8
N	4.0

Distributions Analyte_Detection=Cobalt-60 Gamma Spectrometry

Bias



Quantiles

100.0%	maximum	53.5
99.5%		53.5
97.5%		53.5
90.0%		40.8
75.0%	quartile	15.7
50.0%	median	5.1
25.0%	quartile	-0.1
10.0%		-15.3
2.5%		-16.7
0.5%		-16.7
0.0%	minimum	-16.7

Summary Statistics

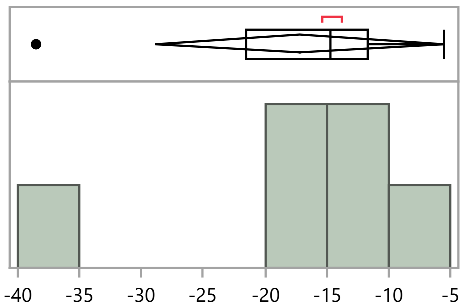
Mean	8.6
Std Dev	17.6
Std Err Mean	4.4
Upper 95% Mean	17.9
Lower 95% Mean	-0.8
N	16.0

XrM43 Distribution by Detection Method

XrM Distribution by Detection Method

Distributions Analyte_Detection=Curium-244 Alpha Spectrometry

Bias



Quantiles

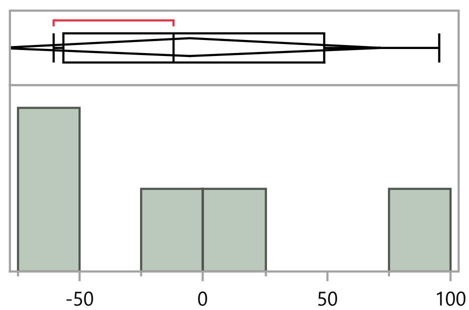
100.0%	maximum	-5.5
99.5%		-5.5
97.5%		-5.5
90.0%		-5.5
75.0%	quartile	-11.7
50.0%	median	-14.7
25.0%	quartile	-21.5
10.0%		-38.5
2.5%		-38.5
0.5%		-38.5
0.0%	minimum	-38.5

Summary Statistics

Mean	-17.2
Std Dev	11.1
Std Err Mean	4.5
Upper 95% Mean	-5.5
Lower 95% Mean	-28.8
N	6.0

Distributions Analyte_Detection=Manganese-54 Gamma Spectrometry

Bias



Quantiles

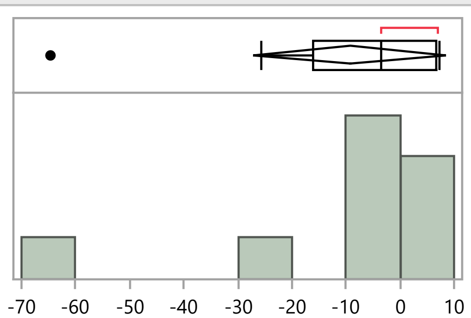
100.0%	maximum	95.5
99.5%		95.5
97.5%		95.5
90.0%		95.5
75.0%	quartile	48.6
50.0%	median	-11.9
25.0%	quartile	-56.7
10.0%		-60.5
2.5%		-60.5
0.5%		-60.5
0.0%	minimum	-60.5

Summary Statistics

Mean	-5.6
Std Dev	62.4
Std Err Mean	27.9
Upper 95% Mean	71.8
Lower 95% Mean	-83.0
N	5.0

Distributions Analyte_Detection=Plutonium-238 Alpha Spectrometry

Bias



Quantiles

100.0%	maximum	7.2
99.5%		7.2
97.5%		7.2
90.0%		7.2
75.0%	quartile	6.8
50.0%	median	-3.6
25.0%	quartile	-16.0
10.0%		-64.6
2.5%		-64.6
0.5%		-64.6
0.0%	minimum	-64.6

Summary Statistics

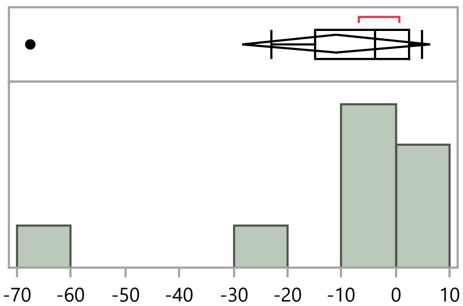
Mean	-9.3
Std Dev	23.1
Std Err Mean	7.7
Upper 95% Mean	8.5
Lower 95% Mean	-27.0
N	9.0

XrM43 Distribution by Detection Method

XrM Distribution by Detection Method

Distributions Analyte_Detection=Plutonium-239/240 Alpha Spectrometry

Bias



Quantiles

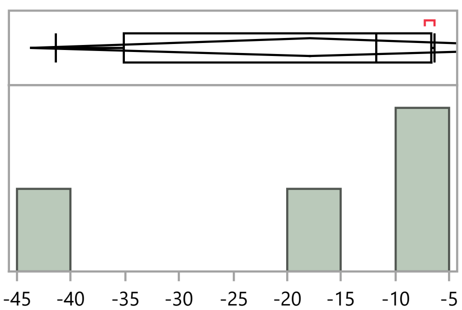
100.0%	maximum	5.0
99.5%		5.0
97.5%		5.0
90.0%		5.0
75.0%	quartile	2.4
50.0%	median	-3.7
25.0%	quartile	-14.9
10.0%		-67.5
2.5%		-67.5
0.5%		-67.5
0.0%	minimum	-67.5

Summary Statistics

Mean	-11.0
Std Dev	22.7
Std Err Mean	7.6
Upper 95% Mean	6.5
Lower 95% Mean	-28.5
N	9.0

Distributions Analyte_Detection=Strontium-90 Gas Flow Proportional Counter

Bias



Quantiles

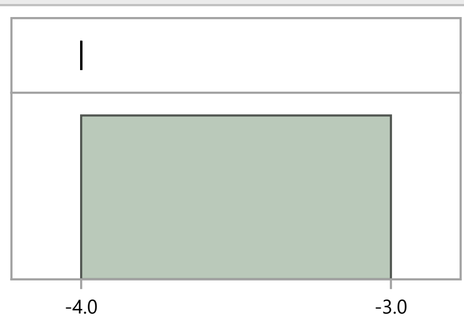
100.0%	maximum	-6.4
99.5%		-6.4
97.5%		-6.4
90.0%		-6.4
75.0%	quartile	-6.6
50.0%	median	-11.8
25.0%	quartile	-35.1
10.0%		-41.4
2.5%		-41.4
0.5%		-41.4
0.0%	minimum	-41.4

Summary Statistics

Mean	-17.9
Std Dev	16.3
Std Err Mean	8.2
Upper 95% Mean	8.1
Lower 95% Mean	-43.8
N	4.0

Distributions Analyte_Detection=Strontium-90 Gross Alpha/Beta - 2 pi gas flow proportional counter

Bias



Quantiles

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

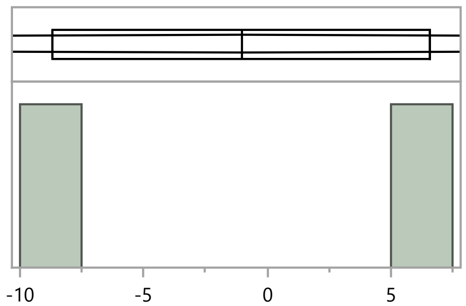
Summary Statistics

Mean	-4.0
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

XrM Distribution by Detection Method

Distributions Analyte_Detection=Strontium-90 Liquid Scintillation Counter

Bias



Quantiles

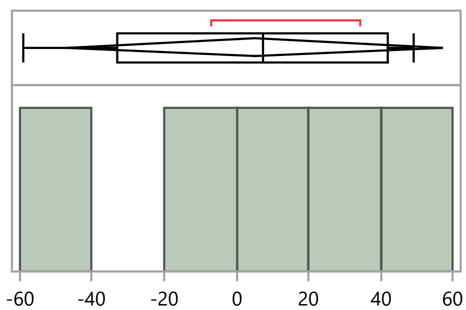
100.0%	maximum	6.6
99.5%		6.6
97.5%		6.6
90.0%		6.6
75.0%	quartile	6.6
50.0%	median	-1.1
25.0%	quartile	-8.7
10.0%		-8.7
2.5%		-8.7
0.5%		-8.7
0.0%	minimum	-8.7

Summary Statistics

Mean	-1.1
Std Dev	10.8
Std Err Mean	7.7
Upper 95% Mean	96.2
Lower 95% Mean	-98.3
N	2.0

Distributions Analyte_Detection=Uranium-234 Alpha Spectrometry

Bias



Quantiles

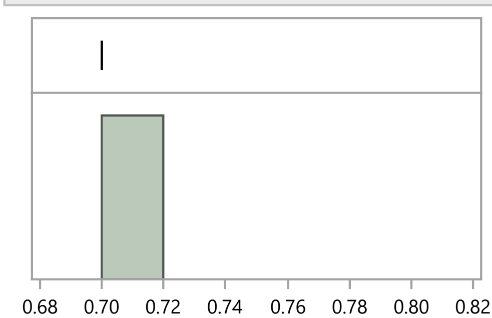
100.0%	maximum	49.3
99.5%		49.3
97.5%		49.3
90.0%		49.3
75.0%	quartile	41.8
50.0%	median	7.5
25.0%	quartile	-32.9
10.0%		-59.0
2.5%		-59.0
0.5%		-59.0
0.0%	minimum	-59.0

Summary Statistics

Mean	5.1
Std Dev	42.0
Std Err Mean	18.8
Upper 95% Mean	57.2
Lower 95% Mean	-47.1
N	5.0

Distributions Analyte_Detection=Uranium-234 Inductively Coupled Plasma Mass Spectrometry

Bias



Quantiles

100.0%	maximum	0.7
99.5%		0.7
97.5%		0.7
90.0%		0.7
75.0%	quartile	0.7
50.0%	median	0.7
25.0%	quartile	0.7
10.0%		0.7
2.5%		0.7
0.5%		0.7
0.0%	minimum	0.7

Summary Statistics

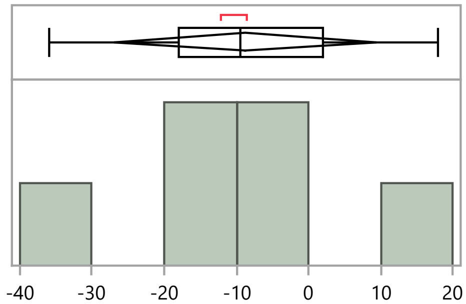
Mean	0.7
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

XrM43 Distribution by Detection Method

XrM Distribution by Detection Method

Distributions Analyte_Detection=Uranium-238 Alpha Spectrometry

Bias



Quantiles

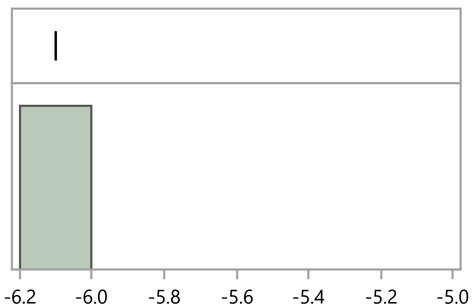
100.0%	maximum	18.0
99.5%		18.0
97.5%		18.0
90.0%		18.0
75.0%	quartile	2.0
50.0%	median	-9.4
25.0%	quartile	-18.1
10.0%		-35.9
2.5%		-35.9
0.5%		-35.9
0.0%	minimum	-35.9

Summary Statistics

Mean	-8.7
Std Dev	17.3
Std Err Mean	7.1
Upper 95% Mean	9.5
Lower 95% Mean	-26.8
N	6.0

Distributions Analyte_Detection=Uranium-238 Inductively Coupled Plasma Mass Spectrometry

Bias



Quantiles

100.0%	maximum	-6.1
99.5%		-6.1
97.5%		-6.1
90.0%		-6.1
75.0%	quartile	-6.1
50.0%	median	-6.1
25.0%	quartile	-6.1
10.0%		-6.1
2.5%		-6.1
0.5%		-6.1
0.0%	minimum	-6.1

Summary Statistics

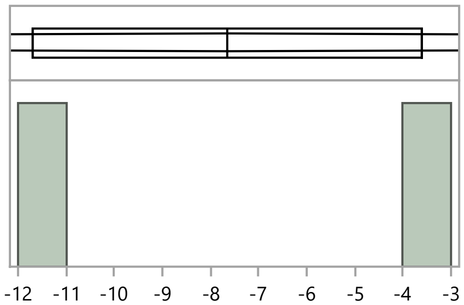
Mean	-6.1
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

XrM43 Distribution by Preparation Method

XrM Distribution by Prep Method

Distributions Analyte_Method=Americium-241 Acid dissolution with hydrofluoric acid

Bias



Quantiles

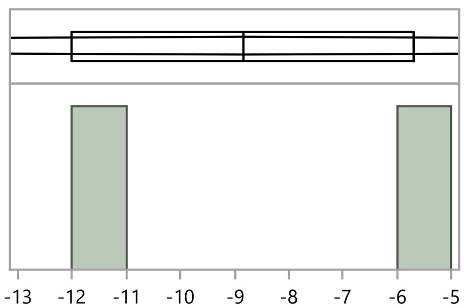
100.0%	maximum	-3.6
99.5%		-3.6
97.5%		-3.6
90.0%		-3.6
75.0%	quartile	-3.6
50.0%	median	-7.7
25.0%	quartile	-11.7
10.0%		-11.7
2.5%		-11.7
0.5%		-11.7
0.0%	minimum	-11.7

Summary Statistics

Mean	-7.7
Std Dev	5.7
Std Err Mean	4.0
Upper 95% Mean	43.8
Lower 95% Mean	-59.1
N	2.0

Distributions Analyte_Method=Americium-241 Acid leaching without hydrofluoric acid

Bias



Quantiles

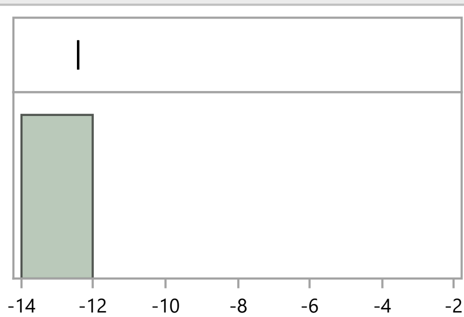
100.0%	maximum	-5.7
99.5%		-5.7
97.5%		-5.7
90.0%		-5.7
75.0%	quartile	-5.7
50.0%	median	-8.9
25.0%	quartile	-12.0
10.0%		-12.0
2.5%		-12.0
0.5%		-12.0
0.0%	minimum	-12.0

Summary Statistics

Mean	-8.9
Std Dev	4.5
Std Err Mean	3.2
Upper 95% Mean	31.2
Lower 95% Mean	-48.9
N	2.0

Distributions Analyte_Method=Americium-241 Coprecipitation, acidified

Bias



Quantiles

100.0%	maximum	-12.4
99.5%		-12.4
97.5%		-12.4
90.0%		-12.4
75.0%	quartile	-12.4
50.0%	median	-12.4
25.0%	quartile	-12.4
10.0%		-12.4
2.5%		-12.4
0.5%		-12.4
0.0%	minimum	-12.4

Summary Statistics

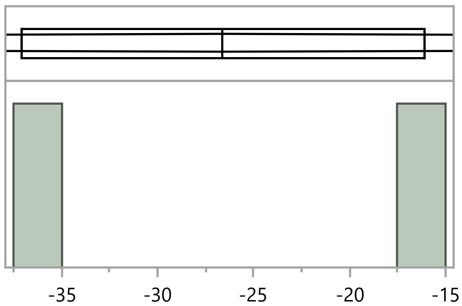
Mean	-12.4
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

XrM43 Distribution by Preparation Method

XrM Distribution by Prep Method

Distributions Analyte_Method=Americium-241 No preparation - analyzed as received

Bias



Quantiles

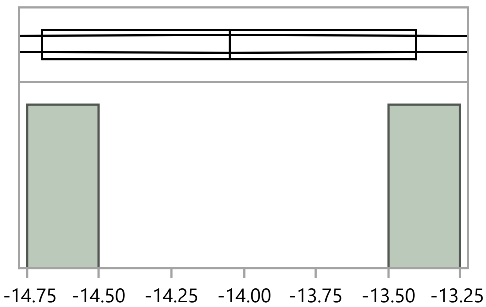
100.0%	maximum	-16.1
99.5%		-16.1
97.5%		-16.1
90.0%		-16.1
75.0%	quartile	-16.1
50.0%	median	-26.6
25.0%	quartile	-37.1
10.0%		-37.1
2.5%		-37.1
0.5%		-37.1
0.0%	minimum	-37.1

Summary Statistics

Mean	-26.6
Std Dev	14.8
Std Err Mean	10.5
Upper 95% Mean	106.8
Lower 95% Mean	-160.0
N	2.0

Distributions Analyte_Method=Americium-241 Other

Bias



Quantiles

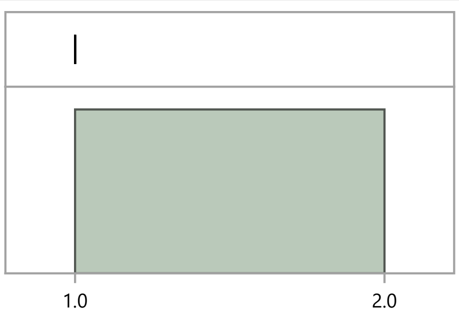
100.0%	maximum	-13.4
99.5%		-13.4
97.5%		-13.4
90.0%		-13.4
75.0%	quartile	-13.4
50.0%	median	-14.1
25.0%	quartile	-14.7
10.0%		-14.7
2.5%		-14.7
0.5%		-14.7
0.0%	minimum	-14.7

Summary Statistics

Mean	-14.1
Std Dev	0.9
Std Err Mean	0.6
Upper 95% Mean	-5.8
Lower 95% Mean	-22.3
N	2.0

Distributions Analyte_Method=Americium-241 Total dissolution by fusion

Bias



Quantiles

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

Summary Statistics

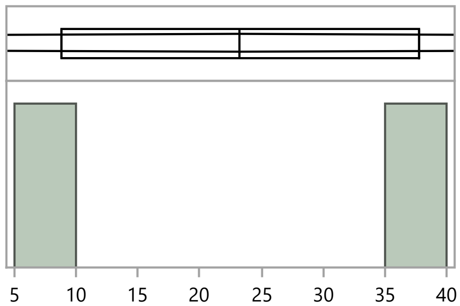
Mean	1.0
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

XrM43 Distribution by Preparation Method

XrM Distribution by Prep Method

Distributions Analyte_Method=Cesium-134 Acid dissolution with hydrofluoric acid

Bias



Quantiles

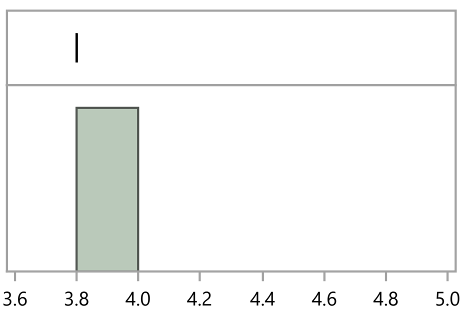
100.0%	maximum	37.7
99.5%		37.7
97.5%		37.7
90.0%		37.7
75.0%	quartile	37.7
50.0%	median	23.3
25.0%	quartile	8.8
10.0%		8.8
2.5%		8.8
0.5%		8.8
0.0%	minimum	8.8

Summary Statistics

Mean	23.3
Std Dev	20.4
Std Err Mean	14.5
Upper 95% Mean	206.9
Lower 95% Mean	-160.4
N	2.0

Distributions Analyte_Method=Cesium-134 EPA 901.1, Gamma Emitting, 600/4-80-032

Bias



Quantiles

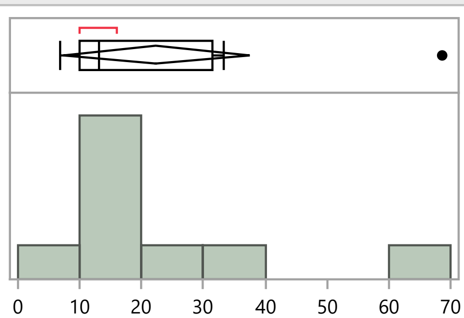
100.0%	maximum	3.8
99.5%		3.8
97.5%		3.8
90.0%		3.8
75.0%	quartile	3.8
50.0%	median	3.8
25.0%	quartile	3.8
10.0%		3.8
2.5%		3.8
0.5%		3.8
0.0%	minimum	3.8

Summary Statistics

Mean	3.8
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

Distributions Analyte_Method=Cesium-134 No preparation - analyzed as received

Bias



Quantiles

100.0%	maximum	68.6
99.5%		68.6
97.5%		68.6
90.0%		68.6
75.0%	quartile	31.5
50.0%	median	13.2
25.0%	quartile	10.1
10.0%		6.9
2.5%		6.9
0.5%		6.9
0.0%	minimum	6.9

Summary Statistics

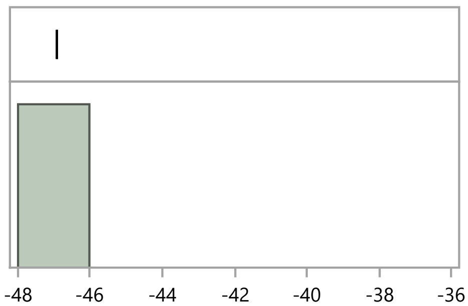
Mean	22.3
Std Dev	19.5
Std Err Mean	6.5
Upper 95% Mean	37.4
Lower 95% Mean	7.3
N	9.0

XrM43 Distribution by Preparation Method

XrM Distribution by Prep Method

Distributions Analyte_Method=Cesium-134 Other

Bias



Quantiles

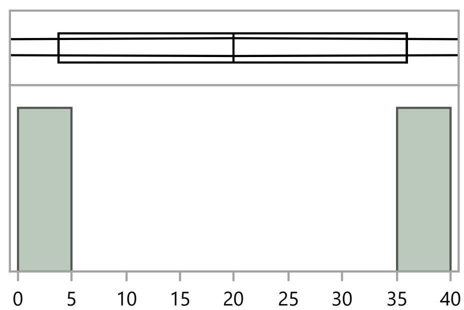
100.0%	maximum	-46.9
99.5%		-46.9
97.5%		-46.9
90.0%		-46.9
75.0%	quartile	-46.9
50.0%	median	-46.9
25.0%	quartile	-46.9
10.0%		-46.9
2.5%		-46.9
0.5%		-46.9
0.0%	minimum	-46.9

Summary Statistics

Mean	-46.9
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

Distributions Analyte_Method=Cesium-137 Acid dissolution with hydrofluoric acid

Bias



Quantiles

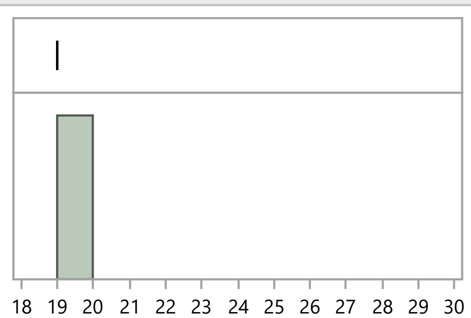
100.0%	maximum	36.0
99.5%		36.0
97.5%		36.0
90.0%		36.0
75.0%	quartile	36.0
50.0%	median	19.9
25.0%	quartile	3.8
10.0%		3.8
2.5%		3.8
0.5%		3.8
0.0%	minimum	3.8

Summary Statistics

Mean	19.9
Std Dev	22.8
Std Err Mean	16.1
Upper 95% Mean	224.5
Lower 95% Mean	-184.7
N	2.0

Distributions Analyte_Method=Cesium-137 EPA 901.1, Gamma Emitting, 600/4-80-032

Bias



Quantiles

100.0%	maximum	19.0
99.5%		19.0
97.5%		19.0
90.0%		19.0
75.0%	quartile	19.0
50.0%	median	19.0
25.0%	quartile	19.0
10.0%		19.0
2.5%		19.0
0.5%		19.0
0.0%	minimum	19.0

Summary Statistics

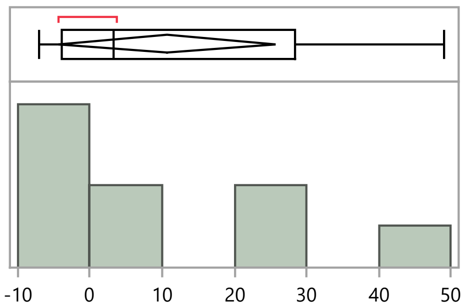
Mean	19.0
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

XrM43 Distribution by Preparation Method

XrM Distribution by Prep Method

Distributions Analyte_Method=Cesium-137 No preparation - analyzed as received

Bias



Quantiles

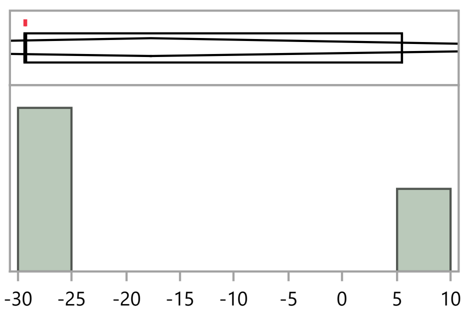
100.0%	maximum	49.0
99.5%		49.0
97.5%		49.0
90.0%		49.0
75.0%	quartile	28.4
50.0%	median	3.2
25.0%	quartile	-3.9
10.0%		-7.0
2.5%		-7.0
0.5%		-7.0
0.0%	minimum	-7.0

Summary Statistics

Mean	10.7
Std Dev	19.6
Std Err Mean	6.5
Upper 95% Mean	25.8
Lower 95% Mean	-4.4
N	9.0

Distributions Analyte_Method=Cesium-137 Other

Bias



Quantiles

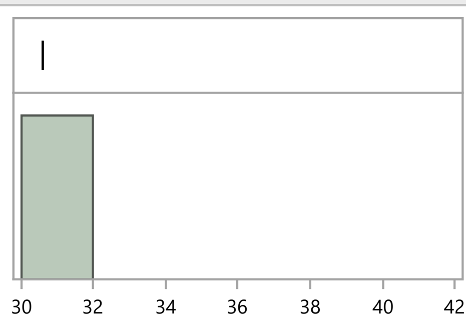
100.0%	maximum	5.5
99.5%		5.5
97.5%		5.5
90.0%		5.5
75.0%	quartile	5.5
50.0%	median	-29.2
25.0%	quartile	-29.4
10.0%		-29.4
2.5%		-29.4
0.5%		-29.4
0.0%	minimum	-29.4

Summary Statistics

Mean	-17.7
Std Dev	20.1
Std Err Mean	11.6
Upper 95% Mean	32.2
Lower 95% Mean	-67.6
N	3.0

Distributions Analyte_Method=Cobalt-57 Acid dissolution with hydrofluoric acid

Bias



Quantiles

100.0%	maximum	30.6
99.5%		30.6
97.5%		30.6
90.0%		30.6
75.0%	quartile	30.6
50.0%	median	30.6
25.0%	quartile	30.6
10.0%		30.6
2.5%		30.6
0.5%		30.6
0.0%	minimum	30.6

Summary Statistics

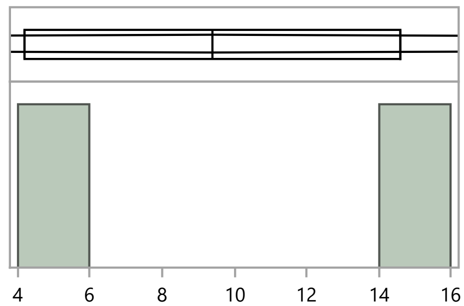
Mean	30.6
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

XrM43 Distribution by Preparation Method

XrM Distribution by Prep Method

Distributions Analyte_Method=Cobalt-57 No preparation - analyzed as received

Bias



Quantiles

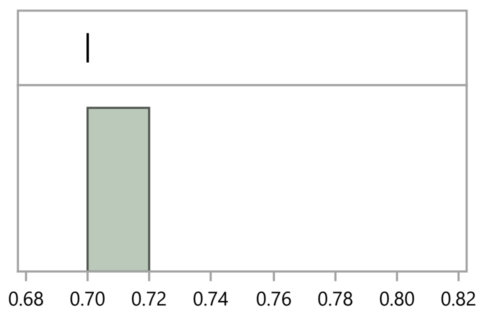
100.0%	maximum	14.6
99.5%		14.6
97.5%		14.6
90.0%		14.6
75.0%	quartile	14.6
50.0%	median	9.4
25.0%	quartile	4.2
10.0%		4.2
2.5%		4.2
0.5%		4.2
0.0%	minimum	4.2

Summary Statistics

Mean	9.4
Std Dev	7.4
Std Err Mean	5.2
Upper 95% Mean	75.5
Lower 95% Mean	-56.7
N	2.0

Distributions Analyte_Method=Cobalt-57 Other

Bias



Quantiles

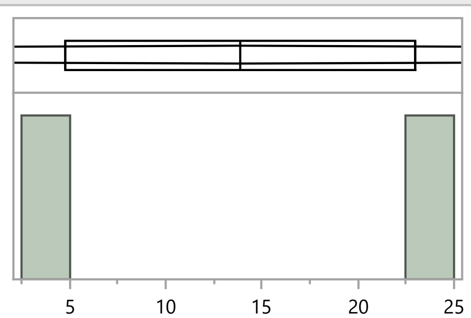
100.0%	maximum	0.7
99.5%		0.7
97.5%		0.7
90.0%		0.7
75.0%	quartile	0.7
50.0%	median	0.7
25.0%	quartile	0.7
10.0%		0.7
2.5%		0.7
0.5%		0.7
0.0%	minimum	0.7

Summary Statistics

Mean	0.7
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

Distributions Analyte_Method=Cobalt-60 Acid dissolution with hydrofluoric acid

Bias



Quantiles

100.0%	maximum	23.0
99.5%		23.0
97.5%		23.0
90.0%		23.0
75.0%	quartile	23.0
50.0%	median	13.9
25.0%	quartile	4.8
10.0%		4.8
2.5%		4.8
0.5%		4.8
0.0%	minimum	4.8

Summary Statistics

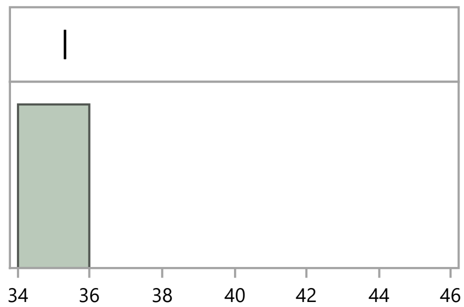
Mean	13.9
Std Dev	12.9
Std Err Mean	9.1
Upper 95% Mean	129.5
Lower 95% Mean	-101.7
N	2.0

XrM43 Distribution by Preparation Method

XrM Distribution by Prep Method

Distributions Analyte_Method=Cobalt-60 EPA 901.1, Gamma Emitting, 600/4-80-032

Bias



Quantiles

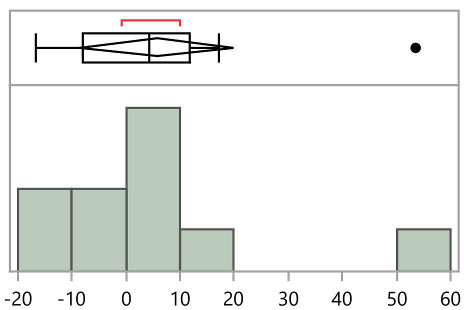
100.0%	maximum	35.3
99.5%		35.3
97.5%		35.3
90.0%		35.3
75.0%	quartile	35.3
50.0%	median	35.3
25.0%	quartile	35.3
10.0%		35.3
2.5%		35.3
0.5%		35.3
0.0%	minimum	35.3

Summary Statistics

Mean	35.3
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

Distributions Analyte_Method=Cobalt-60 No preparation - analyzed as received

Bias



Quantiles

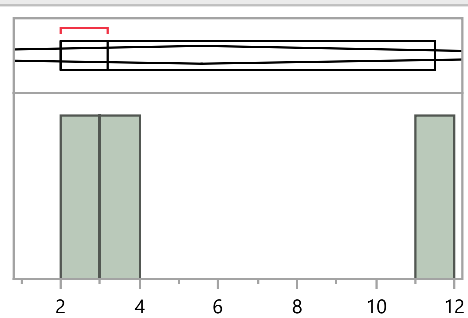
100.0%	maximum	53.5
99.5%		53.5
97.5%		53.5
90.0%		49.9
75.0%	quartile	11.7
50.0%	median	4.3
25.0%	quartile	-7.9
10.0%		-16.5
2.5%		-16.7
0.5%		-16.7
0.0%	minimum	-16.7

Summary Statistics

Mean	5.7
Std Dev	19.8
Std Err Mean	6.3
Upper 95% Mean	19.9
Lower 95% Mean	-8.5
N	10.0

Distributions Analyte_Method=Cobalt-60 Other

Bias



Quantiles

100.0%	maximum	11.5
99.5%		11.5
97.5%		11.5
90.0%		11.5
75.0%	quartile	11.5
50.0%	median	3.2
25.0%	quartile	2.0
10.0%		2.0
2.5%		2.0
0.5%		2.0
0.0%	minimum	2.0

Summary Statistics

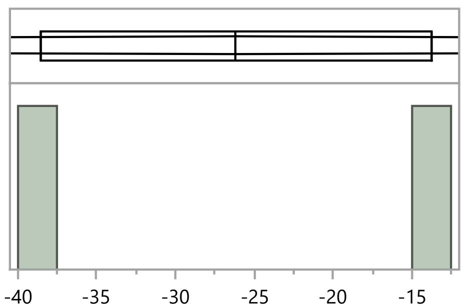
Mean	5.6
Std Dev	5.2
Std Err Mean	3.0
Upper 95% Mean	18.4
Lower 95% Mean	-7.3
N	3.0

XrM43 Distribution by Preparation Method

XrM Distribution by Prep Method

Distributions Analyte_Method=Curium-244 Acid dissolution with hydrofluoric acid

Bias



Quantiles

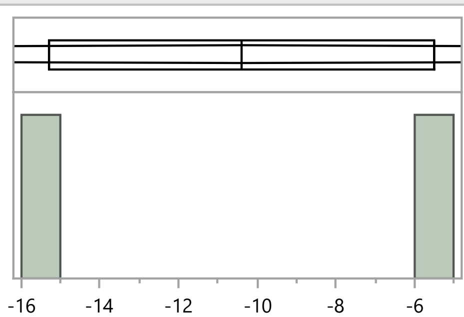
100.0%	maximum	-13.8
99.5%		-13.8
97.5%		-13.8
90.0%		-13.8
75.0%	quartile	-13.8
50.0%	median	-26.2
25.0%	quartile	-38.5
10.0%		-38.5
2.5%		-38.5
0.5%		-38.5
0.0%	minimum	-38.5

Summary Statistics

Mean	-26.2
Std Dev	17.5
Std Err Mean	12.3
Upper 95% Mean	130.8
Lower 95% Mean	-183.1
N	2.0

Distributions Analyte_Method=Curium-244 Acid leaching without hydrofluoric acid

Bias



Quantiles

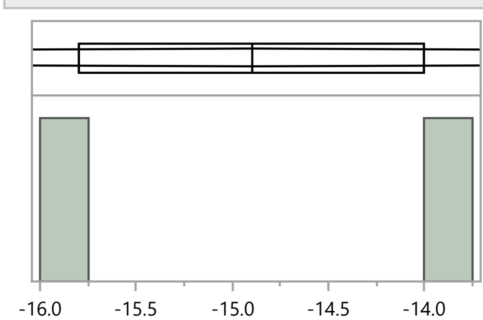
100.0%	maximum	-5.5
99.5%		-5.5
97.5%		-5.5
90.0%		-5.5
75.0%	quartile	-5.5
50.0%	median	-10.4
25.0%	quartile	-15.3
10.0%		-15.3
2.5%		-15.3
0.5%		-15.3
0.0%	minimum	-15.3

Summary Statistics

Mean	-10.4
Std Dev	6.9
Std Err Mean	4.9
Upper 95% Mean	51.9
Lower 95% Mean	-72.7
N	2.0

Distributions Analyte_Method=Curium-244 Other

Bias



Quantiles

100.0%	maximum	-14.0
99.5%		-14.0
97.5%		-14.0
90.0%		-14.0
75.0%	quartile	-14.0
50.0%	median	-14.9
25.0%	quartile	-15.8
10.0%		-15.8
2.5%		-15.8
0.5%		-15.8
0.0%	minimum	-15.8

Summary Statistics

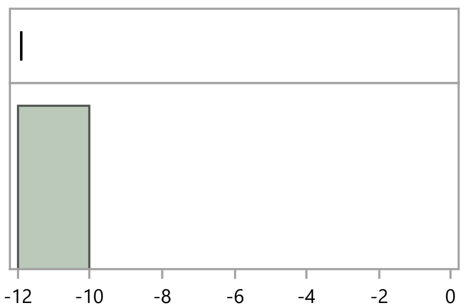
Mean	-14.9
Std Dev	1.3
Std Err Mean	0.9
Upper 95% Mean	-3.5
Lower 95% Mean	-26.3
N	2.0

XrM43 Distribution by Preparation Method

XrM Distribution by Prep Method

Distributions Analyte_Method=Manganese-54 Acid dissolution with hydrofluoric acid

Bias



Quantiles

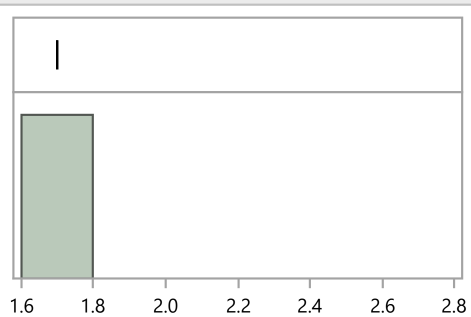
100.0%	maximum	-11.9
99.5%		-11.9
97.5%		-11.9
90.0%		-11.9
75.0%	quartile	-11.9
50.0%	median	-11.9
25.0%	quartile	-11.9
10.0%		-11.9
2.5%		-11.9
0.5%		-11.9
0.0%	minimum	-11.9

Summary Statistics

Mean	-11.9
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

Distributions Analyte_Method=Manganese-54 EPA 901.1, Gamma Emitting, 600/4-80-032

Bias



Quantiles

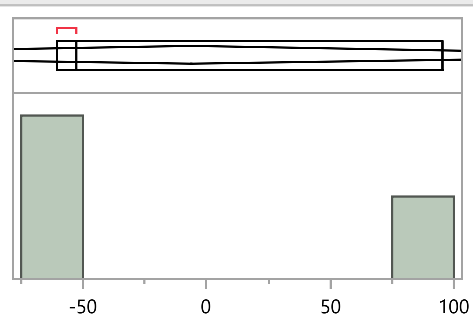
100.0%	maximum	1.7
99.5%		1.7
97.5%		1.7
90.0%		1.7
75.0%	quartile	1.7
50.0%	median	1.7
25.0%	quartile	1.7
10.0%		1.7
2.5%		1.7
0.5%		1.7
0.0%	minimum	1.7

Summary Statistics

Mean	1.7
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

Distributions Analyte_Method=Manganese-54 No preparation - analyzed as received

Bias



Quantiles

100.0%	maximum	95.5
99.5%		95.5
97.5%		95.5
90.0%		95.5
75.0%	quartile	95.5
50.0%	median	-52.8
25.0%	quartile	-60.5
10.0%		-60.5
2.5%		-60.5
0.5%		-60.5
0.0%	minimum	-60.5

Summary Statistics

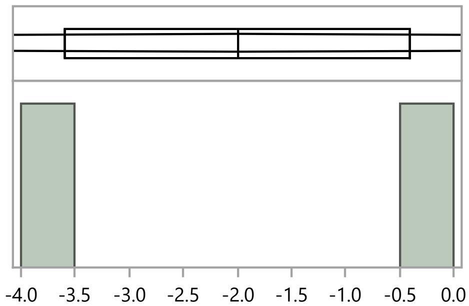
Mean	-5.9
Std Dev	87.9
Std Err Mean	50.8
Upper 95% Mean	212.5
Lower 95% Mean	-224.4
N	3.0

XrM43 Distribution by Preparation Method

XrM Distribution by Prep Method

Distributions Analyte_Method=Plutonium-238 Acid dissolution with hydrofluoric acid

Bias



Quantiles

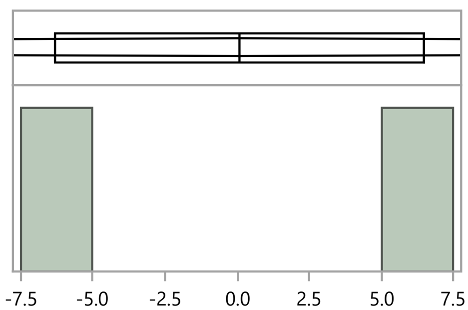
100.0%	maximum	-0.4
99.5%		-0.4
97.5%		-0.4
90.0%		-0.4
75.0%	quartile	-0.4
50.0%	median	-2.0
25.0%	quartile	-3.6
10.0%		-3.6
2.5%		-3.6
0.5%		-3.6
0.0%	minimum	-3.6

Summary Statistics

Mean	-2.0
Std Dev	2.3
Std Err Mean	1.6
Upper 95% Mean	18.3
Lower 95% Mean	-22.3
N	2.0

Distributions Analyte_Method=Plutonium-238 Acid leaching without hydrofluoric acid

Bias



Quantiles

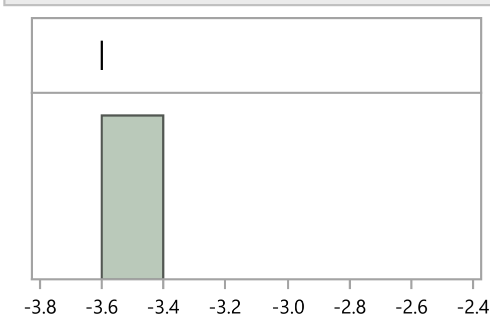
100.0%	maximum	6.5
99.5%		6.5
97.5%		6.5
90.0%		6.5
75.0%	quartile	6.5
50.0%	median	0.1
25.0%	quartile	-6.3
10.0%		-6.3
2.5%		-6.3
0.5%		-6.3
0.0%	minimum	-6.3

Summary Statistics

Mean	0.1
Std Dev	9.1
Std Err Mean	6.4
Upper 95% Mean	81.4
Lower 95% Mean	-81.2
N	2.0

Distributions Analyte_Method=Plutonium-238 Coprecipitation, acidified

Bias



Quantiles

100.0%	maximum	-3.6
99.5%		-3.6
97.5%		-3.6
90.0%		-3.6
75.0%	quartile	-3.6
50.0%	median	-3.6
25.0%	quartile	-3.6
10.0%		-3.6
2.5%		-3.6
0.5%		-3.6
0.0%	minimum	-3.6

Summary Statistics

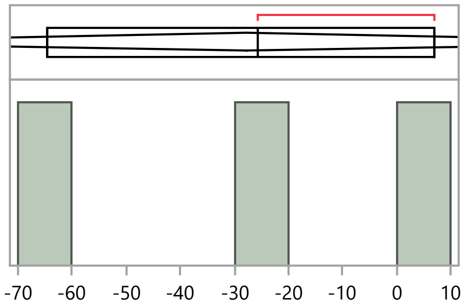
Mean	-3.6
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

XrM43 Distribution by Preparation Method

XrM Distribution by Prep Method

Distributions Analyte_Method=Plutonium-238 Other

Bias



Quantiles

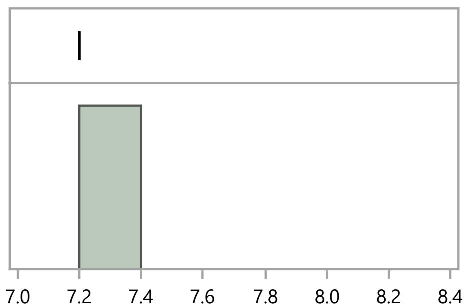
100.0%	maximum	7.0
99.5%		7.0
97.5%		7.0
90.0%		7.0
75.0%	quartile	7.0
50.0%	median	-25.7
25.0%	quartile	-64.6
10.0%		-64.6
2.5%		-64.6
0.5%		-64.6
0.0%	minimum	-64.6

Summary Statistics

Mean	-27.8
Std Dev	35.8
Std Err Mean	20.7
Upper 95% Mean	61.3
Lower 95% Mean	-116.8
N	3.0

Distributions Analyte_Method=Plutonium-238 Total dissolution by fusion

Bias



Quantiles

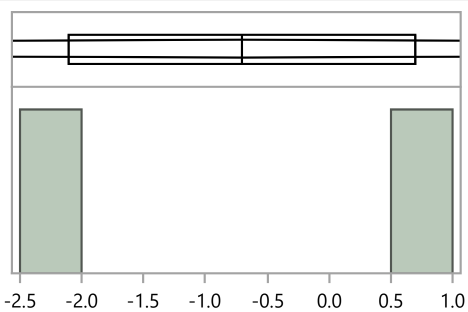
100.0%	maximum	7.2
99.5%		7.2
97.5%		7.2
90.0%		7.2
75.0%	quartile	7.2
50.0%	median	7.2
25.0%	quartile	7.2
10.0%		7.2
2.5%		7.2
0.5%		7.2
0.0%	minimum	7.2

Summary Statistics

Mean	7.2
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

Distributions Analyte_Method=Plutonium-239/240 Acid dissolution with hydrofluoric acid

Bias



Quantiles

100.0%	maximum	0.7
99.5%		0.7
97.5%		0.7
90.0%		0.7
75.0%	quartile	0.7
50.0%	median	-0.7
25.0%	quartile	-2.1
10.0%		-2.1
2.5%		-2.1
0.5%		-2.1
0.0%	minimum	-2.1

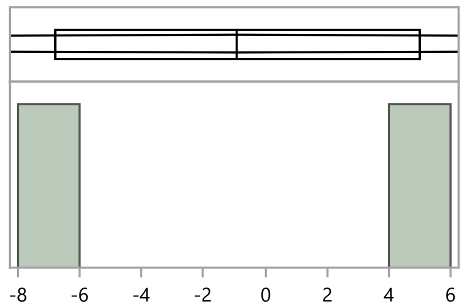
Summary Statistics

Mean	-0.7
Std Dev	2.0
Std Err Mean	1.4
Upper 95% Mean	17.1
Lower 95% Mean	-18.5
N	2.0

XrM Distribution by Prep Method

Distributions Analyte_Method=Plutonium-239/240 Acid leaching without hydrofluoric acid

Bias



Quantiles

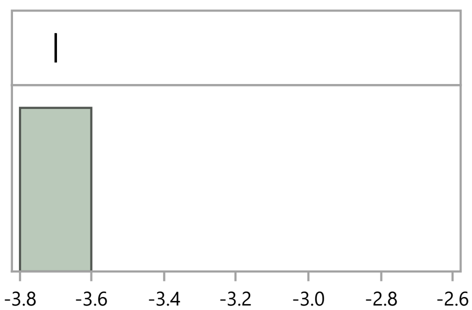
100.0%	maximum	5.0
99.5%		5.0
97.5%		5.0
90.0%		5.0
75.0%	quartile	5.0
50.0%	median	-0.9
25.0%	quartile	-6.8
10.0%		-6.8
2.5%		-6.8
0.5%		-6.8
0.0%	minimum	-6.8

Summary Statistics

Mean	-0.9
Std Dev	8.3
Std Err Mean	5.9
Upper 95% Mean	74.1
Lower 95% Mean	-75.9
N	2.0

Distributions Analyte_Method=Plutonium-239/240 Coprecipitation, acidified

Bias



Quantiles

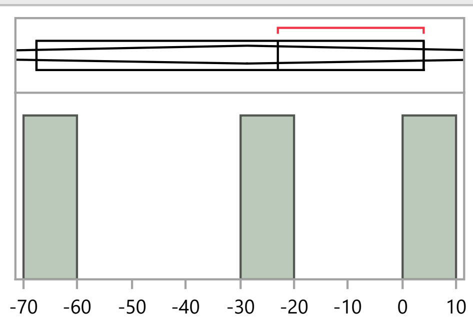
100.0%	maximum	-3.7
99.5%		-3.7
97.5%		-3.7
90.0%		-3.7
75.0%	quartile	-3.7
50.0%	median	-3.7
25.0%	quartile	-3.7
10.0%		-3.7
2.5%		-3.7
0.5%		-3.7
0.0%	minimum	-3.7

Summary Statistics

Mean	-3.7
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

Distributions Analyte_Method=Plutonium-239/240 Other

Bias



Quantiles

100.0%	maximum	4.1
99.5%		4.1
97.5%		4.1
90.0%		4.1
75.0%	quartile	4.1
50.0%	median	-22.9
25.0%	quartile	-67.5
10.0%		-67.5
2.5%		-67.5
0.5%		-67.5
0.0%	minimum	-67.5

Summary Statistics

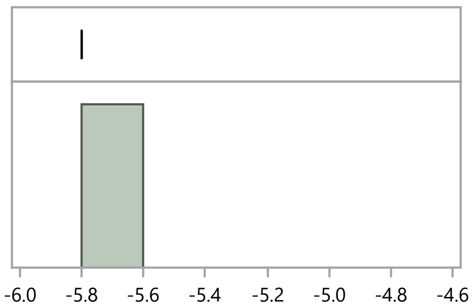
Mean	-28.8
Std Dev	36.2
Std Err Mean	20.9
Upper 95% Mean	61.1
Lower 95% Mean	-118.6
N	3.0

XrM43 Distribution by Preparation Method

XrM Distribution by Prep Method

Distributions Analyte_Method=Plutonium-239/240 Total dissolution by fusion

Bias



Quantiles

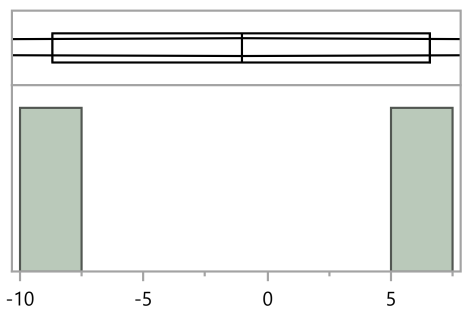
100.0%	maximum	-5.8
99.5%		-5.8
97.5%		-5.8
90.0%		-5.8
75.0%	quartile	-5.8
50.0%	median	-5.8
25.0%	quartile	-5.8
10.0%		-5.8
2.5%		-5.8
0.5%		-5.8
0.0%	minimum	-5.8

Summary Statistics

Mean	-5.8
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

Distributions Analyte_Method=Strontium-90 Acid leaching without hydrofluoric acid

Bias



Quantiles

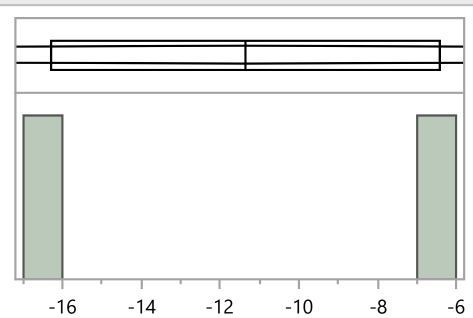
100.0%	maximum	6.6
99.5%		6.6
97.5%		6.6
90.0%		6.6
75.0%	quartile	6.6
50.0%	median	-1.1
25.0%	quartile	-8.7
10.0%		-8.7
2.5%		-8.7
0.5%		-8.7
0.0%	minimum	-8.7

Summary Statistics

Mean	-1.1
Std Dev	10.8
Std Err Mean	7.7
Upper 95% Mean	96.2
Lower 95% Mean	-98.3
N	2.0

Distributions Analyte_Method=Strontium-90 Coprecipitation, acidified

Bias



Quantiles

100.0%	maximum	-6.4
99.5%		-6.4
97.5%		-6.4
90.0%		-6.4
75.0%	quartile	-6.4
50.0%	median	-11.4
25.0%	quartile	-16.3
10.0%		-16.3
2.5%		-16.3
0.5%		-16.3
0.0%	minimum	-16.3

Summary Statistics

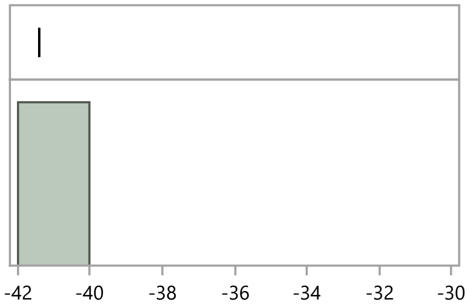
Mean	-11.4
Std Dev	7.0
Std Err Mean	5.0
Upper 95% Mean	51.5
Lower 95% Mean	-74.2
N	2.0

XrM43 Distribution by Preparation Method

XrM Distribution by Prep Method

Distributions Analyte_Method=Strontium-90 EPA 905, Radioactive Strontium, 600/4-80-032

Bias



Quantiles

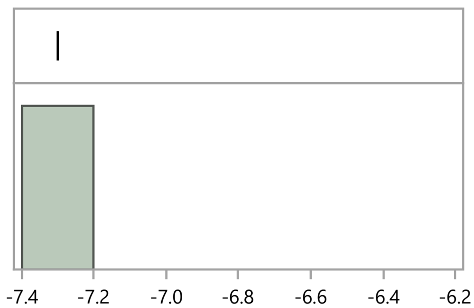
100.0%	maximum	-41.4
99.5%		-41.4
97.5%		-41.4
90.0%		-41.4
75.0%	quartile	-41.4
50.0%	median	-41.4
25.0%	quartile	-41.4
10.0%		-41.4
2.5%		-41.4
0.5%		-41.4
0.0%	minimum	-41.4

Summary Statistics

Mean	-41.4
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

Distributions Analyte_Method=Strontium-90 Other

Bias



Quantiles

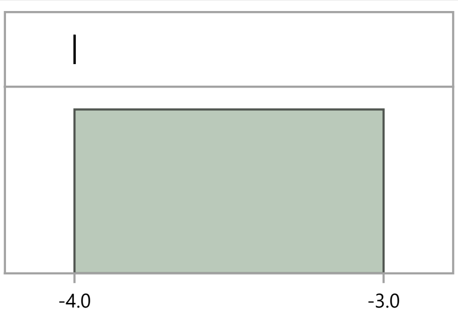
100.0%	maximum	-7.3
99.5%		-7.3
97.5%		-7.3
90.0%		-7.3
75.0%	quartile	-7.3
50.0%	median	-7.3
25.0%	quartile	-7.3
10.0%		-7.3
2.5%		-7.3
0.5%		-7.3
0.0%	minimum	-7.3

Summary Statistics

Mean	-7.3
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

Distributions Analyte_Method=Strontium-90 Total dissolution by fusion

Bias



Quantiles

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

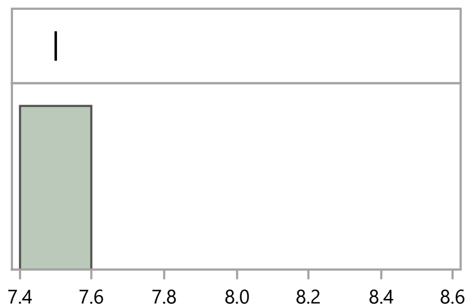
Summary Statistics

Mean	-4.0
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

XrM Distribution by Prep Method

Distributions Analyte_Method=Uranium-234 Acid dissolution with hydrofluoric acid

Bias



Quantiles

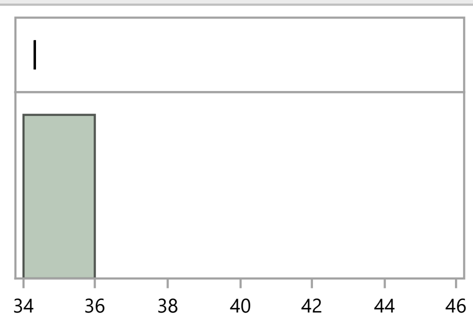
100.0%	maximum	7.5
99.5%		7.5
97.5%		7.5
90.0%		7.5
75.0%	quartile	7.5
50.0%	median	7.5
25.0%	quartile	7.5
10.0%		7.5
2.5%		7.5
0.5%		7.5
0.0%	minimum	7.5

Summary Statistics

Mean	7.5
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

Distributions Analyte_Method=Uranium-234 Acid leaching without hydrofluoric acid

Bias



Quantiles

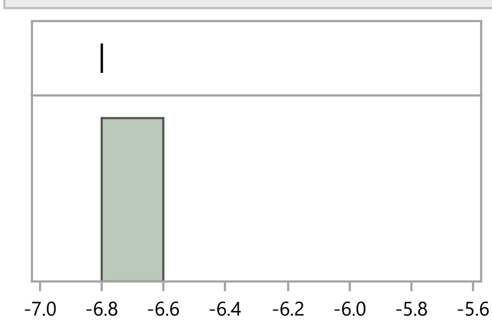
100.0%	maximum	34.3
99.5%		34.3
97.5%		34.3
90.0%		34.3
75.0%	quartile	34.3
50.0%	median	34.3
25.0%	quartile	34.3
10.0%		34.3
2.5%		34.3
0.5%		34.3
0.0%	minimum	34.3

Summary Statistics

Mean	34.3
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

Distributions Analyte_Method=Uranium-234 Coprecipitation, acidified

Bias



Quantiles

100.0%	maximum	-6.8
99.5%		-6.8
97.5%		-6.8
90.0%		-6.8
75.0%	quartile	-6.8
50.0%	median	-6.8
25.0%	quartile	-6.8
10.0%		-6.8
2.5%		-6.8
0.5%		-6.8
0.0%	minimum	-6.8

Summary Statistics

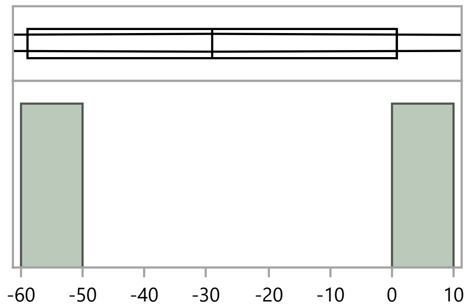
Mean	-6.8
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

XrM43 Distribution by Preparation Method

XrM Distribution by Prep Method

Distributions Analyte_Method=Uranium-234 Other

Bias



Quantiles

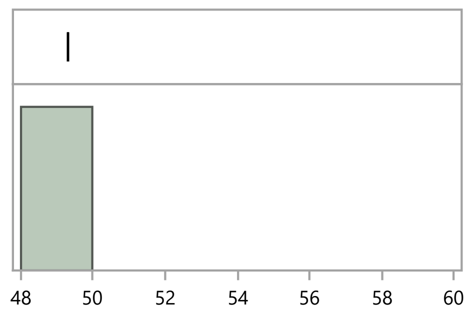
100.0%	maximum	0.7
99.5%		0.7
97.5%		0.7
90.0%		0.7
75.0%	quartile	0.7
50.0%	median	-29.2
25.0%	quartile	-59.0
10.0%		-59.0
2.5%		-59.0
0.5%		-59.0
0.0%	minimum	-59.0

Summary Statistics

Mean	-29.2
Std Dev	42.2
Std Err Mean	29.9
Upper 95% Mean	350.1
Lower 95% Mean	-408.4
N	2.0

Distributions Analyte_Method=Uranium-234 Total dissolution by fusion

Bias



Quantiles

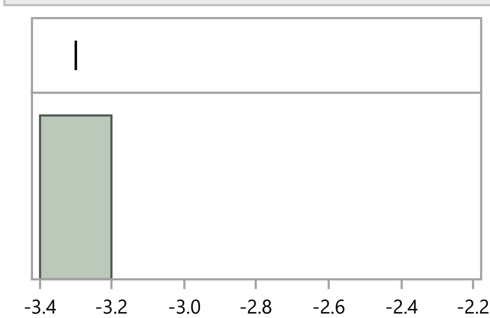
100.0%	maximum	49.3
99.5%		49.3
97.5%		49.3
90.0%		49.3
75.0%	quartile	49.3
50.0%	median	49.3
25.0%	quartile	49.3
10.0%		49.3
2.5%		49.3
0.5%		49.3
0.0%	minimum	49.3

Summary Statistics

Mean	49.3
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

Distributions Analyte_Method=Uranium-238 Acid dissolution with hydrofluoric acid

Bias



Quantiles

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

Summary Statistics

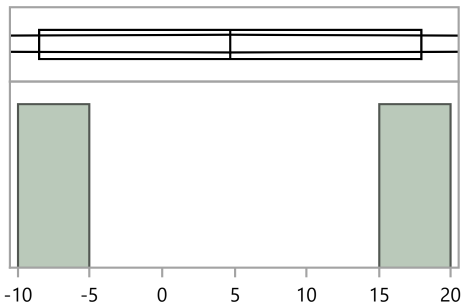
Mean	-3.3
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

XrM43 Distribution by Preparation Method

XrM Distribution by Prep Method

Distributions Analyte_Method=Uranium-238 Acid leaching without hydrofluoric acid

Bias



Quantiles

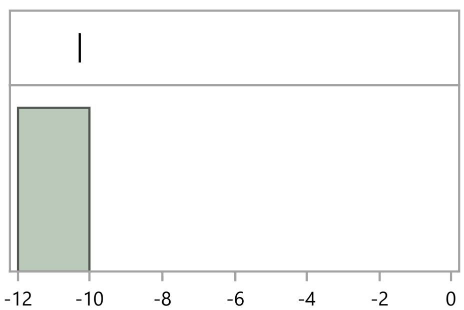
100.0%	maximum	18.0
99.5%		18.0
97.5%		18.0
90.0%		18.0
75.0%	quartile	18.0
50.0%	median	4.8
25.0%	quartile	-8.5
10.0%		-8.5
2.5%		-8.5
0.5%		-8.5
0.0%	minimum	-8.5

Summary Statistics

Mean	4.8
Std Dev	18.7
Std Err Mean	13.3
Upper 95% Mean	173.1
Lower 95% Mean	-163.6
N	2.0

Distributions Analyte_Method=Uranium-238 Coprecipitation, acidified

Bias



Quantiles

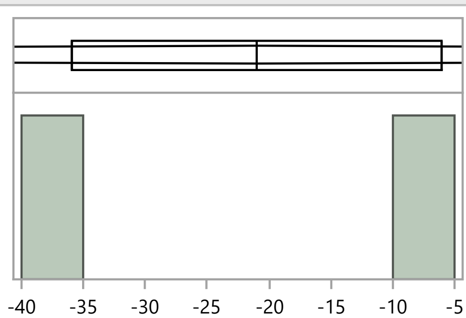
100.0%	maximum	-10.3
99.5%		-10.3
97.5%		-10.3
90.0%		-10.3
75.0%	quartile	-10.3
50.0%	median	-10.3
25.0%	quartile	-10.3
10.0%		-10.3
2.5%		-10.3
0.5%		-10.3
0.0%	minimum	-10.3

Summary Statistics

Mean	-10.3
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0

Distributions Analyte_Method=Uranium-238 Other

Bias



Quantiles

100.0%	maximum	-6.1
99.5%		-6.1
97.5%		-6.1
90.0%		-6.1
75.0%	quartile	-6.1
50.0%	median	-21.0
25.0%	quartile	-35.9
10.0%		-35.9
2.5%		-35.9
0.5%		-35.9
0.0%	minimum	-35.9

Summary Statistics

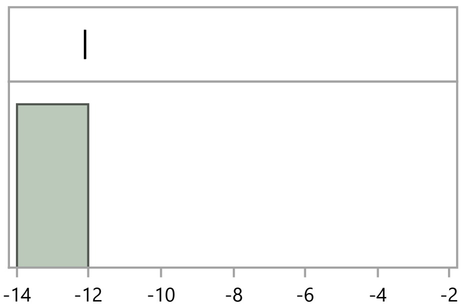
Mean	-21.0
Std Dev	21.1
Std Err Mean	14.9
Upper 95% Mean	168.3
Lower 95% Mean	-210.3
N	2.0

XrM43 Distribution by Preparation Method

XrM Distribution by Prep Method

Distributions Analyte_Method=Uranium-238 Total dissolution by fusion

Bias



Quantiles

100.0%	maximum	-12.1
99.5%		-12.1
97.5%		-12.1
90.0%		-12.1
75.0%	quartile	-12.1
50.0%	median	-12.1
25.0%	quartile	-12.1
10.0%		-12.1
2.5%		-12.1
0.5%		-12.1
0.0%	minimum	-12.1

Summary Statistics

Mean	-12.1
Std Dev	.
Std Err Mean	.
Upper 95% Mean	.
Lower 95% Mean	.
N	1.0