SEDIMENTS

SEDIMENTS

BCSS-1, MESS-2, and PACS-1

Marine and Estuarine Sediments

National Research Council (Canada)

Description:

Sediment for BCSS-1 and MESS-2 was collected in the Baie des Chaleurs, Gulf of St. Lawrence; and for PACS-1 in Esquimalt Harbour, British Columbia. The sediments were freeze-dried, screened to pass through a 125-µm screen, blended, bottled, and radiation-sterilized. The materials may contain sea salt. Semiquantitative analysis results for MESS-1 and BCSS-1 are available in the NRCC description sheet (1987).

Certified concentrations (µg/g dry weight unless noted) (Values in parenthesis are for information only.):

Component	BCSS-1		MESS-2		PACS-1	
	Value	Uncertainty (±)	Value	Uncertainty (±)	Value	Uncertainty (±)
Be	1.3	0.3	2.32	0.12	-	-
C (%)	2.19	0.09	2.14	0.03	3.69	0.11
Na_2O (%)	2.72	0.21	-	-	4.40	0.11
MgO (%)	2.44	0.23	-	-	2.41	0.09
Al_2O_3 (%)	11.83	0.41	16.2	0.49	12.23	0.22
SiO_2 (%)	66.1	1.0	59.4	2.3	55.7	0.5
P_2O_5 (%)	0.154	0.016	0.28	0.03	0.233	0.018
S (%)	0.36	0.05	0.18	0.04	1.32	0.08
Cl (%)	1.12	0.05	-	-	2.39	0.09
K_2O (%)	2.17	0.04	-	-	1.50	0.09
CaO (%)	0.76	0.074	-	-	2.92	0.13
TiO_2 (%)	0.734	0.024	-	-	0.703	0.011
V	93.4	4.9	252	10	127	5
Cr	123	14	106	8	113	8
Mn	229	15	365	21	470	12
Fe_2O_3 (%)	4.70	0.14	6.22	0.31	6.96	0.12
Co	11.4	2.1	13.8	1.4	17.5	1.1
Ni	55.3	3.6	49.3	1.8	44.1	2.0
Cu	18.5	2.7	39.3	2.0	452	16
Zn	119	12	172	16	824	22
As	11.1	1.4	20.7	0.8	211	11
Se	0.43	0.06	0.72	0.09	1.09	0.11
Sr	(96)	-	125	10	277	11
Mo	(1.9)	-	2.85	0.12	12.3	0.9
Cd	0.25	0.04	0.24	0.01	2.38	0.20
Sn	1.85	0.20	2.27	0.42	41.1	3.1
Sb	0.59	0.06	1.09	0.13	171	14
Hg	-	-	0.092	0.009	4.57	0.16
Tl	-	-	(0.98)	(0.6)	-	-
Pb	22.7	3.4	21.9	1.2	404	20

BCSS-1, MESS-1, and PACS-1 (cont.)

Component	BCSS-1 Value	BCSS-1 Uncertainty (±)	MESS-2 Value	MESS-2 Uncertainty (±)	PACS-1 Value	PACS-1 Uncertainty (±)
Tributyl Sn	-	-	-	-	1.27	0.22
Dibutyl Sn	-	-	-	-	1.16	0.18
Monobutyl Sn	-	-	-	-	0.28	0.17

Order Information:

BCSS-1, MESS-1 and PCSS-1 can be purchased for US$150 per unit (80 g, 65 g and 60 g respectively). Price subject to change without notice. Please contact NRCC.

References:

National Research Council Canada (1995) MESS-2, BCSS-1, PACS-1. Marine sediment reference materials for trace metals and other constituents. Description sheet. National Research Council Canada, Institute for Environmental Chemistry, Ottawa, Canada.

National Research Council Canada (1995) MESS-2. Marine sediment. Information sheet. National Research Council Canada, Marine Analytical Standards Program, Halifax, Nova Scotia, Canada.

CRM 277

Trace Elements in Estuarine Sediment

Community Bureau of Reference (Belgium)

Description:

This material consists lyophilized sediment from the Scheldt estuary. Information on aqua regia soluble concentrations is available in the report.

Certified concentrations (µg/g dry weight):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
Sc	9.0	0.12	As	47.3	1.6
Cr	192	7	Se	2.04	0.18
Ni	43.4	1.6	Cd	11.9	0.4
Cu	101.7	1.6	Hg	1.77	0.06
Zn	547	12	Pb	146	3

Noncertified concentrations (µg/g dry weight unless noted):

Element	Value	Element	Value
Be	1.6	Br	87
Na (mg/g)	12	Mo	1.5
Mg (mg/g)	10	Sb	4.0
Al (mg/g)	48	Cs	6.5
Si (mg/g)	230	Ba	329
P (mg/g)	4.1	La	45
K (mg/g)	16	Ce	80
Ca (mg/g)	60	Eu	1.5
Ti (mg/g)	3.0	Th	9.0
V	102	U	3.0
Mn (mg/g)	1.6		
Fe (mg/g)	45.5		
Co	17		

Aqua regia soluble

Element	Value
Cr	145.6
Mn (mg/g)	1.62
Fe (mg/g)	41.7
Cu	97.2
Ni	34.9
Zn	557
Cd	10.8
Pb	137.5

Order information:

CRM 277 can be purchased for ECU250 per unit (40 g). Price includes handling and normal postage within the European Union except when special handling is required. Price subject to change without notice. Please contact BCR.

References:

Community Bureau of Reference (BCR) (1988) BCR CRM 277. Trace element in estuarine sediment. Certificate of analysis. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium.

Community Bureau of Reference (BCR) (1994) Reference Materials. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 86 pp.

CRM 320

Trace Elements in River Sediment

Community Bureau of Reference (Belgium)

Description:

This material consists lyophilized sediment from the river Toce. Information on aqua regia soluble concentrations and concentrations of additional elements is available in the report.

Certified concentrations (µg/g dry weight):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
Sc	15.25	0.36	As	76.7	3.4
Cr	138	7	Se	0.214	0.034
Ni	75.2	1.4	Cd	0.533	0.026
Cu	44.1	1.0	Hg	1.03	0.13
Zn	142	3	Pb	42.3	1.6

Noncertified concentrations (µg/g dry weight unless noted):

Element	Value	Element	Value
Be	2.5	Ga	20
Na (mg/g)	20	Mo	0.6
Mg (mg/g)	20	Sn	6.0
Al (mg/g)	82	Sb	0.6
Si (mg/g)	278	Cs	5.0
P (mg/g)	1.1	Ba	531
K (mg/g)	25	La	46
Ca (mg/g)	22	Ce	95
Ti (mg/g)	5.0	Eu	1.5
V	105	Tl	0.5
Mn (mg/g)	0.8	Th	18
Fe (mg/g)	45	U	6
Co	19		

Aqua regia soluble

Element	Value
Cr	70.1
Fe (mg/g)	32.5
Cu	42.0
Ni	55.0
Zn	124.4
Cd	0.47
Pb	30.0

Order information:

CRM 320 can be purchased for ECU250 per unit (40 g). Price includes handling and normal postage within the European Union except when special handling is required. Price subject to change without notice. Please contact BCR.

References:

Community Bureau of Reference (BCR) (1988) BCR CRM 320. Trace element in river sediment. Certificate of analysis. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium.

Community Bureau of Reference (BCR) (1994) Reference Materials. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 86 pp.

CRM 462

Tributyltin and Dibutyltin in Coastal Sediment

Community Bureau of Reference (Belgium)

Description:

No description is available.

Certified concentrations (µg/kg):

Compound	Value	Uncertainty (±)
Tributyltin	70	14
Dibutyltin	128	16

Order information:

CRM 462 can be purchased for ECU250 per unit (25 g). Price includes handling and normal postage within the European Union except when special handling is required. Price subject to change without notice. Please contact BCR.

Reference:

Community Bureau of Reference (BCR) (1994) Reference Materials. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 86 pp.

CS-1, HS-1 and HS-2

Polychlorinated Biphenyls in Marine Sediments

National Research Council (Canada)

Description:

These CRMs are natural marine sediment research materials for determinations of PCBs. Sediment for CS-1 was collected in the Laurentian Channel midway between Nova Scotia and Newfoundland, Canada. The material is a clean carbonaceous clay. Sediment for HS-1 and HS-2 was collected in a Nova Scotia harbor in Canada. The material is an organic and sulfur rich sediment from an active harbor. The sediments were freeze-dried, homogenized in a modified cement mixer, and subsampled into solvent-rinsed quart-sized steel cans that contain about 200 g of material. A description of the preparation and analysis of these materials can be found in the NRCC description sheets (1982).

Certified concentrations (µg/kg):

CRM	Compound	Value	Uncertainty (±)
CS-1	PCB (as Aroclor 1254)	1.15	0.60
HS-1	PCB (as Aroclor 1254)	21.8	1.1
HS-2	PCB (as Aroclor 1254)	111.8	2.5

HS-1			HS-2		
Congener	Value	Uncertainty (±)	Congener	Value	Uncertainty (±)
101	1.62	0.21	101	5.42	0.34
138	1.98	0.28	138	6.92	0.52
151	0.48	0.08	151	1.37	0.07
153	2.27	0.28	153	6.15	0.67
170	0.27	0.05	170	1.07	0.15
180	1.17	0.15	180	3.70	0.33
194	0.23	0.04	194	0.61	0.07
196	0.45	0.04	196	1.13	0.12
199	0.57	0.07	199	1.39	0.09
209	0.33	0.10	209	0.90	0.14

Order information:

CS-1 can be purchased for US$200, and HS-1 and HS-2 for US$250 per unit (200-g can). Price subject to change without notice. Please contact NRCC.

Reference:

National Research Council Canada (1992) Marine sediments reference materials, polychlorinated biphenyls. Description sheet. National Research Council Canada, Institute for Marine Biosciences, Halifax, Nova Scotia, Canada.

DX-1 - DX-2

Dioxins and Furans in Sediment

National Water Research Institute (Canada)

Description:

No information available.

Reference concentrations (pg/g dry weight):

Parameter[Δ]	DX-1 Value	DX-1 Std. dev.	DX-2 Value	DX-2 Std. dev.
2,3,7,8-TCDD	263	53	262	51
Total TCDD	416	121	418	125
1,2,3,7,8-PeCDD	22	8	28	14
Total PeCDD	226	143	253	150
1,2,3,4,7,8-HxCDD	23	7	25	8
1,2,3,6,7,8-HxCDD	77	27	85	33
1,2,3,7,8,9-HxCDD	53	24	58	19
Total HxCDD	669	185	739	218
1,2,3,4,6,7,8-HpCDD	634	182	757	320
Total HpCDD	1251	361	1486	476
Total OCDD	3932	933	4402	1257
Total PCDD	6490	1309	7294	1733
3,4,7,8-TCDF	89 *	44	134 *	61
Total TCDF	659	259	975	588
1,2,3,7,8-PeCDF	39	14	46	10
2,3,4,7,8-PeCDF	62	32	88	28
Total PeCDF	790	489	916	351
1,2,3,4,7,8-HxCDF	714	279	825	348
1,2,3,6,7,8-HxCDF	116	37	153	61
1,2,3,7,8,9-HxCDF	28 *	42 ◊	36 *	45 ◊
2,3,4,6,7,8-HxCDF	57 *	36	70 *	47
Total HxCDF	1800	809	2111	662
1,2,3,4,6,7,8-HpCDF	2397	796	3064	745
1,2,3,4,7,8,9-HpCDF	137	62	152	84
Total HpCDF	3567	1165	4068	1306
OCDF	7122	2406	7830	3087
Total PCDF	13676	3777	15981	4177
Total PCDD + PCDF	20042	4706	23313	5449

Δ "Total" refers to the homologue total, i.e., the sum of all the congeners. Total PCDD and Total PCDF are the sum of all the dioxin and furan congeners respectively.
* Provisional values subject to change.
◊ The distribution implies less than 95% confidence. Any negative deviation is inadmissable.

Order Information:

These CRMs can each be purchased for Canadian $500 per unit (50 g). Price subject to change without notice. Please contact NWRI.

References:

National Water Research Institute (1995) Dioxins and furans in reference sediment DX-1. Certificate of Analysis. Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada.

National Water Research Institute (1995) Dioxins and furans in reference sediment DX-2. Certificate of Analysis. Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada.

EC-1

Hamilton Harbour Sediment

National Water Research Institute (Canada)

Description:

The sediment used for EC-1 was obtained from a landfill site in Hamilton Bay, Ontario, located in the Great Lakes basin of Canada. The sediment was freeze dried, ground to < 200-mesh particle size, and subsampled into bottles.

Certified concentrations (µg/g dry weight):

Compound	Value	Std. dev.	Compound	Value	Std. dev.
Anthracene	1.2	0.6	Benzo[*ghi*]perylene	4.9	1.3
Benz[*a*]anthracene	8.7	1.6	Fluoranthene	23.2	4.1
Benzo[*b*]fluoranthene	7.9	1.8	Indeno[1,2,3-*cd*]pyrene	5.7	1.2
Benzo[*k*]fluoranthene	4.4	1.0	Phenanthrene	15.8	2.5
Benzo[*a*]pyrene	5.3	1.3	Pyrene	16.7	3.9
Benzo[*e*]pyrene	5.3	1.3	Total PCBs	2.00	0.15

Noncertified concentrations (µg/g dry weight):

Compound	Value	Std. dev.
1,2-Dichlorobenzene	4.9	1.8
1,3-Dichlorobenzene	5.9	3.0
1,4-Dichlorobenzene	30.9	9.5
1,2,3-Trichlorobenzene	2.3	1.0
1,2,4-Trichlorobenzene	3.4	2.0
1,3,5-Trichlorobenzene	2.7	0.7
1,2,3,4-Tetrachlorobenzene	3.4	1.6
1,2,3,5-Tetrachlorobenzene	0.76	0.41
1,2,4,5-Tetrachlorobenzene	3.4	1.6
Chrysene/triphenylene	9.2	1.9
Dibenz[*a,h*]anthracene	1.3	0.4
Hexachlorobenzene	5.4	1.9
Hexachlorobutadiene	0.66	0.56
Octachlorostyrene	6.0	1.4
Pentachlorobenzene	1.7	0.4
Perylene	1.1	0.4

Order information:

EC-1 can be purchased for Canadian $200 per unit (100 g). Price subject to change without notice. Please contact NWRI.

EC-1 (cont.)

References:

Lee, H. - B., G. Dookhran, and A. S. Y. Chau (1987) Analytical reference materials. Part VI. Development and certification of a sediment reference material for selected polynuclear aromatic hydrocarbons. Analyst, 112:31-5.

Lee, H. - B., and A. S. Y. Chau (1987) Analytical reference materials. Part VII. Development and certification of a sediment reference material for total polychlorinated biphenyls. Analyst, 112:37-40.

National Water Research Institute (1994) EC-1. Chlorobenzenes in sediment. Certificate of Analysis. Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada.

National Water Research Institute (1994) EC-1. Polychlorinated biphenyls in sediment. Certificate of Analysis. Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada.

National Water Research Institute (1994) EC-1. Polynuclear aromatic hydrocarbons in sediment. Certificate of Analysis. Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada.

EC-2

Lake Ontario Sediment

National Water Research Institute (Canada)

Description:

The sediment used for EC-2 was obtained from Lake Ontario, near the Niagara River, North America. The sediment was freeze dried, ground to < 200-mesh particle size, and subsampled into bottles.

Certified concentrations (µg/g dry weight unless noted):

Compound	Value	Std. dev.	Compound	Value	Std. dev.
1,2-Dichlorobenzene	18.1	2.5	Benzo[*e*]pyrene	1.91	0.72
1,3-Dichlorobenzene	74.4	10.1	Benzo[*ghi*]perylene	1.47	0.65
1,4-Dichlorobenzene	84.4	17.6	Benzo[*k*]fluoranthene	1.93	0.72
1,2,3-Trichlorobenzene	6.1	1.3	Benz[*a*]anthracene	1.42	0.51
1,2,4-Trichlorobenzene	80.7	5.2	Dibenz[*a,h*]anthracene	0.49	0.21
1,3,5-Trichlorobenzene	34.3	10.8	Fluoranthene	3.55	0.83
1,2,3,4-Tetrachlorobenzene	36.5	4.8	Hexachlorobenzene	200.6	26.4
1,2,3,5-Tetrachlorobenzene	5.2	0.7	Hexachlorobutadiene	21.3	3.2
1,2,4,5-Tetrachlorobenzene	84.0	9.8	Indeno[1,2,3-*cd*]pyrene	1.55	0.53
Benzo[*a*]pyrene	1.21	0.56	Pentachlorobenzene	48.6	4.8
Benzo[*b*]fluoranthene	2.48	0.86	Pyrene	2.92	0.63

Noncertified concentrations (µg/g dry weight unless noted):

Compound	Value	Std. dev.	Compound	Value	Std. dev.
Acenaphthene	0.20	0.04	Naphthalene	1.47	1.5
Acenaphthylene	0.12	0.02	Octachlorostyrene (ng/g)	30.6	9.2
Anthracene	0.11	0.05	Perylene	0.80	0.51
Chrysene/triphenylene	2.14	0.40	Phenanthrene	1.41	0.16
Fluorene	2.14	0.40	Total PCBs	1.16	0.15

Order information:

EC-2 can be purchased for Canadian $200 per unit (100 g). Price subject to change without notice. Please contact NWRI.

References:

Lee, H. - B., R. L. Hong-You, and A. S. Y. Chau (1986) Analytical reference materials. Part VI. Development of a sediment reference material for chlorobenzenes and hexachlorobutadiene. Analyst, 111:81-5.

Lee, H. - B., R. L. Hong-You, and A. S. Y. Chau (1987) Analytical reference materials. Part V. Development and certification of a sediment reference material for selected polynuclear aromatic hydrocarbons. Analyst, 112:31-5.

EC-2 (cont.)

National Water Research Institute (1994) EC-2. Chlorobenzenes in sediment. Certificate of Analysis. Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada.

National Water Research Institute (1994) EC-2. Polychlorinated biphenyls in sediment. Certificate of Analysis. Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada.

National Water Research Institute (1994) EC-2. Polynuclear aromatic hydrocarbons in sediment. Certificate of Analysis. Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada.

EC-3

Niagara River Plume Sediment

National Water Research Institute (Canada)

Description:

The sediment used for EC-3 was obtained from the Niagara river plume, North America. The sediment was freeze dried, ground to < 200-mesh particle size, and subsampled into bottles.

Certified concentrations (ng/g dry weight):

Compound	Value	Stand. dev.	Compound	Value	Stand. dev.
1,2-Dichlorobenzene	20.7	6.2	Benz[*a*]anthracene	312	56
1,3-Dichlorobenzene	105.4	35.0	Fluoranthene	558	92
1,2,3-Trichlorobenzene	8.9	2.4	Hexachlorobenzene	279.0	66.2
1,3,5-Trichlorobenzene	113.6	19.0	Hexachlorobutadiene	61.3	13.8
1,2,3,4-Tetrachlorobenzene	44.3	10.2	Pentachlorobenzene	65.4	16.4
Benzo[*a*]pyrene	386	100	Phenanthrene	293	66
Benzo[*e*]pyrene	450	98	Pyrene	436	94

Noncertified concentrations (ng/g dry weight):

Compound	Value	Stand. dev.	Compound	Value	Stand. dev.
1,4-Dichlorobenzene	108.2	23.6	Benzo[*ghi*]perylene	348	140
1,2,4-Trichlorobenzene	141.2	27.4	Benzo[*k*]fluoranthene	271	208
1,2,3,5-Tetrachloro=benzene	13.6	2.6	Chrysene/triphenylene	458	118
1,2,4,5-Tetrachloro=benzene	155.6	34.8	Dibenz[*a,h*]anthracene	109	34
Acenaphthene	22	18	Fluorene	42	42
Acenaphthylene	25	16	Indeno[1,2,3-*cd*]pyrene	359	72
Anthracene	59	22	Naphthalene	35	40
Benzo[*b*]fluoranthene	505	176	Octachlorostyrene	41.0	12.4
			Perylene	195	42
			Total PCBs	660	108

Order information:

EC-3 can be purchased for Canadian $200 per unit (100 g). Price subject to change without notice. Please contact NWRI.

References:

National Water Research Institute (1994) EC-3. Chlorobenzenes in sediment. Certificate of Analysis. Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada.

National Water Research Institute (1994) EC-3. Polychlorinated biphenyls in sediment. Certificate of Analysis. Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada.

EC-3 (cont.)

National Water Research Institute (1994) EC-3. Polynuclear aromatic hydrocarbons in sediment. Certificate of Analysis. Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada.

EC-4

Toronto Harbour Sediment

National Water Research Institute (Canada)

Description:

The sediment used for EC-4 was obtained from the Toronto Harbour, North America. The sediment was freeze dried, ground to < 200-mesh particle size, and subsampled into bottles.

Noncertified concentrations (ng/g dry weight):

Compound	Value	Stand. dev.
1,2-Dichlorobenzene	6.8	3.6
1,3-Dichlorobenzene	6.8	2.8
1,2,3-Trichlorobenzene	1.9	0.8
1,2,4-Trichlorobenzene	6.7	2.2
1,3,5-Trichlorobenzene	4.4	1.8
1,2,3,4-Tetrachlorobenzene	1.6	0.8
1,2,3,5-Tetrachlorobenzene	0.34	0.36
1,2,4,5-Tetrachlorobenzene	2.4	1.8
Acenaphathene	32	9
Acenaphthylene	48	12
Anthracene	124	16
Benzo[*a*]pyrene	675	114
Benzo[*b*]fluoranthene	753	148
Benzo[*e*]pyrene	747	93
Benzo[*ghi*]perylene	576	122
Benzo[*k*]fluoranthene	560	152
Benz[*a*]anthracene	712	117
Chrysene/triphenylene	1073	150
Dibenz[*a,h*]anthracene	241	96
Fluoranthene	1087	139
Fluorene	88	35
Hexachlorobenzene	2.2	1.2
Hexachlorobutadiene	0.55	0.26
Indeno[1,2,3-*cd*]pyrene	564	101
Naphthalene	58	14
Octachlorostyrene	1.04	0.50
Pentachlorobenzene	1.9	0.8
Perylene	280	93
Phenanthrene	732	75
Pyrene	1085	170
Total PCBs (ng/g)	557	63

Order Information:

EC-4 can be purchased for Canadian $200 per unit (100 g). Price subject to change without notice. Please contact NWRI.

References:

National Water Research Institute (1994) EC-4. Chlorobenzenes in sediment. Certificate of Analysis, Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada.

National Water Research Institute (1994) EC-4. Polychlorinated biphenyls in sediment. Certificate of Analysis, Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada.

National Water Research Institute (1994) EC-4. Polynuclear aromatic hydrocarbons in sediment. Certificate of Analysis, Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada.

EC-5

Humber River Sediment

National Water Research Institute (Canada)

Description:

The sediment used for EC-5 was obtained from the Humber River, North America. The sediment was freeze dried, ground to < 200-mesh particle size, and subsampled into bottles.

Noncertified concentrations (ng/g dry weight):

Compound	Value	Stand. dev.	Compound	Value	Stand. dev.
1,2-Dichlorobenzene	7.4	2.5	Benzo[*ghi*]perylene	333	52
1,3-Dichlorobenzene	7.1	1.9	Benzo[*k*]fluoranthene	419	49
1,4-Dichlorobenzene	29.0	5.5	Benz[*a*]anthracene	503	47
1,2,3-Trichlorobenzene	3.8	0.8	Chrysene/triphenylene	619	60
1,2,4-Trichlorobenzene	8.3	0.7	Dibenz[*a,h*]anthracene	195	44
1,3,5-Trichlorobenzene	6.8	1.3	Fluoranthene	823	74
1,2,3,4-Tetrachlorobenzene	2.5	0.3	Fluorene	84	26
1,2,3,5-Tetrachloro= benzene	0.64	0.13	Hexachlorobenzene	2.4	0.2
			Hexachlorobutadiene	0.88	0.16
1,2,4,5-Tetrachloro= benzene	3.3	0.5	Indeno[1,2,3-*cd*]pyrene	386	66
			Naphthalene	26	6
Acenaphathene	29	9	Octachlorostyrene	0.89	0.11
Acenaphthylene	41	9	Pentachlorobenzene	2.2	0.3
Anthracene	113	17	Perylene	187	28
Benzo[*a*]pyrene	449	61	Phenanthrene	612	57
Benzo[*b*]fluoranthene	480	88	Pyrene	987	134
Benzo[*e*]pyrene	440	76	Total PCBs (µg/g)	597	82

Order information:

EC-5 can be purchased for Canadian $200 per unit (10 g). Price subject to change without notice. Please contact NWRI.

References:

National Water Research Institute (1994) EC-5. Chlorobenzenes in sediment. Certificate of Analysis, Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada.

National Water Research Institute (1994) EC-5. Polychlorinated biphenyls in sediment. Certificate of Analysis, Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada.

National Water Research Institute (1994) EC-5. Polynuclear aromatic hydrocarbons in sediment. Certificate of Analysis, Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada.

EC-6

Great Lakes Sediment

National Water Research Institute (Canada)

Description:

The sediments used for these CRMs were obtained from the Great Lakes Basin, North America. The sediment was freeze dried, ground to < 200-mesh particle size, and subsampled into bottles.

Noncertified concentrations (ng/g dry weight):

Compound	Value	Stand. dev.	Compound	Value	Stand. dev.
1,2,4-Trichlorobenzene	2.1	0.8	Dibenz[*a,h*]anthracene	42	9
1,3,5-Trichlorobenzene	1.5	0.7	Fluoranthene	297	48
1,2,3,4-Tetrachlorobenzene	0.4	-	Fluorene	17	3
1,2,4,5-Tetrachlorobenzene	1.5	0.4	Hexachlorobenzene	3.6	0.2
Acenaphathene	7	2	Hexachlorobutadiene	1.7	1.7
Acenaphthylene	12	4	Hexachloroethylene	0.63	0.29
Anthracene	37	5	Indeno[1,2,3-*cd*]pyrene	157	53
Benzo[*a*]pyrene	250	76	Naphthalene	75	12
Benzo[*b*]fluoranthene	267	90	Octachlorostyrene	3.4	2.7
Benzo[*ghi*]perylene	176	43	Pentachlorobenzene	1.4	0.2
Benzo[*k*]fluoranthene	159	50	Phenanthrene	138	12
Benz[*a*]anthracene	184	27	Pyrene	337	48
Chrysene/triphenylene	279	29	Total PCBs	105	19

Order information:

EC-6 can be purchased for Canadian $200 per unit (100 g). Price subject to change without notice. Please contact NWRI.

References:

National Water Research Institute (1994) EC-6. Chlorobenzenes in sediment. Certificate of Analysis. Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada.

National Water Research Institute (1994) EC-6. Polychlorinated biphenyls in sediment. Certificate of Analysis. Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada.

National Water Research Institute (1994) EC-6. Polynuclear aromatic hydrocarbons in sediment. Certificate of Analysis. Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada.

EC-7

Great Lakes Sediment

National Water Research Institute (Canada)

Description:

The sediments used for these CRMs were obtained from the Great Lakes Basin, North America. The sediment was freeze dried, ground to < 200-mesh particle size, and subsampled into bottles.

Noncertified concentrations (ng/g dry weight):

Compound	Value	Stand. dev.	Compound	Value	Stand. dev.
1,2-Dichlorobenzene	7.8	4.1	Chrysene/triphenylene	182	51
1,3-Dichlorobenzene	5.7	3.7	Dibenz[*a,h*]anthracene	34	6
1,4-Dichlorobenzene	22.4	10.5	Fluoranthene	196	32
1,2,3-Trichlorobenzene	4.4	4.1	Fluorene	16	4
1,2,4-Trichlorobenzene	5.7	2.0	Hexachlorobenzene	53.3	18.7
1,3,5-Trichlorobenzene	13.6	4.0	Hexachlorobutadiene	7.0	3.3
1,2,3,4-Tetrachlorobenzene	1.6	1.2	Hexachloroethylene	1.0	0.4
1,2,4,5-Tetrachlorobenzene	19.2	9.9	Indeno[1,2,3-*cd*]pyrene	62	14
Acenaphathene	3	1	Naphthalene	40	9
Acenaphthylene	13	7	Octachlorostyrene	17.5	7.0
Anthracene	22	5	Pentachlorobenzene	9.1	3.9
Benzo[*a*]pyrene	103	48	Phenanthrene	180	17
Benzo[*b*]fluoranthene	90	32	Pyrene	306	58
Benzo[*ghi*]perylene	95	8	Total PCBs	21	3
Benzo[*k*]fluoranthene	84	2			
Benz[*a*]anthracene	110	11			

Order information:

EC-7 can be purchased for Canadian $200 per unit (100 g). Price subject to change without notice. Please contact NWRI.

References:

National Water Research Institute (1994) EC-7. Chlorobenzenes in sediment. Certificate of Analysis. Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada.

National Water Research Institute (1994) EC-7. Polychlorinated biphenyls in sediment. Certificate of Analysis. Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada.

National Water Research Institute (1994) EC-7. Polynuclear aromatic hydrocarbons in sediment. Certificate of Analysis. Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada.

GBW 07301 - 07312

Stream Sediments

National Research Center for Certified Reference Materials (China)

Description:

No information available.

Certified concentrations (μg/g dry weight unless noted):

Component	GBW 07301	GBW 07302	GBW 07303	GBW 07304	GBW 07305	GBW 07306
Li	29.6	101	33	51	45	40
Be	3.0	17.1	1.5	2.4	2.3	1.7
B	4.6	10.8	33	52	51	50
F	870	0.198	345	740	585	690
P	1490	200	630	470	630	1020
Sc	15.6	4.4	14.3	15.4	14.5	17
Ti	0.587	0.138	0.636	0.534	0.537	0.464
V	121	16.5	120	118	109	142
Cr	194	12.2	87	81	70	190
Mn	920	240	400	825	1160	970
Co	20.4	2.6	11.7	18	18.9	24.4
Ni	76	5.5	25.6	40	34	78
Cu	21.8	4.9	177	37.3	137	383
Zn	79	44	52	101	243	144
Ga	23	27.4	15.9	20.5	20.3	16.7
Ge	1.3	1.7	1.3	1.4	1.4	1.3
As	1.96	6.2	17.6	19.7	75	13.6
Se	(0.11)	(0.21)	1.06	(0.28)	(0.36)	(0.30)
Rb	116	470	79	130	118	107
Sr	525	28	90	142	204	266
Y	22.5	67	22	26	26	20.2
Zr	310	460	220	188	220	170
Nb	35	95	16	18	19	12
Mo	0.74	2	92	0.86	1.2	7.7
Ag	0.048	0.066	0.59	0.084	0.36	0.36
Cd	0.088	0.065	0.10	0.19	0.82	0.43
In	(0.06)	(0.046)	(0.088)	(0.09)	0.13	0.14
Sn	3.1	29	3.4	4.0	4.6	2.8
Sb	0.22	0.46	5.4	1.84	3.9	1.25
Te	-	(0.031)	(0.15)	(0.08)	(0.12)	(0.14)
Cs	5.1	16.6	7.8	10	9.4	9.1
Ba	950	185	615	470	440	330
La	43	90	39	40	46	39
Ce	81	192	64	78	89	68
Pr	10	18.6	8.3	9.3	(9.6	(8.2
Nd	39	62	30	32	35	33
Sm	7.2	10.8	5.3	6.2	6.6	5.6
Eu	1.8	0.49	1.3	1.3	1.4	1.5

GBW 07301 - 07312 (cont.)

Component	GBW 07301	GBW 07302	GBW 07303	GBW 07304	GBW 07305	GBW 07306
Gd	6.1	9.5	4.7	5.0	6.4	5.5
Tb	0.86	1.8	0.70	0.90	0.9	0.69
Dy	4.4	11	4.0	4.6	5.0	3.8
Ho	(0.91)	(2.9)	(0.90)	(1.07)	(1.1)	(0.78)
Er	2.3	(8.0)	(2.4)	2.4	3.1	(2.1)
Tm	(0.42)	1.55	(0.43)	0.48	0.48	(0.38)
Yb	2.36	11	2.6	2.9	2.9	2.1
Lu	(0.45)	1.6	0.39	(0.46)	0.46	(0.36)
Hf	-	(20)	-	-	-	-
Ta	3.7	15.3	(1.08)	(1.36)	(1.4)	(0.72)
W	1.04	24.4	4.9	2.5	3.2	25
Hg	0.018	0.04	(0.05)	0.044	0.10	0.045
Tl	0.61	1.9	0.58	1.2	1.16	1.08
Pb	24.4	32	40	30.4	112	27
Bi	0.66	1.64	0.79	0.64	2.4	5.0
Th	28	70	9.2	14.6	15.2	9.0
U	4.4	17	1.86	2.6	2.6	2.4

Component	GBW 07307	GBW 07308	GBW 07309	GBW 07310	GBW 07311	GBW 07312
H_2O^+ (%)	-	-	(2.93)	(2.10)	(2.66)	(2.10)
Li	32	13.2	30	13.0	70.6	39.0
Be	2.7	2.0	1.8	0.9	26	8.2
B	143	3.6	54	26	68	24
F	890	204	494	149	0.165*	1250
Na_2O (%)	-	-	1.44	(0.04)	0.46	0.44
MgO (%)	-	-	2.39	0.12	0.62	0.47
Al_2O_3 (%)	-	-	10.58	2.84	10.37	9.30
SiO_2 (%)	-	-	64.89	88.89	76.25	77.29
P	820	140	670	271	255	235
S	-	-	150	90	170	940
Cl	-	-	(50)	(53)	290	(163)
K_2O (%)	-	-	1.99	0.125	3.28	2.91
CaO (%)	-	-	5.35	0.70	0.47	1.16
Sc	14.6	5.7	11.1	4.1	7.4	5.1
Ti	4480	3640	5500	1270	2100	1510
V	96	26	97	107	46.8	46.6
Cr	122	7.6	85	136	40	35
Mn	690	335	620	1013	2490	1400
FeO (%)	-	-	(1.52)	(0.24)	(0.34)	(1.19)
Fe_2O_3 (%)	-	-	4.86	3.86	4.39	4.88
Co	20.8	3.6	14.4	15.3	8.5	8.8
Ni	53	2.7	32.3	30.2	14.3	12.8
Cu	38	4.1	32.1	22.6	78.6	1230
Zn	238	43	78	46	373	498
Ga	17.7	10.8	14.0	6.4	18.5	14.1
Ge	1.4	0.94	1.28	0.40	1.81	1.87
As	84	2.4	8.4	25	188	115
Se	(0.31)	(0.15)	0.16	0.28	0.20	0.25
Br	-	-	(1.5)	(2.4)	(2.3)	(1.7)
Rb	147	132	80	9.2	408	270

Component	GBW 07307	GBW 07308	GBW 07309	GBW 07310	GBW 07311	GBW 07312
Sr	220	52	166	25.3	29	24.4
Y	23.8	18	26.6	13.8	42.7	29.3
Zr	162	490	370	70	153	234
Nb	17.2	35	17.7	6.8	25	15.4
Mo	1.4	0.54	0.64	1.2	5.9	8.4
Ag	1.05	0.062	0.089	0.27	3.2	1.15
Cd	1.05	0.081	0.26	1.12	2.3	4.0
In	0.081	(0.043	0.056	0.067	1.86	0.96
Sn	5.4	9.4	2.6	1.4	370	54
Sb	2.6	0.24	0.81	6.3	14.9	24.3
Te	(0.065)	-	(0.04)	(0.09)	(0.38)	0.29
I	-	-	(0.61)	1.6	2.0	1.8
Cs	5.9	3.6	5.1	2.3	17.4	7.9
Ba	720	480	430	42	260	206
La	45	30	40	13.0	30	32.7
Ce	78	54	78	38	58	61
Pr	9.6	5.7	9.2	3.2	7.4	6.9
Nd	37	21	34	11.8	27	25.6
Sm	6.1	3.8	6.3	2.4	6.2	5.0
Eu	1.3	0.56	1.33	0.47	0.60	0.61
Gd	5.8	3.5	5.5	2.25	5.9	4.4
Tb	0.76	0.54	0.87	0.42	1.13	0.82
Dy	4.2	2.6	5.1	2.2	7.2	4.8
Ho	(1.03)	(0.96)	0.96	0.45	1.4	0.94
Er	2.3	1.8	2.8	1.3	4.6	3.1
Tm	(0.49)	(0.36)	0.44	0.20	0.74	0.53
Yb	2.6	2.1	2.8	1.2	5.1	3.7
Lu	0.41	(0.36)	0.45	0.19	0.78	0.58
Hf	-	(15)	9.7	1.8	5.4	8.3
Ta	(1.3)	3.7	1.3	(0.52)	5.7	3.2
W	5.5	1.95	1.76	1.63	126	37.4
Au	-	-	(1.3)	-	(3.6)	(5.6)
Hg	0.053	0.042	0.083	0.280	0.072	0.056
Tl	0.93	0.78	0.49	0.21	2.9	1.76
Pb	350	21	23	27	636	285
Bi	0.66	0.19	0.42	0.38	50	10.9
Th	12.6	13.4	12.4	5.0	23.3	21.4
U	3.5	3.0	2.6	2.1	9.1	7.8
TOC	-	-	(0.47)	(0.4)	(0.24)	(0.4)
LOI (%)	-	-	(7.21)	(2.88)	(3.02)	(2.62)

Values in parenthesis are for information only.

Order information:

These CRMs can be purchased for US$70 per unit (70 g). Price subject to change without notice. Please contact NRCCRM.

Reference:

National Research Center for CRMs (1995) Certified reference materials catalog. State Bureau of Technical Supervision, National Research Center for Certified Reference Materials, Office of Certified Reference Materials, Hepingjie, Chaoyangqu, Beijing, China. 147 pp.

GBW 07313

Marine Sediment

National Research Center for Certified Reference Materials (China)

Description:

The material for this CRM was collected from the central part of the Pacific during the HY4-871 cruise of the R/V Haiyang of the Ministry of Geology and Mineral Resources. The sediment was air dried, crumbled to less than 5 mm pieces, mixed, oven dried at 60°C, ground to less than 0.08 mm particles, mixed, and packaged.

Certified concentrations (μg/g dry weight unless noted):

Component	Value	Uncertainty (±)	Component	Value	Uncertainty (±)
Li	60.0	1.5	Sr	267	15
B	125	9	Y	104	5
Na_2O (%)	4.81	0.05	Zr	177	10
MgO (%)	3.38	0.05	Mo	7.2	0.5
Al_2O_3 (%)	13.75	0.09	Sb	1.85	0.35
SiO_2 (%)	53.86	0.06	Cs	9.4	0.7
P_2O_5 (%)	0.45	0.01	Ba (%)	0.44	0.02
S (%)	0.31	0.02	La	67.8	2.9
Cl (%)	4.07	0.04	Ce	92	8
K_2O (%)	2.95	0.05	Pr	20.1	1.9
CaO	1.71	0.03	Nd	91.8	3.9
Sc	25.6	2.9	Sm	21.5	1.3
TiO_2 (%)	0.67	0.01	Eu	5.3	0.3
V	112	5	Gd	22.0	1.2
Cr	58.4	1.3	Tb	3.4	0.3
MnO (%)	0.43	0.01	Dy	19.9	1.8
Fe_2O_3 (%)	6.58	0.07	Ho	4.3	0.2
Co	76.7	1.2	Er	11	0.7
Ni	150	4	Yb	9.8	1.1
Cu	424	8	Lu	1.46	0.19
Zn	160	3	W	5.5	0.6
Ga	23.7	1.7	Pb	29.3	1.1
As	5.8	0.8	Tm	1.54	0.14
Rb	97.3	2.6	Th	13.9	1.1
			U	1.98	0.47

Noncertified concentrations (μg/g dry weight unless noted):

Component	Value
F (%)	0.13
Org. C (%)	0.25
FeO (%)	0.29
Nb	15.1

Order Information:

GBW 07313 can be purchased for US$175 per unit (50 g). Price subject to change without notice. Please contact NRCCRM.

References:

Institute of Marine Geology (1990) Certificate of certified reference material. Marine sediment. Institute of Marine Geology, Ministry of Geology and Mineral Resources, Qingdao, China.

National Research Center for CRMs (1995) Certified reference materials catalog. State Bureau of Technical Supervision, National Research Center for Certified Reference Materials, Office of Certified Reference Materials, Hepingjie, Chaoyangqu, Beijing, China. 147 pp.

GBW 07314

Offshore Marine Sediment

National Research Center for Certified Reference Materials (China)

Description:

No information available.

Certified concentrations (µg/g dry weight unless noted):

Component	Value	Component	Value	Component	Value
B	73	TiO_2 (%)	0.825	As	10.3
Na_2O (%)	1.68	Cr	86	Sr	150
MgO (%)	2.50	MnO (%)	0.096	Cd	0.20
Al_2O_3 (%)	13.07	Fe_2O_3 (%)	5.36	Ba	425
SiO_2 (%)	61.91	Co	14.2	Hg	0.048
P_2O_5 (%)	0.148	Ni	34.3	Pb	25
K_2O (%)	2.48	Cu	31	Org. C (%)	0.50
CaO (%)	4.31	Zn	87		

Noncertified concentrations (µg/g dry weight unless noted):

Component	Value	Component	Value	Component	Value
Sc	12.5	La	38	Er	3.0
V	103.1	Ce	78	Yb	2.8
Ga	16.1	Pr	8.7	Lu	0.45
Rb	109.3	Nd	33	Hf	6.2
Y	27.0	Sm	6.7	Ta	1.2
Zr	229	Eu	1.3	W	2.1
Nb	19.1	Gd	5.6	Tm	0.44
Mo	0.64	Tb	0.83	Th	10.2
Sb	1.4	Dy	5.4	U	2.7
Cs	8.2	Ho	1.0		

HNO_3 - $HClO_4$ soluble concentrations (µg/g)

Cr	46
Cu	28
Zn	77
Cd	0.17
Pb	23

Order information:

GBW 07314 can be purchased for US$175 per unit (50 g). Price subject to change without notice. Please contact NRCCRM.

Reference:

National Research Center for CRMs (1995) Certified reference materials catalog. State Bureau of Technical Supervision, National Research Center for Certified Reference Materials, Office of Certified Reference Materials, Hepingjie, Chaoyangqu, Beijing, China. 147 pp.

GBW 08301

River Sediment

National Research Center for Certified Reference Materials (China)

Description:

No information available.

Certified concentrations (µg/g dry weight unless noted):

Component	Value	Component	Value
Cr	90	Se	0.39
Mn	975	Cd	2.45
Fe (%)	3.94	Ba	375
Co	16.5	Hg	0.22
Cu	53	Pb	79
As	56		

Noncertified concentrations (µg/g dry weight unless noted):

Component	Value
Be	3.5
V	96
Ni	32
Zn	251

Order information:

GBW 08302 can be purchased for US$50 per unit (100 g). Price subject to change without notice. Please contact NRCCRM.

Reference:

National Research Center for CRMs (1995) Certified reference materials catalog. State Bureau of Technical Supervision, National Research Center for Certified Reference Materials, Office of Certified Reference Materials, Hepingjie, Chaoyangqu, Beijing, China. 147 pp.

GBW 08304

Environmental Radioactivity of River Sediment

National Research Center for Certified Reference Materials (China)

Description:

No information available.

Certified activites (Bg/g):

Isotope	Value	Isotope	Value
^{238}U	0.394	^{60}Co	0.631
^{235}U	0.0197	^{137}Cs	0.131
^{226}Ra	0.12	^{90}Sr	0.0197
^{232}Th	0.0599	$^{239}Pu + ^{240}Pu$	0.0199
^{40}K	0.415		

Order information:

GBW 08304 can be purchased for US$50 per unit (100 g). Price subject to change without notice. Please contact NRCCRM.

Reference:

National Research Center for CRMs (1995) Certified reference materials catalog. State Bureau of Technical Supervision, National Research Center for Certified Reference Materials, Office of Certified Reference Materials, Hepingjie, Chaoyangqu, Beijing, China. 147 pp.

GSD-9

River Sediment

National Research Center for CRMs (China)

Description:

The material for this CRM is a river sediment collected on the margin of a sand bar in the Yangtse River, upstream from the city of Wuhan, Hubei, China.

Certified concentrations (µg/g dry weight unless noted):

Component	Value	Uncertainty (±)	Component	Value	Uncertainty (±)
Li	30	0.6	Mo	0.64	0.05
Be	1.8	0.1	Ag	0.089	0.006
B	54	3.6	Cd	0.26	0.02
F	494	15	In	0.056	0.005
Na_2O (%)	1.44	0.02	Sn	2.6	0.2
MgO (%)	2.39	0.03	Sb	0.81	0.08
Al_2O_3 (%)	10.58	0.05	Cs	5.1	0.5
SiO_2 (%)	64.89	0.06	Ba	430	8
P	670	11	La	40	1.3
S	150	20	Ce	78	4
K_2O (%)	1.99	0.03	Pr	9.2	0.5
CaO (%)	5.35	0.04	Nd	34	1.3
Sc	11.1	0.3	Sm	6.3	0.2
Ti	5500	70	Eu	1.33	0.04
V	97	2	Gd	5.5	0.2
Cr	85	2.7	Tb	0.87	0.06
Mn	620	8	Dy	5.1	0.2
Fe_2O_3 (%)	4.86	0.04	Ho	0.96	0.04
Co	14.4	0.4	Er	2.8	0.2
Ni	32.3	0.8	Yb	2.8	0.13
Cu	32.1	0.6	Lu	0.45	0.02
Zn	78	1.4	Hf	9.7	0.9
Ga	14.0	0.4	Ta	1.3	0.1
Ge	1.28	0.11	W	1.76	0.1
As	8.4	0.4	Hg (ng/g)	83	6
Se	0.16	0.03	Tl	0.49	0.05
Rb	80	1.5	Pb	23	1
Sr	166	4	Bi	0.42	0.02
Y	26.6	1.0	Tm	0.44	0.05
Zr	370	10	Th	12.4	0.4
Nb	17.7	0.8	U	2.6	0.3

GSD-9 (cont.)

Noncertified concentrations (μg/g dry weight unless noted):

Component	Value
Cl	50
Br	1.5
Te	0.04
I	0.61
Au (ng/g)	1.3

Order information:

No price information is available. Please contact NRCCRM.

Reference:

Institute of Geophysical and Geochemical Exploration (1986) Certificate of geochemical standard reference materials. Institute of Geophysical and Geochemical Exploration, Langfang, Hebei, China.

GSD-10

Stream Sediment

National Research Center for CRMs (China)

Description:

The material for this CRM was collected from a tributary stream in Yishan, Guangxi, China. The drainage basin rocks are carbonates.

Certified concentrations (μg/g dry weight unless noted):

Component	Value	Uncertainty (±)	Component	Value	Uncertainty (±)
Li	13.0	0.3	Ag	0.27	0.010
Be	0.9	0.1	Cd	1.12	0.05
B	26	2	In	0.067	0.010
F	149	14	Sn	1.4	0.17
MgO (%)	0.12	0.017	Sb	6.3	0.3
Al_2O_3 (%)	2.84	0.04	I	1.6	0.3
SiO_2 (%)	88.89	0.12	Cs	2.3	0.3
P	271	7	Ba	42	3
S	90	10	La	13.0	0.5
K_2O (%)	0.125	0.007	Ce	38	2
CaO (%)	0.70	0.015	Pr	3.2	0.2
Sc	4.1	0.2	Nd	11.8	0.8
Ti	1270	30	Sm	2.4	0.08
V	107	2	Eu	0.47	0.02
Cr	136	4	Gd	2.25	0.13
Mn	1013	11	Tb	0.42	0.05
Fe_2O_3 (%)	3.86	0.04	Dy	2.2	0.14
Co	15.3	0.4	Ho	0.45	0.04
Ni	30.2	0.6	Er	1.3	0.09
Cu	22.6	0.6	Yb	1.2	0.1
Zn	46	1.3	Lu	0.19	0.02
Ga	6.4	0.5	Hf	1.8	0.2
Ge	0.40	0.04	W	1.63	0.13
As	25	1	Hg (ng/g)	280	18
Se	0.28	0.03	Tl	0.21	0.03
Rb	9.2	0.8	Pb	27	1
Sr	25.3	1.2	Bi	0.38	0.02
Y	13.8	0.7	Tm	0.20	0.02
Zr	70	3	Th	5.0	0.2
Nb	6.8	0.6	U	2.1	0.1
Mo	1.2	0.05			

GSD-10(cont.)

Noncertified concentrations (μg/g dry weight unless noted):

Component	Value
Na_2O (%)	0.04
Cl	53
Br	2.4
Te	0.09
Ta	0.52

Order information:

No price information is available. Please contact NRCCRM.

Reference:

Institute of Geophysical and Geochemical Exploration (1986) Certificate of geochemical standard reference materials. Institute of Geophysical and Geochemical Exploration, Langfang, Hebei, China.

GSD-11

Stream Sediment

National Research Center for CRMs (China)

Description:

The material for this CRM was collected from the Shizhuyuan ore field in Chenzhou, Hunan, China. The rocks of the drainage basin include biotite granite, carbonates and sandstone. Mineralization of W, Sn, Mo and Bi are known.

Certified concentrations (µg/g dry weight unless noted):

Component	Value	Uncertainty (±)	Component	Value	Uncertainty (±)
Li	70.6	0.9	Mo	5.9	0.3
Be	26	1	Ag	3.2	0.2
B	68	3	Cd	2.3	0.07
F	1650	49	In	1.86	0.15
Na_2O (%)	0.46	0.01	Sn	370	29
MgO (%)	0.62	0.03	Sb	14.9	0.7
Al_2O_3 (%)	10.37	0.05	I	2.0	0.2
SiO_2 (%)	76.25	0.10	Cs	17.4	0.5
P	255	13	Ba	260	8
S	170	20	La	30	0.8
Cl	290	17	Ce	58	2
K_2O (%)	3.28	0.03	Pr	7.4	0.3
CaO (%)	0.47	0.01	Nd	27	1
Sc	7.4	0.2	Sm	6.2	0.2
Ti	2100	40	Eu	0.60	0.04
V	46.8	1.2	Gd	5.9	0.3
Cr	40	1	Tb	1.13	0.06
Mn	2490	33	Dy	7.2	0.4
Fe_2O_3 (%)	4.39	0.04	Ho	1.4	0.1
Co	8.5	0.3	Er	4.6	0.3
Ni	14.3	0.4	Yb	5.1	0.3
Cu	78.6	1.1	Lu	0.78	0.04
Zn	373	6	Hf	5.4	0.3
Ga	18.5	0.6	Ta	5.7	0.3
Ge	1.81	0.13	W	126	4
As	188	6	Hg (ng/g)	72	6
Se	0.20	0.03	Tl	2.9	0.3
Rb	408	6	Pb	636	10
Sr	29	1.4	Bi	50	2
Y	42.7	2.1	Tm	0.74	0.06
Zr	153	6	Th	23.3	0.7
Nb	25	1	U	9.1	0.6

GSD 11(cont.)

Noncertified concentrations (μg/g dry weight unless noted):

Component	Value
Br	2.3
Te	0.38
Au (ng/g)	3.6

Order information:

No price information is available. Please contact NRCCRM.

Reference:

Institute of Geophysical and Geochemical Exploration (1986) Certificate of geochemical standard reference materials. Institute of Geophysical and Geochemical Exploration, Langfang, Hebei, China.

GSD-12

Stream Sediment

National Research Center for CRMs (China)

Description:

The material for this CRM was collected from a tributary of the Yangchun ore field, Guangdon, China. The rocks in the drainage basin include sandstone, shale, carbonates, granite and granodiorite. There is Cu, W and Sn mineralization in the area.

Certified concentrations (µg/g dry weight unless noted):

Component	Value	Uncertainty (±)	Component	Value	Uncertainty (±)
Li	39.0	0.6	Ag	1.15	0.06
Be	8.2	0.3	Cd	4.0	0.16
B	24	1.3	In	0.96	0.09
F	1250	24	Sn	54	3
Na_2O (%)	0.44	0.01	Sb	24.3	1.3
MgO (%)	0.47	0.04	Te	0.29	0.05
Al_2O_3 (%)	9.30	0.06	I	1.8	0.2
SiO_2 (%)	77.29	0.08	Cs	7.9	0.3
P	235	10	Ba	206	7
S	940	30	La	32.7	0.8
K_2O (%)	2.91	0.02	Ce	61	2
CaO (%)	1.16	0.02	Pr	6.9	0.7
Sc	5.1	0.2	Nd	25.6	1.7
Ti	1510	0.18	Sm	5.0	0.2
V	46.6	1.4	Eu	0.61	0.02
Cr	35	1	Gd	4.4	0.2
Mn	1400	19	Tb	0.82	0.04
Fe_2O_3 (%)	4.88	0.04	Dy	4.8	0.1
Co	8.8	0.3	Ho	0.94	0.05
Ni	12.8	0.5	Er	3.1	0.2
Cu	1230	14	Yb	3.7	0.2
Zn	498	8	Lu	0.58	0.04
Ga	14.1	0.3	Hf	8.3	0.6
Ge	1.87	0.08	Ta	3.2	0.2
As	115	3	W	37.4	1.0
Se	0.25	0.02	Hg (ng/g)	56	4
Rb	270	5	Tl	1.76	0.18
Sr	24.4	1.3	Pb	285	5
Y	29.3	1.1	Bi	10.9	0.5
Zr	234	8	Tm	0.53	0.04
Nb	15.4	0.5	Th	21.4	0.7
Mo	8.4	0.3	U	7.8	0.4

GSD 12 (cont.)

Noncertified concentrations (μg/g dry weight unless noted):

Component	Value
Cl	78
Te	0.051
Au (ng/g)	0.55

Order Information:

No price information is available. Please contact NRCCRM.

Reference:

Institute of Geophysical and Geochemical Exploration (1986) Certificate of geochemical standard reference materials. Institute of Geophysical and Geochemical Exploration, Langfang, Hebei, China.

HR-1

Humber River Sediment

National Water Research Institute (Canada)

Description:

The sediment used for HR-1 was obtained from the Humber River, North America. The sediment was freeze dried, ground to < 200-mesh particle size, and subsampled into bottles.

Certified concentrations (µg/g unless noted):

Element	Value	Stand. dev.	Element	Value	Stand. dev.
Al (%)	5.12	1.84	Zn	1108	75
V	76.6	21.2	As	6.81	2.93
Mn	514	103	Se	0.97	0.69
Fe (%)	3.10	0.36	Cd	4.30	1.64
Co	13.0	9.9	Hg	0.328	0.147
Ni	38.5	10.7	Pb	144	54
Cu	78.5	14.0			

Order information:

This CRM can be purchased for Canadian $200 per unit (100 g). Price subject to change without notice. Please contact NWRI.

References:

National Water Research Institute (1994) HR-1. Trace metals in sediment. Certificate of Analysis. Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada.

National Water Research Institute (1995) Quality assurance reference materials and services. Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada. 48 pp.

HS-3 - HS-6

Polycyclic Aromatic Hydrocarbons in Marine Sediments

National Research Council (Canada)

Description:

These CRMs are natural marine sediment reference materials for determination of PAHs. Sediment was collected in four harbors in Nova Scotia, reflecting varying degrees of commercial and industrial activities. The sediments were freeze dried, sieved to pass a 125-µm sieve, homogenized in a modified cement mixer, and stored in solvent-rinsed pint-sized cans holding approximately 200 g of sediment.

Concentrations (µg/g dry weight):

Compound	Value	Uncertainty (±)	Value	Uncertainty (±)
	HS-3		HS-4	
Acenaphthene	4.5	1.5	0.15 *	
Acenaphthylene	0.3	0.1	0.15 *	
Anthracene	13.4	0.5	0.14	0.07
Benzo[*a*]pyrene	7.4	3.6	0.65	0.08
Benzo[*b*]fluoranthene	7.7	1.2	0.70	0.15
Benzo[*ghi*]perylene	5.0	2.0	0.58	0.22
Benzo[*k*]fluoranthene	2.8	2.0	0.36	0.05
Benz[*a*]anthracene	14.6	2.0	0.53	0.05
Chrysene	14.1	2.0	0.65	0.08
Dibenz[*a,h*]anthracene	1.3	0.5	0.12	0.05
Fluoranthene	60	9	1.25	0.10
Fluorene	13.3	3.1	0.15	
Indeno[1,2,3-*cd*]pyrene	5.4	1.3	0.51	0.15
Naphthalene	9.0	0.7	0.15 *	
Phenanthrene	85	20	0.68	0.08
Pyrene	39	9	0.94	0.12

* Amount present less than 0.15 µg/g.

HS-3 - HS-6 (cont.)

Compound	Value	Uncertainty (±)	Value	Uncertainty (±)
	HS-5		HS-6	
Acenaphthene	0.23	0.10	0.23	0.07
Acenaphthylene	0.15 *		0.19	0.05
Anthracene	0.38	0.15	1.1	0.4
Benzo[*a*]pyrene	1.7	0.8	2.2	0.4
Benzo[*b*]fluoranthene	2.0	1.0	2.8	0.6
Benzo[*ghi*]perylene	1.3	0.3	1.78	0.72
Benzo[*k*]fluoranthene	1.0	0.4	1.43	0.15
Benz[*a*]anthracene	2.9	1.2	1.8	0.3
Chrysene	2.8	0.9	2.0	0.3
Dibenz[*a,h*]anthracene	0.2	0.1	0.49	0.16
Fluoranthene	8.4	2.6	3.54	0.65
Fluorene	0.4	0.1	0.47	0.12
Indeno[1,2,3-*cd*]pyrene	1.3	0.7	1.95	0.58
Naphthalene	0.25	0.07	4.1	1.1
Phenanthrene	5.2	1.0	3.0	0.6
Pyrene	5.8	1.8	3.0	0.6

* Amount present less than 0.15 µg/g.

Order information:

These materials can be purchased for US$280 per unit (200 g). Price subject to change without notice. Please contact NRCC.

Reference:

National Research Council Canada (1992) HS-3, HS-4, HS-5, HS-6. Harbour sediment reference materials for polycyclic aromatic hydrocarbons. Description sheet. National Research Council Canada, National Research Council Canada, Institute for Marine Biosciences, Halifax, Nova Scotia, Canada.

IAEA-135

Sediment

International Atomic Energy Agency (Austria)

Description:

This sample is intended as a reference material for the measurements of man-made and natural radionuclides in environmental marine samples. The sediment sample was collected ins 1991 by the Institute of Environmental and Biological Sciences of the Lancaster University, Lancaster, UK, at Conder Green, Lune Estuary, UK. This area is influenced by the radioactive discharges of the nuclear installations of Sellafield. The sediment sample was dried, ground in a ball mill and homogenized. Moisture content of the sample detained by drying several aliquots at 80°C to constant weight was found to be approximately 2.8%. The reference values given in the certificate were established on the basis of results submitted by 151 laboratories participating in the world-wide intercomparison exercise organized by the IAEA-MEL during 1992.

Recommended values (mBq/g dry weight):

Radionuclide	Activity	Confidence interval (α = O .05)	Radionuclide	Activity	Confidence interval (α = O .05)
^{40}K	560	552 - 570	^{226}Ra	23.9	20.6 - 25
^{60}Co	4.8	4.6 - 51	^{228}Ra	36.7	34.4 - 39.7
^{134}Cs	5.2	4.8 - 5.5	$^{232}Th(t)$	36.9	35 - 38
^{137}Cs	1108	1086 - 1150	^{238}Pu	43	41.6 - 4 5
^{154}Eu	6.8	6.4 - 7.1	$^{239+240}Pu$	213	205 - 225.8
^{155}Eu	5.5	5.1 - 6.1			

Information values (mBq/g dry weight):

Radionuclide	Activity	Confidence interval (α = O .05)	Radionuclide	Activity	Confidence interval (α = O .05)
^{57}Co	7	4.7 - 8.5	^{234}U (n)	14	11.7 - 18.5
^{90}Sr	64.5	58 - 74	^{234}U (t)	28.3	20.9 - 32
^{106}Ru	19.9	16.8 - 22	^{235}U (t)	1.05	0.65 - 1.3
^{125}Sb	8.8	8.2 - 11	^{238}U (n)	13	11.3 - 18.1
^{210}Pb	48	42.2 - 54.13	^{238}U (t, G)	30	27 - 36.5
^{228}Th (t, G)	38.2	25.7 - 72	^{241}Am	318	310 - 325
^{230}Th (t)	69.1	61 - 73.4			

n - Normal dissolution techniques. t - Total dissolution techniques. G - Gamma spectrometry.

Order Information:

IAEA-135 can be purchased for US$110 per unit (50 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

IAEA-135 (cont.)

Reference:

International Atomic Energy Agency (1993) Intercompanson of radionuclide measurements in sedimet sample IAEA-135. Report No. IAEA/AL/063. Marine Envirorment Laboratory, IAEA, Monaco.

IAEA-300

Sediment

International Atomic Energy Agency (Austria)

Description:

The sediment for IAEA-300 was collected by the Federal Maritime and Mydrographic Agency, Hamburg, Germany, during July 1992 in the Baltic Sea on board the RV VALDIVIA. This material was sampled with a large BSH box corer (500 x 500 mm) and the top 10-cm layer was kept for the exercise. This sediment was muddy, clayish, and mainly anoxic, except the upper 0 - 3 cm layer which was oxic. This material was freeze-dried and the final amount obtained was approximately 39 kg dry weight. This matenal was ground in a ball mill and further homogenized by mixing in a stainless steel rotating drum for about one week. More the 99% of the final material was in the size below 500 µm. Only 6.7% of the material was below 63 µm, and 90.9% between 63 µm and 250 µm. The moisture content of the sediment was determined by drying several aliquots of the material in an oven at 80°C to corset weight and was found to be 1.4% at the time of sample preparation. The reference values given in the certificate were established on the basis of results submitted by 159 participants in the world-wide intercomparison exercise organized by the IAEA-MEL during 1993.

Recommended values (mBq/g dry weight):

Radionuclide	Activity	Confidence interval (α = O .05)		Radionuclide	Activity	Confidence interval (α = O .05)	
^{40}K	1059	1043	- 1080	^{210}Po	340.5	273.6	- 1361
^{60}Co	1.5	1.2	- 1.7	^{228}Ra	61.6	59	- 63.9
^{125}Sb	11	1O.1	- 13	^{234}U	69	64	- 74
^{134}Cs	66.6	65	- 68	^{238}U	64.7	61	- 1168.7
^{137}Cs	1066.6	1046	-11080	$^{239+240}Pu$	3.5	3.44	- 3.65
^{155}Eu	4.95	4	- 5.9	^{241}Am	1.38	1.2	- 1.5
^{210}Pb	360	339	- 1395				

Information values (mBq/g dry weight):

Radionuclide	Activity	Radionuclide	Activity
^{54}Mn	1.9	^{230}Th	88
^{90}Sr	10.8	^{232}Th	72 4
^{226}Ra	56-5	^{235}U	2.75
^{228}Th	64	^{238}Pu	0 .15

Order Information:

IAEA-300 can be purchased for US$60 per unit (100 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

Reference:

International Atomic Energy Agency (1994) Report on the Intercompanson Run IAEA-300. Radionuclides in marine sediment. Report No IAEA/AL/064. Marine Environment Laboratory, IAEA, Monaco.

IAEA-313 - IAEA-314

Stream Sediments

International Atomic Energy Agency (Austria)

Description:

The material for these SRMs was donated by the Indonesian Atomic Energy Commission.

Concentrations (µg/g) or activities (mBq/g):

	IAEA-313		IAEA-314	
Radionuclide	Activity	Confidence interval	Activity	Confidence interval
^{226}Ra	342	307 - 379	732	678 - 787
Th	77.1	74.8 - 79.4	17.8	16.8 - 18.8
U	18.2	17.0 - 19.3	56.8	52.9 - 60.7

Order information:

IAEA-313 and IAEA-314 can each be purchased for US$60 per unit (50 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

Reference:

International Atomic Energy Agency (1994) AQCS (Analytical Quality Control Services) Intercomparison runs reference materials 1994 - 1995. Catalog. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 100 pp.

IAEA-356

Trace Elements in Polluted Marine Sediment

International Atomic Energy Agency (Austria)

Description:

Approximately 30 kg of sediment were collected from the Lagoon of Venice, Italy. The sediment was frozen, freeze dried, ground, passed through a 250 µm sieve, and homogenized. The material was packaged into glass bottles sealed with Teflon tape. Moisture content of the sample detained by drying several aliquots at 105°C to constant weight was found to be approximately 1.5%.

Recommended concentrations (mg/kg dry weight):

Element	Value	Confidence range			Element	Value	Confidence range		
Na (g/kg)	13.9	12.4	-	16.1	Pb	71.0	63.3	-	78.0
Al (g/kg)	39.0	31.8	-	44.2	Sr	170	164	-	202
Ca (g/kg)	88.7	81.1	-	96.8	Ag	8.41	5.19	-	11.6
Sc	6.90	6.75	-	9.94	Cd	4.47	4.32	-	4.77
Ti (g/kg)	2.19	1.67	-	2.56	Sb	8.33	7.27	-	9.10
V	55.5	32.8	-	60.1	Ce	41.5	38.3	-	49.8
Cr	69.8	62.9	-	74.4	La	19.3	15.9	-	20.6
Mn (g/kg)	312	288	-	323	Hg	7.62	6.74	-	7.98
Fe (g/kg)	24.1	22.5	-	25.1	Pb	347	301	-	365
Co	15.0	14.1	-	16.4	Th	6.64	6.24	-	6.92
Ni	36.9	35.1	-	40.1	U	3.20	2.40	-	3.50
Cu	365	351	-	375					
Zn	977	936	-	1019	Methyl Hg				
As	26.9	22.6	-	30.0	as Hg (µg/g)	5.46	5.07	-	5.84
Br	76.1	50.4	-	86.2					
Ba	548	457	-	594					

Information values (mg/kg dry weight):

Element	Value	Confidence range			Element	Value	Confidence range		
K (g/kg)	12.6	9.35	-	13.9	Cs	4.60	4.13	-	7.47
Se	0.76	0.40	-	1.58	Sm	3.50	3.40	-	3.83
Sn	52.5	43.6	-	62.2	Eu	0.73	0.63	-	0.86
Te	0.54	0.48	-	1.15	Ta	0.61	0.59	-	0.81
Zr	117	91	-	206	Hf	2.96	2.76	-	3.15
Mo	4.87	1.91	-	6.35					

Order Information:

IAEA-356 can be purchased for US$110 per unit (50 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

References:

Horvat, M., V. Mandic, L. Liang, N. S. Bloom, S. Padberg, Y-H. Lee, H. Hintelman, and J. Benoit (1994) Certification of methylmercury compounds concentration in marine sediment reference material IAEA-356. Appl. Organomet. Chem., 8:533-40.

International Atomic Energy Agency (1994) IAEA-356. Trace elements in polluted marine sediment. Information sheet. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria.

International Atomic Energy Agency (1994) World-wide and regional intercompanson for the determination of trace elements in polluted marine sediment IAEA-356. Report No. IAEA/AL/058. Marine Envirorment Laboratory, International Atomic Energy Agency, Monaco.

IAEA-357

Sediment from Coastal "Hot Spot"

International Atomic Energy Agency (Austria)

Description:

Approximately 30 kg of sediment were collected from the Lagoon of Venice, Italy. The sediment was frozen, freeze dried, ground, passed through a 250 µm sieve, and homogenized. The material was packaged into glass bottles sealed with Teflon tape.

Recommended concentrations (ng/g dry weight):

Compound	Value	Uncertainty (±)	Compound	Value	Uncertainty (±)
4,4'-DDD	30	6	PCB 52	47	4
4,4'-DDE	25	7	PCB 101	73	6
4,4'-DDT	35	12	PCB 138	74	16
Anthracene	2100	120	PCB 170	15	5.2
Aroclor 1254	940	202	Phenanthrene	10400	750
Benzo[*a*]pyrene	6900	1000	Phytane	720	280
Benzo[*e*]pyrene	6100	3300	Pyrene	15100	2700
Benzo[*ghi*]perylene	5200	1000	Resolved aromatics		
Benz[*a*]anthracene	7400	1200	(µg/g)	130	27
Chrysene	8900	1500	Sigma alkanes		
HCB	2.4	0.7	C14-34	14200	5100
Heptachlor	1.5	0.6			
Indeno[1,2,3-*cd*]= pyrene	4900	600			

Information values only (ng/g dry weight unless noted):

Compound	Value	Uncertainty (±)	Compound	Value	Uncertainty (±)
2,4'-DDD	9.2	2.5	PCB 156	10	3.6
Dibenz[*a,h*]= anthracene	940	220	PCB 180	27	6
Fluorene	1300	580	PCB 194	5.5	2.7
PCB 28	14	4	Resolved aliphatics		
PCB 44	22	4	(µg/g)	33	18
PCB 105	29	6	Total aromatics		
PCB 118	92	19	(µg/g)	130	27
PCB 128	15	1	UVF ROPME (µg/g)	4400	1400
PCB 153	64	11			

Order Information:

IAEA-357 can be purchased for US$60 per unit (25 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

References:

International Atomic Energy Agency (1990) IAEA-357. Sediment for chlorinated and petroleum hydrocarbons. Reference sheet. International Atomic Energy Agency, 19, av. des Castellans, MC-98000, Monaco.

International Atomic Energy Agency (1994) AQCS (Analytical Quality Control Services) Intercomparison runs reference materials 1994 - 1995. Catalog. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 100 pp.

Villeneuve, J. - P., and L. D. Mee (1992) World-wide and regional intercomparison for the determination of organochlorine compounds and petroleum hydrocarbons in sediment sample. IAEA-357. IAEA Report 51. IAEA/MEL, B. P. no. 800., MC-98012, Monaco. 53 pp.

IAEA-367

Sediment from the Pacific Ocean

International Atomic Energy Agency (Austria)

Description:

The material for IAEA-367 was collected by the Lawrence Livermore National Laboratory, USA, at the Enewetak Atoll, Marshall Islands, Pacific Ocean. The sample was dried, ground and homogenized.

Recommended activities (mBq/g):

Radionuclide	Value	Range
367		
^{60}Co	1	0.9 - 1.3
^{90}Sr	102	62 - 129
^{137}Cs	195	190 - 201
$^{239+240}Pu$	38	34.4 - 39.8

Information only activities (from Reference sheet, 1991) (mBq/g):

Radionuclide	Value	Range
^{40}K	5.2	
^{155}Eu	1.6	0.9 - 2.2
^{226}Ra	10.7	
^{228}Th	0.2	
^{230}Th	19	
^{234}U	24	
Radionuclide	Value	Range
^{235}U	1..6	
^{238}U	20.3	
^{238}Pu	0.08	
^{241}Am	26.4	24 - 27.7
^{241}Pu	170	154 - 190

Order Information:

IAEA-367 can be purchased for US$60 per unit (40 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

References:

International Atomic Energy Agency (1991) IAEA-367 sediment. Reference sheet. International Atomic Energy Agency, 19, av. des Castellans, MC-98000, Monaco.

International Atomic Energy Agency (1994) AQCS (Analytical Quality Control Services) Intercomparison runs reference materials 1994 - 1995. Catalog. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 100 pp.

IAEA-368

Sediment from the Pacific Ocean

International Atomic Energy Agency (Austria)

Description:

The material for IAEA-368 was collected by the Service Mixte de Sécurité Radiologique of the Commissariat à l'Energie Atomique, Montléry, France, and the Direction des Applications Militaires of the Ministère de la Défense, France, at the Mururoa Atoll in the Pacific Ocean. The sample was dried, ground and homogenized.

Recommended activities (mBq/g):

Radionuclide	Value	Range	Radionuclide	Value	Range
^{60}Co	0.6	0.5 - 0.7	^{238}U	31	25 - 33
^{155}Eu	3.8	3.4 - 4.3	^{238}Pu	8.5	7.6 - 8.9
^{210}Pb	23.2	19.8 - 27.2	$^{239+240}Pu$	31	29 - 34
^{226}Ra	21.4	20.3 - 22.6			

Recommended activities (mBq/g):

Radionuclide	Value	Range	Radionuclide	Value	Range
^{40}K	5.4	5 - 8	^{232}Th	0.3	0.06 - 2.30
^{90}Sr	1.8	0.45 - 6.9	^{234}U	35.7	21.5 - 44.8
^{137}Cs	0.34	0.2 - 0.44	^{235}U	1.9	1.6 - 2.6
^{228}Th	1	0 - 2	^{241}Am	1.3	1.2 - 1.5
^{230}Th	26.7				

Order Information:

IAEA-368 can be purchased for US$60 per unit (100 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

References:

International Atomic Energy Agency (1991) IAEA-368 sediment. Reference sheet. International Atomic Energy Agency, 19, av. des Castellans, MC-98000, Monaco.

International Atomic Energy Agency (1992) AQCS (Analytical Quality Control Services) Intercomparison Runs Reference Materials 1992. Catalog, 88 pp. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria.

JLk-1

Lake Sediment

Geological Survey of Japan (Japan)

Description:

JLk-1 is fresh water lake sediment from Lake Biwa, Shiga Prefecture, Japan.

Recommended values (μg/g dry weight unless noted):

Constituent	Value	Constituent	Value	Constituent	Value
H_2O^+ (%)	6.11	S	1130	Cu	59.8
H_2O^- (%)	3.52	K_2O (%)	2.77	Zn	151
Li	54.7	CaO (%)	0.68	As	27.7
Be	2.9	TiO_2 (%)	0.67	Sr	69
C	1.52%	V	116	Rb	144
Na_2O (%)	1.05	Cr	69	Cs	12.4
MgO (%)	1.76	MnO (%)	0.27	Tl	1.11
Al_2O_3 (%)	16.86	FeO (%)	2.34	Pb	45
SiO_2 (%)	57.09	Fe_2O_3 (%)	4.24	LOI (%)	12.00
P_2O_5 (%)	0.21	Co	18.1		
		Ni	36.9		

Order information:

Samples are available free of charge. Please contact to Dr. N. Imai, Geochemistry Section, GSJ.

Reference:

Terashima, S., A. Ando, T. Okai, Y. Kanai, M. Taniguchi, F. Takizawa, and S. Itoh (1990) Elemental concentrations in nine new GSJ rock reference samples "Sedimentary rock series". Geostands. Newsletter, 14(1):1-5.

JSd-1

Stream Sediment

Geological Survey of Japan (Japan)

Description:

JSd-1 is a composite sample collected in the northern region, Ibaraki Prefecture, Japan.

Recommended values (µg/g dry weight unless noted):

Constituent	Value	Constituent	Value	Constituent	Value
H_2O^+ (%)	2.17	S	68	Cu	22.2
H_2O^- (%)	0.78	K_2O (%)	2.19	Zn	99
Li	24.2	CaO (%)	3.07	As	2.36
Be	1.3	TiO_2 (%)	0.65	Sr	323
C	1148	V	81	Rb	65
Na_2O (%)	2.73	Cr	22	Cs	2.0
MgO (%)	1.85	MnO (%)	0.093	Tl	0.404
Al_2O_3 (%)	14.66	FeO (%)	1.40	Pb	14
SiO_2 (%)	66.42	Fe_2O_3 (%)	3.55	LOI (%)	3.14
P_2O_5 (%)	0.12	Co	10.9		
		Ni	6.9		

Order Information:

Samples are available free of charge. Please contact to Dr. N. Imai, Geochemistry Section, GSJ.

Reference:

Terashima, S., A. Ando, T. Okai, Y. Kanai, M. Taniguchi, F. Takizawa, and S. Itoh (1990) Elemental concentrations in nine new GSJ rock reference samples "Sedimentary rock series". Geostands. Newsletter, 14(1):1-5.

JSd-2

Stream Sediment

Geological Survey of Japan (Japan)

Description:

JSd-2 is a composite sample collected in the eastern region, Ibaraki Prefecture, Japan.

Recommended values (μg/g dry weight unless noted):

Constituent	Value	Constituent	Value	Constituent	Value
H_2O^+ (%)	2.75	S	1.33%	Ni	94
H_2O^- (%)	0.50	K_2O (%)	1.15	Cu	1114
Li	20.6	CaO (%)	3.63	Zn	2070
Be	0.8	TiO_2 (%)	0.63	As	39.4
C	3580	V	124	Sr	202
Na_2O (%)	2.48	Cr	104	Rb	27
MgO (%)	2.81	MnO (%)	0.123	Cs	1.2
Al_2O_3 (%)	12.47	FeO (%)	6.22	Pb	151
SiO_2 (%)	60.27	Fe_2O_3 (%)	4.60	LOI (%)	3.52
P_2O_5 (%)	0.08	Co	48		

Order information:

Samples are available free of charge. Please contact to Dr. N. Imai, Geochemistry Section, GSJ.

Reference:

Terashima, S., A. Ando, T. Okai, Y. Kanai, M. Taniguchi, F. Takizawa, and S. Itoh (1990) Elemental concentrations in nine new GSJ rock reference samples "Sedimentary rock series". Geostands. Newsletter, 14(1):1-5.

JSd-3

Stream Sediment

Geological Survey of Japan (Japan)

Description:

Composite sample of central region, Ibaraki Prefecture, Japan.

Recommended and preferable (asterisked) values (μg/g dry weight unless noted):

Constituent	Value	Constituent	Value	Constituent	Value
H_2O^+ (%)	2.53	S	297	Ni	19.6
H_2O^- (%)	1.01	K_2O (%)	2.01	Cu	426
Li	163	CaO (%)	0.53	Zn	139
Be	10.0	TiO_2 (%)	0.42	As	261
C	6175	V	72	Sr	60
Na_2O (%)	0.44	Cr	35	Pb	285
MgO (%)	1.18	MnO (%)	0.144	Cs	30.6
Al_2O_3 (%)	10.14	FeO (%)	1.08	Pb	82
SiO_2 (%)	75.36	Fe_2O_3 (%)	3.19	LOI (%)	4.79
P_2O_5 (%)	0.09	Co	12.5		

Order information:

Samples are available free of charge. Please contact to Dr. N. Imai, Geochemistry Section, GSJ.

Reference:

Terashima, S., A. Ando, T. Okai, Y. Kanai, M. Taniguchi, F. Takizawa, and S. Itoh (1990) Elemental concentrations in nine new GSJ rock reference samples "Sedimentary rock series". Geostands. Newsletter, 14(1):1-5.

LKSD-1 - LKSD-4

Lake Sediments

Canada Centre for Mineral and Energy Technology (Canada)

Description:

LKSD-1 through LKSD-4 are typical lake sediments from the Canadian Shield. The collections were carried out by the Geological Survey of Canada using various dredges and other sampling devices, normally from the center of the lake bottom. LKSD-1 is a mixture of sediments from Joe Lake and Brady Lake, Ontario; LKSD-2, from Calabogie Lake in Ontario, and two locations in the North West Territory; LKSD-3, from Calabogie Lake, a composite from two locations in Manitoba, and a composite of 6 other locations in Ontario; and LKSD-4, from Big Gull Lake in Ontario, and Key and Sea Horse Lakes in Saskatchewan. Thirty-five laboratories provided analytical data and provisionally recommended values are available for 65 elements. These sediment materials are available as a set of four.

Provisional values:

	LKSD-1	LKSD-2	LKSD-3	LKSD-4
Oxide (%)	Value	Value	Value	Value
Na_2O	2.0	1.9	2.3	0.7
MgO	1.7	1.7	2.0	0.9
Al_2O_3	7.8	12.3	12.5	5.9
SiO_2	40.1	58.9	58.5	41.6
P_2O_5	0.2	0.3	0.2	0.3
K_2O	1.1	2.6	2.2	0.8
CaO	10.8	2.2	2.3	1.8
TiO_2	0.5	0.6	0.5	0.4
MnO	0.1	0.3	0.2	0.1
Fe_2O_3	4.1	6.2	5.7	4.1

Total elements (µg/g unless noted)

Element	Value	Value	Value	Value
Li	7	20	25	12
Be	1.1	2.5	1.9	1.0
B	49	65	25	22
C (%)	12.3	4.5	4.5	17.7
F	300	590	490	260
S (%)	1.57	0.14	0.14	0.99
Sc	9	13	13	7
Ti	3010	3460	3330	2270
V	50	77	82	49
Cr	31	57	87	33
Mn	700	2020	1440	500
Fe (%)	2.8	4.3	4.0	2.8

LKSD-1 through LKSD-4 (cont.)

Total elements (µg/g unless noted)

Element	Value	Value	Value	Value
Co	11	17	30	11
Ni	16	26	47	31
Cu	44	37	35	31
Zn	331	209	152	194
As	40	11	27	16
Br	11	18	16	49
Rb	24	85	78	28
Sr	250	220	240	110
Y	19	44	30	23
Zr	134	254	178	105
Nb	7	8	8	9
Mo	10	<5	<5	<5
Ag	0.6	0.8	2.7	<0.5
Sn	16	5	3	5
Sb	1.2	1.1	1.3	1.7
Cs	1.5	3.0	2.3	1.7
Ba	430	780	680	330
La	16	68	52	26
Ce	27	108	90	48
Nd	16	58	44	25
Sm	4	11	8	5
Eu	0.9	1.9	1.5	1.1
Tb	0.6	1.4	1.0	1.2
Dy	3.4	7.3	4.9	3.7
Yb	2.0	4.0	2.7	2.0
Lu	0.4	0.6	0.4	0.5
Hf	3.6	7.0	4.8	2.8
Ta	0.3	0.8	0.7	0.4
W	<4	<4	<4	<4
Au (ng/g)	5	3	3	2
Pb	82	44	29	91
Th	2.2	13.4	11.4	5.1
U	9.7	7.6	4.6	31.0

Elements by extraction using concentrated HNO_3 and HCl (µg/g unless noted):

Element	Value	Value	Value	Value
V	27	48	55	32
Cr	12	29	51	21
Mn	460	1840	1220	430
Fe (%)	1.8	3.5	3.5	2.7
Co	9	17	30	11
Ni	11	23	44	32
Cu	44	36	34	30
Zn	337	200	139	189
As	30	9	23	12
Mo	12	2	2	2
Ag	0.6	0.8	2.4	0.2
Cd	1.2	0.8	0.6	1.9
Sb	1.2	1.2	1.4	1.5

LKSD-1 through LKSD-4 (cont.)

Elements by extraction using concentrated HNO_3 and HCl (µg/g unless noted):

Element	Value	Value	Value	Value
Hg (ng/g)	110	160	290	190
Pb	84	40	26	93

Elements by extraction using dilute HNO_3 and HCl (µg/g unless noted):

Element	Value	Value	Value	Value
Mn	410	1840	1300	420
Fe (%)	1.8	3.7	3.6	2.6
Co	8	16	30	9
Ni	12	23	46	31
Cu	44	36	34	31
Zn	335	205	151	195
Ag	0.6	0.8	2.8	0.2
Cd	1.2	0.6	0.4	1.9
Pb	83	34	21	91

Order Information:

These sediments are packaged in bottles containing 100 g of each material and can be purchased for Canadian $415 per set. Price subject to change without notice. Please contact CANMET.

Reference:

Bowman, W. S. (1994) Catalogue of certified reference materials. CCRMP 94-1E. Canada Centre for Mineral and Energy Technology, Ottawa, Canada. 74 pp.

MAG-1

Marine Sediment

US Geological Survey (USA)

Description:

MAG-1 is a fine-grained gray-brown clayey mud from the Wilkinson Basin of the Gulf of Maine, USA. The sample was obtained using a 125-liter Campbell grab sampler from a depth of 282 m at 42° 34.6' N, 69° 32.6' W from the research vessel GOSNOLD. This mud has a very low carbonate content. More than 60% of the sediment weight was seawater of 33-34 ‰ salinity, resulting in approximately 4% evaporate sea water salts in the final material. A more complete description of MAG-1, including mineralogical information, can be found in Manheim *et al.* (1976). Values for elemental concentrations have been calculated by Abbey (1982, 1983), Gladney and Goode (1981) and Gladney and Roelandts (1988) using the results of various analysts. Those calculated by Gladney and Roelandts (1988) are listed below.

Best available concentrations (μg/g dry weight unless noted):

Component	Mean	Uncertainty (±)	Component	Mean	Uncertainty (±)
H	8660	-	Br	252	66
Li	79	4	Rb	149	6
Be	3.2	0.4	Sr	146	15
B	136	6	Y	28	3
C	21500	4000	Zr	126	13
N	800	-	Nb	12	2
O (%)	46.10	-	Mo	1.6	0.6
F	770	80	Ru	<0.46	-
Na (%)	2.84	0.08	Rh (ng/g)	<0.1	-
Mg (%)	1.81	0.06	Pd (ng/g)	1.7	0.8
Al (%)	8.66	0.16	Ag (ng/g)	80	21
Si (%)	23.52	0.45	Cd (ng/g)	202	29
P	710	90	In (ng/g)	180	-
S	3900	660	Sn	3.6	1.0
Cl	31000	600	Sb	0.96	0.10
K (%)	2.95	0.14	Te (ng/g)	66	-
Ca (%)	0.98	0.07	I	380	-
Sc	17.2	1.0	Cs	8.6	0.7
Ti	4500	400	Ba	479	41
V	140	6	La	43	4
Cr	97	8	Ce	88	9
Mn	760	70	Pr	9.3	1.3
Fe (%)	4.75	0.21	Nd	38	5
Co	20.4	1.6	Sm	7.5	0.6
Ni	53	8	Eu	1.55	0.14
Cu	30	3	Gd	5.8	0.7
Zn	130	6	Tb	0.96	0.09
Ga	20.4	1.5	Dy	5.2	0.3
Ge	<1	-	Ho	1.02	0.10
As	9.2	1.2	Er	3.0	0.5
Se (ng/g)	1160	120	Tm (ng/g)	429	23

MAG-1 (cont.)

Component	Mean	Uncertainty (±)	Component	Mean	Uncertainty (±)
Yb	2.61	0.27	Pt (ng/g)	1.0	-
Lu (ng/g)	400	40	Au (ng/g)	2.4	0.6
Hf	3.7	0.5	Hg (ng/g)	17.9	-
Ta	1.11	0.22	Tl (ng/g)	590	-
W	1.4	0.2	Pb	24	3
Re	<10	-	Bi (ng/g)	340	80
Os	<22	-	Th	11.9	1.0
Ir	<6.8	-	U	2.7	0.3

Major and minor oxide concentrations (%):

Component	Mean	Uncertainty (±)	Component	Mean	Uncertainty (±)
H_2O^+	5.6	1.1	K_2O	3.55	0.17
H_2O^-	2.39	0.16	CaO	1.37	0.10
CO_2	7.88	1.45	TiO_2	0.751	0.067
Na_2O	3.83	0.11	MnO	0.098	0.009
MgO	3.00	0.10	FeO	3.06	0.42
Al_2O_3	16.37	0.3	Fe_2O_3	3.49	0.64
SiO_2	50.36	0.96	Cl	3.10	0.06
P_2O_5	0.163	0.021	F	0.077	0.008
			S	0.39	0.07

Order information:

MAG-1 is available for US$65 per bottle. Please contact USGS.

References:

Abbey, S. (1982) An evaluation of USGS III. Geostand. Newsletter, 6(1):47-76.

Abbey, S. (1983) Studies in "standard samples" of silicate rocks and minerals 1969-1982. Paper 83-15, 114 pp. Geological Survey of Canada, Canadian Government Publishing Centre, Supply and Services Canada, Hull, Quebec, Canada.

Gladney, E. S., and W. E. Goode (1981) Elemental concentrations in eight new United States Geological Survey rock standards: a review. Geostand. Newsletter, 5(1):31-64.

Gladney, E. S., and I. Roelandts (1988) 1987 Compilation of elemental concentration data for USGS BHVO-1, MAG-1, QLO-1, RGM-1, SCo-1, SDC-1, SGR-1 and STM-1. Geostand. Newsletter, 12(2):253-362.

Manheim, F. T., J. C. Hathaway, F. J. Flanagan, and J. D. Fletcher (1976) Marine mud, MAG-1, from the Gulf of Maine. In: F. J. Flanagan (ed.), Description and analyses of eight new USGS rock standards, USGS Prof. paper 840, pp. 25-28. US Government Printing Office, Washington, DC, USA.

NIES 2

Pond Sediment

National Institute for Environmental Studies (Japan)

Description:

The sediment used for this material was collected in 1977 from the surface layers of the bottom of Sanshiro Pond located within the grounds of the University of Tokyo. The sediment was sieved through a nylon sieve (2 mm) to remove gravel and leaves, filtered under suction with a Buchner funnel to remove the interstitial water, and air-dried on filter paper for two weeks. The dried sediment was ball-milled, sieved to pass through a 200-mesh sieve, homogenized and packaged in acid-washed glass bottles. The bottled samples were radiation sterilized. A complete mineralogical description of NIES 2 can be found in Iwata *et al.* (1983a and b).

Certified concentrations (μg/g dry weight unless noted):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
Na (%)	0.57	0.04	Ni	40	3
Al (%)	10.6	0.5	Cu	210	12
K (%)	0.68	0.06	Zn	343	17
Ca (%)	0.81	0.06	As	12	2
Fe (%)	6.53	0.35	Cd	0.82	0.06
Cr	75	5	Pb	105	6
Co	27	3			

Noncertified concentrations (μg/g dry weight unless noted):

Element	Value
Si (%)	21
P (%)	0.14
Ti (%)	0.64
Sc	28
V	250
Mn	770
Element	Value
Br	17
Rb	42
Sr	110
Sb	2.0
La	17
Hg	1.3

Order Information:

NIES 2 (20-g bottles) can be obtained free of charge. Please contact Dr. Jun Yoshinaga at NIES.

References:

Iwata, Y., H. Haraguchi, J. C. Van Loon, and K. Fuwa (1983a) Mineralogical characterization of the reference material of "pond sediment." Bull. Chem. Soc. Japan, 56(2):434-8.

Iwata, Y., K. Matsumoto, H. Haraguchi, K. Notsu, K. Okamoto and K. Fuwa (1983b) Preparation and evaluation of certified reference "pond sediment (NIES no. 2)." Quarterly J. Plasma Spec., 3(2):72-85.

National Institute for Environmental Studies (1991) NIES certified material, pond sediment. Information sheet. National Institute for Environmental Studies, Yatabe-machi,Tsukuba, Ibaraki, 305, Japan.

SARM 46, 51 and 52

Stream Sediments
South Africa Bureau of Standards (South Africa)

Description:

Orders of magnitude for As, Ga, Se, W, Au, Br, Cs, Eu, Hf, La, Lu, Sc, Sm, Ta, Tb, Yb and Sb are available from SABS. No further information available.

Certified concentrations (µg/g dry weight unless noted):

	SARM 46	SARM 51	SARM 52
Element	Value	Value	Value
Na_2O (%)	0.28	0.07	-
MgO (%)	3.16	0.92	0.60
SiO_2 (%)	35.90	33.81	57.81
Al_2O_3 (%)	6.71	11.87	9.38
P_2O_5 (%)	0.11	0.21	0.09
K_2O (%)	0.35	0.33	0.25
CaO (%)	1.32	0.86	0.37
TiO_2 (%)	0.60	0.82	1.30
V	225	181	346
Cr	559	509	-
Cr_2O_3 (%)	-	-	0.19
MnO (%)	1.14	0.21	0.27
Fe_2O_3 (%)	28.16	18.36	19.71
Co	56	60	81
Ni	-	178	182
Cu	566	268	219
Zn	5900	2200	264
Sr	25	44	25
Y	-	21	20
Zr	101	121	250
Nb	-	-	11
Rb	-	37	20
Pb	-	5200	1200

SARM 46, 51 and 52 (cont.)

Noncertified concentrations (μg/g dry weight unless noted):

	SARM 46	SARM 51	SARM 52
Component	Value	Value	Value
Na_2O (%)	-	-	0.1
S (%)	0.17	0.24	0.02
FeO (%)	18.0	3.0	4.0
Ni	125	-	-
Ga	-	20	15
Mo	10	-	-
Y	20	-	-
Nb	-	9	-
Rb	20	-	-
Pb	1.3	-	-
Ba	180	335	410
Ce	110	120	210
Th	-	10	11

Order information:

Each CRM can be purchased for US$56 per unit (100 g). Price subject to change. Please contact SABS.

Reference:

South African Committee for Certified Reference Materials (1990) Catalogue of certified reference materials. South Africa Bureau of Standards, Private Bag X191, Pretoria, Transvaal 0001, South Africa. 36 pp.

SD-M-2/TM

Marine Sediment

International Atomic Energy Agency (Austria)

Description:

Approximately 80 g of sediment were collected, freeze dried, ground, passed through a 150 µm sieve, and homogenized. The material was packaged into acid cleaned glass bottles with plastic screw caps. This material was produced in cooperation with the Regional Seas Programme of UNEP.

Recommended values (µg/g dry weight unless noted):

Element	Value	Range			Element	Value	Range		
Na (mg/g)	13.5	11.8	-	14.3	Cd	0.113	0.108	-	0.149
Al (mg/g)	32.0	15.6	-	55.4	Sb	0.99	0.92	-	1.25
K	17.6	15.0	-	19.2	Cs	8.05	6.30	-	8.87
Ca (mg/g)	112	64	-	134	Ba	252	231	-	310
Sc	10.3	9.9	-	11.4	La	26.2	24.0	-	28.4
V	91.2	72.5	-	97.8	Ce	54.3	47.2	-	55.8
Mn (mg/g)	1.17	1.10	-	1.19	Nd	24.6	18.9	-	39.4
Fe (mg/g)	27.1	25.0	-	28.5	Sm	4.27	3.28	-	4.90
Co	13.6	13.1	-	14.2	Eu	0.85	0.79	-	1.19
Ni	56.1	53.3	-	58.5	Tb	0.52	0.48	-	0.58
Cu	32.7	31.7	-	34.2	Yb	1.62	1.41	-	1.92
Zn	74.8	72.0	-	78.3	Lu	0.243	0.186	-	0.320
As	18.3	17.4	-	19.3	Hf	2.83	2.60	-	3.55
Br	65.7	57.4	-	78.0	Hg	0.054	0.046	-	0.064
Rb	99.7	90	-	119	Pb	22.8	20.1	-	25.6
Sr	540	510	-	568	Th	8.15	7.20	-	9.10
Zr	110	53	-	197	U	2.49	1.44	-	3.50

Order Information:

SD-M-2/TM can be purchased for US$60 per unit (25 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

References:

International Atomic Energy Agency (1990) SD-M-2, trace elements in marine sediment. Reference sheet. International Atomic Energy Agency, 19, av. des Castellans, MC-98000, Monaco.

International Atomic Energy Agency (1994) AQCS (Analytical Quality Control Services) Intercomparison runs reference materials 1994 - 1995. Catalog. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 100 pp.

SD-N-2

Marine Sediment

International Atomic Energy Agency (Austria)

Description:

No information available.

Recommended activities (mBq/g):

Radionuclide	Activity	Range
^{40}K	220	189 - 226
^{137}Cs	0.8	0.5 - 1.0
^{232}Th	4.9	4.5 - 5.4

Order information:

SD-N-2 can be purchased for US$110 per unit (5 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

Reference:

International Atomic Energy Agency (1994) AQCS (Analytical Quality Control Services) Intercomparison runs reference materials 1994 - 1995. Catalog, International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 100 pp.

SES-1

Estuarine Sediment Research Material for Polycyclic Aromatic Hydrocarbons

National Research Council (Canada)

Description:

SES-1 is a spiked natural estuarine sediment. The sediment was collected in the estuary of a Nova Scotia river, at a site free of commercial or industrial activity. The sediment was freeze dried, sieved to pass a 125-µm sieve and homogenized in a modified cement mixer. A subsample was taken and spiked with a solution of polycyclic aromatic hydrocarbons. The subsample was then returned to the bulk sample and homogenized. The material was stored in solvent-rinsed pint-sized cans holding approximately 200 g of sediment. The material was characterized by Soxhlet extraction with either hexane or dichloromethane and the concentrations of polycyclic aromatic hydrocarbons determined. No differences were observed between results obtained using the two different extraction solvents when analyzed by the same technique. Biases between different analytical techniques were apparent.

Average concentrations (µg/g dry weight):

Compound	Analytical technique				
	Spike	HPLC/FL	HPLC/MS	GC/MS	GC/FID
Acenaphthene	7.21	2.9	0.69	0.59	0.67
Anthracene	1.63	0.9	0.02	0.02	0.06
Benz[*a*]anthracene	1.31	0.8	0.68	0.5	1.00
Benzo[*a*]pyrene	1.21	0.8	0.29	0.15	0.34
Benzo[*b*]fluoranthene	-	1.2	1.46	-	-
Benzo[*k*]fluoranthene	-	1.0	1.27	-	-
Benzo[*ghi*]perylene	1.21	0.8	1.39	0.69	1.10
Chrysene	1.32	1.4	1.14	1.1	1.19
Dibenz[*a,h*]anthracene	1.30	1.0	1.04	0.6	0.94
Fluoranthene	1.58	1.1	1.94	1.35	1.40
Fluorene	1.42	1.6	0.64	0.55	0.57
Indeno[1,2,3-*cd*]pyrene	1.28	1.0	1.42	0.8	1.20
Naphthalene	3.62	1.6	2.16	1.7	0.57
Phenanthrene	1.37	1.0	1.47	1.05	1.14
Pyrene	4.09	3.5	2.79	2.4	2.72

Order information:

SES-1 can be purchased for US$190 per unit (200 g). Price subject to change without notice. Please contact NRCC.

Reference:

National Research Council Canada (1993) SES-1, Estuarine sediment reference material for polycyclic aromatic hydrocarbons. Description sheet. National Research Council Canada, Institute for Marine Biosciences, Halifax, Nova Scotia, Canada.

SL-1

Lake Sediment

International Atomic Energy Agency (Austria)

Description:

The lake sediment sample was collected at a water depth of 15 m by the US Department of Agriculture at the Sardis Reservoir, Panola County, Mississippi, USA, and donated to the IAEA. The material was dried at 50°C for 7 days, ground and sieved, and the 0.10-mm fraction collected. This fraction was further homogenized in a rotating plastic drum and 25-gram portions stored in plastic bottles. The homogeneity of the sample was tested by determining the content of several elements by NAA in samples taken from several bottles. By applying F and t tests, it was found that the results do not differ significantly and the material can be considered homogeneous at least for sample weights ≥100 mg. The content of hydroscopic moisture as determined by drying at constant weight was rather small (~ 2.7%), but it may vary with a change in ambient humidity. The results of an intercomparison exercise that resulted in the recommended values for SL-1 can be found in the 1994 - 1995 IAEA catalog and other recommended values in Dybczynski and Suschny (1979).

Recommended concentrations (μg/g dry weight unless noted):

Element	Value	Confidence range			Element	Value	Range		
Na (mg/g)	1.72	1.60	-	1.84	Cd	0.26	0.21	-	0.31
Sc	17.3	16.2	-	18.4	Sb	1.31	1.19	-	1.43
Ti (mg/g)	5.17	4.80	-	5.54	Cs	7.01	6.13	-	7.89
V	170	155	-	185	Ba	639	586	-	692
Cr	104	95.0	-	113	La	52.6	49.5	-	55.7
Mn (mg/g)	3.46	3.30	-	3.62	Ce	117	100	-	134
Fe (mg/g)	67.4	65.7	-	69.1	Nd	43.8	41.0	-	46.6
Co	19.8	18.3	-	21.3	Sm	9.25	8.74	-	9.76
Ni	44.9	36.9	-	52.9	Dy	7.46	5.34	-	9.58
Cu	30.0	24.4	-	35.6	Yb	3.42	2.78	-	4.06
Zn	223	213	-	233	Hf	4.16	3.58	-	4.74
As	27.5	24.6	-	30.4	Pb	37.7	30.3	-	45.1
Br	6.82	5.09	-	8.55	Th	14	13	-	15
Rb	113	102	-	124	U	4..02	3.70	-	4.34

Noncertified concentrations (Dybczynski and Suschny, 1979) (μg/g dry weight unless noted):

Element	Value	Element	Value
Li	29	Ca (%)	0.25
B	39	Ga	24
Mg (%)	2.9	Ge	25
Al (%)	8.9	Se	2.9
P	831	Sr	80
S (%)	1.2	Y	85
Cl	10	Zr	241
K (%)	1.5	Nb	17

SL-1 (cont.)

Element	Value	Element	Value
Mo	1.3	Ho	1.3
Ru	0.13	Tm	0.66
Ag (ng/g)	82	Lu	0.54
In	0.20	Ta	1.6
Sn	4	W	6
Te	2	Au (ng/g)	10
I	28	Ir (ng/g)	8.3
Eu	1.6	Pt	0.36
Gd	12	Hg	0.13
Tb	1.4	Bi	1

Order information:

SL-1 can be purchased for US$110 per unit (25 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

References:

Dybczynski, R., and O. Suschny (1979) Final report on the intercomparison run SL-1 for the determination of trace elements in a lake sediment sample. IAEA/RL/64, International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria.

International Atomic Energy Agency (1994) AQCS (Analytical Quality Control Services) Intercomparison runs reference materials 1994 - 1995. Catalog. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 100 pp.

SL-2

Lake Sediment

International Atomic Energy Agency (Austria)

Description:

No information available.

Recommended activities (mBq/g):

Radionuclide	Activity	Range
^{40}K	240	211 - 269
^{137}Cs	2.4	2.2 - 2.6

Order information:

SL-2 can be purchased for US$110 per unit (250 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

Reference:

International Atomic Energy Agency (1994) AQCS (Analytical Quality Control Services) Intercomparison runs reference materials 1994 - 1995. Catalog. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 100 pp.

SL-3

Lake Sediment

International Atomic Energy Agency (Austria)

Description:

No information available.

Recommended concentrations (µg/g dry weight unless noted):

Element	Value	Confidence range			Element	Value	Confidence range		
Na (mg/g)	6.69	6.36	-	7.02	La	22.5	21.6	-	23.5
Mg (mg/g)	27.0	24.6	-	29.4	Ce	45.5	43.9	-	47.2
Al (mg/g)	24.5	23.4	-	25.7	Nd	21.5	20.0	-	23.0
K (mg/g)	8.74	7.92	-	9.57	Sm	3.83	3.53	-	4.13
Ca (mg/g)	111.1	107.2	-	115.0	Eu	0.66	0.64	-	0.67
Sc	3.91	3.64	-	4.18	Tb	0.49	0.44	-	0.54
Ti (mg/g)	2.61	2.30	-	2.92	Dy	2.22	1.65	-	2.78
As	3.2	3.0	-	3.4	Yb	1.89	1.77	-	2.01
Br	5.63	4.84	-	6.42	Lu	0.30	0.27	-	0.33
Rb	38.8	36.9	-	40.6	Hf	9.10	8.51	-	9.69
Sr (mg/g)	0.47	0.46	-	0.49	Ta	0.70	0.66	-	0.75
Sb	0.56	0.46	-	0.65	Th	7.02	6.54	-	7.50
Cs	1.38	1.24	-	1.51	U	2.30	2.08	-	2.52

Order Information:

SL-3 can be purchased for US$60 per unit (25 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

Reference:

International Atomic Energy Agency (1994) AQCS (Analytical Quality Control Services) Intercomparison runs reference materials 1994 - 1995. Catalog. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 100 pp.

SRM 1646a

Estuarine Sediment

National Institute of Standards and Technology (USA)

Description:

The estuarine sediment sample was dredged from a location of 37° 11.1' N, 76° 17.1' W, in the Chesapeake Bay, USA, and supplied to the NIST by the Virginia Institute of Marine Science. The material was freeze-dried and transferred to the USGS, Denver, CO. The material was lightly disaggregated and sieved through a 1 mm screen to remove coarse contaminants. The fraction less then 1 mm was then ball-milled to pass through a 75 µm sieve, blended, radiation sterilized, and bottled. placed in polyethylene bags and bottled.

Certified concentrations (µg/g dry weight unless noted):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
Na (%)	0.741	0.017	Cr	40.9	1.9
Mg (%)	0.388	0.009	Mn	234.5	2.8
Al (%)	2.297	0.018	Fe (%)	2.008	0.039
Si (%)	40.0	0.16	Cu	10.01	0.34
P (%)	0.027	0.001	Zn	48.9	1.6
S (%)	0.352	0.004	As	6.23	0.21
K (%)	0.864	0.016	Se	0.193	0.028
Ca (%)	0.519	0.020	Cd	0.148	0.007
Ti (%)	0.456	0.021	Pb	11.7	1.2
V	44.84	0.76			

Noncertified concentrations (µg/g dry weight unless noted):

Element	Value	Element	Value
Li	18	Sr	68
Be	< 1	Mo	1.8
Sc	5	Sb	0.3
Co	5	Ce	34
Ni	23	Nd	15
Ga	5	Hg	0.04
Rb	38	Tl	< 0.5
Sn	1	Th	5.8
Ba	210	U	2.0
La	17		

Order information:

SRM 1646a can be purchased for US$268 per unit (75 g). Price subject to change without notice. Please contact NIST.

Reference:

National Institute of Standards and Technology (1995) SRM 1646a. Estuarine sediment. Certificate of analysis (revised). National Institute of Standards and Technology, Gaithersburg, MD, USA.

SRM 1939

Polychlorinated Biphenyls (Congeners) in River Sediment A

National Institute of Standards and Technology (USA)

Description:

The sediment material was collected from the Hudson River, New York. It was dried, sieved, homogenized, radiation sterilized using ^{60}Co at 3.2 megarads, and transferred to amber bottles with Teflon-lined screw caps.

Certified concentrations (µg/g dry weight):

Compound	Value	Uncertainty (±)
PCB 26	4.20	0.29
PCB 28	2.21	0.10
PCB 44	1.07	0.12

Noncertified concentrations (µg/g dry weight):

Compound	Value	Uncertainty (±)	Compound	Value	Uncertainty (±)
PCB 18	3.46	0.08	Phenanthrene	0.13	0.01
PCB 31	6.86	0.14	Fluoranthene	0.19	0.01
PCB 49	3.78	0.05	Pyrene	0.17	0.02
PCB 52	4.48	0.06	Benz[*a*]anthracene	0.046	0.001
PCB 66	0.93	0.01	Chrysene/		
PCB 101	0.82	0.01	triphenylene	0.051	0.001
PCB 118	0.51	0.01	PCB 153	0.40	0.01
PCB 128	0.10	0.01	PCB 105	0.25	0.01
PCB 138	0.57	0.01	Heptachlorepoxide/		
PCB 187	0.18	0.01	oxychlordane	0.51	0.02
PCB 180	0.16	0.01	*cis*-Chlordane	0.22	0.01
PCB 170	0.11	0.01	*trans*-Nonachlor	0.27	0.01
			4,4'-DDE	0.54	0.01
			4,4'-DDD	0.06	0.01

Order information:

SRM 1939 can be purchased for US$230 per unit (50 g). Price subject to change without notice. Please contact NIST.

Reference:

National Institute of Standards and Technology (1990) SRM 1939. Polychlorinated biphenyls (congeners) in river sediment. Certificate of analysis. National Institute of Standards and Technology, Gaithersburg, MD, USA.

SRM 1941a

Organics in Marine Sediment

National Institute of Standards and Technology (USA)

Description:

SRM 1941a is intended for use in validating analytical methods for the determination of trace levels of selected naturally present PAHs, PCBs, chlorinated pesticides and sulfur in marine sediments. The marine sediment used to prepare this SRM was collected in the Chesapeake Bay at the mouth of the Baltimore Harbor, Maryland, near the Francis Scott Key Bridge (39° 12.68' N and 76° 31.33' W) using a modified Van Veen type grab sampler to a depth of 10 cm. The sediment was freeze dried, sieved (150 - 250 µm particles used for this SRM), homogenized in a cone blender, radiation (^{60}Co) sterilized, and packaged in screw-capped amber glass bottles.

Certified values:

Elements (percent dry weight):

Element	Value	Uncertainty (±)
S	0.9589	0.0058

PAHs (µg/g dry weight):

Compound	Value	Uncertainty (±)	Compound	Value	Uncertainty (±)
Anthracene	184	14	Dibenz[*a,j*]anthracene	74.3	6.8
Benzo[*a*]fluoranthene	118	11	Fluoranthene	981	78
Benzo[*a*]pyrene	628	52	Fluorene	97.3	8.6
Benzo[*b*]chrysene	99	20	Indeno[1,2,3-*cd*]=		
Benzo[*b*]fluoranthene	740	110	pyrene	501	72
Benzo[*e*]pyrene	553	59	Naphthalene	1010	140
Benzo[*ghi*]perylene	525	67	Pentaphene	42	12
Benzo[*k*]fluoranthene	361	18	Perylene	452	58
Benz[*a*]anthracene	427	25	Phenanthrene	489	23
Chrysene	380	24	Picene	80.0	9.0
Dibenz[*a,c*]anthracene	43.1	3.7	Pyrene	811	24
Dibenz[*a,h*]anthracene	73.9	9.7	Triphenylene	197	11

SRM 1941a (cont.)

PCBs (µg/g dry weight):

Compound	Value	Uncertainty (±)	Compound	Value	Uncertainty (±)
PCB 44	4.80	0.62	PCB 128	1.87	0.32
PCB 49	9.5	2.1	PCB 138/163/164	13.38	0.97
PCB 52	6.89	0.56	PCB 149	9.2	1.1
PCB 66	6.8	1.4	PCB 153	17.6	1.9
PCB 87	6.70	0.37	PCB 156	0.93	0.14
PCB 95	7.5	1.1	PCB 170/190	3.00	0.46
PCB 99	4.17	0.51	PCB 180	5.83	0.58
PCB 101	11.0	1.6	PCB 194	1.78	0.23
PCB 105	3.65	0.27	PCB 206	3.67	0.87
PCB 110	9.47	0.85	PCB 209	8.34	0.49
PCB 118	10.0	1.1			

PCBs are listed according to Ballschmitter and Zell (1980). The major PCB congener is listed first, the others listed are minor components.

Chlorinated pesticides (ng/g dry weight):

Compound	Value	Uncertainty (±)	Compound	Value	Uncertainty (±)
2,4'-DDE	0.73	0.11	*cis*-Chlordane	2.33	0.56
4,4'-DDD	5.06	0.58	Hexachlorobenzene	70	25
4,4'-DDE	6.59	0.56	*trans*-Nonachlor	1.26	0.13

Noncertified values:

PAHs (µg/g dry weight):

Compound	Value	Uncertainty (±)	Compound	Value	Uncertainty (±)
1-Methylphenanthrene	101	27	Anthanthrene	129	10
2-Methylphenanthrene	158	32	Benzo[*c*]phenanthrene	80	39
3-Methylphenanthrene	97	32	Benzo[*ghi*]fluoranthene	97.9	3.1
4H-Cyclopenta[*def*]= phenanthrene	92	15	Benzo[*j*]fluoranthene	341	22
Acenaphthene	41	10	Biphenyl	175	18
Acenaphthylene	37	14	Dibenzothiophene	70.0	9.4
Acephenanthrylene	48.1	1.2	Indeno[1,2,3-*cd*]= fluoranthene	20.0	2.3

PCBs (ng/kg dry weight):

Compound	Value	Uncertainty (±)
PCB 8	1.39	0.19
PCB 18	1.15	0.16
PCB 28	9.8	3.7
PCB 31	6.2	2.4
PCB 151	2.62	0.22
PCB 183	1.63	0.15
PCB 187/182	7.0	2.6

Chlorinated pesticides (ng/g dry weight):

Compound	Value	Uncertainty (±)
4,4'-DDT	1.25	0.10
Dieldrin	1.26	0.37
Oxychlordane	2.59	0.19

SRM 1941a (cont.)

Aliphatic hydrocarbons (ng/g dry weight):

Compound	Value	Uncertainty (±)	Compound	Value	Uncertainty (±)
n-Decane	230	15	*n*-Eicosane	167	17
n-Dodecane	164	10	*n*-Docosane	128	11
n-Tridecane	207	25	*n*-Tetracosane	168	16
n-Tetradecane	264	35	*n*-Hexacosane	186	48
n-Pentadecane	470	120	*n*-Octacosane	138	24
n-Hexadecane	147	19	*n*-Triacontane	108	11
n-Heptadecane	269	38	Phytane	74	22
n-Octadecane	151	15	Pristane	61	25
n-Nonadecane	129	14			

Elements (µg/g dry weight unless noted):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
TOC (%)	4.8	1.2	Pb	86	6
Na (%)	1.16	0.03	Sb	11.4	0.4
Al (%)	7.4	0.3	Cs	5.7	0.2
Cl (%)	1.36	0.08	La	147	6
K (%)	1.63	0.08	Ce	117	3
Sc	29.4	0.8	Sm	12	3
Ti (%)	1.8	0.2	Eu	1.95	0.07
V	830	30	Tb	1.2	0.2
Cr	600	20	Hf	33	1
Mn	870	20	Ta	26.9	0.7
Fe (%)	8.1	0.2	Au	0.017	0.006
Co	24.8	0.8	Hg	0.5	0.2
Zn	610	20	Th	26.3	0.9
As	55	9			
Se	3.9	0.6			

Order information:

SRM 1941a can be purchased for US$365 per unit (75 g). Price subject to change without notice. Please contact NIST.

References:

Ballschmitter, K., and M. Zell (1980) Analysis of polychlorinated biphenyls (PCB) by glass capillary gas chromatography - composition of technical Aroclor - and Clophen-PCB mixtures. Fresenius Z. Anal. Chem., 302:20-31.

National Institute of Standards and Technology (1994) SRM 1941a. Organics in marine sediment. Certificate of analysis. National Institute of Standards and Technology, Gaithersburg, MD, USA.

SRM 2704

Buffalo River Sediment

National Institute of Standards and Technology (USA)

Description:

The river sediment for this SRM was collected from the Buffalo River, near the Ohio Street Bridge, Buffalo, NY. The U. S. Army Corps of Engineers, under contract to NIST, collected and screened the sediment. The material was shipped under refrigeration in Teflon-lined drums to Technimed Corporation, FL, for freeze drying. The freeze-dried sediment was shipped to a NIST contractor laboratory where it was screened, sieved, radiation sterilized, blended and bottled.

Certified concentrations (µg/g dry weight unless noted):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
Li	47.5	4.1	Fe (%)	4.11	0.10
C (%)	3.348	0.016	Co	14.0	0.6
Na (%)	0.547	0.014	Ni	44.1	3.0
Mg (%)	1.20	0.02	Cu	98.6	5.0
Al (%)	6.11	0.16	Zn	438	12
Si (%)	29.08	0.13	As	23.4	0.8
P (%)	0.0998	0.0028	Se	1.12	0.05
S (%)	0.397	0.004	Sb	3.79	0.15
K (%)	2.00	0.04	Cd	3.45	0.22
Ca (%)	2.60	0.03	Ba	414	12
Ti (%)	0.457	0.018	Hg	1.47	0.07
V	95	4	Tl	1.06	0.07
Cr	135	5	Pb	161	17
Mn	555	19	U	3.13	0.13

Noncertified concentrations (µg/g dry weight unless noted):

Element	Value	Element	Value	Element	Value
Cl (%)	< 0.01	Sn	9.5	Dy	6
Sc	12	I	2	Yb	2.8
Ga	15	Cs	6	Lu	0.6
Br	7	La	29	Hf	8
Rb	100	Ce	72	Th	9.2
Sr	130	Sm	6.7		
Zr	300	Eu	1.3		

Order Information:

SRM 2704 can be purchased for US$183 per unit (50 g). Price subject to change without notice. Please contact NIST.

Reference:

National Institute of Standards and Technology (1990) SRM 2704. Buffalo river sediment. Certificate of analysis. National Institute of Standards and Technology, Gaithersburg, MD, USA.

SRM 4350B

River Sediment

National Institute of Standards and Technology (USA)

Description:

This SRM is intended for use in tests of environmental radioactivity in matrices similar to that of the SRM. The average particle diameter is 8 µm. Semiquantitative emission spectrometry analysis and the gamma ray spectrum of this SRM are available in the Certificate of Analysis.

Certified values:

Reference time: Sept. 9, 1981

Radionuclide	Activity (Bq/g)	Uncertainty (%)	Half-life (yr)
^{60}Co	4.64×10^{-3}	5.0	5.28
^{137}Cs	2.90×10^{-2}	6.3	30.7
^{152}Eu	3.05×10^{-2}	4.0	13.54
^{154}Eu	3.78×10^{-3}	15	8.48
^{226}Ra	3.58×10^{-2}	10	
^{238}Pu	1.3×10^{-5}	17	
$^{239}Pu + ^{240}Pu$	5.08×10^{-4}	5.8	
^{241}Am	1.5×10^{-4}	21	

Order information:

SRM 4350B can be purchased for US$312 per unit (85 g). Price subject to change without notice. Please contact NIST.

Reference:

National Institute of Standards and Technology (1981) SRM 4350B. River sediment. Certificate of analysis. National Institute of Standards and Technology, Gaithersburg, MD, USA.

SRM 4354

Gyttja Lake Sediment

National Institute of Standards and Technology (USA)

Description:

This SRM is a freshwater lake sediment and is intended for use in tests of environmental radioactivity in matrices similar to that of the SRM. The average particle diameter of this material (gyttja) is 8 µm. Semiquantitative emission spectrometry analysis of this SRM is available in the Certificate of Analysis.

Certified values:

Reference time: Feb. 14, 1986

Radionuclide	Activity (Bq/g)	Uncertainty (%)
^{60}Co	3.20×10^{-1}	13
^{90}Sr	1.09	23
^{137}Cs	5.92×10^{-2}	7
^{228}Th	2.86×10^{-2}	13
^{232}Th	2.68×10^{-2}	10
^{235}U	7.5×10^{-4}	19
^{238}U	1.74×10^{-2}	8
^{238}Pu	2.6×10^{-4}	+14 - 38
$^{239}Pu + ^{240}Pu$	4.00×10^{-3}	+7 - 18
^{241}Am	1.1×10^{-3}	+30 - 81

Order information:

SRM 4354 can be purchased for US$250 per unit (25 g). Price subject to change without notice. Please contact NIST.

Reference:

National Bureau of Standards (1986) SRM 4354. Freshwater lake sediment. Certificate of analysis. National Bureau of Standards, Gaithersburg, MD, USA.

STSD-1 - STSD-4

Stream Sediments

Canada Centre for Mineral and Energy Technology (Canada)

Description:

STSD-1 through STSD-4 are typical stream sediments from various geochemical environments in Canada. The collections were carried out by the Geological Survey of Canada by hand or using shovels. STSD-1 is from Lavant Creek in Ontario; STSD-2, from Hirok Stream and a composite of two samples from British Columbia; STSD-3, from the same locations as STSD-2 with the addition of material from Lavant Creek; and STSD-4, from the same locations as STSD-2 with the addition of material from Ontario. Thirty-five laboratories provided analytical data and provisionally recommended values. These sediment materials are available as a set of four.

Provisional values:

	STSD-1	STSD-2	STSD-3	STSD-4
Oxide (percent)	Value	Value	Value	Value
Na_2O	1.8	1.7	1.5	2.7
MgO	2.2	3.1	2.2	2.1
P_2O_5	0.4	0.3	0.4	0.2
Al_2O_3	9.0	16.1	10.9	12.1
SiO_2	42.5	53.7	48.6	58.9
K_2O	1.2	2.1	1.8	1.6
CaO	3.6	4.0	3.3	4.0
TiO_2	0.8	0.8	0.7	0.8
MnO	0.5	0.1	0.3	0.2
Fe_2O_3	6.5	7.5	6.2	5.7
LOI (1000°C)	31.6	10.3	23.6	11.6

Provisional values for total elements (µg/g unless noted)

Element	Value	Value	Value	Value
H_2O^- (%)	4.46	2.43	3.47	1.73
Li	11	65	23	14
Be	1.6	5.2	2.6	1.7
B	89	42	82	46
C (%)	12.3	1.6	8.4	4.1
F	950	940	850	380
Sc	14	16	13	14
Ti	4600	4870	4400	4530
V	98	101	134	106
Cr	67	116	80	93
Mn	3950	1060	2730	1520
Fe (%)	4.7	5.2	4.4	4.1
Co	17	19	16	13
Ni	24	53	30	30
Cu	36	47	39	65
Zn	178	246	204	107

STSD-1 through STSD-4 (cont.)

Provisional values for total elements (µg/g unless noted)

Element	Value	Value	Value	Value
As	23	42	28	15
Br	40	4	24	13
Rb	30	104	68	39
Sr	170	400	230	350
Y	42	37	36	24
Zr	218	185	196	190
Nb	5	20	12	9
Mo	<5	13	6	<5
Ag	<0.5	0.5	<0.5	<0.5
Sn	4	5	4	2
Sb	3.3	4.8	4.0	7.3
Cs	1.8	12	5.2	1.9
Ba	630	540	1490	2000
La	30	59	39	24
Ce	51	93	63	44
Nd	28	43	33	21
Sm	6	8	7	5
Eu	1.6	2.0	1.3	1.2
Tb	1.2	1.3	1.1	0.8
Dy	5.6	6.5	5.4	3.8
Yb	4.0	3.7	3.4	2.6
Lu	0.8	0.7	0.8	0.5
Hf	6.1	5.0	5.1	5.5
Ta	0.4	1.6	0.9	0.6
W	<4	7	<4	<4
Au (ng/g)	8	3	7	4
Pb	35	66	40	16
Th	3.7	17.2	8.5	4.3
U	8.0	18.6	10.5	3.0
LOI (500°C)	29.7	8.7	21.6	10.2

Provisional values for partial extraction using concentrated HNO_3 and HCl (µg/g unless noted):

Element	Value	Value	Value	Value
V	47	58	61	51
Cr	28	50	34	30
Mn	3740	720	2630	1200
Fe (%)	3.5	4.1	3.4	2.6
Co	14	17	14	11
Ni	18	47	25	23
Cu	36	43	38	66
Zn	165	216	192	82
As	17	32	22	11
Mo	2	13	7	2
Ag	0.3	0.5	0.4	0.3
Cd	0.8	0.8	1.0	0.6
Sb	2.0	2.6	2.4	3.6
Hg (ng/g)	110	46	90	930
Pb	34	66	39	13

Order information:

These sediments are packaged in bottles containing 100 g of each material and can be purchased for Canadian $415 per set. Price subject to change without notice. Please contact CANMET.

Reference:

Bowman, W. S. (1994) Catalogue of certified reference materials. CCRMP 94-1E. Canada Centre for Mineral and Energy Technology, Ottawa, Canada. 74 pp.

SUD-1

Sudbury Sediment

National Water Research Institute (Canada)

Description:

The sediment used for SUD-1 was obtained from Sudbury, North America. The sediment was freeze dried, ground to < 200-mesh particle size, and subsampled into bottles.

Certified concentrations (µg/g unless noted):

Element	Value	Stand. dev.	Element	Value	Stand. dev.
Al (%)	5.35	1.87	Zn	772	62
V	72.1	23.3	As	29.1	8.7
Mn	564	111	Se	2.65	1.89
Fe (%)	3.32	0.34	Cd	2.30	1.70
Co	44.8	11.8	Hg	0.113	0.058
Ni	946	99	Pb	58.0	25.6
Cu	565	97			

Order information:

This CRM can be purchased for Canadian $200 per unit (100 g). Price subject to change without notice. Please contact NWRI.

References:

National Water Research Institute (1994) SUD-1. Trace metals in sediment. Certificate of Analysis (draft), Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada.

National Water Research Institute (1995) Quality assurance reference materials and services. Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada. 48 pp.

TH-1

Toronto Harbour Sediment

National Water Research Institute (Canada)

Description:

The sediment used for TH-1 was obtained from Toronto Harbour, North America. The sediment was freeze dried, ground to < 200-mesh particle size, and subsampled into bottles.

Noncertified concentrations (µg/g unless noted):

Compound	Value	Stand. dev.	Compound	Value	Stand. dev.
Al (%)	5.27	1.78	Cu	103.2	19.2
V	85.5	20.4	Zn	1529	109
Mn	566	109	As	9.7	1.0
Fe (%)	3.64	0.71	Se	0.798	0.337
Co	15.2	10.3	Cd	5.66	1.64
Ni	44.2	11.9	Pb	255	88

Order Information:

This CRM can be purchased for Canadian $200 per unit (100 g). Price subject to change without notice. Please contact NWRI.

Reference:

National Water Research Institute (1994) TH-1. Trace metals in sediment. Certificate of Analysis. Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada.

TH-2

Great Lakes Sediment

National Water Research Institute (Canada)

Description:

The sediment used for TH-2 was obtained from Great Lakes Basin, North America. The sediment was freeze dried, ground to < 200-mesh particle size, and subsampled into bottles.

Noncertified concentrations (µg/g unless noted):

Element	Value	Stand. dev.	Element	Value	Stand. dev.
Al (%)	6.33	0.48	Cu	123	10
V	81.8	22	Zn	921	180
Cr	116	47	As	8.6	2.9
Mn	562	47	Se	0.815	0.161
Fe (%)	3.57	0.11	Cd	5.81	2.76
Co	14.4	2.5	Hg	0.651	0.252
Ni	42.4	9.0	Pb	186	17

Order information:

This CRM can be purchased for Canadian $200 per unit (100 g). Price subject to change without notice. Please contact NWRI.

Reference:

National Water Research Institute (1994) TH-2. Trace metals in sediment. Certificate of Analysis. Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada.

WQB-1

Lake Ontario Sediment

National Water Research Institute (Canada)

Description:

The sediment used for WQB-1 was obtained from Lake Ontario, North America. The sediment was freeze dried, ground to <200-mesh particle size, and subsampled into bottles. The geochemical composition of WQB-1 can be found in Cheam and Chau (1984).

Certified concentrations (µg/g unless noted):

Element	Value	Stand. dev.
As	23.00	1.84
Se	1.02	0.17
Hg	1.09	0.15

Noncertified concentrations (µg/g unless noted):

Element	Value	Stand. dev.	Element	Value	Stand. dev.
Al (%)	7.31	2.28	Ni	62.1	12.5
V	127	35	Cu	78.3	13.1
Mn	2197	270	Cd	2.10	1.23
Fe (%)	4.80	0.49	Zn	294	83
Co	23.1	13.2	Pb	85.7	38.8

Order information:

WQB-1 can be purchased for Canadian $200 per unit (100 g). Price subject to change without notice. Please contact NWRI.

References:

Cheam, V., and A. S. Y. Chau (1984) Analytical reference materials. Part IV. Development and certification of the first Great Lakes sediment reference material for arsenic, selenium and mercury. Analyst, 109:775-9.

National Water Research Institute (1994) WQB-1. Trace metals in sediment. Certificate of Analysis. Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada.

WQB-3

Great Lakes Sediments

National Water Research Institute (Canada)

Description:

The sediment samples used for WQB-3 were obtained from Hamilton Harbour and Lake Ontario, North America. The sediment samples were freeze dried, and ground to < 200-mesh particle size separately. Then, 160 kg of Lake Ontario sediment and 53 kg of Hamilton Harbour sediment were blended and subsampled into bottles. The geochemical composition of WQB-3 can be found in Cheam *et al.* (1989).

Certified concentrations (µg/g unless noted):

Element	Value	Stand. dev.	Element	Value	Stand. dev.
Mn	1264	91	Zn	1396	107
Fe (%)	6.0	0.4	As	18.8	1.5
Co	15.3	1.7	Se	1.15	0.19
Ni	52.0	6.1	Hg	2.75	0.28

Noncertified concentrations (µg/g unless noted):

Element	Value	Stand. dev.	Element	Value	Stand. dev.
Al (%)	5.80	3.42	Cd	3.85	3.18
V	92.0	51.8	Pb	243	174
Cu	82.9	19.1			

Order Information:

This CRM can be purchased for Canadian $200 per unit (100 g). Price subject to change without notice. Please contact NWRI.

References:

Cheam, V., K. I. Aspila, and A. S. Y. Chau (1989) Analytical reference materials VIII. Development and certification of a new Great Lakes sediment reference material for eight trace metals. Sci. Total Environ., 87/88:517-24.

National Water Research Institute (1994) WQB-3. Trace metals in sediment. Certificate of Analysis. Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada.

SLUDGES

SLUDGES

CRM 088

Polycyclic Aromatic Hydrocarbons in Sewage Sludge

Community Bureau of Reference (Belgium)

Description:

No description available.

Certified values (µg/g dry weight):

Compound	Value	Uncertainty (±)
Benzo[*a*]anthracene	0.93	0.9
Benzo[*a*]pyrene	0.91	0.09
Benzo[*b*]fluoranthene	1.17	0.08
Benzo[*b*]naphtho[1,2-*d*]thiophene	0.42	0.05
Benzo[*e*]pyrene	1.02	0.7
Benzo[*k*]fluoranthene	0.57	0.5
Indeno[1,2,3-*cd*]pyrene	0.81	0.6
Pyrene	2.16	0.9

Order information:

This CRM can each be purchased for ECU375 per unit (10 g). Price includes handling and normal postage within the European Union except when special handling is required. Please contact BCR.

Reference:

Community Bureau of Reference (BCR) (1994) Reference Materials. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 86 pp.

CRM 145R - 146

Sewage Sludges

Community Bureau of Reference (Belgium)

Description:

CRM 145R is composed of sewage sludge of domestic origin, and CRM 146 of sewage sludge of industrial origin.

Certified values (µg/g):

	CRM 145R		CRM 146	
Element	Value	Uncertainty (±)	Value	Uncertainty (±)
Mn	156	4	588	24
Co	5.61	0.31	11.8	0.7
Ni	247	7	280	18
Cu	696	12	934	24
Zn	2122	23	4059	90
Cd	3.50	0.15	77.7	2.6
Hg	2.01	0.22	9.49	0.76
Pb	286	5	1270	28
Aqua regia soluble concentrations (µg/g)				
Cr	307	13	-	-
Ni	251	6	-	-
Cu	707	9	-	-
Zn	2137	50	-	-
Pb	282	9	-	-

Noncertified values (µg/g):

Cr	-		784	
Se	3.3		1.7	
Aqua regia soluble concentrations (µg/g)				
Cr	-		769	
Mn	219.6		555	
Co	-		9.9	
Ni	-		269	
Cu	-		921	
Zn	-		4002	
Cd	-		76.5	
Pb	-		1255	

Order Information:

CRM145R can be purchased for ECU300 per unit (40 g). No price information was available for CRM 146. Price includes handling and normal postage within the European Union except when special handling is required. Price subject to change without notice. Please contact BCR.

Reference:

Community Bureau of Reference (BCR) (1994) Reference Materials. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 86 pp.

CRM 392

Polychlorinated Biphenyls in Sewage Sludge

Community Bureau of Reference (Belgium)

Description:

No information available.

Certified concentrations (µg/kg dry weight):

Congener	Value	Uncertainty (±)	Congener	Value	Uncertainty (±)
PCB 28	100	10	PCB 118	97	12
PCB 52	79	9	PCB 153	288	18
PCB 101	134	11	PCB 180	313	24

Noncertified concentration (µg/kg dry):

Congener	Value
PCB 138+163	268

Order information:

CRM 176 can be purchased for BFR5000 per unit (30 g). Price includes handling and normal postage within the European Union except when special handling is required. Please contact BCR.

Reference:

Community Bureau of Reference (BCR) (1992) Reference Materials. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 75 pp.

SOILS

SOILS

RS-1 - RS-3

Red Soil

All-Union Research Institute of Metrology of Certified Reference Materials (Russia)

Description:

These CRMs are also known as CKP-1 to CKP-3 and CRM Nos. 2501 to 2503-83. They were issued in 1982.

Certified concentrations (µg/g dry weight unless noted):

Component	RS-1 Value	RS-1 Abs. error	RS-2 Value	RS-2 Abs. error	RS-3 Value	RS-3 Abs. error
Li	50	10	50	10	50	10
Be	1.6	0.4	10	4	25	5
B	60	20	60	20	60	20
F	0.04	0.01	0.04	0.01	0.04	0.01
Na_2O (%)	0.15	0.03	0.15	0.03	0.15	0.03
MgO (%)	0.92	0.05	0.92	0.05	0.92	0.05
Al_2O_2 (%)	17.01	0.26	17.01	0.26	17.01	0.26
SiO_2 (%)	59.18	O.30	59.18	O.30	59.18	0.30
P_2O_5 (%)	0.1	0.01	0.1	0.01	0.1	0.01
S (%)	0.04	0.01	0.04	0.01	0.04	0.01
K_2O (%)	0.98	0.03	0.98	0.03	0.98	0.03
CaO (%)	0.17	0.04	0.17	0.04	0.17	0.04
Sc	15	3	15	3	15	3
TiO_2 (%)	1.56	0.04	1.56	0.04	1.56	0.04
V	180	30	180	30	180	30
Cr	180	20	180	20	180	20
MnO (%)	0.051	0.002	0.051	0.002	0.051	0.002
Fe_2O_3 (%)	7.86	0.08	7.86	0.08	7.86	0.08
Co	14	3	63	5	150	20
Ni	54	5	160	20	380	30
Cu	47	2	170	20	310	10
Zn	87	3	270	30	610	60
Ga	15	2	15	2	15	2
As	10	2	30	10	50	10
Se	(3)		(3)		(3)	
Pb	80	7	80	7	80	7
Sr	50	10	50	10	50	10
Y	27	9	27	9	27	9
Zr	340	30	340	30	340	30
Nb	25	6	25	6	25	6
Mo	3	1	8	3	13	2
Cd	0.12	0.03	2.6	0.9	5	2
Sn	5	1	22	4	60	20

Values in parenthesis are reference only.

RS-1 - RS-3 (cont.)

Component	RS-1 Value	RS-1 Abs. error	RS-2 Value	RS-2 Abs. error	RS-3 Value	RS-3 Abs. error
Cs	9	2	9	2	9	2
Ba	270	80	270	80	270	80
La	30	3	30	3	30	3
Ce	70	30	70	30	70	30
Yb	3.6	0.9	3.6	0.9	3.6	0.9
Hg	0.08	0.03	0.26	0.08	0.4	0.1
Pb	23	4	150	30	280	60
LOI (%)	11.86	0.16	11.86	0.16	11.86	0.16

Order information:

These CRM can be purchased for DM375 per unit (100 g). Price subject to change without notice. Please contact Breitländer.

Reference:

All-Union Research Institute of Metrology of Certified Reference Materials (1982?) Certificate for USSR Certified Reference Materials of red soil composition CRM Nos. 2502 to 2503-83 (CKP set). All-Union Research Institute of Metrology of Certified Reference Materials (VNIIMSO), Russia.

BS-1 - BS-3

Black Soil

All-Union Research Institute of Metrology of Certified Reference Materials (Russia)

Description:

These CRMs are also known as CRM Nos. 2507 to 2509-83. They were issued in 1982.

Certified concentrations (μg/g dry weight unless noted):

Component	BS-1		BS-2		BS-3	
	Value	Abs. error	Value	Abs. error	Value	Abs. error
Li	23	3	23	3	23	3
Be	2	0.4	9	2	24	5
B	56	4	56	4	56	4
F	280	50	280	50	280	50
Na_2O (%)	0.81	0.02	0.81	0.02	0.81	0.02
MgO (%)	0.95	0.03	0.95	0.03	0.95	0.03
Al_2O_3 (%)	9. 81	0.14	9. 81	0.14	9.81	0.14
SiO_2 (%)	71.49	0.27	71.49	0.27	71.48	0.27
P_2O_5 (%)	0.18	0.02	0.18	0.02	0.18	0.02
S (%)	0.05	0.01	0.05	0.01	0.05	0.01
K_2O (%)	2.42	0.04	2.42	0.04	2.42	0.04
CaO (%)	1. 60	0.05	1.6	0.05	1.6	0.05
Sc	11	1	11	1	11	1
Ga	11	3	11	3	11	3
TiO_2 (%)	O .74	0.03	0.74	0.03	0.74	0.03
V	72	7	72	7	72	7
Cr	83	6	83	6	83	6
MnO (%)	0.079	0.002	0.079	0.002	0.079	0.002
Fe_2O_3 (%)	3.48	0.06	3.48	0.06	3.48	0.06
Co	9	2	46	4	130	10
Ni	32	4	110	10	300	10
Cu	25	2	110	10	270	10
Zn	56	5	180	20	460	30
As	8	3	21	5	40	10
Se	(3)		(3)		(3)	
Pb	88	7	88	7	88	7
Sr	110	30	110	30	110	30
Y	31	6	31	6	31	6
Zr	470	20	470	20	470	20
Nb	14	3	14	3	14	3
Mo	1.2	0.1	6	2	11	1
Cd	0.1	0.02	1.8	0.4	4.5	0.8
Sn	3	1	20	3	60	10
Cs	4	1	4	1	4	1
Ba	500	80	500	80	500	80

Values in parenthesis are reference only.

BS-1 - BS-3 (cont.)

Component	BS-1		BS-2		BS-3	
	Value	Abs. error	Value	Abs. error	Value	Abs. error
La	36	5	36	5	36	5
Ce	70	20	70	20	70	20
Yb	4.1	0.7	4.1	0.7	4.1	0.7
Hg	0.05	0.02	0.21	0.07	0.4	0.1
Pb	18	1	90	10	260	20
LOI (%)	8.26	0.30	8.26	0.30	8.26	0.30

Order Information:

These CRM can be purchased for DM375 per unit (100 g). Price subject to change without notice. Please contact Breitländer.

Reference:

All-Union Research Institute of Metrology of Certified Reference Materials (1982?) Certificate for USSR Certified Reference Materials of typical black soil composition CRM Nos. 2507 to 2509-83. All-Union Research Institute of Metrology of Certified Reference Materials (VNIIMSO), Russia.

SS-1 - SS-3

Sandy Soil

All-Union Research Institute of Metrology of Certified Reference Materials (Russia)

Description:

These CRMs are turf ash-bearing sandy soils. They are also known as CRM Nos. 2498 to 2500-83. They were issued in 1982.

Certified concentrations (µg/g dry weight unless noted):

Component	SS-1		SS-2		SS-3	
	Value	Abs. error	Value	Abs. error	Value	Abs. error
Li	3.5	0.8	3.5	0.8	3.5	0.8
Be	1.1	0.3	10	3	25	5
B	30	10	30	10	30	10
Na_2O (%)	0.51	0.03	0.51	0.03	0.51	0.03
MgO (%)	O 0.13	0.05	0.13	0.05	0.13	0.05
Al_2O3 (%)	3.36	0.11	3. 36	0.11	3.36	0.11
SiO_2 (%)	91.24	0.23	91.24	0.23	91.24	0.23
P_2O_5 (%)	0.036	0. 006	0.036	0.006	0.036	0.006
K_2O (%)	1.23	0.03	1. 23	0.03	1.23	0.03
CaO (%)	0.27	0.03	0.27	0.03	0.27	0.03
Sc	2.6	0.8	2.6	0.8	2.6	0.8
TiO_2 (%)	0.29	0.01	0.29	0.01	0.29	O.01
V	14	3	14	3	14	3
Cr	100	10	100	10	100	10
MnO (%)	0.011	0.001	0.011	0.001	0.011	0.001
Fe_2O_3 (%)	0.99	O.O5	0.99	0.05	0.99	0.05
Co	2	0.5	45	3	130	10
Ni	10	2	87	9	290	10
Cu	9	4	100	10	260	10
Zn	10	2	140	20	430	30
Ga	5	2	5	2	5	2
As	3	1	17	6	70	20
Se	(0.8)	-	(0.8)	-	(0.8)	-
Rb	32	4	32	4	32	4
Sr	69	8	69	8	69	8
Y	13	3	13	3	13	3
Zr	350	60	350	60	350	60
Nb	12	4	12	4	12	4
Mo	1.5	0.6	7	2	12	2
Cd	0.1	0.03	1.3	0.3	4	1
Sn	1.9	0.5	19	4	60	20
Cs	1.6	0.4	1.6	0.4	1.6	0.4
Ba	310	80	310	80	310	80

Values in parenthesis are reference only.

SS-1 - SS-3 (cont.)

Component	SS-1		SS-2		SS-3	
	Value	Abs. error	Value	Abs. error	Value	Abs. error
La	10	2	10	2	10	2
Ce	17	6	17	6	17	6
Yb	1.5	0.6	1.5	0.6	1.5	0.6
Hg	0.03	0.01	0.13	0.02	0.3	0.1
Pb	8	1	87	5	250	20
LOI (%)	1.48	0.06	1.48	0.06	1.48	0.06

Order information:

These CRM can be purchased for DM375 per unit (100 g). Price subject to change without notice. Please contact Breitländer.

Reference:

All-Union Research Institute of Metrology of Certified Reference Materials (1982?) Certificate for USSR Certified Reference Materials of turf-ash-bearing sandy soil composition CRM Nos. 2502 to 2503. All-Union Research Institute of Metrology of Certified Reference Materials (VNIIMSO), Russia.

GS-1 - GS-3

Grey Soil

All-Union Research Institute of Metrology of Certified Reference Materials (Russia)

Description:

These CRMs are composed of a carbonate grey soil and are also known as CCK-1 to CCK-3 and CRM Nos. 2504 to 2506-83. They were issued in 1982.

Certified concentrations (µg/g dry weight unless noted):

	GS-1		GS-2		GS-3	
Component	Value	Abs. error	Value	Abs. error	Value	Abs. error
Li	32	7	32	7	32	7
Be	2.2	0.3	8	2	26	5
B	63	7	63	7	63	7
F	500	100	500	100	500	100
Na2O	1.64	0.05	1.64	0.05	1.64	0.05
MgO	2.99	0.09	2.99	0.09	2.99	0.09
Al203	11.48	0.14	11.48	0.14	11.48	0.14
Si02	52.65	0.17	52.65	0.17	52.65	0.17
P2O5	0.17	0.01	0.17	0.01	0.17	0.01
S (total)	0.04	0.01	0.04	0.01	0.04	0.01
K2O	2.09	0.04	2.09	0.04	2.09	0.04
CaO	11.47	0.10	11.47	0.10	11.47	0.10
Sc	14	2	14	2	14	2
Ti02	0.64	0.02	0.64	0.02	0.64	0.02
V	90	10	90	10	90	10
Cr	84	7	84	7	84	7
MnO	0.089	0.003	0.089	0.003	0.089	0.003
Fe203 (total)	4.6	0.05	4.6	0.05	4.6	0.05
Co	12	1	57	8	150	10
Ni	45	4	130	10	320	10
Cu	34	4	120	10	290	10
Zn	70	2	170	10	390	20
Ga	13	2	13	20	13	20
As	13	5	29	5	60	10
Se	(1)	-	(1)	-	(1)	-
Pb	81	6	81	6	81	6
Sr	310	30	310	30	310	30
Y	26	8	26	8	26	8
Zr	190	10	190	10	190	10
Nb	13	2	13	2	13	2
Mo	1.4	0.3	6	2	13	3
Cd	0.3	0.1	2.1	0.5	5.5	1.3
Sn	4	1	20	5	60	20
Cs	5	2	5	2	5	2
Ba	500	50	500	50	500	50

Values in parenthesis are reference only.

Component	GS-1 Value	GS-1 Abs. error	GS-2 Value	GS-2 Abs. error	GS-3 Value	GS-3 Abs. error
La	29	5	29	5	29	5
Ce	60	20	60	20	60	20
Yb	3.3	0.7	3.3	0.7	3.3	0.7
Hg	0.025	0.007	0.18	0.03	0.4	0.1
Pb	17	2	100	10	280	10
LOI (%)	11.80	0.14	11.80	0.14	11.80	0.14

Order Information:

These CRM can be purchased for DM375 per unit (100 g). Price subject to change without notice. Please contact Breitländer.

Reference:

All-Union Research Institute of Metrology of Certified Reference Materials (1982?) Certificate for USSR Certified Reference Materials of carbonate grey soil composition CRM Nos. 2504 to 2506-83 (CCK set). All-Union Research Institute of Metrology of Certified Reference Materials (VNIIMSO), Russia.

CRM 141

Trace Elements in a Calcareous Loam Soil

Community Bureau of Reference (Belgium)

Description:

This material consists of a homogeneous powder, with particles smaller than 90 µm. Additional information is available on aqua regia soluble concentrations.

Certified concentrations (µg/g dry weight):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
Cu	32.6	1.4	Hg	0.0568	0.0043
Zn	81.3	3.7	Pb	29.4	2.6
Cd	0.36	0.10			

Information values only (percent dry weight unless noted):

Component	Value
Na_2O	0.43
MgO	1.19
Al_2O_3	10.56
P_2O_5	0.16
SiO_2	42.58
K_2O	1.56
CaO	17.98
TiO_2	0.47
Fe_2O_3	3.74
Cr (µg/g)	75.0
Mn (µg/g)	547
Co (µg/g)	9.2
Ni (µg/g)	30.9
Se (µg/g)	0.160

Aqua regia soluble

Component	Value
Cr	53
Mn	512
Ni	28
Cu	31.2
Zn	70
Cd	0.30
Pb	26.3

Order information:

CRM 141 can be purchased for ECU250 per unit (50 g). Price includes handling and normal postage within the European Union except when special handling is required. Price subject to change without notice. Please contact BCR.

References:

Community Bureau of Reference (BCR) (1983) BCR CRM 141. Trace element in calcareous loam soil. Certificate of analysis. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium.

Community Bureau of Reference (BCR) (1994) Reference Materials. Community Bureau of

CRM 141 (cont.)

Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 86 pp.

CRM 142R

Light Sandy Soil

Community Bureau of Reference (Belgium)

Description:

No information available.

Certified concentrations (µg/g dry weight):

Element	Value	Uncertainty (±)
Co	12.1	0.7
Mn	970	16

Aqua regia soluble

Element	Value	Uncertainty (±)
Ni	29.2	2.5
Cu	69.7	1.3
Cd	0.34	0.04
Pb	40.2	1.9
Ni	61.1	1.5
Zn	93.3	2.7
Cd	0.25	0.01
Pb	25.7	1.6

Information values only (µg/g dry weight):

Element	Value
Cr	113
Zn	101

Aqua regia soluble

Component	Value
Cr	862
Mn	802
Co	10.2
Cu	69.8

Order information:

CRM 142R can be purchased for ECU300 per unit (50 g). Price includes handling and normal postage within the European Union except when special handling is required. Price subject to change without notice. Please contact BCR.

References:

Community Bureau of Reference (BCR) (1994) Reference Materials. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 86 pp.

CRM 143R

Sewage Sludge Amended Soil

Community Bureau of Reference (Belgium)

Description:

No information available.

Certified concentrations (µg/g dry weight):

Element	Value	Uncertainty (±)
Co	12.3	0.3
Mn	904	13
Ni	299	5
Cu	130.6	1.4
Zn	1055	14
Cd	71.8	1.2
Hg	1.10	0.007

Aqua regia soluble

Element	Value	Uncertainty (±)
Ni	296	4
Mn	858	11
Cr	426	12
Zn	1063	16
Cd	72.0	1.8
Pb	174	5

Information values only (µg/g dry weight):

Element	Value
Cr	597
Se	0.6

Aqua regia soluble

Component	Value
Co	11.8
Cu	128
Hg	1.1

Order information:

CRM 143R can be purchased for ECU300 per unit (50 g). Price includes handling and normal postage within the European Union except when special handling is required. Price subject to change without notice. Please contact BCR.

References:

Community Bureau of Reference (BCR) (1994) Reference Materials. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 86 pp.

RM 481

Chlorobiphenyls in Industrial Soil

Community Bureau of Reference (Belgium)

Description:

No information available.

Certified concentrations (µg/g dry weight):

IUPAC number	Congener	Value	Uncertainty (±)
101	2,2',4,5,5'-Pentachlorobiphenyl	37	3
118	2,3',4,4',5-Pentachlorobiphenyl	9.4	0.6
128	2,2',3,3',4,4'-Hexachlorobiphenyl	9.1	0.8
149	2,2',3,4',5',6-Hexachlorobiphenyl	97	7
153	2,2',4,4',5,5'-Hexachlorobiphenyl	137	7
156	2,3,3',4,4',5-Hexachlorobiphenyl	7.0	0.5
170	2,2',3,3',4,4',5-Heptachlorobiphenyl	52	4
180	2,2',3,4,4',5,5'-Heptachlorobiphenyl	124	6

Order information:

RM 481 can be purchased for ECU200 per unit (25 g). Price includes handling and normal postage within the European Union except when special handling is required. Price subject to change without notice. Please contact BCR.

Reference:

Community Bureau of Reference (BCR) (1995) Reference Materials. Addendum 1995. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 12 pp.

GBW 07401 - 07408

Soils

National Research Center for Certified Reference Materials (China)

Description:

No information available.

Certified concentrations (µg/g dry weight unless noted):

Component	GBW 07401 Value	GBW 07402 Value	GBW 07403 Value	GBW 07404 Value	GBW 07405 Value	GBW 07406 Value	GBW 07407 Value	GBW 07408 Value
Li	35.3	22	18.4	55.4	56	36	19.5	35.2
Be	2.5	1.8	1.4	1.85	2.0	4.4	2.8	1.9
B	50	36	23	97	53	57	-	54
Org. C (%)	-	-	0.5	-	-	-	-	0.31
N	1870	630	640	1000	610	740	660	370
F	506	2240	246	540	603	906	321	577
Na_2O (%)	1.66	1.62	2.71	0.11	0.122	0.19	0.074	1.72
MgO (%)	1.81	1.04	0.58	0.49	0.61	0.34	0.26	2.38
Al_2O_3 (%)	14.18	10.31	12.24	23.45	21.58	21.23	29.26	11.92
SiO_2 (%)	62.6	73.35	74.72	50.95	52.57	56.93	32.69	58.61
P	735	446	320	695	390	303	1150	775
S	310	210	120	180	410	260	250	120
Cl	-	-	-	-	-	98	100	-
K_2O (%)	2.59	2.54	3.04	1.03	1.5	1.7	0.20	2.42
CaO (%)	1.72	2.36	1.27	0.26	-	0.22	0.16	8.27
Sc	11.2	10.7	5.0	20.2	17.2	15.5	28	11.7
Ti	0.483	0.271	0.224	1.080	0.629	0.439	2.020	0.380
V	86	62	36.5	247	166	130	245	81.4
Cr	62	47	32	370	118	75	410	68
Mn	1760	510	304	1420	1360	1450	1780	650
F_2O_3 (%)	5.19	3.52	2.0	10.3	12.62	8.09	18.76	4.48
Co	14.2	8.7	5.5	22.3	12.3	7.6	97	12.7
Ni	20.4	19.4	12.2	64.2	40	53	276	31.5
Cu	21	16.3	11.4	40.5	144	390	97	24.3
Zn	680	42.3	31.4	210	494	96.6	142	68
Ga	19.3	12	13.7	30.6	31.7	29.5	39.3	14.8
Ge	1.34	1.2	1.17	1.91	2.6	3.2	1.6	1.27
As	33.5	13.7	4.4	58	412	220	4.8	12.7
Se	0.14	0.16	0.094	0.64	1.56	1.34	0.32	0.12
Br	2.9	4.5	4.3	4.0	-	-	5.2	-
Pb	140	88	85	75	117	237	15.8	96
Sr	155	187	380	77	41.5	39	26	236
Y	25	21.7	15	39	21	18.8	26.6	26
Zr	245	219	246	500	272	220	318	229

GBW 07401 - 07408 (cont.)

Component	GBW 07401 Value	GBW 07402 Value	GBW 07403 Value	GBW 07404 Value	GBW 07405 Value	GBW 07406 Value	GBW 07407 Value	GBW 07408 Value
Nb	16.6	27	9.3	37.6	22.6	26.8	64	15
Mo	1.4	0.98	0.30	2.6	4.6	18	2.9	1.16
Ag	0.35	0.054	0.091	0.070	4.4	0.20	0.057	0.060
Cd	4.3	0.071	0.059	0.35	0.45	0.13	0.080	0.13
In	0.081	0.091	0.031	0.12	4.1	0.84	0.10	-
Sn	6.1	3	2.5	5.7	17.7	72	3.6	2.8
Sb	0.87	1.3	0.45	6.3	35.4	60	0.42	1.04
Te	-	-	0.04	-	-	-	-	0.046
I	1.9	1.8	-	9.4	3.8	19.4	19.3	1.6
Cs	9.0	4.9	3.2	21.4	15.0	10.8	2.7	7.5
Ba	590	930	1210	213	296	118	180	480
La	34	164	21	53	35.7	30	46	35.5
Ce	70	402	39	136	91	66	98	66
Pr	7.5	57	4.8	8.4	7.0	5.8	11	8.3
Nd	28	210	18.4	27.3	24	21	45	32
Sm	5.2	18	3.3	4.4	4.0	3.8	10.3	5.9
Eu	1.0	3.0	0.72	0.85	0.82	0.66	3.4	1.2
Gd	4.6	7.8	2.9	4.7	3.5	3.4	9.6	5.4
Tb	0.75	0.97	0.49	0.94	0.69	0.61	1.3	0.89
Dy	4.6	4.4	2.6	6.6	3.7	3.3	6.6	4.8
Ho	0.87	0.93	0.53	1.46	0.80	0.69	1.1	0.97
Er	2.6	2.1	1.5	4.5	2.4	2.2	2.7	2.8
Tm	0.42	0.42	0.28	0.70	0.41	0.40	0.42	0.46
Yb	2.66	1.97	1.68	4.8	2.8	2.7	2.4	2.8
Lu	0.41	0.32	0.29	0.75	0.42	0.42	0.35	0.43
Hf	6.8	5.8	6.8	14	8.1	7.5	7.7	7.0
Ta	1.4	-	-	3.1	1.8	5.3	3.9	1.05
W	3.1	1.08	0.95	6.2	33.5	89.5	1.23	1.7
Au (ng/g)	-	-	-	-	260	-	-	-
Hg	32	15	60	590	294	72	61	16.6
Tl (ng/g)	1.0	0.62	-	0.94	1.6	2.4	-	0.59
Pb	98	20.2	26	58.5	552	314	13.6	21
Bi	1.17	0.38	0.17	1.04	41	49	0.20	0.30
Th	11.6	16.6	6	27.3	22.7	23	9.1	11.8
U	3.3	1.45	1.26	6.7	6.5	6.7	2.2	2.7

Noncertified concentrations (μg/g dry weight unless noted):

Component	GBW 07401 Value	GBW 07402 Value	GBW 07403 Value	GBW 07404 Value	GBW 07405 Value	GBW 07406 Value	GBW 07407 Value	GBW 07408 Value
H_2O^+ (%)	4.99	2.86	1.91	10.13	8.81	8.90	13.73	3.28
B	-	-	-	-	-	-	10.5	-
Org. C (%)	1.8	0.49	-	0.62	0.32	0.806	0.64	-
Cl	78	63	57	36	78	-	-	68
CaO (%)	-	-	-	-	0.095	-	-	-
Br	-	-	-	-	1.8	7.2	-	2.6
In	-	-	-	-	-	-	-	0.043
Te	0.051	0.035	-	0.15	4.0	0.42	-	-
I	-	-	1.3	-	-	-	-	-
Ta	-	0.8	0.8	-	-	-	-	-
Au (ng/g)	0.55	1.7	-	5.5	-	9.0	0.8	1.4
Tl	-	-	0.48	-	-	-	0.21	-
LOI (%)	8.59	4.41	2.65	10.88	9.14	10.00	14.30	9.15

Order information:

These CRMs are for US$70 per unit (70 g). Price subject to change without notice. Please contact NRCCRM at the address above.

Reference:

National Research Center for CRMs (1995) Certified reference materials catalog. State Bureau of Technical Supervision, National Research Center for Certified Reference Materials, Office of Certified Reference Materials, Hepingjie, Chaoyangqu, Beijing, China. 147 pp.

GBW 08302

Tibet Soil

National Research Center for Certified Reference Materials (China)

Description:

No information available.

Certified concentrations (μg/g dry weight unless noted):

Element	Value	Element	Value
Be	2.96	Cu	24.6
N	0.128	Zn	58.0
Na (%)	1.52	As	3.8
Mg (%)	1.53	Se	0.16
Al (%)	7.11	Rb	135
Si (%)	30.57	Sr	163
P (%)	0.86	Cd	0.081
Ca (%)	2.59	La	41.9
Sc	10.8	Ce	83.6
Ti (%)	0.40	Sm	7.1
V	77.5	Eu	1.4
Cr	60.8	Yb	3.1
Mn	677	Pb	14.2
Fe (%)	3.34	Th	17.6
Co	13.1	U	3.84
Ni	31.1		

Noncertified concentrations (μg/g dry weight unless noted):

Element	Value	Element	Value
Sb	0.4	Dy	5
Br	1.3	Hf	7.3
Cs	7.3	Lu	0.48
Ba	509	Ta	1.1
Tb	0.9	Hg	0.018

Order information:

GBW 08302 is available for US$30 per unit (25 g). Price subject to change without notice. Please contact NRCCRM.

Reference:

National Research Center for CRMs (1995) Certified reference materials catalog. State Bureau of Technical Supervision, National Research Center for Certified Reference Materials, Office of Certified Reference Materials, Hepingjie, Chaoyangqu, Beijing, China. 147 pp.

GBW 08303

Polluted Farmland Soil

National Research Center for Certified Reference Materials (China)

Description:

No information available.

Certified concentrations (µg/g dry weight unless noted):

Element	Value	Element	Value
Na (%)	1.10	Co	13.0
Mg (%)	1.30	Ni	40
Al (%)	6.86	Cu	120
P (%)	0.160	Zn	260
K (%)	1.57	As	10.6
Ca (%)	4.79	Sr	405
Ti (%)	0.36	Cd	1.20
Cr	112	Hg	2.15
Mn	519	Pb	73
Fe (%)	2.97	Th	11.6

Noncertified concentrations (µg/g dry weight unless noted):

Element	Value		
		Ba	724
Be	2.5	Mo	3.3
Si (%)	25.9	La	40
Sc	10	Rb	68
Se	1.0	U	3.2
Element	Value		

Order information:

GBW 08303 is available for US$40 per unit (40 g). Price subject to change without notice. Please contact NRCCRM.

Reference:

National Research Center for CRMs (1995) Certified reference materials catalog. State Bureau of Technical Supervision, National Research Center for Certified Reference Materials, Office of Certified Reference Materials, Hepingjie, Chaoyangqu, Beijing, China. 147 pp.

GSS-1

Brown Soil

National Research Center for CRMs (China)

Description:

The material used for this CRM was collected at Yichun, Heilongjiang, China. The soil is a dark brown padzolitic soil typical of the mountainous and hilly terrain of northeast China. The underlaying bedrock is granite in a district of Pb-Zn mineralization.

Certified concentrations (μg/g dry weight unless noted):

Component	Value	Uncertainty (±)	Component	Value	Uncertainty (±)
Li	35.3	0.6	Mo	1.4	0.06
Be	2.5	0.13	Ag	0.35	0.03
B	50	2	Cd	4.3	0.2
F	506	19	In	0.081	0.011
Na_2O (%)	1.66	0.02	Sn	6.1	0.4
MgO (%)	1.81	0.04	Sb	0.87	0.12
Al_2O_3 (%)	14.18	0.08	I	1.9	0.2
SiO_2 (%)	62.60	0.09	Cs	9.0	0.4
P	735	13	Ba	590	15
S	310	60	La	34	1
K_2O (%)	2.59	0.02	Ce	70	2
CaO (%)	1.72	0.03	Pr	7.5	0.3
Sc	11.2	0.3	Nd	28	1.4
Ti	4830	70	Sm	5.2	0.2
V	86	2	Eu	1.0	0.04
Cr	62	1.6	Gd	4.6	0.16
Mn	1760	24	Tb	0.75	0.04
Fe_2O_3 (%)	5.19	0.04	Dy	4.6	0.17
Co	14.2	0.4	Ho	0.87	0.04
Ni	20.4	0.6	Er	2.6	0.1
Cu	21	0.6	Yb	2.66	0.12
Zn	680	11	Lu	0.41	0.03
Ga	19.3	0.8	Hf	6.8	0.5
Ge	1.34	0.12	Ta	1.4	0.1
As	33.5	1.7	W	3.1	0.14
Se	0.14	0.02	Hg (ng/g)	32	3
Br	2.9	0.3	Tl	1.0	0.08
Rb	140	3	Pb	98	3
Sr	155	3	Bi	1.17	0.06
Y	25	1	Tm	0.42	0.04
Zr	245	6	Th	11.6	0.4
Nb	16.6	0.7	U	3.3	0.3

GSS-1 (cont.)

Noncertified concentrations (µg/g dry weight unless noted):

Component	Value
Cl	78
Te	0.051
Au (ng/g)	0.55

Order information:

No price information is available. Please contact NRCCRM.

Reference:

Institute of Geophysical and Geochemical Exploration (1986) Certificate of geochemical standard reference materials. Institute of Geophysical and Geochemical Exploration, Langfang, Hebei, China.

GSS-2

Chesnut Soil

National Research Center for CRMs (China)

Description:

The material is a composite of soils from several localities in the semi-desert, hilly country of Bainaimiao, Inner Mongolia, in the vicinity of a copper deposit. The bedrocks of the area are sandstone, schist, diorite and granite.

Certified concentrations (μg/g dry weight unless noted):

Component	Value	Uncertainty (±)	Component	Value	Uncertainty (±)
Li	22	0.4	Mo	0.98	0.06
Be	1.8	0.1	Ag	0.054	0.004
B	36	2	Cd	0.071	0.009
F	2240	66	In	0.091	0.019
Na_2O (%)	1.62	0.02	Sn	3.0	0.2
MgO (%)	1.04	0.02	Sb	1.3	0.1
Al_2O_3 (%)	10.31	0.05	I	1.8	0.15
SiO_2 (%)	73.35	0.11	Cs	4.9	0.3
P	446	11	Ba	930	24
S	210	30	La	164	5
K_2O (%)	2.54	0.02	Ce	402	10
CaO (%)	2.36	0.02	Pr	57	3
Sc	10.7	0.3	Nd	210	10
Ti	2710	30	Sm	18	1
V	62	2	Eu	3.0	0.1
Cr	47	1.6	Gd	7.8	0.4
Mn	510	6	Tb	0.97	0.2
Fe_2O_3 (%)	3.52	0.03	Dy	4.4	0.2
Co	8.7	0.3	Ho	0.93	0.08
Ni	19.4	0.5	Er	2.1	0.2
Cu	16.3	0.4	Yb	1.97	0.11
Zn	42.3	1.2	Lu	0.32	0.03
Ga	12	0.5	Hf	5.8	0.5
Ge	1.2	0.1	W	1.08	0.12
As	1.37	0.6	Hg (ng/g)	15	2
Se	0.16	0.02	Tl	0.62	0.13
Br	4.5	0.4	Pb	20.2	1.0
Rb	88	2	Bi	0.38	0.02
Sr	187	4	Tm	0.42	0.07
Y	21.7	0.9	Th	16.6	0.4
Zr	219	8	U	1.45	0.18
Nb	27	1			

GSS-2 (cont.)

Noncertified concentrations (μg/g dry weight unless noted):

Component	Value
Cl	63
Te	0.035
Ta	0.8
Au (ng/g)	1.7

Order information:

No price information is available. Please contact NRCCRM.

Reference:

Institute of Geophysical and Geochemical Exploration (1986) Certificate of geochemical standard reference materials. Institute of Geophysical and Geochemical Exploration, Langfang, Hebei, China.

GSS-3

Yellow-Brown Soil

National Research Center for CRMs (China)

Description:

The material is a a yellow-brown soil from the temperate hilly country of Shandong, China, in the vicinity of a gold mine. The bedrock of the area is gneiss.

Certified concentrations (μg/g dry weight unless noted):

Component	Value	Uncertainty (±)	Component	Value	Uncertainty (±)
Li	18.4	0.5	Nb	9.3	0.7
Be	1.4	0.1	Mo	0.30	0.04
B	23	1.6	Ag	0.091	0.004
F	246	15	Cd	0.059	0.009
Na_2O (%)	2.71	0.03	In	0.031	0.005
MgO (%)	0.58	0.016	Sn	2.5	0.2
Al_2O_3 (%)	12.24	0.05	Sb	0.45	0.06
SiO_2 (%)	74.72	0.11	Te	0.040	0.009
P	320	9	Cs	3.2	0.3
S	120	10	Ba	1210	30
K_2O (%)	3.04	0.02	La	21	0.8
CaO (%)	1.27	0.02	Ce	39	2
Sc	5.0	0.2	Pr	4.8	0.2
Ti	2240	40	Nd	18.4	1.1
V	36.5	1.1	Sm	3.3	0.14
Cr	32	1.4	Eu	0.72	0.02
Mn	304	5	Gd	2.9	0.2
Fe_2O_3 (%)	2.00	0.02	Tb	0.49	0.04
Co	5.5	0.2	Dy	2.6	0.1
Ni	12.2	0.4	Ho	0.53	0.04
Cu	11.4	0.4	Er	1.5	0.14
Zn	31.4	1.1	Yb	1.68	0.08
Ga	13.7	0.6	Lu	0.29	0.015
Ge	1.17	0.13	Hf	6.8	0.5
As	4.4	0.3	W	0.95	0.11
Se	0.094	0.06	Hg (ng/g)	60	3
Br	4.3	0.5	Pb	26	1.3
Rb	85	2	Bi	0.17	0.02
Sr	380	8	Tm	0.28	0.03
Y	15	0.6	Th	6.0	0.3
Zr	246	7	U	1.26	0.18

GSS-4

Yellow Soil

National Research Center for CRMs (China)

Description:

The material is yellow soil from the subtropical hill country of Yishan, Guangxi, China. The underlaying bedrock is composed of carbonates.

Certified concentrations (μg/g dry weight unless noted):

Component	Value	Uncertainty (±)	Component	Value	Uncertainty (±)
Li	55.4	1.0	Mo	2.6	0.1
Be	1.85	0.17	Ag	0.070	0.006
B	97	6	Cd	0.35	0.03
F	540	15	In	0.12	0.02
Na_2O (%)	0.11	0.01	Sn	5.7	0.5
MgO (%)	0.49	0.02	Sb	6.3	0.6
Al_2O_3 (%)	23.45	0.11	I	9.4	0.7
SiO_2 (%)	50.95	0.08	Cs	21.4	0.7
P	695	13	Ba	213	10
S	180	30	La	53	2
K_2O (%)	1.03	0.03	Ce	136	6
CaO (%)	0.26	0.02	Pr	8.4	1.1
Sc	20.2	0.10	Nd	27.3	1.4
Ti	10800	140	Sm	4.4	0.2
V	247	6	Eu	0.85	0.05
Cr	370	6	Gd	4.7	0.3
Mn	1420	30	Tb	0.94	0.06
Fe_2O_3 (%)	10.30	0.05	Dy	6.6	0.3
Co	22.3	0.6	Ho	1.46	0.07
Ni	64.2	1.7	Er	4.5	0.4
Cu	40.5	0.10	Yb	4.8	0.3
Zn	210	5	Lu	0.75	0.04
Ga	30.6	2.0	Hf	14	1
Ge	1.91	0.19	Ta	3.1	0.2
As	58	3	W	6.2	0.2
Se	0.64	0.10	Hg (ng/g)	590	34
Br	4.0	0.7	Tl	0.94	0.16
Rb	75	2	Pb	58.5	2.1
Sr	77	3	Bi	1.04	0.07
Y	39	2	Tm	0.70	0.06
Zr	500	21	Th	27.3	0.8
Nb	37.6	1.4	U	6.7	0.5

GSS-4 (cont.)

Noncertified concentrations (μg/g dry weight unless noted):

Component	Value
Cl	36
Te	0.15
Au (ng/g)	5.5

Order information:

No price information is available. Please contact NRCCRM.

Reference:

Institute of Geophysical and Geochemical Exploration (1986) Certificate of geochemical standard reference materials. Institute of Geophysical and Geochemical Exploration, Langfang, Hebei, China.

GSS-5

Yellow-Red Soil

National Research Center for CRMs (China)

Description:

The material for this CRM was collected in a humid hilly area in the Qibaoshan polymetallic ore field, Hunan, China. The underlying bedrock is granite-porphyry.

Certified concentrations (μg/g dry weight unless noted):

Component	Value	Uncertainty (±)	Component	Value	Uncertainty (±)
Li	56	1	Cd	0.45	0.04
Be	2.0	0.16	In	4.1	0.4
B	53	3	Sn	17.7	1.5
F	603	17	Sb	35.4	2.4
Na_2O (%)	0.122	0.009	I	3.8	0.5
MgO (%)	0.61	0.02	Cs	15.0	0.6
Al_2O_3 (%)	21.58	0.09	Ba	296	12
SiO_2 (%)	52.57	0.1	La	35.7	1.8
P	390	17	Ce	91	6
S	410	40	Pr	7.0	0.8
K_2O (%)	1.50	0.02	Nd	24	1
Sc	17.2	0.6	Sm	4.0	0.3
Ti	6290	90	Eu	0.82	0.03
V	166	4	Gd	3.5	0.16
Cr	118	3	Tb	0.69	0.08
Mn	1360	28	Dy	3.7	0.3
Fe_2O_3 (%)	12.62	0.08	Ho	0.80	0.1
Co	12.3	0.5	Er	2.4	0.2
Ni	40	1	Yb	2.8	0.2
Cu	144	3	Lu	0.42	0.03
Zn	494	11	Hf	8.1	1.0
Ga	31.7	2.1	Ta	1.8	0.16
Ge	2.6	0.2	W	33.5	1.1
As	412	8	Au (ng/g)	260	4
Se	1.56	0.12	Hg (ng/g)	294	19
Pb	117	3	Tl	1.6	0.2
Sr	41.5	1.9	Pb	552	14
Y	21	1	Bi	41	2
Zr	272	8	Tm	0.41	0.03
Nb	22.6	1.0	Th	22.7	0.8
Mo	4.6	0.2	U	6.5	0.5
Ag	4.4	0.3			

GSS-5 (cont.)

Noncertified concentrations (μg/g dry weight unless noted):

Component	Value
Cl	78
Br	1.8
Te	4.0

Order information:

No price information is available. Please contact NRCCRM.

Reference:

Institute of Geophysical and Geochemical Exploration (1986) Certificate of geochemical standard reference materials. Institute of Geophysical and Geochemical Exploration, Langfang, Hebei, China.

GSS-6

Yellow-Red Soil

National Research Center for CRMs (China)

Description:

The material for this CRM is a composite sample from the subtropical low-hill region of Yangchun, Guangdong, China. The rocks in the area are shale, sandstone, granite and granodiorite. Copper, W, Sn, Sb and As mineralization occurs in the area.

Certified concentrations (μg/g dry weight unless noted):

Component	Value	Uncertainty (±)	Component	Value	Uncertainty (±)
Li	36	0.5	Mo	18	0.8
Be	4.4	0.3	Ag	0.20	0.01
B	57	3	Cd	0.13	0.016
F	906	27	In	0.84	0.12
Na_2O (%)	0.19	0.008	Sn	72	4
MgO (%)	0.34	0.02	Sb	60	3
Al_2O_3 (%)	21.23	0.09	I	19.4	0.6
SiO_2 (%)	56.93	0.11	Cs	10.8	0.3
P	303	15	Ba	118	6
S	260	30	La	30	1
Cl	98	11	Ce	66	3
K_2O (%)	1.70	0.03	Pr	5.8	0.4
CaO (%)	0.22	0.01	Nd	21	1.4
Sc	15.5	0.5	Sm	3.8	0.3
Ti	4390	50	Eu	0.66	0.03
V	130	3	Gd	3.4	0.16
Cr	75	2	Tb	0.61	0.05
Mn	1450	32	Dy	3.3	0.14
Fe_2O_3 (%)	8.09	0.06	Ho	0.69	0.04
Co	7.6	0.4	Er	2.2	0.2
Ni	53	1	Yb	2.7	0.2
Cu	390	6	Lu	0.42	0.03
Zn	96.6	2.4	Hf	7.5	0.5
Ga	29.5	1.8	Ta	5.3	0.4
Ge	3.2	0.3	W	89.5	3.4
As	220	7	Hg (ng/g)	72	5
Se	1.34	0.12	Tl	2.4	0.3
Rb	237	4	Pb	314	6
Sr	39	2	Bi	49	3
Y	18.8	0.8	Tm	0.40	0.04
Zr	220	7	Th	23	1
Nb	26.8	1.0	U	6.7	0.5

GSS-6 (cont.)

Noncertified concentrations (μg/g dry weight unless noted):

Component	Value
Br	7.2
Te	0.42
Au (ng/g)	9.0

Order Information:

No price information is available. Please contact NRCCRM.

Reference:

Institute of Geophysical and Geochemical Exploration (1986) Certificate of geochemical standard reference materials. Institute of Geophysical and Geochemical Exploration, Langfang, Hebei, China.

GSS-7

Laterite

National Research Center for CRMs (China)

Description:

The material for this CRM is a laterite soil from the tropical region of the Leizhou Peninsula, China. The underlying bedrock is basalt.

Certified concentrations (µg/g dry weight unless noted):

Component	Value	Uncertainty (±)
Li	19.5	0.5
Be	2.8	0.3
F	321	17
Na_2O (%)	0.074	0.009
MgO (%)	0.26	0.02
Al_2O_3 (%)	29.26	0.2
SiO_2 (%)	32.69	0.11
P	1150	19
S	250	20
Cl	100	8
K_2O (%)	0.20	0.01
CaO (%)	0.16	0.016
Sc	28	1
Ti	20200	230
V	245	8
Cr	410	9
Mn	1780	44
Fe_2O_3 (%)	18.76	0.16
Co	97	2
Ni	276	6
Cu	97	2
Zn	142	5
Ga	39.3	2.9
Ge	1.6	0.2
As	4.8	0.6
Se	0.32	0.05
Br	5.2	0.8
Pb	15.8	1.3
Sr	26	2
Y	26.6	1.7
Zr	318	19
Nb	64	3

Component	Value	Uncertainty (±)
Mo	2.9	0.14
Ag	0.057	0.006
Cd	0.080	0.014
In	0.10	0.02
Sn	3.6	0.7
Sb	0.42	0.05
I	19.3	1.1
Cs	2.7	0.5
Ba	180	12
La	46	3
Ce	98	6
Pr	11	0.5
Nd	45	1.6
Sm	10.3	0.2
Eu	3.4	0.1
Gd	9.6	0.6
Tb	1.3	0.1
Dy	6.6	0.4
Ho	1.1	0.1
Er	2.7	0.3
Yb	2.4	0.2
Lu	0.35	0.03
Hf	7.7	0.2
Ta	3.9	0.4
W	1.23	0.13
Hg (ng/g)	61	4
Pb	13.6	1.2
Bi	0.20	0.03
Tm	0.42	0.03
Th	9.1	0.4
U	2.2	0.2

GSS-7 (cont.)

Noncertified concentrations (μg/g dry weight unless noted):

Component	Value
B	10.5
Au (ng/g)	0.8
Tl	0.21

Order information:

No price information is available. Please contact NRCCRM.

Reference:

Institute of Geophysical and Geochemical Exploration (1986) Certificate of geochemical standard reference materials. Institute of Geophysical and Geochemical Exploration, Langfang, Hebei, China.

GSS-8

Loess

National Research Center for CRMs (China)

Description:

The material for this CRM is a loess soil collected from Luochuan, Shaaxi, China.

Certified concentrations (µg/g dry weight unless noted):

Component	Value	Uncertainty (±)	Component	Value	Uncertainty (±)
Li	35.2	0.7	Ag	0.060	0.006
Be	1.9	0.1	Cd	0.13	0.02
B	54	2	Sn	2.8	0.3
F	577	14	Sb	1.04	0.12
Na_2O (%)	1.72	0.02	Te	0.046	0.008
MgO (%)	2.38	0.03	I	1.6	0.3
Al_2O_3 (%)	11.92	0.08	Cs	7.5	0.5
SiO_2 (%)	58.61	0.08	Ba	480	11
P	775	12	La	35.5	1.4
S	120	30	Ce	66	4
K_2O (%)	2.42	0.02	Pr	8.3	0.5
CaO (%)	8.27	0.06	Nd	32	1.6
Sc	11.7	0.4	Sm	5.9	0.3
Ti	3800	50	Eu	1.2	0.04
V	81.4	1.8	Gd	5.4	0.3
Cr	68	2	Tb	0.89	0.05
Mn	650	9	Dy	4.8	0.2
Fe_2O_3 (%)	4.48	0.02	Ho	0.97	0.05
Co	12.7	0.4	Er	2.8	0.08
Ni	31.5	0.7	Yb	2.8	0.1
Cu	24.3	0.5	Lu	0.43	0.03
Zn	68	1.6	Hf	7.0	0.5
Ga	14.8	0.7	Ta	1.05	0.16
Ge	1.27	0.13	W	1.7	0.16
As	12.7	0.5	Hg (ng/g)	16.6	1.7
Se	0.12	0.02	Tl	0.59	0.08
Rb	96	2	Pb	21	1
Sr	236	6	Bi	0.30	0.02
Y	26	1	Tm	0.46	0.04
Zr	229	6	Th	11.8	0.4
Nb	15	1	U	2.7	0.2
Mo	1.16	0.05			

GSS-8 (cont.)

Noncertified concentrations (μg/g dry weight unless noted):

Component	Value
Cl	68
Br	2.6
In	0.043
Au (ng/g)	1.4

Order information:

No price information is available. Please contact NRCCRM.

Reference:

Institute of Geophysical and Geochemical Exploration (1986) Certificate of geochemical standard reference materials. Institute of Geophysical and Geochemical Exploration, Langfang, Hebei, China.

IAEA-312

Soil

International Atomic Energy Agency (Austria)

Description:

The material for this SRM was donated by the Indonesian Atomic Energy Commission.

Concentrations (μg/g) or activities (mBq/g):

Radionuclide	Activity	Confidence interval
^{226}Ra	269	250 - 287

Element	Value	Confidence interval
Th	91.4	81.3 - 101
U	16.5	15.7 - 17.4

Order information:

IAEA-312 can be purchased for US$60 per unit (50 g). Price subject to change after Summer 1992. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

Reference:

IAEA (1994) AQCS (Analytical Quality Control Services) Intercomparison runs reference materials 1994 - 1995. Catalog. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 100 pp.

IAEA-375

Soil

International Atomic Energy Agency (Austria)

Description:

Top soil to a depth of 20 cm was used in the preparation of this material. The soil was collected on the field of the collective farm "Staryi Vishkov", Novozybkov district, Brjansk region, Russia, in July 1990. Approximately 500 g of dried soil was milled at the Brjansk Centre of Agricultural Radiology and Chemicalization. The milled material passed through a 0.3 mm sieve and was estruded into 25 polyethylene bags. The material in the bags was then homogenized as one batch at IAEA. After homogenization, the material was bottled and sterilized using ^{60}Co irradiation.

Recommended activities (Bq/kg dry weight unless noted) or concentrations (μg/g):

Radionuclide	Activity	Confidence interval		Radionuclide	Activity	Confidence interval	
^{40}K	424	417	- 432	^{226}Ra	19.9	18.0	- 21.7
^{90}Sr	107.7	101.0	- 114.3	^{228}Ra	26.0	18.8	- 33.1
^{106}Ru	55.7	53.2	- 58.3	^{228}Th	21.4	15.9	- 26.8
^{125}Sb	76.5	74.1	- 78.8	^{232}Th	20.6	19.1	- 22.1
^{134}Cs	436	454	- 472	^{238}U	25.0	18.6	- 131.4
^{137}Cs	5281	5201	- 5361	^{241}Am	1.38	1.2	- 1.5

Element	Value	Confidence interval		
Th	5.18	5.00	-	5.35
U	1.86	1.66	-	2.05

Order information:

IAEA-312 can be purchased for US$110 per unit (250 g). Price subject to change after Summer 1992. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

References:

IAEA (1994) AQCS (Analytical Quality Control Services) Intercomparison runs reference materials 1994 - 1995. Catalog. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 100 pp.

Strachnov, V., V. Valkovic, P. R. Danesi, J. Larosa, R. Dekner, and R. Zeisler (1993) Preliminary report. Intercomparison run IAEA-375: determination of radionuclides in soil sample IAEA-375. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 57 pp.

SARM 42

Soil

South Africa Bureau of Standards (South Africa)

Description:

SARM 42 comes from the Rustenburg area of the Transvaal. As this material is a fine grained stream sediment, only information from x-ray defractometry is available. The following minerals are present: quartz, ilmenite, magnetite, rutile with small amounts of plagioclase, pyroxenes and clay minerals. Orders of magnitude for As, Ga, Se, W, Au, Br, Cs, Eu, Hf, La, Lu, Sc, Sm, Ta, Tb, Yb and Sb are available from SABS.

Certified concentrations (µg/g dry weight unless noted):

Component	Value	Component	Value
Al_2O_3 (%)	10.03	Fe_2O_3 (%)	4.68
SiO_2 (%)	74.09	Ni	125
K_2O (%)	0.45	Cu	17
CaO (%)	0.89	Zn	44
TiO_2 (%)	0.36	Pb	22
V	94	MgO (%)	1.92
Cr_2O_3 (%)	0.63	Sr	37
MnO (%)	0.10	Y	11
Co	35	Zr	192

Noncertified concentrations (µg/g dry weight unless noted):

Component	Value	Component	Value
Na_2O (%)	0.15	Mo	5
P_2O_5 (%)	0.04	Ba	250
S (%)	0.02	Ce	30
FeO (%)	4.0	Pb	10
Ga	12	Th	5
Nb	8		

Order information:

SARM 42 can be purchased for US$56 per unit (100 g). Price subject to change. Please contact SABS.

Reference:

South African Committee for Certified Reference Materials (1990) Catalogue of certified reference materials. South Africa Bureau of Standards, Private Bag X191, Pretoria, Transvaal 0001, South Africa. 36 pp.

SO-2 - SO-4

Soils

Canada Centre for Mineral and Energy Technology (Canada)

Description:

SO-2 through SO-4 were selected to represent major kinds of soil materials. The collections were made in different areas of Canada. Material for SO-2 was collected in the Montgomery Forest, north of Quebec, and is of the B horizon of a ferro-humic Podzol developed in sandy till. Its organic matter content is approximately 10%. The material for SO-3 was collected near Guelph, Ontario and is a calcareous till parent material of the Guelph series, a gray brown Luvisol. It has substantial amounts of calcite and dolomite. The material for SO-4 was collected near Saskatoon, Saskatchewan, and is of the A horizon of a black Chernozemic soil developed in silty glacial lacustrine deposits. Forty laboratories provided analytical data and provisionally recommended values.

Recommended values (µg/g unless noted):

	SO-2			SO-3			SO-4		
Constituent	Value		Uncertainty	Value		Uncertainty	Value		Uncertainty
Na (%)	1.9	±	0.05	0.74	±	0.04	1.0	±	0.02
Mg (%)	0.54	±	0.03	4.98	±	0.1	0.56	±	0.04
Al (%)	8.07	±	0.18	3.05	±	0.11	5.46	±	0.15
Si (%)	24.99	±	0.23	15.86	±	0.19	31.97	±	0.24
P (%)	0.3	±	0.02	0.048	±	0.005	0.09	±	0.07
K (%)	2.45	±	0.04	1.61	±	0.05	1.73	±	0.03
Ca (%)	1.96	±	0.1	14.63	±	0.4	1.11	±	0.06
Ti (%)	0.86	±	0.02	0.2	±	0.02	0.34	±	0.02
V	64	±	10	38	±	6	90	±	11
Cr	16	±	2	26	±	3	61	±	6
Mn (%)	0.072	±	0.002	0.052	±	0.002	0.06	±	0.002
Fe (%)	5.56	±	0.16	1.51	±	0.06	2.37	±	0.07
Co	9	±	2	8	±	3	11	±	1
Ni	8	±	2	16	±	3	26	±	3
Cu	7	±	1	17	±	1	22	±	1
Zn	124	±	5	52	±	3	94	±	3
Pb	78	±	6	39	±	3	NA		
Sr	340	±	50	217	±	29	170	±	18
Ba	966	±	67	296	±	39	NA		
Hg	0.082	±	0.009	0.017	±	0.007	0.03	±	0.006
Pb	21	±	4	14	±	3	16	±	3

Order information:

These CRMs are packaged in 200-g bottles and can be purchased for Canadian $205 each. Price subject to change without notice. Please contact CANMET.

Reference:

Bowman, W. S. (1994) Catalogue of certified reference materials. CCRMP 94-1E. Canada Centre for Mineral and Energy Technology, Ottawa, Canada. 74 pp.

SOIL-6

Soil

International Atomic Energy Agency (Austria)

Description:

Not available.

Recommended activities (Bq/g):

Radionuclide	Activity	Confidence interval
^{90}Sr	30.34	24.2 - 31.67
^{137}Cs	53.65	51.43 - 57.91
^{226}Ra	79.92	69.56 - 93.43
^{239}Pu	1.04	0.962 - 1.11

Order information:

SOIL-6 can be purchased for US$110 per unit (250 g). Price subject to change after Summer 1992. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

Reference:

IAEA (1994) AQCS (Analytical Quality Control Services) Intercomparison runs reference materials 1994 - 1995. Catalog. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 100 pp.

SOIL-7

Soil

International Atomic Energy Agency (Austria)

Description:

Not available.

Recommended concentrations (μg/g):

Element	Value	Range			Element	Value	Range		
Sc	8.3	6.9	-	9.0	La	28	27	-	29
V	66	59	-	73	Ce	61	50	-	63
Cr	60	49	-	74	Nd	30	22	-	34
Mn	631	604	-	650	Sm	5.1	4.8	-	5.5
Co	8.9	8.4	-	10.1	Eu	1.0	0.9	-	1.3
Cu	11	9	-	13	Tb	0.6	0.5	-	0.9
Zn	104	101	-	113	Dy	3.9	3.2	-	5.3
As	13.4	12.5	-	14.2	Yb	2.4	1.9	-	2.6
Pb	51	47	-	56	Hf	5.1	4.8	-	5.5
Sr	108	103	-	114	Ta	0.8	0.6	-	1.0
Y	21	15	-	27	Pb	60	55	-	71
Zr	185	180	-	201	Th	8.2	6.5	-	8.7
Sb	1.7	1.4	-	1.8	U	2.6	2.2	-	3.3
Cs	5.4	4.9	-	6.4					

Order information:

SOIL-7 can be purchased for US$110 per unit (25 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

Reference:

IAEA (1994) AQCS (Analytical Quality Control Services) Intercomparison runs reference materials 1994 - 1995. Catalog. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 100 pp.

SRM 2709 - 2711

Soils

National Institute of Standards and Technology (USA)

Description:

SRM 2709 is agricultural soil from the San Joaquin Valley, CA. SRM 2710 is a highly contaminated Northern Great Plains soil collected from the top 10 cm of pasture in a flood plain downstream from a major processing plant in Butte, MT. SRM 2711 is a moderately contaminated soil from an undisclosed location in Montana. It is an agricultural soil collected in the till layer (upper 15.2 cm) of a wheat field. The materials were dried, sieved to remove large pieces of material, deaggregated and recreened, ball milled to pass through a 74 µm screen, blended, and bottled.

Certified concentrations (µg/g unless noted) (values in parenthesis are not certified):

	SRM 2709		SRM 2710		SRM 2711	
Element	Value	Uncertainty	Value	Uncertainty	Value	Uncertainty
C (%)	(1.2)		(3)		(2)	
Na (%)	1.16	0.03	1.14	0.06	1.14	0.03
Mg (%)	1.51	0.05	0.853	0.042	1.05	0.03
Al (%)	7.50	0.06	6.44	0.08	6.53	0.09
Si (%)	29.66	0.23	28.97	0.18	30.44	0.19
P (%)	0.062	0.005	0.106	0.015	0.086	0.007
S (%)	0.089	0.002	0.240	0.006	0.042	0.001
K (%)	2.03	0.06	2.11	0.11	2.45	0.08
Ca (%)	1.89	0.05	1.25	0.03	2.88	0.08
Sc	(12)		(8.7)		(9)	
Ti (%)	0.342	0.024	0.283	0.010	0.306	0.023
V	112	5	76.6	2.3	81.6	2.9
Cr	130	4	(39)		(47)	
Mn	538	17	1.01%	0.04%	638	28
Fe (%)	3.50	0.11	3.38	0.10	2.89	0.06
Co	13.4	0.7	(10)		(10)	
Ni	88	5	14.3	1.0	20.6	1.1
Cu	34.6	0.7	2950	130	114	2
Zn	106	3	6952	91	350.4	4.8
Ga	(14)		(34)		(15)	
As	17.7	0.8	626	38	105	8
Se	1.57	0.08	-		1.52	0.14
Br	-		(6)		(5)	
Rb	(96)		(120)		-	
Sr	231	2	(240)		245.3	0.7
Y	(18)		(23)		(25)	
Zr	(160)		-		(230)	
Mo	(2.0)		(19)		-	
Ag	0.41	0.03	35.3	1.5	4.63	0.39
Cd	0.38	0.01	21.8	0.2	41.70	0.25

	SRM 2709		SRM 2710		SRM 2711	
Element	Value	Uncertainty	Value	Uncertainty	Value	Uncertainty
In	-		(5.1)		(1.1)	
Sb	7.9	0.6	38.4	3.0	19.4	1.8
I	(5)		-		(3)	
Cs	(5.3)		(107)		(6.1)	
Ba	968	40	707	51	726	38
La	(23)		(34)		(40)	
Ce	(42)		(57)		(69)	
Nd	(19)		(23)		(31)	
Sm	(3.8)		(7.8)		(5.9)	
Eu	(0.9)		(1)		(1.1)	
Dy	(3.5)		(5.4)		(5.6)	
Ho	(0.54)		(0.6)		(1)	
Yb	(1.6)		(1.3)		(2.7)	
Hf	(3.7)		(3.2)		(7.3)	
W	(2)		(93)		(3)	
Au	(0.3)		(0.6)		(0.03)	
Hg	1.40	0.08	32.6	1.8	6.25	0.19
Tl	0.74	0.05	(1.3)		2.47	0.15
Pb	18.9	0.5	5532	80	1162	31
Th	(11)		(13)		(14)	
U	(3)		(25)		(2.6)	

Order information:

These SRMs can be purchased for US$215 per unit (50 g) each. Price subject to change without notice. Please contact NIST.

Reference:

National Institute of Standards and Technology (1993) SRM 2711. Montana soil. Certificate of analysis. National Institute of Standards and Technology, Gaithersburg, MD, USA.

SRM 4353

Rocky Flats Soil Number 1

National Institute of Standards and Technology (USA)

Description:

This SRM is soil from the Rocky Flats, Colorado, and is intended for use in tests of environmental radioactivity in matrices similar to that of the SRM. Semiquantitative emission spectrometry analysis and gamma ray spectrum of this SRM are available in the Certificate of Analysis.

Certified values (excluding "hot" particles):

Reference time: Dec. 15, 1980

Radionuclide	Activity (Bq/g)	Uncertainty (%)
^{40}K	7.23×10^{-1}	9.6
^{90}Sr	7.63×10^{-3}	10.2
^{137}Cs	1.76×10^{-2}	4.5
^{226}Ra	4.30×10^{-2}	6.6
^{228}Ac	6.98×10^{-2}	5.1
^{228}Th	7.08×10^{-2}	5.1
^{230}Th	4.43×10^{-4}	5.1
^{232}Th	6.93×10^{-2}	5.1
^{234}U	3.91×10^{-2}	3.6
^{238}U	3.89×10^{-2}	5.1
^{238}Pu	1.66×10^{-4}	11.0
$^{239}Pu + ^{240}Pu$	8.03×10^{-3}	7.5
^{241}Am	1.25×10^{-3}	7.3

Order information:

SRM 4353 can be purchased for US$312 per unit (85 g). Price subject to change without notice. Please contact NIST.

Reference:

National Institute of Standards and Technology (1981) SRM 4353. Rocky Flats soil number 1. Certificate of analysis. National Institute of Standards and Technology, Gaithersburg, MD, USA.

SRM 4355

Peruvian Soil

National Institute of Standards and Technology (USA)

Description:

The material of this SRM has non-measurable radioactivity concentrations for many fallout nuclides and is intended as a blank or very low level standard in tests of environmental radioactivity. The starting material for this SRM is the IAEA Soil-5 which has been the subject of extensive trace element analysis. The elemental composition of the two materials, however, will be similar but not identical.

Certified values:

Reference time: June 1, 1982

Radionuclide (%)	Activity (Bq/g)	Est. Detection Limit (Bq/g)	Uncertainty (%)
^{60}Co	Not detected	1.6×10^{-5}	
^{125}Sb	Not detected	1.4×10^{-4}	
^{137}Cs	3.3×10^{-4}		13
^{152}Eu	Not detected	2.3×10^{-4}	
^{154}Eu	Not detected	2×10^{-4}	
^{155}Eu	Not detected	2×10^{-4}	
^{228}Th	4.22×10^{-2}		5
^{230}Th	3.97×10^{-2}		5
^{232}Th	4.30×10^{-2}		5
$^{239}Pu + ^{240}Pu$	7.6×10^{-6}		28
^{241}Am	4×10^{-6}		36

Order information:

SRM 4355 can be purchased for US$317 per unit (75 g). Price subject to change without notice. Please contact NIST.

Reference:

National Institute of Standards and Technology (1987) SRM 4355. Peruvian soil. Certificate of analysis (revised). National Institute of Standards and Technology, Gaithersburg, MD, USA.

TILL-1 to TILL-4

Till Samples

Canada Centre for Mineral and Energy Technology (Canada)

Description:

This set consists of two soil samples and two till samples and are intended to complement the lake and stream sediment reference materials and as eventual replacement for the reference soils SO-1 to S0-4. Some interlaboratory analytical data is available, but no compilation or statistical analysis has been performed. Preliminary data from one laboratory is presented below.

Preliminary results:

	TILL-1	TILL-2	TILL-3	TILL-4
Total element (µg/g unless noted):				
Li (ng/g)	14	42	21	27
Sc	15	13	11	12
Cr	67	80	126	56
Co	18	13	16	8
Ni	20	29	38	14
Cu	43	139	22	223
Zn	91	121	52	66
Br	5	11	4	8
Sr	239	124	258	97
Y	37	41	15	34
Zr	518	385	220	394
Mo	2	15	2	18
Ag	17	24	83	107
Sb	8	0.8	0.8	1.0
Cs	1	12	2	13
Ba	730	550	550	420
La	29	46	21	45
Ce	83	112	46	91
Nb	12	20	9	14
Sm	7	9	4	8
Eu	2	1	<1	<1
Tb	1	1	<0.5	1
Yb	4	4	<2	4
Hf	13	10	6	11
Ta	0.7	2	0.6	2
W	<1	6	<1	245
Au (ng/g)	17	3	9	5
Pb	21	30	27	50
Th	6	18	5	18
U	2	6	2	5

TILL-1 to TILL-4 (cont.)

Major and minor element oxides (%)

Na_2O	2.6	2.1	2.6	2.4
MgO	2.1	1.8	1.7	1.2
Al_2O_3	13.8	16.2	12.2	14.5
SiO_2	60.9	60.8	69.7	65.1
K_2O	2.3	3.1	2.4	3.3
CaO	2.8	1.3	2.7	1.3
TiO_2	1.0	0.9	0.5	0.8
Fe_2O_3	6.6	5.1	3.7	5.3
MnO	0.2	0.1	0.1	0.1
P_2O_5	0.2	0.2	0.1	0.2
LOI (1000°C)	7.3	8.2	4.6	5.7

Values for partial extraction using concentrated HNO_3 - concentrated HCl (µg/g unless noted):

Ag	0.2	<0.2	1.6	<0.2
Cd	<0.2	<0.2	<0.2	<0.2
Hg (ng/g)	90	70	100	30

Order information:

These materials can be purchased for Canadian $100 per unit (100 g). Price subject to change without notice. Please contact CANMET.

Reference:

Bowman, W. S. (1994) Catalogue of certified reference materials. CCRMP 94-1E. Canada Centre for Mineral and Energy Technology, Ottawa, Ontario, Canada. 74 pp.

TISSUES

TISSUES

A-11

Milk Powder

International Atomic Energy Agency (Austria)

Description:

No information available.

Recommended values (mg/kg dry weight unless noted):

Element	Value	Confidence interval	Element	Value	Confidence interval
Na (g/kg)	4.42	4.09 - 4.75	Cu (µg/kg)	378	354 - 402
Mg (g/kg)	1.10	1.02 - 1.18	Zn	38.9	36.6 - 41.2
P (g/kg)	9.10	8.08 - 10.1	As (µg/kg)	4.85	4.53 - 5.17
Cl (g/kg)	9.08	7.34 - 10.82	Rb	30.8	24.5 - 37.1
Ca (g/kg)	12.9	12.1 - 13.7	Mo (µg/kg)	92	82 - 103
K (g/kg)	17.2	16.2 - 18.2	Cd (µg/kg)	1.7	1.2 - 2.2
Cr (µg/kg)	17.7	13.7 - 21.7	I (µg/kg)	87	78 - 96
Mn (µg/kg)	257	248 - 266	Hg (µg/kg)	3.2	2.2 - 4.2
Fe	3.65	2.89 - 4.41	Pb (µg/kg)	54	29 - 79
Co (µg/kg)	4.5	3.7 - 5.3			

Order Information:

A-11 can be purchased for US$60 per unit (25 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

Reference:

International Atomic Energy Agency (1994) AQCS (Analytical Quality Control Services) Intercomparison runs reference materials 1994 - 1995. Catalog. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 100 pp.

A-12

Animal Bone

International Atomic Energy Agency (Austria)

Description:

A batch of approximately 50 kg of a commercial beef marrow bone powder, which is defatted, sterilized and crushed beef bone, was homogenized at IAEA by mixing in a ratating plastic drum. The grain size wwas below 125 µm. Aliquots of 80 g were packaged in plastic bottles and radiation sterilized using ^{60}Co irradiation.

Recommended values (mBq/g dry weight):

Radionuclide	Activity	Confidence interval		
^{90}Sr	54.8	46.3	-	59.2
^{226}Ra	5.2	4.4	-	6.7

Order Information:

A-12 can be purchased for US$110 per unit (80 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

References:

International Atomic Energy Agency (1994) AQCS (Analytical Quality Control Services) Intercomparison runs reference materials 1994 - 1995. Catalog. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 100 pp.

Pszonicki, L., A. N. Hanna, and O. Suschny (1982) Report on the intercomparison run A-12 of the determination of radionuclides in animal bone. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 22 pp and tables.

A-13

Animal Blood

International Atomic Energy Agency (Austria)

Description:

Fresh beef blood obtained from a slaughter house was freeze dried. A batch of 40 kg was powdered using a plastic ball mill, sieved to less than 300 µm, and homogenized in a ratating plastic drum. Aliquots of 25 g were packaged in plastic bottles and radiation sterilized using ^{60}Co irradiation.

Recommended values (mg/kg dry weight unless noted):

Element	Concentration	Confidence interval			Element	Concentration	Confidence interval		
Na (g/kg)	12.6	11.6	-	13.5	Cu	4.3	3.7	-	4.8
S (g/kg)	6.5	5.9	-	7.0	Zn	13	12	-	14
K (g/kg)	2.5	2.1	-	2.8	Se	0.24	0.15	-	0.31
Ca	286	226	-	332	Br	22	19	-	24
Fe (g/kg)	2.4	2.2	-	2.5	Pb	2.3	1.7	-	3.1

Order Information:

A-13 can be purchased for US$110 per unit (25 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

References:

International Atomic Energy Agency (1994) AQCS (Analytical Quality Control Services) Intercomparison runs reference materials 1994 - 1995. Catalog. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 100 pp.

Pszonicki, L., A. N. Hanna, and O. Suschny (1982) Report on the intercomparison run A-13. Trace elements in freeze dried animal blood. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 22 pp and tables.

A-14

Milk Powder

International Atomic Energy Agency (Austria)

Description:

The milk powder was industrially prepared from fresh skimmed milk by spray drying. Aliquots of 250 g were bottled and radiation sterilized using ^{60}Co irradiation.

Recommended values (mBq/g or g/kg dry weight):

Radionuclide	Activity	Confidence interval		
^{40}K	527	510	-	543
^{90}Sr	1.5	1.33	-	1.57
^{137}Cs	1.79	1.62	-	1.97

Element	Concentration	Confidence interval		
Na	4.3	3.8	-	4.6
K	16.6	16.0	-	17.1
Ca	13.1	12.0	-	14.0

Order Information:

A-14 can be purchased for US$110 per unit (250 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

References:

International Atomic Energy Agency (1994) AQCS (Analytical Quality Control Services) Intercomparison runs reference materials 1994 - 1995. Catalog. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 100 pp.

Strachnov, V., R. Schelenz, R. Dekner, and K. Burns (1989) Report on the re-evaluation of reference material A-14 milk powder. IAEA/AL/022. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 13 pp.

CARP-1

Ground Whole Carp

National Research Council (Canada)

Description:

CARP-1 is a ground whole fish CRM prepared from common carp (*Cyprinus carpio*) collected near the warm water discharge of the Consumer's Power Plant, Saginaw Bay, Lake Huron, December 1988. The material was homogenized by comminution and an antioxidant was added. The water content as increased and the slurry processed through a high pressure homogenizer. The material was bottles in 10-mL glass ampoules which were heat sealed, sterilized, and individually packed in sealed trilaminate pouches. Organochlorine compounds are at concentrations naturally present in the sample.

Certified concentrations (ng/kg wet weight):

Compound	Value	Uncertainty (±)	Compound	Value	Uncertainty (±)
2,3,7,8-TCDF	11.9	2.7	PCB 52	124	32
1,2,3,7,8-PCDF	5.0	2.0	PCB 101/90	124	37
2,3,7,8-TCDD	6.6	0.6	PCB 105	54	24
1,2,3,7,8-PCDD	4.4	1.1	PCB 118	132	60
1,2,3,4,7,8-HxCDD	1.9	0.7	PCB 138/163/164	102	23
1,2,3,6,7,8-HxCDD	5.6	1.3	PCB 153	83	39
1,2,3,7,8,9-HxCDD	0.7	0.4	PCB 170/190	22	8
1,2,3,4,6,7,8-HpCDD	6.3	1.9	PCB 180	46	14
			PCB 187/182	36	16

Order information:

A unit of CARP-1 contains 6 9-g ampoules of slurry and can be purchased for Canadian $495 per unit. Price subject to change without notice. Please contact NRC.

Reference:

National Research Council (1995) CARP-1. Ground whole carp reference material for organochlorine compounds. Information sheet. National Research Council, Institute for Environmental Research, Ottawa, Ontario, Canada.

CLV-1 - CLV-2

Spruce Twigs and Needles

Canada Centre for Mineral and Energy Technology (Canada)

Description:

CLV-1 and CLV-2 consist of spruce tiwgs and needles respectively from the Cluff Lake uranium mining area in northern Saskatchewan. Each sample was milled and ground to less than 212 µm, blended and bottled. The bottles were sealed in laminated aluminum foil-mylar pouches to maintain sample intergrity. The material was subjected to gamma ray irradiation to a minimum does of 25,000 Sv for sterilization purposes. Nine laboratories participated in the interlaboratory program to provide analytical results for U and five radionuclides.

Consensus values (Bq/q unless noted):

Constituent	CLV-1	CLV-2
^{137}Cs	0.11	0.034
^{210}Pb	0.66	0.074
^{210}Po	0.49	0.073
^{226}Ra	0.70	0.038
^{230}Th	0.31	0.033
U (µg/g)	87	3.6

Additional analytical information provided by one laboratory (µg/g unless noted):

Constituent	CLV-1	CLV-2	Constituent	CLV-1	CLV-2
Na	280	70	Cu	<40	<41
Mg	<800	<1000	Br	<10	<20
Al	1430	320	Sr	<310	<530
Cl	220	440	I	<4.0	<8.0
K	<0.20	<0.42	Ba	<170	<280
^{40}K	0.080	0.12	Dy	<0.53	<1.1
Ca	0.63	0.77	Th	0.53	0.14
Ti	<130	<160	^{232}Th	0.0022	0.0006
V	3.6	0.76	^{234}U	1.06	0.045
Mn	612	440	^{238}U	1.06	0.044
Co	<3.8	<4.5			

Order information:

These CRMs can be purchased for Canadian $110 per unit (125 g bottle). Price subject to change without notice. Please contact CANMET.

Reference:

Bowman, W. S. (1994) Catalogue of certified reference materials. CCRMP 94-1E. Canada Centre for Mineral and Energy Technology, Ottawa, Canada. 74 pp.

CRM 060

Aquatic Plant

Community Bureau of Reference (Belgium)

Description:

Specimens of *Lagarosiphon major* were used for this CRM.

Certified concentrations (µg/g dry weight):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
Al	4180	120	Cd	2.20	0.10
Mn	1759	51	Hg	0.34	0.04
Cu	51.2	1.9	Pb	63.8	3.2
Zn	313	8			

Noncertified concentrations (µg/g dry weight unless noted):

Element	Value	Element	Value
B	25	Ni	40
N (mg/g)	41.2	As	8
S (mg/g)	5.2	Se	0.7
Cl (mg/g)	10	Mo	2

Order information:

This CRM can be purchased for ECU150 per unit (25 g). Price includes handling and normal postage within the European Union except when special handling is required. Price subject to change without notice. Please contact BCR.

Reference:

Community Bureau of Reference (BCR) (1994) Reference Materials. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 86 pp.

CRM 061

Aquatic Plant

Community Bureau of Reference (Belgium)

Description:

Specimens of *Platihypnidium riparioides* were used for this CRM.

Certified concentrations (µg/g dry weight):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
Al (mg/g)	10.740	0.240	Cd	1.07	0.08
Mn	3771	78	Hg	0.23	0.02
Cu	720	31	Pb	64.4	3.5
Zn	566	13			

Noncertified concentrations (µg/g dry weight unless noted):

Element	Value	Element	Value
B	77	Ni	420
N (mg/g)	33.5	As	7
S (mg/g)	2.3	Se	1
Cl (mg/g)	2.3	Mo	11

Order information:

This CRM can be purchased for ECU150 per unit (25 g). Price includes handling and normal postage within the European Union except when special handling is required. Price subject to change without notice. Please contact BCR.

Reference:

Community Bureau of Reference (BCR) (1994) Reference Materials. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 86 pp.

CRM 062

Olive Leaves

Community Bureau of Reference (Belgium)

Description:

Leaves of *Olea europea* were used for this CRM.

Certified concentrations (µg/g dry weight):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
Al	450	20	Cd	0.10	0.02
Mn	57.0	2.4	Hg	0.28	0.02
Cu	46.6	1.8	Pb	25.0	1.5
Zn	16.0	0.7			

Noncertified concentrations (µg/g dry weight unless noted):

Element	Value	Element	Value
B	20	Ni	8
N (mg/g)	19.5	As	0.2
S (mg/g)	1.6	Se	0.1
Cl (mg/g)	0.7	Mo	0./=2

Order information:

This CRM can be purchased for ECU150 per unit (25 g). Price includes handling and normal postage within the European Union except when special handling is required. Price subject to change without notice. Please contact BCR.

Reference:

Community Bureau of Reference (BCR) (1994) Reference Materials. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 86 pp.

CRM 063R, CRM 150 and CRM 151

Milk Powders

Community Bureau of Reference (Belgium)

Description:

CRM 063R is representative of natural elemental levels in milk. The higher levels of Cd, Cu, Fe, and Hg in CRMs 150 and 151 were obtained by spiking liquid milk.

Certified concentrations (µg/g dry weight unless noted):

Element	Value	Uncertainty (±)
	CRM 063R	
N (mg/g)	62.3	0.8
Na (mg/g)	4.37	0.031
Mg (mg/g)	1.263	0.024
P (mg/g)	11.10	0.13
Cl (mg/g)	9.94	0.30
K (mg/g)	17.68	0.19
Ca (mg/g)	13.49	0.10
Fe	2.32	0.23
Cu	0.602	0.019
Zn	49.0	0.6
I	0.81	0.05
Pb (ng/g)	18.5	2.7

Element	Value	Uncertainty (±)
	CRM 150	
Fe	11.8	0.6
Cu	2.23	0.08
Cd	21.8	1.4
I	1.29	0.09
Hg (ng/g)	9.4	1.7
Pb (ng/g)	1000	40
	CRM 151	
Fe	50.1	1.3
Cu	5.23	0.08
Cd	101	8
I	5.350	0.014
Hg (ng/g)	101	10
Pb (ng/g)	2002	26

Noncertified concentrations (µg/g dry weight unless noted):

Element	Value
	CRM 063R
N (mg/g) (Kjeldahl)	60.87
Se	129
Mo	0.33
	CRM 150
Ni	61.5
Zn	49
Se	127
Mo	236
Tl	1.0

Element	Value
	CRM 151
Ni	56
Zn	50
Se	125
Mo	223
Tl	0.8

Order information:

These CRMs can be purchased for ECU150 per unit (23 g or 50 g). Price includes handling and normal postage within the European Union except when special handling is required. Price subject to change without notice. Please contact BCR.

Reference:

Community Bureau of Reference (BCR) (1994) Reference Materials. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 86 pp.

CRM 100

Beech Leaves

Community Bureau of Reference (Belgium)

Description:

No information available.

Certified concentrations (mg/g dry weight):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
N	26.29	0.25	S	2.69	0.04
Mg	0.878	0.017	Cl	1.49	0.06
Al	0.435	0.004	K	9.94	0.20
P	1.55	0.04	Ca	5.30	0.05

Noncertified concentrations (µg/g dry weight unless noted):

Element	Value	Element	Value
Mn	1.3	Mo (ng/g)	0.5
Fe (ng/g)	550	Cd (ng/g)	0.34
Cu (ng/g)	12.0	Pb (ng/g)	16.3
Zn (ng/g)	69		

Order information:

This CRM can be purchased for ECU150 per unit (20 g). Price includes handling and normal postage within the European Union except when special handling is required. Price subject to change without notice. Please contact BCR.

Reference:

Community Bureau of Reference (BCR) (1994) Reference Materials. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 86 pp.

CRM 101

Spruce Needles

Community Bureau of Reference (Belgium)

Description:

No information available.

Certified concentrations (µg/g dry weight):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
N	18.89	0.18	Cl	0.688	0.023
Mg	0.619	0.009	Ca	4.28	0.08
Al	0.173	0.005	Mn	0.915	0.011
P	1.69	0.04	Zn	0.0353	0.0023
S	1.70	0.04			

Noncertified concentrations (µg/g dry weight unless noted):

Element	Value	Element	Value
K	6	Mo (ng/g)	0.3
Cr	2.7	Cd	0.35
Fe	150	Pb	2.6
Cu	5.0		

Order information:

This CRM can be purchased for ECU150 per unit (20 g). Price includes handling and normal postage within the European Union except when special handling is required. Price subject to change without notice. Please contact BCR.

Reference:

Community Bureau of Reference (BCR) (1994) Reference Materials. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 86 pp.

CRM 129

Hay Powder

Community Bureau of Reference (Belgium)

Description:

No information available.

Certified concentrations (µg/g dry weight):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
N	37.2	0.5	K	33.8	0.8
N (Kjeldahl)	34.2	0.4	Ca	6.40	0.1
Mg	1.45	0.04	Zn (ng/g)	32.1	1.7
P	2.36	0.07	I (ng/g)	0.167	0.024
S	3.16	0.04			

Noncertified concentrations (µg/g dry weight unless noted):

Element	Value	Element	Value
Mn (mg/g)	70	Se (ng/g)	0.025
Fe	0.114	Mo (ng/g)	1
Cu	0.01		

Order information:

This CRM can be purchased for ECU150 per unit (30 g). Price includes handling and normal postage within the European Union except when special handling is required. Price subject to change without notice. Please contact BCR.

Reference:

Community Bureau of Reference (BCR) (1994) Reference Materials. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 86 pp.

Bovine Muscle, Bovine Liver and Pig Kidney

Community Bureau of Reference (Belgium)

Description:

Advantage was taken of the fact that whereas organs such as liver and kidney concentrate many elements of interest such as Pb, Cd, Hg, and Se, the levels in muscle are rather low. Thus the three materials provide a wide range of elemental contents and matrix characteristics.

Certified concentrations (µg/g dry weight unless noted):

Element	Value	Uncertainty (±)
	CRM 184	
Mn	334	28
Fe	79	2
Cu	2.36	0.06
Zn	166	3
Se (ng/g)	183	12
Cd (ng/g)	13	2
Hg (ng/g)	2.6	0.6
Pb (ng/g)	239	11
	CRM 185	
Mn	9.3	0.3
Fe	214	5
Cu	189	4
Zn	142	3
As	24	3
Se (ng/g)	446	13
Cd (ng/g)	298	25
Hg (ng/g)	44	3
Pb (ng/g)	501	27

Element	Value	Uncertainty (±)
	CRM 186	
Mn	8.5	0.3
Fe	299	10
Cu	31.9	0.4
Zn	128	3
As	63	9
Se (ng/g)	10300	500
Cd (ng/g)	2710	150
Hg (ng/g)	1970	40
Pb (ng/g)	306	11

Noncertified concentrations (µg/g dry weight unless noted):

Element	Value
	CRM 184
P (mg/g)	8.3
Na (mg/g)	2.0
Mg	10200
Cl (mg/g)	2.0
K	16.6
Ca	150
Cr	76 - 153
Ni (ng/g)	270
As (ng/g)	26
I (ng/g)	40

Element	Value
	CRM 185
P (mg/g)	11.7
Na (mg/g)	2.1
Mg	634
Cl (mg/g)	2.9
K	11.2
Ca	131
Cr	47 - 124
Ni (ng/g)	1400
I (ng/g)	105

Element	Value
	CRM 186
P (mg/g)	12.2
Na (mg/g)	7.1
Mg	829
Cl (mg/g)	9.4
K	12.6
Ca	295
Cr	58 - 142
Ni (ng/g)	420
I (ng/g)	145

Order information:

These CRMs can be purchased for ECU150 per unit (15 g). Price includes handling and normal postage within the European Union except when special handling is required. Price subject to change without notice. Please contact BCR.

Reference:

Community Bureau of Reference (BCR) (1994) Reference Materials. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 86 pp.

CRM 187 - CRM 188

Pesticides in Milk Powder

Community Bureau of Reference (Belgium)

Description:

No information available.

Certified concentrations (µg/g dry weight):

	CRM 187		CRM 188	
Compound	Value	Uncertainty	Value	Uncertainty
4,4'-DDE	6.6	0.6	51.3	3.5
4,4'-DDT	-	-	69.0	4.6
alpha-HCH	1.80	0.14	20.0	0.9
beta-HCH	-	-	12.0	1.2
beta-HEPO	(1.4)		32.0	1.8
Dieldrin	(2.3)		36.1	2.4
Endrin	-	-	6.2	0.9
gamma-HCH	5.7	0.7	45.4	2.9
HCB	1.5	0.2	37.4	2.7

Values in parenthesis are not certified.

Order information:

These CRMs can each be purchased for ECU150 per unit (5 g) respectively. Price includes handling and normal postage within the European Union except when special handling is required. Price subject to change without notice. Please contact BCR.

Reference:

Community Bureau of Reference (BCR) (1994) Reference Materials. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 86 pp.

CRM 194 - CRM 196

Lead and Cadmium in Blood

Community Bureau of Reference (Belgium)

Description:

No information available.

Certified concentrations (µg/g dry weight):

	CRM 194		CRM 195		CRM 196	
Element	Value	Uncertainty	Value	Uncertainty	Value	Uncertainty
Cd	0.5	0.1	5.37	0.24	12.4	0.5
Pb	126	4	416	9	772	11

Order information:

These CRMs can each be purchased for ECU150 per unit (5 g) respectively. Price includes handling and normal postage within the European Union except when special handling is required. Price subject to change without notice. Please contact BCR.

Reference:

Community Bureau of Reference (BCR) (1994) Reference Materials. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 86 pp.

CRM 278

Trace Elements in Mussel Tissue

Community Bureau of Reference (Belgium)

Description:

This material consists of freeze dried mussel (*Mytilus edulis*) tissue powder.

Certified concentrations (µg/g dry weight):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
Cr	0.80	0.08	As	5.9	0.2
Mn	7.3	0.2	Se	1.66	0.04
Fe	133	4	Cd	0.34	0.02
Cu	9.60	0.16	Hg	0.188	0.007
Zn	76	2	Pb	1.91	0.04

Noncertified concentrations (µg/g dry weight unless noted):

Element	Value	Element	Value
Na (mg/g)	20	Ni	1.0
Mg (mg/g)	1.4	Cl (mg/g)	32
Al	70	Br	83
P (mg/g)	7.2	Rb	2.5
K (mg/g)	4.8	Sr	14.5
Ca (mg/g)	1.0	Ba	0.7
Co	0.34		
Ti	2.0		

Order information:

CRM 278 can be purchased for ECU150 per unit (15 g) respectively. Price includes handling and normal postage within the European Union except when special handling is required. Price subject to change without notice. Please contact BCR.

References:

Community Bureau of Reference (BCR) (1988) BCR CRM 278. Trace element in mussel tissue. Certificate of analysis. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium.

Community Bureau of Reference (BCR) (1994) Reference Materials. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 86 pp.

CRM 279

Sea Lettuce

Community Bureau of Reference (Belgium)

Description:

This material consists specimens of *Ulva lactuga*..

Certified concentrations (µg/g dry weight):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
Cu	13.14	0.37	Se	0.593	0.032
Zn	51.3	1.2	Cd	0.274	0.022
As	3.09	30	Pb	13.48	0.36

Noncertified concentrations (µg/g dry weight):

Element	Value	Element	Value
N (mg/g)	20.8	Mn (mg/g)	2.09
Mg (mg/g)	14	Fe (mg/g)	2.4
P (mg/g)	1.80	Cl (mg/g)	25
K (mg/g)	13	I	154
Ca (mg/g)	27	Hg	0.05
Cr	10.7		

Order information:

CRM 279 can be purchased for ECU150 per unit (35 g) respectively. Price includes handling and normal postage within the European Union except when special handling is required. Price subject to change without notice. Please contact BCR.

Reference:

Community Bureau of Reference (BCR) (1994) Reference Materials. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 86 pp.

CRM 281

Rye Grass

Community Bureau of Reference (Belgium)

Description:

No description available.

Certified concentrations (µg/g dry weight):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
B	5.9	0.7	Se	0.028	0.004
Mn	81.6	2.6	Mo	0.84	0.06
Ni	3.00	0.17	Cd	0.120	0.003
Cu	9.65	0.38	Sb	0.047	0.005
Zn	31.5	1.4	Hg	0.0205	0.0019
As	0.057	0.004	Pb	2.38	0.11

Noncertified concentrations (µg/g dry weight):

Element	Value	Element	Value
Mg (mg/g)	1.5	Fe	164
K (mg/g)	33	Co	0.117
Cr	2.1		

Order information:

CRM 281 can be purchased for ECU150 per unit (30 g) respectively. Price includes handling and normal postage within the European Union except when special handling is required. Price subject to change without notice. Please contact BCR.

Reference:

Community Bureau of Reference (BCR) (1994) Reference Materials. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 86 pp.

CRM 402

White Clover

Community Bureau of Reference (Belgium)

Description:

No description available.

Certified concentrations (µg/g dry weight):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
Co	0.178	0.008	Se	6.70	0.25
As	0.093	0.010	Mo	6.93	0.19

Noncertified concentrations (µg/g dry weight):

Element	Value	Element	Value
Cr	5.19	Ni	8.25
Fe	244	Zn	25.2

Order information:

CRM 402 can be purchased for ECU150 per unit (30 g) respectively. Price includes handling and normal postage within the European Union except when special handling is required. Price subject to change without notice. Please contact BCR.

Reference:

Community Bureau of Reference (BCR) (1994) Reference Materials. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 86 pp.

CRM 414

Trace Elements in Plankton

Community Bureau of Reference (Belgium)

Description:

This material consists of freeze dried plankton powder in a glass bottle. The bottle contains a small PTFE ball to facilitate homogenisation prior to use.

Certified concentrations (µg/g dry weight):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
V	8.10	0.18	As	6.82	0.28
Cr	23.8	1.2	Se	1.75	0.10
Mn	299	12	Cd	0.383	0.014
Ni	18.8	0.8	Hg	0.276	0.018
Cu	29.5	1.3	Pb	0.397	0.19
Zn	112	3			

Noncertified concentrations (µg/g dry weight unless noted):

Element	Value	Element	Value
K (mg/g)	7.55	Co	1.43
Sc	0.54	Sr	261
Fe	1.85	Mo	1.35

Order information:

CRM 414 can be purchased for ECU150 per unit (5 g) respectively. Price includes handling and normal postage within the European Union except when special handling is required. Price subject to change without notice. Please contact BCR.

References:

Community Bureau of Reference (BCR) (1992) BCR CRM 414. Trace element in plankton. Certificate of analysis. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium.

Community Bureau of Reference (BCR) (1994) Reference Materials. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 86 pp.

CRM 422

Trace Elements in Cod Muscle

Community Bureau of Reference (Belgium)

Description:

This material consists of cod muscle powder in a glass bottle. The bottle contains a small PTFE ball to facilitate homogenisation prior to use.

Certified concentrations (µg/g dry weight):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
Mn	0.543	0.028	Se	1.63	0.07
Fe	5.46	0.30	Cd	0.017	0.002
Cu	1.05	0.07	I	4.95	0.49
Zn	19.6	0.5	Hg	0.559	0.016
As	21.1	0.5	Pb	0.085	0.015

Noncertified concentrations (µg/g dry weight unless noted):

Element	Value	Element	Value
Na (mg/g)	2200	Co	0.015
Mg (mg/g)	1370	Br	17
S	11500	Sr	0.7
K (mg/g)	21700	Methyl Hg	0.43
Ca (mg/g)	330		

Order information:

CRM 422 can be purchased for ECU 150 per unit (7 g) respectively. Price includes handling and normal postage and it is subject to change without notice. Please contact BCR.

References:

Community Bureau of Reference (BCR) (1992) BCR CRM 422. Trace element in cod muscle. Certificate of analysis. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium.

Community Bureau of Reference (BCR) (1994) Reference Materials. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 86 pp.

CRM 450

Natural Milk Powder

Community Bureau of Reference (Belgium)

Description:

No information available.

Certified concentrations (µg/kg dry weight unless noted):

Compound	Value	Uncertainty (±)
PCB 28	100	10
PCB 52	79	9
PCB 101	134	11
PCB 118	97	12
PCB 153	288	18
PCB 180	313	24

Order information:

These CRMs can be purchased for ECU150 per unit (23 g or 50 g). Price includes handling and normal postage within the European Union except when special handling is required. Price subject to change without notice. Please contact BCR.

Reference:

Community Bureau of Reference (BCR) (1994) Reference Materials. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 86 pp.

CRM 463 - 464

Total and Methylmercury in Tuna Fish

Community Bureau of Reference (Belgium)

Description:

No information available.

Certified concentrations (mg/kg dry weight):

RM 463			RM 463		
Compound	Value	Uncertainty (±)	Compound	Value	Uncertainty (±)
Total Hg	2.85	0.16	Total Hg	5.24	0.10
CH_3Hg^+	3.04	0.16	CH_3Hg^+	5.50	0.17

Order Information:

These CRMs can be purchased for ECU200 per unit (15 g). Price includes handling and normal postage within the European Union except when special handling is required. Price subject to change without notice. Please contact BCR.

Reference:

Community Bureau of Reference (BCR) (1995) Reference Materials. Addendum 1995. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 12 pp.

CTA-OTL-1

Oriental Tobacco Leaves

Polish Academy of Science and the Institute of Nuclear Chemistry and Technology (Poland)

Description:

Fresh oriental tobacco leaves grown in Bulgaria were collected by hand and dried at ambient temperature. This material was placed on plastic trays and dried for 72 hrs in a drying room. The dried material was then ground by hand using agate mortars and pestles, sieved to pass through an 80 µm sieve, and stored in nylon bags. Every effort was made to avoid contamination of the material with metals. The material was further homogenized by mixing for 16 hrs in a plastic drum rotated in three directions. Distribution of 50-g portions into wide-mouthed, air-tight polyethylene bottles was achieved using a specially constructed scoop. The material was sterilized by electron beam radiation (13 MeV) from linear accelerator LAEA-13. The recommende and information values were determined based on the results of a worldwide intercomparison exercise with 61 participants.

Recommended concentrations (µg/g dry weight unless noted):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
Li	23.0	1.8	Br	9.28	1.06
Mg	4470	210	Se	0.153	0.018
Al	1740	290	Rb	9.79	1.27
P	2892	134	Sr	201	20
S (mg/g)	7.32	0.81	Cd	1.12	0.12
K (mg/g)	15.6	0.5	Cs	0.177	0.022
Ca (mg/g)	31.7	1.2	Ba	84.2	11.5
V	3.08	0.42	La	1.44	0.16
Cr	2.59	0.32	Ce	2.69	0.30
Mn	412	14	Sm	0.229	0.052
Co	0.879	0.039	Eu	0.038	0.009
Ni	6.32	0.65	Tb	0.032	0.006
Cu	14.1	0.5	Pb	4.91	0.80
Zn	49.9	2.4	Th	0.348	0.054
As	0.539	0.060			

Information values (µg/g dry weight):

Element	Value	Element	Value
Na	345	Yb	0.13
Cl	298	Hf	0.18
Sc	0.38	Au	0.0018
Fe	989	Hg	0.043
Mo	0.28	U	0.10
Sb	0.075		

Order information:

CTA-OTL-1 can be purchased for US$140 per unit (50-g bottle) plus 10 - 15% for air mail costs. Please contact ICHTJ.

References:

Dybczyhski, R. (1980) Comparison of the effectiveness of various procedures for the rejection of outlying results and assigning consensus values in interlaboratory programs involving determination of trace elements or radionuclides. Anal. Chim. A., 117:53-70.

Dybczyhski, R., H. Polkowska-Motrenko, Z. Samczyhski, and Z. Szopa (1991) Two new Polish geological-environmental reference materials: apatite concentrate (CTA-AC-1) and fine fly ash (CTA-FFA-1). Geostand. Newsletter, 15(2):163-85.

Dybczyhski, R., H. Polkowska-Motrenko, Z. Samczyhski, and Z. Szopa (1993) New Polish certified reference materialsfor multielement inorganic trace analysis. Fresenius J. Anal. Chem., 345:99-103.

Instytut Chemii i Techniki Jadrowej (1995) Oriental tobacco leaves (CTA-OTL-1). Polish Certified Reference Material for multielement analysis. Description sheet. Instytut Chemii i Techniki Jadrowej, Department of Analytical Chemistry, 03-195 Warsawa, Poland.

DOLT-2

Dogfish Liver

National Research Council (Canada)

Description:

DOLT-2 contains dogfish (*Squalus acanthias*) liver containing 5% fat. The livers were cleaned and frozen for storage, thawed, homogenized and extracted with acetone to produce a partially defatted protein powder. This powder was screened through a 24 mesh nylon screen, mixed, bottled, and radiation sterilized. The predecessor CRM, DOLT-1, has been periodically analyzed for more than eight years and has been physically and chemically stable over time.

Certified concentrations (µg/g dry weight):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
Al	25.2	2.4	As	16.6	1.1
Cr	0.37	0.08	Se	6.06	0.49
Mn	6.88	0.56	Ag	0.608	0.032
Fe	1103	47	Cd	20.8	0.5
Co	0.24	0.05	Hg	1.99	0.10
Ni	0.20	0.02	Pb	0.22	0.02
Cu	25.8	1.1			
Zn	85.8	2.5	Methyl Hg	0.693	0.053

Information value (µg/g dry weight):

Sn	0.13

Order information:

DOLT-2 can be purchased for US$165 per unit (25 g). Price subject to change without notice. Please contact NRCC.

Reference:

National Research Council Canada (1995) DORM-2 and DOLT-2. Dogfish muscle and liver reference materials for trace metals. Description sheet. National Research Council Canada, Institute for Environmental Chemistry, Ottawa, Canada.

DORM-2

Dogfish Muscle

National Research Council (Canada)

Description:

DORM-2 contains dogfish (*Squalus acanthias*) muscle containing 5% fat. The muscle was frozen for storage, thawed, homogenized, dried and extracted with acetone to produce a partially defatted protein powder. This powder was screened through a 24 mesh nylon screen, mixed, bottled, and radiation sterilized. The predecessor CRM, DORM-1, has been periodically analyzed for more than eight years and has been physically and chemically stable over time.

Certified concentrations (µg/g dry weight unless noted):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
Al	10.9	1.7	As	18.0	1.1
Cr	34.7	5.5	Se	1.40	0.09
Mn	3.66	0.34	Ag	0.041	0.013
Fe	142	10	Cd	0.043	0.008
Co	0.182	0.031	Hg	4.64	0.26
Ni	19.4	3.1	Pb	0.065	0.007
Cu	2.34	0.16			
Zn	25.6	2.3	Methyl Hg	4.47	0.32

Information values (µg/g dry weight):

Sn	0.023
Tl	0.004

Order information:

DORM-2 can be purchased for US$165 per unit (30 g). Price subject to change without notice. Please contact NRCC.

Reference:

National Research Council Canada (1995) DORM-2 and DOLT-2. Dogfish muscle and liver reference materials for trace metals. Description sheet. National Research Council Canada, Institute for Environmental Chemistry, Ottawa, Canada.

GBW 08501

Peach Leaves

National Research Center for Certified Reference Materials (China)

Description:

No information available.

Certified concentrations (µg/g dry weight unless noted):

Element	Value	Element	Value	Element	Value
Mg (%)	0.47	Cu	10.4	Ba	18.4
K (%)	2.17	Zn	22.8	Hg	0.046
Mn	75.4	As	0.34	Pb	0.99
Fe	431	Sr	61.6		
Cr	0.94	Cd	0.018		

Noncertified concentrations (µg/g dry weight):

Element	Value
B	45.8
Co	0.25
Se	0.04

Order information:

This CRM is available in 5 g quantities. Price subject to change without notice. Please contact NRCCRM.

Reference:

National Research Center for CRMs (1995) Certified reference materials catalog. State Bureau of Technical Supervision, National Research Center for Certified Reference Materials, Office of Certified Reference Materials, Hepingjie, Chaoyangqu, Beijing, China. 147 pp.

GBW 08504

Cabbage

National Research Center for Certified Reference Materials (China)

Description:

No information available.

Certified concentrations (µg/g dry weight unless noted):

Element	Value	Element	Value	Element	Value
N (%)	2.8	Ca (%)	0.792	As	0.056
Na (%)	0.757	Mn	22.0	Se	0.083
Mg (%)	0.184	Fe	52.0	Sr	45.2
P (%)	0.34	Cu	3.00	Cd	0.029
K (%)	1.45	Zn	26.7	Pb	0.28

Noncertified concentrations (µg/g dry weight):

Element	Value
Pb	31.7

Order information:

This CRM is available in 5 g quantities. Price subject to change without notice. Please contact NRCCRM.

Reference:

National Research Center for CRMs (1995) Certified reference materials catalog. State Bureau of Technical Supervision, National Research Center for Certified Reference Materials, Office of Certified Reference Materials, Hepingjie, Chaoyangqu, Beijing, China. 147 pp.

GBW 08505

Tea

National Research Center for Certified Reference Materials (China)

Description:

No information available.

Certified concentrations (µg/g dry weight unless noted):

Element	Value	Element	Value	Element	Value
N (%)	4.88	Fe	373	Cd	0.032
Na	142	Ni	7.61	Sb	0.037
Mg (%)	0.224	Cu	16.2	Ba	15.7
P (%)	0.426	Zn	38.7	La	0.458
S (%)	0.315	As	0.191	Ce	0.686
K (%)	1.97	Se	0.041	Pb	1.06
Ca (%)	0.284	Rb	36.9	Th	0.105
Mn	766	Sr	10.8		

Noncertified concentrations (µg/g dry weight):

Element	Value	Element	Value	Element	Value
Sc	0.1	Cr	0.8	Sm	0.06
Ti	36	Br	2	Hg	0.004
Co	0.2	Cs	0.13		

Order information:

This CRM is available in 5 g quantities. Price subject to change without notice. Please contact NRCCRM.

Reference:

National Research Center for CRMs (1995) Certified reference materials catalog. State Bureau of Technical Supervision, National Research Center for Certified Reference Materials, Office of Certified Reference Materials, Hepingjie, Chaoyangqu, Beijing, China. 147 pp.

GBW 08506 - GBW 08507

Fluoride Composition in Corn

National Research Center for Certified Reference Materials (China)

Description:

No information available.

Certified F concentrations (μg/g dry weight):

GBW 08506	1.91
GBW 08507	33.7

Order information:

These CRMs are available in 5 g quantities. Price subject to change without notice. Please contact NRCCRM.

Reference:

National Research Center for CRMs (1995) Certified reference materials catalog. State Bureau of Technical Supervision, National Research Center for Certified Reference Materials, Office of Certified Reference Materials, Hepingjie, Chaoyangqu, Beijing, China. 147 pp.

GBW 08508

Mercury in Rice

National Research Center for Certified Reference Materials (China)

Description:

No information available.

Certified concentrations (μg/g dry weight):

Element	Value
Mn	28.4
Fe	43.2
Cu	3.6
Zn	18.0
Hg	0.038

Order information:

This CRM is available in 5 g quantities. Price subject to change without notice. Please contact NRCCRM.

Reference:

National Research Center for CRMs (1995) Certified reference materials catalog. State Bureau of Technical Supervision, National Research Center for Certified Reference Materials, Office of Certified Reference Materials, Hepingjie, Chaoyangqu, Beijing, China. 147 pp.

GBW 08509

Non Fat Milk Powder

National Research Center for Certified Reference Materials (China)

Description:

No information available.

Certified concentrations (µg/g dry weight unless noted):

Element	Value	Element	Value	Element	Value
N (%)	55.1	K (%)	18.6	Zn	46.8
Na (%)	5.26	Ca (%)	12.2	As	0.031
Mg (%)	1.30	Mn	0.28	Se	0.22
P (%)	10.7	Fe	5.18	Pb	0.034
Cl (%)	11.2	Cu	0.26		

Noncertified concentrations (µg/g dry weight):

Element	Value
S (%)	3.33
Br	15
Rb	18
Hg	0.0005

Order information:

This CRM is available in 5 g quantities. Price subject to change without notice. Please contact NRCCRM.

Reference:

National Research Center for CRMs (1995) Certified reference materials catalog. State Bureau of Technical Supervision, National Research Center for Certified Reference Materials, Office of Certified Reference Materials, Hepingjie, Chaoyangqu, Beijing, China. 147 pp.

GBW 08551

Pork Liver

National Research Center for Certified Reference Materials (China)

Description:

No information available.

Certified concentrations (µg/g dry weight unless noted):

Element	Value	Element	Value
N (%)	10.86	Cu	17.2
Na (%)	0.233	Zn	172
Mg	747	As	0.044
K (%)	1.15	Se	0.94
Ca	197	Mo	3.8
Mn	8.32	Cd	0.067
Fe (%)	0.105	Pb	0.54

Noncertified concentrations (µg/g dry weight):

Element	Value
P (%)	1.3
Co	0.100
Cr	0.20

Order information:

This CRM is available in 5 g quantities. Price subject to change without notice. Please contact NRCCRM.

Reference:

National Research Center for CRMs (1995) Certified reference materials catalog. State Bureau of Technical Supervision, National Research Center for Certified Reference Materials, Office of Certified Reference Materials, Hepingjie, Chaoyangqu, Beijing, China. 147 pp.

GBW 08552

Pork Muscle

National Research Center for Certified Reference Materials (China)

Description:

No information available.

Certified concentrations (µg/g dry weight unless noted):

Element	Value	Element	Value	Element	Value
N (%)	12.27	K (%)	1.40	Zn	94.2
Na (%)	0.202	Ca	147	Se	0.49
Mg	988	Mn	0.48	Br	6.2
P (%)	0.813	Fe	43.6		
Cl (%)	0.187	Cu	3.88		

Noncertified concentrations (µg/g dry weight):

Element	Value	Element	Value	Element	Value
Co	0.03	Mo	0.055	Hg	0.023
Cr	0.39	Cs	0.14	Pb	0.20
Sr	0.18	Ba	0.39		

Order Information:

This CRM is available in 5 g quantities. Price subject to change without notice. Please contact NRCCRM.

Reference:

National Research Center for CRMs (1995) Certified reference materials catalog. State Bureau of Technical Supervision, National Research Center for Certified Reference Materials, Office of Certified Reference Materials, Hepingjie, Chaoyangqu, Beijing, China. 147 pp.

GBW 08571

Mussel

National Research Center for Certified Reference Materials (China)

Description:

The mussels for this CRM were collected in the Dalian Sea, China. The tissues were ground in a glass and stainless steel mixer, lyophilised under vacuum, ground in a ball mill, sieved to pass a 80-mesh sieve, mixed and packaged in acid-washed bottles. The bottled tissue material was sterilized in situ using ^{60}Co radiation.

Certified concentrations (µg/g dry weight unless noted):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
Na (%)	0.582	0.014	Cu	7.7	0.9
Mg (%)	0.197	0.020	Zn	138	9
K (%)	0.424	0.424	As	6.1	1.1
Ca (%)	0.111	0.003	Se	3.65	0.17
Cr	0.57	0.08	Sr	12.8	1.1
Mn	10.2	1.8	Cd	4.5	4.5
Fe	221	14	Pb	1.96	0.09
Co	0.94	0.94	Hg	0.067	0.008
Ni	1.03	1.03			

Noncertified concentrations (µg/g dry weight unless noted):

Element	Value	Element	Value	Element	Value
Li	0.8	Br	90	Sm	0.02
B	7	Rb	2	Eu	0.08
Al	231	Mo	0.6	Hf	0.01
P (%)	1.35	Sb	6	Au	0.1
Sc	0.05	Ba	2	Th	0.06
Ti	10	La	0.2		
Cl (%)	0.9	Ce	0.3		

Order information:

This CRM can be purchased for US$100 per unit (12 g). Price subject to change without notice. Please contact NRCCRM.

References:

National Research Center for CRMs (1995) Certified reference materials catalog. State Bureau of Technical Supervision, National Research Center for Certified Reference Materials, Office of Certified Reference Materials, Hepingjie, Chaoyangqu, Beijing, China. 147 pp.

Second Institute of Oceanography (1989) Certificate of Certified Reference Material. Mussel. Second Institute of Oceanography, National Bureau of Oceanography, Hangzhou, China.

GBW 08572

Prawn

National Research Center for Certified Reference Materials (China)

Description:

This CRM is composed of tissues of mature prawns cultivated in Tanggu, Tianjin, China. After removing the inedible parts, the tissue was beaten to a pulp, lyophilised under vacuum, ground in a ball mill, sieved to pass a 100-mesh sieve, mixed and packaged in acid-washed bottles. The bottled tissue material was sterilized in situ using ^{60}Co radiation.

Certified concentrations (µg/g dry weight unless noted):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
N (%)	14.3	0.4	Fe	19.8	0.4
F	5.31	0.39	Cu	4.66	0.23
Na (%)	0.381	0.008	Zn	60.8	1.4
Mg (%)	0.160	0.003	As	1.42	0.06
P (%)	0.845	0.012	Se	1.52	0.04
Al (%)	0.131	0.004	Sr	40.6	3.4
K (%)	0.597	0.012	Cd	0.023	0.004
Ca (%)	0.304	0.006	Ba	4.29	0.72
Cr	0.24	0.06	Pb	0.298	0.019
Mn	1.96	0.13	Hg	0.201	0.004

Noncertified concentrations (µg/g dry weight unless noted):

Element	Value
S (%)	0.85
Ti	1.05
Co	0.29
Br	13.5

Order Information:

This CRM can be purchased for US$50 per unit (8 g). Price subject to change without notice. Please contact NRCCRM.

References:

Institute of Food Detection (1991) Certificate of Certified Reference Material. Prawn. Institute of Food Detection, Ministry of Commerce, Beijing, China.

National Research Center for CRMs (1995) Certified reference materials catalog. State Bureau of Technical Supervision, National Research Center for Certified Reference Materials, Office of Certified Reference Materials, Hepingjie, Chaoyangqu, Beijing, China. 147 pp.

IAEA-134

Cockle Flesh

International Atomic Energy Agency (Austria)

Description:

This sample is intended as a reference material for the measurements of manmade and natural radionuclides in environmental mantle samples. The cockle flesh sample was collected in 1991 by the Fisheries Laboratory of the Ministry of Agriculture, Fisheries and Food, Lowestoft, UK, at Flookburgh Sands, a location of the north coast of Morecambe Bay, Cumbria, England, about 25 miles southeast of the Sellafield discharges. The cockle flesh sample was cleaned, cooked and shelled. The frozen flesh was thawed, dried, ground and homogenized. Moisture content of the sample determined by drying several aliquots at 80°C to constant weight was found to be about 3.3%. The reference values given in the certificate were established on the basis of results submitted by 134 laboratories participating in the world-wide intercomparison exercise organized by the IAEA-MEL during 1992.

Recommended values (mBq/g dry weight):

Radionuclide	Activity	Confidence interval (α = O .05)			Radionuclide	Activity	Confidence interval (α = O .05)		
^{40}K	212	196	-	1240	^{137}Cs	49.8	48	-	50:6
^{60}Co	4.5	4.3	-	14.7	$^{239+240}Pu$	15	13.8	-	16.2

Information values (mBq/g dry weight):

Radionuclide	Activity	Confidence interval (α = O .05)			Radionuclide	Activity	Confidence interval (α = O .05)		
^{90}Sr	4.8	4.1	-	6	^{228}Th	3	2.6	-	3.4
^{106}Ru	11.7	10.2	-	14.1	^{230}Th	4	2	-	5.6
^{125}Sb	2.8	2.5	-	3 8	^{232}Th	1.7	0.8	-	3.0
^{134}Cs	1	0.16	-	5.9	^{234}U	3.7	2.5	-	5.1
^{154}Eu	1.25	1.1	-	1.4	^{235}U	0.49	0.16	-	4.9
^{155}Eu	1 .6	1.0	-	1.8	^{238}U	4	3.3	-	9
$^{210}Pb^{*}$	5.4	3.3	-	7	^{238}Pu	3.1	3	-	3.4
^{226}Ra	2.6	2.0	-	3.2	^{241}Am	38.15	35.0	-	39.4
^{228}Ra	3.8	2.6	-	4.7					

Order Information:

IAEA-134 can be purchased for US$110 per unit (75 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

Reference:

International Atomic Energy Agency (1993) Intercompanson of radionuclide measurements in marine cockle flesh sample IAEA-134. Report No. IAEA/AL/062. Marine Environment Laboratory, IAEA, Monaco.

IAEA-142

Organochlorine Compounds and Petroleum Hydrocarbons in Mussel Homogenate

International Atomic Energy Agency (Austria)

Description:

Approximately 80 kg of deep frozen mussel tissue from Ireland was bought from a local supplier. The mussel tissue was freeze dried, ground, sieved through a 250 µm stainless steel sieve, and homogenized. Aliquots of about 35 g were packed into glass bottles with aluminum screw caps and seales with teflon tape. Moisture content of the lyophilized sample was determined by drying to a constant weight at 105°C and was found to be about 5.8%.

Recommended concentrations (ng/g dry weight unless noted):

Compound	Value	Confidence range		
Organochlorine compounds				
4,4'-DDE	8.15	5.4	-	10.3
PCB 66	1.8	1.1	-	1.95
PCB 101	3.1	2.7	-	5.04
PCB 105	1.4	1.08	-	2.05
PCB 118	3	2.5	-	4.1
PCB 138	5.6	4.2	-	7.1
PCB 153	6.4	4.9	-	8.7
PCB 156	0.5	0.28	-	0.6
PCB 187	2.4	2.05	-	3.7

Compound	Value	Confidence range		
Petroleum hydrocarbons				
1-Methyl=phenanthrene	20	15.9	-	24
2-Methyl=naphthalene	23	20.1	-	29.3
Benzo[*a*]=anthracene	15	12.1	-	17
Benzo[*a*]pyrene	3.5	2.9	-	5
Benzo[*e*]pyrene	27	22	-	30
Benzo[*ghi*]=perylene	9.9	8.3	-	12.9
Biphenyl	7	4.8	-	5.2
Chrysene	32	20.9	-	45.9
Indeno[1,2,3-*cd*]=pyrene	6.5	5.5	-	7.9
Naphthalene	24	20.7	-	47.5
Perylene	7.3	6.1	-	9.3
Phenanthrene	60	41.3	-	82
Pyrene	57	38.8	-	80.9
Unresolved aliphatics (µg/g)	100	61.3	-	128
Total aromatics (µg/g)	42	26.9	-	47.5
Unresolved aromatics (µg/g)	27	24.9	-	37.7
n-C17	670	502	-	906

Information values (ng/g dry weight unless noted):

Organochlorine compounds

Compound	Value	Confidence range		
4,4'-DDD	4.3	2.8	-	5.8
4,4'-DDT	2	1	-	3.1
Aldrin	1.4	0.79	-	5.4
alpha-Endosulfan	0.96	0.05	-	1.4
alpha-HCH	0.43	0.21	-	0.65
Aroclor 1254	56	32.7	-	83
Aroclor 1260	36	12	-	69
Dieldrin	3.4	1.5	-	5
gamma-Endosulfan	0.29	0.22	-	0.59
gamma-HCH	0.97	0.5	-	1.5
HCB	0.48	0.32	-	0.7
Heptachlor epoxide	0.27	0.15	-	0.49
PCB 8	1	0.7	-	2.4
PCB 18	0.97	0.34	-	1.46
PCB 28	1.3	0.82	-	2.4
PCB 31	0.9	0.57	-	1.4
PCB 44	1.9	1.02	-	5.2
PCB 52	3	1.8	-	7.3
PCB 70	2.3	1.6	-	4.3
PCB 99	4.3	2.7	-	5.4
PCB 128	1.5	0.74	-	1.8
PCB 149	3.7	2.8	-	6.9
PCB 180	0.75	0.55	-	1.4

Petroleum hydrocarbons

Compound	Value	Confidence range		
1-Methyl-naphthalene	15	13	-	16.6
2-Methyl-phenanthrene	47	1905	-	75.4
2,6-Dimethyl-naphthalene	10	8.5	-	11
Acenaphthene	3.4	1.9	-	7.1
Acenaphthylene	1.9	1.4	-	2.7
Anthracene	4.3	1.8	-	6.4
Benzo[*b*]-fluoranthene	19	13.9	-	30
Benzo[*k*]-fluoranthene	9.7	6	-	12.5
Dibenzo[*a,h*]-anthracene	1.8	1.5	-	5
Fluoranthene	73	58.9	-	94
Fluorene	8.7	6.1	-	11.4
Phytane	120	50	-	182
Pristane	170	90	-	240
UVF Chrysene (µg/g)	5.4	4.6	-	5.8
UVF-ROPME (µg/g)	59	31.9	-	89.3
Oil (µg/g)	120	70.5	-	143
Aliphatics, unresolved (µg/g)	9.2	6.2	-	16
n-C18	195	100	-	446

Order Information:

IAEA-142 can be purchased for US$110 per unit (250 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

Reference:

International Atomic Energy Agency (1995) IAEA-142. Organochlorine compounds and petroleum hydrocarbons in mussel homogenate. Reference sheet. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria.

IAEA-152

Milk Powder

International Atomic Energy Agency (Austria)

Description:

Milk powder with elevated radioactivity was collected from a processing plant. Aliquots of 25 g were bottled and radiation sterilized using ^{60}Co irradiation.This material was affected by radioactivity from the Chernobyl Nuclear Power Plant accident.

Recommended values (mBq/g dry weight):

Radionuclide	Activity	Confidence interval
^{40}K	539	510 - 574
^{90}Sr	7.7	7.0 - 8.3
^{134}Cs	764	722 - 802
^{137}Cs	2159	2503 - 2209

Order Information:

IAEA-152 can be purchased for US$60 per unit (250 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

References:

Cooper, E. L., J. J. LaBrecque, R. Dekner, F. Reichel, R. Schelenz (1988) Intercomparison study IAEA-152 on the determination of elevated levels of fallout radionuclides in milk powder. IAEA/AL/009. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 32 pp.

International Atomic Energy Agency (1994) AQCS (Analytical Quality Control Services) Intercomparison runs reference materials 1994 - 1995. Catalog. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 100 pp.

IAEA-153

Milk Powder

International Atomic Energy Agency (Austria)

Description:

A 500-kg bulk sample of milk powder supplied in 25-kg sacks was collcted from a processing plant. These sacks were assumed to be homogeneous and the homogeneity tested using Br, K, Na, Mg, and Zn determinations. Aliquots of 50 g were bottled and then radiation sterilized using ^{60}Co irradiation.

Recommended values (mg/kg dry weight unless noted):

Element	Concentration	Confidence interval			Element	Concentration	Confidence interval		
Na (g/kg)	4.18	3.87	-	4.44	Fe	2.53	1.66	-	3.47
Mg (g/kg)	1.06	1.00	-	1.15	Zn	39.6	37.7	-	41.2
P (g/kg)	10.1	9.01	-	11.0	Br	12.3	11.0	-	13.6
K (g/kg)	17.6	16.5	-	18.8	Pb	14.0	12.3	-	16.1
Ca (g/kg)	12.9	12.5	-	13.2					

Order Information:

IAEA-153 can be purchased for US$60 per unit (50 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

References:

International Atomic Energy Agency (1994) AQCS (Analytical Quality Control Services) Intercomparison runs reference materials 1994 - 1995. Catalog. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 100 pp.

Strachnov, V. I., R. F. W. Schelenz, R. Dekner, E. Zeiller, and K. Burns (1989) Intercomparison study IAEA-153 on the determination of inorganic constituents in milk powder. IAEA/AL/010. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 105 pp.

IAEA-156

Clover

International Atomic Energy Agency (Austria)

Description:

Approximately 1000 kg of clover was collecred in during the summer harvest of 1986 from different farms in the same field in Austria. The air-dried bulk sample was milled to a grain size smaller than 0.3 mm and homogenized in an agricultural animal nutrition mixer. Aliquots of 250 g were bottled and the bottles were sterilized using ^{60}Co irradiation. This material was affected by radioactivity from the Chernobyl Nuclear Power Plant accident.

Recommended values (mBq/g dry weight):

Radionuclide	Activity	Confidence interval
^{40}K	657	637 - 676
^{90}Sr	14.8	13.4 - 16.3
^{134}Cs	132	126 - 138
^{137}Cs	264	254 - 274

Order Information:

IAEA-156 can be purchased for US$60 per unit (250 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

References:

International Atomic Energy Agency (1994) AQCS (Analytical Quality Control Services) Intercomparison runs reference materials 1994 - 1995. Catalog. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 100 pp.

Strachnov, V., V. Valkovic, and R. Dekner (1991) Intercomparison study IAEA-156 on the determination of radionuclides in clover. IAEA/AL/035. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 23 pp.

IAEA-307

Sea Plant

International Atomic Energy Agency (Austria)

Description:

The sea plant sample (*Posidonia oceanica*) was collected along the shore of the Principality of Monaco in October 1986. The plants were affected by radioactivity from the Chernobyl Nuclear Power Plant accident. The plants were washed with tap water, dried, ground, sieved and homogenized.

Recommended activities (mBq/g):

Radionuclide	Value	Range	Radionuclide	Value	Range
^{40}K	150	141 - 161	^{226}Ra	3.1	2.1 - 4.4
^{106}Ru	33.5	30.0 - 36.5	^{238}Pu	0.025	0.025 - 0.028
^{110m}Ag	5.1	4.8 - 5.5	$^{239+240}Pu$	0.72	0.72 - 0.79
^{134}Cs	1.6	1.5 - 1.9	^{241}Am	0.036	0.036 - 0.050
^{137}Cs	4.9	4.5 - 5.2			

Information only activities (from Reference Sheet, 1989) (mBq/g):

Radionuclide	Value	Range	Radionuclide	Value	Range
^{90}Sr	0.72	0.28 - 1.6	^{228}Th	3.2	1.5 - 4.2
^{210}Pb	58.5	40 - 91	^{238}U	14	2.5 - 21

Order Information:

IAEA-307 can be purchased for US$60 per unit (90 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

References:

International Atomic Energy Agency (1989) IAEA-307. Natural and artificial radionuclides in sea plant. Reference sheet. International Atomic Energy Agency, 19, av. des Castellans, MC-98000, Monaco.

International Atomic Energy Agency (1992) AQCS (Analytical Quality Control Services) Intercomparison Runs Reference Materials 1992. Catalog, 88 pp. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria.

IAEA-308

Mediterranean Seaweeds

International Atomic Energy Agency (Austria)

Description:

The mixture of seaweeds for IAEA-308 was collected along the shore of the Principality of Monaco in October 1986. The plants were affected by radioactivity from the Chernobyl Nuclear Power Plant accident. The material was roughly cleaned, air dried, ground, sieved and homogenized.

Recommended activities (mBq/g):

Radionuclide	Value	Range			Radionuclide	Value	Range		
^{40}K	1381	1320	-	1456	^{210}Pb	73	66	-	75
^{106}Ru	23	22	-	25	^{228}Th	2.5	2.2	-	3.6
^{110m}Ag	2.0	1.2	-	2.7	^{238}Pu	0.017	0.016	-	0.023
^{134}Cs	1.6	1.5	-	1.8	$^{239+240}Pu$	0.50	0.46	-	0.52
^{137}Cs	5.6	5.3	-	6.0	^{241}Am	0.17	0.16	-	0.25

Order Information:

IAEA-308 can be purchased for US$60 per unit (100 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

References:

International Atomic Energy Agency (1989) IAEA-308 mixture of seaweeds. Reference sheet. International Atomic Energy Agency, 19, av. des Castellans, MC-98000, Monaco.

International Atomic Energy Agency (1992) AQCS (Analytical Quality Control Services) Intercomparison Runs Reference Materials 1992. Catalog, 88 pp. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria.

IAEA-321

Milk Powder

International Atomic Energy Agency (Austria)

Description:

A single batch bulk sample of approximately 500 kg of milk powder with elevated levels of radionuclides was collected from a processing plant in Europe in 1987. Aliquots of 250 g were bottled and radiation sterilized using ^{60}Co irradiation.

Recommended values (mBq/g dry weight):

Radionuclide	Activity	Confidence interval
^{40}K	552	563 - 569
^{90}Sr	3.3	3.16 - 3.44
^{134}Cs	15.5	14.8 - 16.2
^{137}Cs	72.6	71.1 - 74.2

Order Information:

IAEA-153 can be purchased for US$60 per unit (50 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

References:

International Atomic Energy Agency (1994) AQCS (Analytical Quality Control Services) Intercomparison runs reference materials 1994 - 1995. Catalog. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 100 pp.

Strachnov, V., K. Burnw, and R. Dekner (1990) Intercomparison study IAEA-321 on the determination of radionuclides in milk powder. IAEA/AL/026. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 21 pp.

IAEA-336

Lichen

International Atomic Energy Agency (Austria)

Description:

This material is epiphytic lichen produced by LNETI, Sacavem, Portugal.

Recommended values (mg/kg dry weight unless noted):

Element	Value	Confidence interval	Element	Value	Confidence interval
Al	655	583 - 728	Zn	30.9	29.4 - 32.5
K (g/kg)	1.840	1.780 - 1.900	As	0.634	0.597 - 0.671
V	1.47	1.33 - 1.61	Se	0.218	0.195 - 0.240
Cr	1.04	0.94 - 1.14	Cd	0.115	0.105 - 0.126
Mn	63.1	59.9 - 66.4	Hg	0.197	0.174 - 0.219
Fe	441	418 - 454	Pb	4.95	4.70 - 5.20
Cu	3.67	3.26 - 4.07			

Order Information:

IAEA-336 can be purchased for US$110 per unit (25 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

References:

International Atomic Energy Agency (1993) Progress report no. 1. Intercomparison run in trace and minor elements in candidate lichen research material (IAEA-336) and AQCS cabbage material (IAEA-359). International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria.

International Atomic Energy Agency (1994) AQCS (Analytical Quality Control Services) Intercomparison runs reference materials 1994 - 1995. Catalog. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 100 pp.

IAEA-350

Tuna Homogenate

International Atomic Energy Agency (Austria)

Description:

Sixteen tuna, weighing between 17 and 19 kg each were collected from the northern Mediterranean Sea. The fillets were freeze dried under a vacuum of 0.1 Torr, ground, passed through a 250 µm sieve and further homogenized. The material was packaged in glass bottles with teflon-lined screw caps. Teflon tape was wound around the cap to minimize contact of the sample with the atmosphere. This material replaces MA-A-2/TM. It was prepared in cooperation with the Regional Seas Programme of UNEP.

Recommended concentrations (µg/g dry weight):

Element	Values	Range	Element	Values	Range
Cr	0.75	0.55 - 1.01	Se	5.51	4.40 - 5.95
Mn	0.60	0.52 - 0.74	Pb	2.50	2.41 - 3.40
Fe	72.1	66.7 - 77.3	Cd	0.032	0.018 - 0.050
Cu	2.83	2.55 - 3.10	Hg	4.10	3.31 - 4.42
Zn	17.4	16.6 - 18.5			

Information only concentrations (µg/g dry weight):

Element	Values	Range	Element	Values	Range
Ca	100	72 - 191	As	3.73	2.50 - 5.71
Co	0.056	0.032 - 0.229	Sb	0.020	0.003 - 0.080
Ni	0.46	0.32 - 1.13	Pb	0.48	0.20 - 0.86

Order Information:

IAEA-350 can be purchased for US$60 per unit (35 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

References:

International Atomic Energy Agency (1990) IAEA-350 Trace elements in tuna fish flesh. Reference sheet. International Atomic Energy Agency, 19, av. des Castellans, MC-98000, Monaco.

International Atomic Energy Agency (1994) AQCS (Analytical Quality Control Services) Intercomparison runs reference materials 1994 - 1995. Catalog. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 100 pp.

IAEA-351

Tuna Homogenate

International Atomic Energy Agency (Austria)

Description:

Sixteen tuna, weighing between 17 and 19 kg each were collected from the northern Mediterranean Sea. The fillets were freeze dried under a vacuum of 0.1 Torr, ground, passed through a 250 µm sieve and further homogenized. The material was packaged in glass bottles with teflon-lined screw caps. Teflon tape was wound around the cap to minimize contact of the sample with the atmosphere. This material was prepared in cooperation with the Regional Seas Programme of UNEP.

Recommended concentrations (ng/g dry weight):

Compound	Value	Range		Compound	Value	Range	
4,4'-DDD	25	12	- 38	Lindane	1.7	0.5	- 2.9
4,4'-DDE	140	77	- 203	PCB 101	21	15.4	- 26.6
4,4'-DDT	53	22	- 84	PCB 118	38	10	- 66
Aldrin	46	0	- 110	PCB 138	110	94	- 126
Aroclor 1254	720	170	- 1270	PCB 153	160	145	- 175
Aroclor 1260	550	230	- 870	PCB 180	88	69	- 107
HCB	0.45	0.11	- 0.79				

Order Information:

IAEA-351 can be purchased for US$60 per unit (35 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

References:

International Atomic Energy Agency (1990) IAEA-351 Chlorinated hydrocarbons in tuna homogenate. Reference sheet. International Atomic Energy Agency, 19, av. des Castellans, MC-98000, Monaco.

International Atomic Energy Agency (1994) AQCS (Analytical Quality Control Services) Intercomparison runs reference materials 1994 - 1995. Catalog. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 100 pp.

IAEA-352

Tuna Homogenate

International Atomic Energy Agency (Austria)

Description:

The tuna fish flesh was collected in the western Mediterranean Sea, near Sète, France, in April 1988. Approximately 60 kg was freeze dried, ground, passed through a 1 mm sieve and further homogenized. This material was prepared in cooperation with the Regional Seas Programme of UNEP.

Recommended activities (mBq/g):

Radionuclide	Value	Confidence interval		
^{40}K	3.91	3.79	-	405
^{137}Cs	2.7	2.5	-	2.8
^{210}Pb	0.6	0.36	-	1.0
^{210}Po	2.2	1.7	-	2.7

Information only activity (from Reference Sheet, 1990) (mBq/g):

Radionuclide	Value	Confidence interval		
^{90}Sr	0.2	0.17	-	0.5

Order Information:

IAEA-352 can be purchased for US$60 per unit (100 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

References:

International Atomic Energy Agency (1990) IAEA-352 tuna fish flesh. Reference sheet. International Atomic Energy Agency, 19, av. des Castellans, MC-98000, Monaco.

International Atomic Energy Agency (1992) AQCS (Analytical Quality Control Services) Intercomparison Runs Reference Materials 1992. Catalog, 88 pp. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria.

IAEA-373

Grass

International Atomic Energy Agency (Austria)

Description:

Approximately 140 kg of grass was collected in 1990 on the collective farm "Vladimirovskil", Polesskoe district, Kiev, in the Chernobyl region. The grass was air dried, milled to a grain size below 0.3 mm and packaged in sacks. The sacks contents were then homogenized at IAEA in a large mixer. Aliquots of 200 g were bottled and radiation sterilized using ^{60}Co irradiation. This material was affected by radioactivity from the Chernobyl Nuclear Power Plant accident and was a donation from the former USSR.

Recommended values (mBq/g dry weight):

Radionuclide	Activity	Confidence interval	
^{40}K	432	421	- 443
^{90}Sr	1320	1276	- 1363
^{134}Cs	1167	1143	- 1191
^{137}Cs	12.35	12.13	- 12.57

Order Information:

IAEA-373 can be purchased for US$60 per unit (200 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

References:

International Atomic Energy Agency (1994) AQCS (Analytical Quality Control Services) Intercomparison runs reference materials 1994 - 1995. Catalog. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 100 pp.

Strachnov, V., V. Valkovic, P. R. Danesi, R. Dekner, J. Larosa, and R. Zeisler (1993) Preliminary report. Intercomparison run IAEA-373: determination of radionuclides in grass. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 61 pp.

LGC7008 - LGC7010

Pure Pesticides

Laboratory of the Government Chemist (UK)

Description:

These CRMs are spiked matrices certified for their pesticide content.

Available CRMs:

CRM	Matrix	Unit	Pesticides
LGC7008	Corn oil	5 mL	4,4'-DDE (~0.2 µg/g) Chlorpyrifos-methyl (~2 µg/g) Dieldrin (~0.2 µg/g) gamma-HCH (~0.2 µg/g) Malathion (~2 µg/g) Pirimiphos-methyl (~2 µg/g) Propetamphos (~2 µg/g)
LGC7009	Oat bran	10 g	4,4'-DDE (~0.1 µg/g) Chlorpyrifos-methyl (~1 µg/g) gamma-HCH (~0.1 µg/g) Malathion (~1 µg/g) Pirimiphos-methyl (~1 µg/g) Propetamphos (~1 µg/g)
LGC7010	Lemon juice	30 mL	2-Phenylphenol (~5 µg/g) Biphenyl (~5 µg/g) Thiabendazole (~5 µg/g)

Order information:

These CRMs can be purchased for £55 per unit. Price subject to change without notice. Please contact LGC.

Reference:

Laboratory of the Government Chemist (1995) Certified Reference Materials. Office of Reference Materials, Laboratory of the Government Chemist, Queen's Road, Teddington, Middlesex TW11 0LY, England.

LUTS-1

Non Defatted Lobster Hepatopancreas

National Research Council (Canada)

Description:

Freshly frozen "edible grade" lobster tomalley was thawed, homogenized by comminution, and an antioxidant added. The water content was increased and the slurry processed through a high pressure homogenizer. The material was bottled, heat sealed and sterilized. LUTS-1 contains 55% lipids by weight. A more complete description of the material can be found in Berman and Sturgeon (1988).

Certified concentrations (µg/g unless noted):

Element	As Bottled Value	As Bottled Uncertainty (±)	Dry Weight Value	Dry Weight Uncertainty (±)
Mg	89.5	4.1	601	28
K	948	72	6360	480
Ca	203	33	1360	220
Cr	0.079	0.012	0.53	0.08
Mn	1.20	0.13	8.02	0.86
Fe	11.6	0.9	77.8	6.0
Co	0.051	0.006	0.34	0.04
Ni	0.200	0.034	1.34	0.23
Cu	15.9	1.2	107	8
Zn	12.4	0.8	82.9	5.4
As	2.83	0.13	19.0	0.9
Se	0.641	0.054	4.30	0.36
Sr	2.46	0.28	16.5	1.9
Ag	0.580	0.049	3.89	0.33
Cd	2.12	0.15	14.2	1.0
Hg	0.0167	0.0022	0.112	0.015
Pb	0.010	0.002	0.069	0.011
Methyl Hg (as Hg)	0.0094	0.0006	0.063	0.004

Order information:

LUTS-1 can be purchased for US$165 per unit (6 10-g vials). Price subject to change without notice. Please contact NRCC.

References:

Berman, S. S., and R. E. Sturgeon (1988) A new approach to the preparation of biological reference materials for trace metals. Fresenius Z. Anal. Chem., 332(6):546-8.

National Research Council Canada (1994) LUTS-1. Non defatted lobster hepatopancreas reference material for trace metals. Description sheet. National Research Council Canada, Institute for Environmental Chemistry, Ottawa, Canada.

MA-A-1/OC

Copepod Homogenate

International Atomic Energy Agency (Austria)

Description:

MA-A-1/OC is composed of homogenized copepods *(Calanus cristatus)* collected in the Norwegian Sea. The material was freeze dried under a vacuum of 0.1 Torr. The lyophilized material was ground, sieved to pass through a 250 µm sieve and homogenized. This material was packaged in glass bottles with aluminum screw caps. Teflon tape was wound around the seal to minimize contact with the outside atmosphere.

Recommended concentrations (ng/g dry weight):

Compound	Value	Range		
4,4'-DDD	5.5	0	-	11
4,4'-DDE	6.1	1.5	-	17.1
4,4'-DDT	8.3	3.4	-	13.2
Aldrin	14	0	-	33
alpha-HCH	10	1.6	-	18.4
Aroclor 1242	120	67	-	173
Aroclor 1254	140	70	-	210
gamma-HCH	8.2	1.9	-	14.5

Order Information:

MA-A-1/OC can be purchased for US$110 per unit (30 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

References:

International Atomic Energy Agency (1990) MA-A-1/OC, copepod homogenate for chlorinated hydrocarbons. Reference sheet. International Atomic Energy Agency, 19, av. des Castellans, MC-98000, Monaco.

International Atomic Energy Agency (1994) AQCS (Analytical Quality Control Services) Intercomparison runs reference materials 1994 - 1995. Catalog. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 100 pp.

MA-A-3/OC

Shrimp Homogenate

International Atomic Energy Agency (Austria)

Description:

Deep-frozen shrimps (*Penaeus duorarum*) imported from Senegal were collected from a local supplier. The abdomen of each animal was separated from the cephalothorax which was discarded. The cuticle was then removed and only the muscle retained. The soft tissues were frozen and lyophilized. This material was then ground and sieved, to pass through a 150-µm sieve, and homogenized. The material was packaged in glass bottles with aluminum screw caps.

Recommended concentrations (ng/g dry weight):

Compound	Value	Range			Compound	Value	Range		
Aldrin	0.7	0.2	-	1.2	4,4'-DDD	0.81	0.05	-	1.57
Aroclor 1254	33	0	-	67	4,4'-DDE	4.7	1.3	-	8.1
HCB	0.32	0.20	-	0.44	4,4'-DDT	3.2	0	-	6.7
gamma-HCH	3.2	0	-	6.7					

Order Information:

MA-A-3/OC can be purchased for US$60 per unit (35 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

References:

International Atomic Energy Agency (1990) MA-A-3/OC. Chlorinated hydrocarbons in fish homogenate. Reference sheet. International Atomic Energy Agency, 19, av. des Castellans, MC-98000, Monaco.

International Atomic Energy Agency (1994) AQCS (Analytical Quality Control Services) Intercomparison runs reference materials 1994 - 1995. Catalog. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 100 pp.

MA-B-3/OC

Lyophilised Fish Tissue

International Atomic Energy Agency (Austria)

Description:

Garpike fish (*Belone belone*) were collected in the Baltic Sea and filleted. The fillets were frozen and lyophilized. This material was ground and sieved using a 300-µm screen. The fine material was homogenized and packaged in glass bottles with aluminum screw caps. Teflon tape was wound around the cap to minimize contact of the sample with the atmosphere.

Recommended concentrations (ng/g dry weight):

Compound	Values	Range	Compound	Values	Range
Aldrin	1.8	0.1 - 3.5	alpha-HCH	10	0 - 24
Aroclor 1254	400	170 - 630	gamma-HCH	3.4	0 - 7.2
Aroclor 1260	390	140 - 640	4,4'-DDD	46	13 - 59
HCB	1.5	0.9 - 2.1	4,4'-DDE	160	50 - 270
PCB 101	61	27 - 94	4,4'-DDT	65	16 - 114
PCB 153	120	86 - 154			

Order Information:

MA-B-3/OC can be purchased for US$110 per unit (35 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

References:

International Atomic Energy Agency (1990) MA-B-3/OC, chlorinated hydrocarbons in shrimp homogenate. Reference sheet. International Atomic Energy Agency, 19, av. des Castellans, MC-98000, Monaco.

International Atomic Energy Agency (1994) AQCS (Analytical Quality Control Services) Intercomparison runs reference materials 1994 - 1995. Catalog. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 100 pp.

MA-B-3/RN

Lyophilised Fish Tissue

International Atomic Energy Agency (Austria)

Description:

No information available.

Recommended activities (mBq/g):

Radionuclide	Activity	Range		
^{40}K	272	252	-	299
^{137}Cs	14.2	13.7	-	15.3

Order Information:

MA-B-3/RN can be purchased for US$60 per unit (50 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

Reference:

International Atomic Energy Agency (1994) AQCS (Analytical Quality Control Services) Intercomparison runs reference materials 1994 - 1995. Catalog. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 100 pp.

MUS-1

Mussel Tissue for Domoic Acid

National Research Council (Canada)

Description:

MUS-1 is a shelf-stable slurry of mussel (*Mytilus edulis*) tissue containing domoic acid. Batches of contaminated and cleaned pre-cooked mussel tissues were blended to obtain a target level of domoic acid. After addition of an antioxidant (0.02 % ethoxyquin) and adjustment of the moisture content to 87 %, the homogenate was bottled in 15 mL polyethylene containers. The bottles were heat sealed, thermally sterilized and packed in trilaminate pouches.

Certified concentration (µg/g):

100

Order information:

MUS-1 can be purchased for US$400 per unit (4 15-g vials). Price subject to change without notice. Please contact NRCC.

Reference:

National Research Council Canada (1992) MUS-1. Mussel tissue reference material for domoic acid. Description sheet. National Research Council Canada, Institute for Marine Biosciences, Halifax, Nova Scotia, Canada.

MUS-2

Mussel Tissue Reference Material for Diarrhetic Shellfish Poisoning Toxins

National Research Council (Canada)

Description:

MUS-2 is a shelf-stable slurry of mussel (*Mytilus edulis*) digestive gland tissue and *Prorocentrum lima*. The material contains okadaic acid and dinophysistoxin-1 (DTX-1), toxins responsible for diarrhetic shellfish poisoning. Batches of contaminated and cleaned pre-cooked mussel tissues were blended to obtain a target level of domoic acid. After addition of an antioxidant (0.02% ethoxyquin) and adjustment of the moisture content to 87%, the homogenate was bottled in 15 mL polyethylene containers. The bottles were heat sealed, thermally sterilized and packed in trilaminate pouches. In conjunction with the development of MUS-2, NRC has also developed precise methods for the determination of DSP toxins in shellfish tissue.

Certified concentration (µg/g):

Okadaic acid	11
DTX-1	1

Order information:

MUS-2 can be purchased for US$280 per unit (4 4-g bottles). Price subject to change without notice. Please contact NRCC.

Reference:

National Research Council Canada (1992) MUS-2. Mussel tissue reference material for diarrhetic shellfish poisoning toxins. Description sheet. National Research Council Canada, Institute for Marine Biosciences, Halifax, Nova Scotia, Canada.

NIES 3

Chlorella

National Institute for Environmental Studies (Japan)

Description:

Chlorella (*Chlorella pyrenoidosa*) is a typical green algae which is widely distributed in lakes, rivers, and ponds. The material was prepared from spray dried chlorella obtained from a commercial source. The chlorella powder was blended and bottled.

Certified values (µg/g unless noted):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
Fe (%)	0.185	0.010	Co	0.87	0.05
K (%)	1.24	0.06	Cu	3.5	0.3
Ca (%)	0.49	0.03	Zn	20.5	1.0
Mg (%)	0.33	0.02	Sr	40	3
Mn	69	5			

Reference values (µg/g unless noted):

Element	Value
P (%)	1.7
Sc	0.013
Cd	0.026
Pb	0.60

Order information:

NIES 3 (36-g bottles) is available free of charge. Please contact Dr. Jun Yoshinaga at NIES.

Reference:

National Institute for Environmental Studies (1982) NIES certified material, Chlorella. Information sheet. National Institute for Environmental Studies, Yatabe-machi,Tsukuba, Ibaraki, 305, Japan.

NIES 11

Fish Tissue

National Institute for Environmental Studies (Japan)

Description:

This material was prepared from fish fillets of sea bass (*Leteolabrax japonicus*, Cuvier). The fish used were 50-60 cm in length and were collected in Tokyo Bay, Japan. The fish tissue was homogenized, freeze dried and blended. This material was packaged in polyethylene laminate bags with an oxygen absorber and stored at -20°C.

Certified values (μg/g):

Component	Value	Uncertainty (±)
Total Sn	2.4	0.1
Tributyl Sn	1.3	0.1

Reference value (μg/g):

Component	Value
Triphenyl Sn	6.3

Order information:

NIES 11 is available free of charge. Please contact Dr. Jun Yoshinaga at NIES.

Reference:

National Institute for Environmental Studies (1990) NIES certified material No. 11 "Fish Tissue." Information sheet. National Institute for Environmental Studies, Yatabe-machi,Tsukuba, Ibaraki, 305, Japan.

RM 532 - 534

PCDDs and PCDFs in Milk Powders

Community Bureau of Reference (Belgium)

Description:

These RMs are unspiked and spiked milk powder. They consist of 65 g of spray dried powder.

Noncertified concentrations (ng/kg):

RM 532 Unspiked Milk Powder		RM 533 Spiked Milk Powder (lower level)		RM 534 Spiked Milk Powder (hiher level)	
Compound	Value	Compound	Value	Compound	Value
2,3,7,8-TCDD	0.10	2,3,7,8-TCDD	0.42	2,3,7,8-TCDD	0.65
1,2,3,7,8-PCDD	0.29	1,2,3,7,8-PCDD	0.86	1,2,3,7,8-PCDD	1.44
1,2,3,4,7,8-HCDD	0.17	1,2,3,4,7,8-HCDD	0.56	1,2,3,4,7,8-HCDD	0.80
1,2,3,6,7,8-HCDD	0.43	1,2,3,6,7,8-HCDD	1.27	1,2,3,6,7,8-HCDD	1.92
1,2,3,7,8,9-HCDD	0.16	1,2,3,7,8,9-HCDD	0.47	1,2,3,7,8,9-HCDD	0.80
2,3,7,8-TCDF	0.16	2,3,7,8-TCDF	0.39	2,3,7,8-TCDF	0.15
1,2,3,7,8-PCDF	0.1	1,2,3,7,8-PCDF	0.1	1,2,3,7,8-PCDF	3.16
2,3,4,7,8-PCDF	0.67	2,3,4,7,8-PCDF	1.96	2,3,4,7,8-PCDF	1.75
1,2,3,4,7,8-HCDF	0.34	1,2,3,4,7,8-HCDF	1.06	1,2,3,4,7,8-HCDF	1.55
1,2,3,6,7,8-HCDF	0.34	1,2,3,6,7,8-HCDF	1.03	1,2,3,6,7,8-HCDF	1.03
2,3,4,6,7,8-HCDF	0.39	2,3,4,6,7,8-HCDF	1.22	2,3,4,6,7,8-HCDF	1.90

Order information:

These RMs can be purchased for ECU150 per unit (65 g). Price includes handling and normal postage within the European Union except when special handling is required. Price subject to change without notice. Please contact BCR.

Reference:

Community Bureau of Reference (BCR) (1995) Reference Materials. Addendum 1995. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 12 pp.

RM 8412

Corn (Zea Mays) Stalk

Agriculture and Agri-Food (Canada)

Description:

RM 8412 is intended for use in evaluating analytical methods and instruments used for the determination of major, minor and trace constituent elements in plant tissues, plant derived food, feeds, and other similar food, and in agricultural and biological materials. RM 8412 was prepared and characterized by the Centre for Land and Biological Resources Research, Agriculture and Agri-Food Canada and is distributed by NIST. Corn plants were manually harvested in the fall 1981 and manually separated into the component leaves, stalks, and ears. Stalks were washed free of any adhering solids, coarse chopped, dried for at least 24 hr at 80°C in an air oven, and ground in a hammer mill. The resulting fine powder was sieved through nylon and teflon monofilament sieve cloths supported in polyethylene holders, with material passing 210 µm (about minus 70 mesh) collected for the RM. This fraction was blended in a V-type feed blender, packaged in glass bottles with linerless white polypropylene caps and sterilized with ^{60}Co gamma radiation to 2.0 megarads.

Best estimate concentrations (µg/g dry weight unless noted):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
Na	28	8	Fe	139	15
Mg (%)	0.160	0.007	Cu	8	1
Cl (%)	0.244	0.014	Zn	32	3
K (%)	1.735	0.047	Se	0.016	0.008
Ca (%)	0.216	0.008	Sr	12	2
Mn	15	2			

Information concentrations (µg/g dry weight):

Element	Value
N	6970
F	0.65

Order information:

A unit of RM 8412 contains 2 25-g of powder in glass bottles and can be purchased for US$495 per unit. Price subject to change without notice. Please contact NIST.

Reference:

National Institute of Standards and Technology (1994) RM 8412. Corn (Zea mays) stalk. Certificate of analysis. National Institute of Standards and Technology, Gaithersburg, MD, USA.

RM 8413

Corn (Zea Mays) Kernel

Agriculture and Agri-Food (Canada)

Description:

RM 8413 is intended for use in evaluating analytical methods and instruments used for the determination of major, minor and trace constituent elements in plant tissues, plant derived food, feeds, and other similar food, and in agricultural and biological materials. RM 8412 was prepared and characterized by the Centre for Land and Biological Resources Research, Agriculture and Agri-Food Canada and is distributed by NIST. Corn plants were manually harvested in the fall 1981 and manually separated into the component leaves, stalks, and ears. Mature ears were selected, husks and silks removed, and kernels on the cobs were dried at 38°C to facilitate machine separation of kernels from cobs. Additional moisture was removed from the kernels by freeze drying. The kernels were then ground with dry ice in a large hammer mill with additional grinding in a Wiley mill. The resulting fine powder was sieved through nylon and teflon monofilament sieve cloths supported in polyethylene holders, with material passing 210 µm (about minus 70 mesh) collected for the RM. This fraction was blended in a V-type feed blender, packaged in glass bottles with linerless white polypropylene caps and sterilized with ^{60}Co gamma radiation to 2.0 megarads.

Best estimate concentrations (µg/g dry weight unless noted):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
Mg (%)	0.0990	0.0082	Fe	23	5
K (%)	0.357	0.037	Cu	3.0	0.6
Ca	42	5	Zn	15.7	1.4
Mn	4.0	0.3	Se	0.004	0.002

Information concentrations (µg/g dry weight):

Element	Value
N	13750
F	0.24
Al	4
Cl	450

Order information:

A unit of RM 8413 contains 2 25-g of powder in glass bottles and can be purchased for US$495 per unit. Price subject to change without notice. Please contact NIST.

Reference:

National Institute of Standards and Technology (1994) RM 8413. Corn (Zea mays) kernel. Certificate of analysis. National Institute of Standards and Technology, Gaithersburg, MD, USA.

RM 8414

Bovine Muscle Powder

Agriculture and Agri-Food (Canada)

Description:

RM 8414 is intended for use in evaluating analytical methods and instruments used for the determination of major, minor and trace constituent elements in meat, meat products and other similar food, and in agricultural and biological materials. RM 8414 was prepared and characterized by the Centre for Land and Biological Resources Research, Agriculture and Agri-Food Canada and is distributed by NIST. The source of RM 8414 was boneless hip, commonly denoted in Canda grade A round steak, consisting of the major muscles (semimembranosus, biceps femoris and adductor) from market weight beef cattle (*Bos taurus*). The meat was trimmed of all visible fat and connective tissues and the resulting lean muscle tissue frozen in a stainless steel comminuting machine with a 1-mm stainless stell screen. The finely milled product was freeze dried and the dry bulk powder sterilized with ^{60}Co radiation to 2.0 megarads. Additional reduction of particle size was affected by ball-milling with Teflon-TFE balls in a 1-L monofilament sieve cloths supported by high density white polyethylene holders. Pairs of sieves with openings of approximately 250 µm/50µm or 250 µm/90 µm were used to yield the suitable narrow middle cuts constituting the reference material. This fraction was blended in a polymethylmethacrylate V-configuration blender and packaged into clean 150-mL brim capacity, clear glass bottles with pulp/Sarab-lined black polypropylene screw caps. Units of RM 8414 are hermetically sealed in aluminum-nylon pouches to enhance long term stability. Chemical analyses to establish recommended concentrations were conducted in an interlaboratory cooperative characterization campaign involving more than 70 laboratories worldwide. Details of the preparation and characterization of RM 8414 can be found in Ihnat (1994a and 1994b), Ihnat *et al.* (1994), and Ihnat and Wolynetz (1994).

Best estimate concentrations (µg/g dry weight unless noted):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
B	0.6	0.4	Ni	0.05	0.04
N (%)	13.75	0.32	Cu	2.84	0.45
Na (%)	0.210	0.008	Zn	142	14
Mg	960	95	As	0.009	0.003
Al	1.7	1.4	Se	0.076	0.010
P (%)	0.836	0.045	Br	1.1	0.5
S (%)	0.795	0.041	Pb	28.7	3.5
Cl (%)	0.188	0.015	Sr	0.052	0.015
K (%)	1.517	0.037	Mo	0.08	0.06
Ca	145	20	Cd	0.013	0.011
Cr	0.071	0.038	I	0.035	0.011
Mn	0.37	0.09	Hg	0.005	0.003
Fe	71.2	9.2	Pb	0.38	0.24
Co	0.007	0.003			

Information concentrations (µg/g dry weight):

Element	Value
F	0.22
V	0.005
Sb	0.01
Cs	0.05
Ba	0.05

Order Information:

A unit of RM 8414 contains 2 25-g of powder in glass bottles and can be purchased for US$495 per unit. Price subject to change without notice. Please contact NIST.

References:

Ihnat, M. (1994a) Characterization (certification) of bovine muscle powder (NIST RM 8414), whole egg powder (NIST RM 8415) and whole milk powder (NIST RM 8435) reference materials for essential and toxic major, minor and trace element constituents. Fresenius J. Anal. Chem., 348:459-67.

Ihant, M. (1994b) Development of a new series of agricultural/food reference materials for analytical quality control of elemental determinations. J. AOAC Internatl., 77(6):1605-27.

Ihnat, M., R. W. Dabeka, and M. S. Wolynetz (1994) Preparation and homogeneity characterization of ten agricultural/food reference materials for elemental composition. Fresenius J. Anal. Chem., 348:445-51.

Ihnat, M., and M. S. Wolynetz (1994) An interlaboratory characterization (certification) campaign to establish the elemental composition of a new series of agricultural/food reference materials. Fresenius J. Anal. Chem., 348:452-8.

National Institute of Standards and Technology (1994) RM 8414. Bovine muscle powder. Certificate of analysis. National Institute of Standards and Technology, Gaithersburg, MD, USA.

RM 8415

Whole Egg Powder

Agriculture and Agri-Food (Canada)

Description:

RM 8415 is intended for use in evaluating analytical methods and instruments used for the determination of major, minor and trace constituent elements in egg, egg products and other similar food, and in agricultural and biological materials. RM 8415 was prepared and characterized by the Centre for Land and Biological Resources Research, Agriculture and Agri-Food Canada and is distributed by NIST. The source of RM 8415 was Canada grade A dried whole egg powder, containing color and maximum @% Zeolex (sodium silico-aluminate anti-caking ingredient) obtained from Surrey, Canada. The dried bulk powder was sterilized with ^{60}Co radiation to 2.0 megarads. Material sieving was through nylon monofilament sieve cloths supported in high density white polyethylene holders. Pairs of sieves with openings of approximately 250 µm/50 µm were used to yield the suitable narrow middle cuts constituting the reference material. This fraction was blended in a polymethylmethacrylate V-configuration blender and packaged into clean 150-mL brim capacity, clear glass bottles with triseal (polyethylene)-lined white polypropylene screw caps. Units of RM 8415 are hermetically sealed in aluminum-nylon pouches to enhance long term stability. Chemical analyses to establish recommended concentrations were conducted in an interlaboratory cooperative characterization campaign involving more than 70 laboratories worldwide. Details of the preparation and characterization of RM 8414 can be found in Ihnat (1994a and 1994b), Ihnat *et al.* (1994), and Ihnat and Wolynetz (1994).

Best estimate concentrations (µg/g dry weight unless noted):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
B	0.41	0.26	Mn	1.78	0.38
N (%)	6.30	0.17	Fe	112	16
Na (%)	0.377	0.034	Co	0.012	0.005
Mg	305	27	Cu	2.70	0.35
Al	540	86	Zn	67.5	7.6
P (%)	1.001	0.032	Se	1.39	0.17
S (%)	0.512	0.050	Sr	5.63	0.46
Cl (%)	0.508	0.032	Mo	0.247	0.023
K (%)	0.319	0.037	I	1.97	0.46
Ca (%)	0.248	0.019	Hg	0.004	0.003
V	0.459	0.081	Pb	0.061	0.012
Cr	0.37	0.18			

Information concentrations (µg/g dry weight):

Element	Value
As	0.01
Cd	0.005
Sb	0.002
Ba	3

Order information:

A unit of RM 8415 contains 2 25-g of powder in glass bottles and can be purchased for US$495 per unit. Price subject to change without notice. Please contact NIST.

References:

Ihnat, M. (1994a) Characterization (certification) of bovine muscle powder (NIST RM 8414), whole egg powder (NIST RM 8415) and whole milk powder (NIST RM 8435) reference materials for essential and toxic major, minor and trace element constituents. Fresenius J. Anal. Chem., 348:459-67.

Ihant, M. (1994b) Development of a new series of agricultural/food reference materials for analytical quality control of elemental determinations. J. AOAC Internatl., 77(6):1605-27.

Ihnat, M., and M. S. Wolynetz (1994) An interlaboratory characterization (certification) campaign to establish the elemental composition of a new series of agricultural/food reference materials. Fresenius J. Anal. Chem., 348:452-8.

Ihnat, M., R. W. Dabeka, and M. S. Wolynetz (1994) Preparation and homogeneity characterization of ten agricultural/food reference materials for elemental composition. Fresenius J. Anal. Chem., 348:445-51.

National Institute of Standards and Technology (1994) RM 8415. Whole egg powder. Certificate of analysis. National Institute of Standards and Technology, Gaithersburg, MD, USA.

RM 8433

Corn Bran

Agriculture and Agri-Food (Canada)

Description:

RM 8433 is intended for use in evaluating analytical methods and instruments used for the determination of major, minor and trace constituent elements in corn, corn products, other similar food, agricultural, and biological materials. RM 8433 was prepared and characterized by the Centre for Land and Biological Resources Research, Agriculture and Agri-Food Canada and is distributed by NIST. The source material for RM 8433 was refined corn bran from Illinois, USA. The dry bulk powder was sterilized with ^{60}Co gamma radiation to 2.0 megarads. Material sieving was through nylon monofilament sieve cloths supported in high density white polyethylene holders. Pairs of sieves with openings of approximately 200 µm/90 µm were used to yield a suitable narrow middle cut constituting the RM. This fraction was blended in a polymethylmethacrylate V-configuration blender and packaged into clean 150-mL brim capacity clear glass bottles with triseal (polyethylene)-lined white polypropylene screw caps. Details of the preparation and characterization of RM 8433 can be found in Ihnat (1994a and 1994b), Ihnat *et al.* (1994), and Ihnat and Wolynetz (1994).

Best estimate concentrations (µg/g dry weight unless noted):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
B	2.8	1.2	Ni	0.158	0.054
N (%)	0.884	0.036	Cu	2.47	0.40
Na	430	31	Zn	18.6	2.2
Mg	818	59	As	0.002	0.002
Al	1.01	0.55	Se	0.045	0.008
P	171	11	Br	2.3	0.5
S	860	150	Rb	0.5	0.3
Cl	31	21	Sr	4.62	0.56
K	566	75	Mo	0.252	0.039
Ca	420	38	Cd	0.012	0.005
V	0.005	0.002	I	0.026	0.006
Cr	0.101	0.087	Ba	2.40	0.52
Mn	2.55	0.29	Hg	0.003	0.001
Fe	14.8	1.8	Pb	0.140	0.034
Co	0.006	0.006			

Information concentrations (µg/g dry weight):

Element	Value
Sb	0.004

Order information:

A unit of RM 8433 contains 50-g of powder in a glass bottle and can be purchased for US$495 per unit. Price subject to change without notice. Please contact NIST.

References:

Ihnat, M. (1994a) Characterization (certification) of Corn Bran (NIST SRM 8433), Corn Starch (NIST SRM 8432) and Microcrystalline Cellulose (NIST SRM 8416) reference materials for essential and toxic major, minor and trace element constituents. Fresenius J. Anal. Chem., 348:474-8.

Ihant, M. (1994b) Development of a new series of agricultural/food reference materials for analytical quality control of elemental determinations. J. AOAC Internatl., 77(6):1605-27.

Ihnat, M., and M. S. Wolynetz (1994) An interlaboratory characterization (certification) campaign to establish the elemental composition of a new series of agricultural/food reference materials. Fresenius J. Anal. Chem., 348:452-8.

Ihnat, M., R. W. Dabeka, and M. S. Wolynetz (1994) Preparation and homogeneity characterization of ten agricultural/food reference materials for elemental composition. Fresenius J. Anal. Chem., 348:445-51.

National Institute of Standards and Technology (1993) RM 8433. Corn bran. Certificate of analysis. National Institute of Standards and Technology, Gaithersburg, MD, USA.

RM 8435

Whole Milk Powder

Agriculture and Agri-Food (Canada)

Description:

RM 8435 is intended for use in evaluating analytical methods and instruments used for the determination of major, minor and trace constituent elements in milk, dairy products, other similar food, agricultural, and biological materials. RM 8435 was prepared and characterized by the Centre for Land and Biological Resources Research, Agriculture and Agri-Food Canada and is distributed by NIST. The source material for RM 8435 was spray processed whole milk powder obtained from Quebec, Canada. The dry bulk powder was sterilized with ^{60}Co gamma radiation to 2.0 megarads. Material sieving was through nylon monofilament sieve cloths supported in high density white polyethylene holders. Pairs of sieves with openings of approximately 250 µm/90 µm were used to yield a suitable narrow middle cut constituting the RM. This fraction was blended in a polymethylmethacrylate V-configuration blender and packaged into clean 150-mL brim capacity clear glass bottles with triseal (polyethylene)-lined white polypropylene screw caps. Details of the preparation and characterization of RM 8416 can be found in Ihnat (1994a and 1994b), Ihnat *et al.* (1994), and Ihnat and Wolynetz (1994).

Best estimate concentrations (µg/g dry weight unless noted):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
B	1.1	0.8	Fe	1.8	1.1
N (%)	4.182	0.053	Cu	0.46	0.08
Na (%)	0.356	0.040	Zn	28.0	3.1
Mg	814	76	Se	0.131	0.014
Al	0.9	0.9	Br	20	10
P (%)	0.780	0.049	Sr	4.35	0.50
S (%)	0.265	0.035	Mo	0.29	0.13
Cl (%)	0.842	0.044	I	2.3	0.4
K (%)	1.363	0.047	Ba	0.58	0.23
Ca (%)	0.922	0.049	Pb	0.11	0.05
Mn	0.17	0.05			

Information concentrations (µg/g dry weight):

Element	Value
F	0.17
Ti	4
Cr	0.5
Co	0.003
Ni	0.01
As	0.001
Rb	16
Cd	0.0002
W	0.002

Order Information:

A unit of RM 8435 contains 50-g of powder in a glass bottles and can be purchased for US$495 per unit. Price subject to change without notice. Please contact NIST.

References:

Ihnat, M. (1994a) Characterization (certification) of Corn Bran (NIST SRM 8433), Corn Starch (NIST SRM 8432) and Microcrystalline Cellulose (NIST SRM 8416) reference materials for essential and toxic major, minor and trace element constituents. Fresenius J. Anal. Chem., 348:474-8.

Ihant, M. (1994b) Development of a new series of agricultural/food reference materials for analytical quality control of elemental determinations. J. AOAC Internatl., 77(6):1605-27.

Ihnat, M., and M. S. Wolynetz (1994) An interlaboratory characterization (certification) campaign to establish the elemental composition of a new series of agricultural/food reference materials. Fresenius J. Anal. Chem., 348:452-8.

Ihnat, M., R. W. Dabeka, and M. S. Wolynetz (1994) Preparation and homogeneity characterization of ten agricultural/food reference materials for elemental composition. Fresenius J. Anal. Chem., 348:445-51.

National Institute of Standards and Technology (1994) RM 8435. Whole milk powder. Certificate of analysis. National Institute of Standards and Technology, Gaithersburg, MD, USA.

SRM 955a

Lead in Blood

National Institute of Standards and Technology (USA)

Description:

SRM 955a is intended primarily for use in calibrating instrumentation and evaluating analytical methods for Pb in blood. Blood was collected from two cows that had been fed gelatin capsules containing lead nitrate. The blood was blended to produce four pools with different Pb contents. The pools were treated with 1.5 mg/mL tripotassium EDTA and dispensed into polyethylene vials. The vials were shipped frozen to NIST. This SRM could be used in studies of marine mammals.

Certified Pb concentrations (µmol/L):

SRM vial	Value	Uncertainty (±)
955a-1	0.242	0.004
955a-2	0.653	0.006
955a-3	1.478	0.015
955a-4	2.627	0.018

Order information:

SRM 955a can be purchased for US$309 per unit (4 2-mL vials). Price subject to change without notice. Please contact NIST.

Reference:

National Institute of Standards and Technology (1994) SRM 955a. Lead in blood. Certificate of analysis. National Institute of Standards and Technology, Gaithersburg, MD, USA.

SRM 1515

Apple Leaves

National Institute of Standards and Technology (USA)

Description:

Mid-shoot leaves were collected from orchards adjacent to theFruit Research Laboratory at Biglerville, PA, USA, and from orchards at the Horticultural Research Farm at Rock Spring, PA, USA. Approximately equal amounts of leaves from Golden Delicious and Rome apple varieties were used. Fungicide and insecticide sprays were controlled to minimize heavy metal contamination. The leaves were dipped into a non-ionic detergent solution, rinsed in distilled water, dried at 60°C, and ground to pass a 425 µm screen in s stainless steel mill. The ground leaves were jet milled and air classified to a particle size of approximately 75 µm. After mixing in a large blender, the leaves were sterilized using ^{60}Co radiation and bottled.

Certified concentrations (µg/g unless noted):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
B	27	2	Ni	0.91	0.12
N (%)	2.25	0.19	Cu	5.64	0.24
Na	24.4	1.2	Zn	12.5	0.3
Mg (%)	0.271	0.008	As	0.038	0.007
Al	286	9	Se	0.050	0.009
P (%)	0.159	0.011	Pb	10.2	1.5
Cl	579	23	Sr	25	2
K (%)	1.61	0.02	Mo	0.094	0.013
Ca (%)	1.526	0.015	Cd	0.013	0.002
V	0.26	0.03	Ba	49	2
Mn	54	3	Hg	0.044	0.004
Fe	83	5	Pb	0.470	0.024

Noncertified concentrations (µg/g unless noted):

Element	Value	Element	Value
N (%) (Kjeldahl)	2.31	Nd	17
S (%)	0.18	Eu	0.2
Sc	0.03	Sm	3
Co	0.09	Gd	3
Cr	0.3	Yb	0.3
Br	1.8	Tb	0.4
Sn	< 0.2	W	0.007
Sb	0.013	Au	0.001
I	0.3	Th	0.03
La	20	U	0.006
Ce	3		

Order information:

SRM 1515 can be purchased for US$207 (50 g). Price subject to change without notice. Please contact NIST.

Reference:

National Institute of Standards and Technology (1993) SRM 1515. Apple leaves. Certificate of analysis. National Institute of Standards and Technology, Gaithersburg, MD, USA.

SRM 1547

Peach Leaves

National Institute of Standards and Technology (USA)

Description:

The plant material for SRM 1547 is representative of healthy Georgia peach trees, variety "Coronet", picked from a field in Peach County, Georgia, USA, approximately 150 mi south of Athens, Georgia. Fungicide and insecticide sprays were controlled to minimize heavy metal contamination. The leaves were dried and ground to pass through a 1 mm screen. The ground leaves were jet milled and air classified to a particle size of approximately 75 µm (200 mesh). After mixing, the leaves were irradiated with ^{60}Co radiation to a minimum absorbed dose of 27.8 kGy for microbiological control and then bottled.

Certified concentrations (µg/g dry weight unless noted):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
B	29	2	Cu	3.7	0.4
Na	24	2	Zn	17.9	0.4
Mg (%)	0.432	0.008	As	0.060	0.018
Al	249	8	Se	0.120	0.009
P (%)	0.137	0.007	Pb	19.7	1.2
Cl	360	19	Sr	53	4
K (%)	2.43	0.03	Mo	0.060	0.008
Ca (%)	1.56	0.02	Cd	0.026	0.003
V	0.37	0.03	Ba	124	4
Mn	98	3	Hg	0.031	0.007
Fe	218	14	Pb	0.87	0.03
Ni	0.69	0.09			

Noncertified concentrations (µg/g dry weight unless noted):

Element	Value	Element	Value	Element	Value
N (%)	2.96	Sb	0.02	Gd	1
S (%)	0.2	I	0.3	Tb	0.1
Sc	0.04	La	9	Yb	0.2
Cr	1	Ce	10	Th	0.05
Co	0.07	Nd	7	U	0.015
Br	11	Sm	1		
Sn	< 0.2	Eu	0.17		

Order information:

SRM 1547 can be purchased for US$207 (50 g). Price subject to change without notice. Please contact NIST.

Reference:

National Institute of Standards and Technology (1992) SRM 1547. Peach leaves. Certificate of analysis. National Institute of Standards and Technology, Gaithersburg, MD, USA.

SRM 1566a

Oyster Tissue

National Institute of Standards and Technology (USA)

Description:

Oysters were obtained from a commercial source. The oysters had been shucked, frozen, and packaged in sealed plastic bags. The oyster material was ground, freeze-dried, and powdered. At NIST, the material was jet-milled to pass a 355 µm screen, radiation sterilized and bottled.

Certified concentrations (µg/g dry weight unless noted):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
Na (%)	0.417	0.013	Ni	2.25	0.44
Mg (%)	0.118	0.017	Cu	66.3	4.3
Al	202.5	12.5	Zn	830	57
P (%)	0.623	0.018	As	14.0	1.2
S (%)	0.862	0.019	Se	2.21	0.24
Cl (%)	0.829	0.014	Sr	11.1	1.0
K (%)	0.790	0.047	Ag	1.68	0.15
Ca (%)	0.196	0.019	Cd	4.15	0.38
V	4.68	0.15	I	4.46	0.42
Cr	1.43	0.46	Hg	0.0642	0.0067
Mn	12.3	1.5	Pb	0.371	0.014
Fe	539	15	U	0.132	0.012
Co	0.57	0.11			

Noncertified concentrations (µg/g dry weight unless noted):

Element	Value	Element	Value
N (%)	6.81	Ce	0.4
F	240	Sm	0.06
Sc	0.06	Eu	0.01
Rb	3	Tb	0.007
Sn	3	Hf	0.04
Sb	0.01	Ta	0.003
Cs	0.02	Au	0.01
La	0.3	Th	0.04

Order information:

SRM 1566a can be purchased for US$315 (25 g). Price subject to change without notice. Please contact NIST.

Reference:

National Institute of Standards and Technology (1989) SRM 1566a, oyster tissue. Certificate of analysis, National Institute of Standards and Technology, Gaithersburg, MD, USA.

SRM 1575

Pine Needles

National Institute of Standards and Technology (USA)

Description:

The plant material for this SRM was collected at Maistee State Park, approximately 65 km north of Muskegon, MI, USA. The material was air dried, and ground in a comminuting machine. After grinding, the material was dried at 85°C, mixed, packaged in polyethylene-lined fiber drums, and sterilized using ^{60}Co radiation. The material was then resieved and the portion that passed through a polypropylene sieve having openings of 0.25 mm was used for the SRM.

Certified concentrations (µg/g unless noted):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
Al	545	30	As	0.21	0.04
P (%)	0.12	0.02	Pb	11.7	0.1
K (%)	0.37	0.02	Sr	4.8	0.2
Ca (%)	0.41	0.02	Hg	0.15	0.05
Cr	2.6	0.2	Pb	10.8	0.5
Mn	675	15	Th	0.037	0.003
Fe	200	10	U	0.020	0.004
Cu	3.0	0.3			

Noncertified concentrations (µg/g unless noted):

Element	Value	Element	Value
N (%)	1.2	Sb	0.2
Sc	0.03	La	0.2
Co	0.1	Ce	0.4
Ni	3.5	Eu	0.006
Br	9	Tl	0.05
Cd	< 0.5		

Order information:

SRM 1575 can be purchased for US$165 (70 g). Price subject to change without notice. Please contact NIST.

Reference:

National Institute of Standards and Technology (1993) SRM 1575. Pine needles. Certificate of analysis. National Institute of Standards and Technology, Gaithersburg, MD, USA.

SRM 1570a

Trace Elements in Spinach Leaves

National Institute of Standards and Technology (USA)

Description:

Grade Z chopped frozen spinach from Oregon, USA, was used to prepare this SRM. The spinach was thawed, mixed, blended, and freeze dried. The freeze dried material was ground and sieved through a polypropylene sieve having openings of 0.25 mm. The sieved material was jet milled and air classified to a particule size of approximately 75 µm. After further mixing, the spinach was irradiated with ^{60}Co radiation to a monimum absorbed dose of approximately 27.8 kGy for microbiological control and then bottled. This SRM is intended primarily for use in evaluating the reliability of analytical methods for the determination of major, minor, and trace elements in botanical materials, agricultural food products, and materials of similar matrix.

Certified concentrations (mg/kg unless noted):

Element	Value	Uncertainty	Element	Value	Uncertainty
B	37.6	1.0	Ni	2.14	0.10
N (%)	5.90	0.25	Cu	12.2	0.6
Na (%)	1.818	0.041	Zn	82	3
Al	310	11	As	0.068	0.012
P (%)	0.518	0.011	Se	0.117	0.009
K (%)	2.903	0.052	Sr	55.6	0.8
Ca (%)	1.527	0.041	Cd	2.89	0.07
V	0.57	0.03	Hg	0.030	0.003
Mn	75.9	1.9	Th	0.048	0.003
Co	0.39	0.05			

Noncertified concentrations (mg/kg unless noted):

Element	Value	Element	Value
N (%)	5.74	Rb	13
Mg (%)	0.89	Eu	0.0054
S (%)	0.46	Pb	0.20
Ca Sc	0.055	U	0.15

Order information:

SRM 1570a can be purchased for US$257 (60 g). Price subject to change without notice. Please contact NIST.

Reference:

National Institute of Standards and Technology (1994) SRM 1970a. Trace elements in spinach leaves. Certificate of analysis. National Institute of Standards and Technology, Gaithersburg, MD, USA.

SRM 1577b

Bovine Liver

National Institute of Standards and Technology (USA)

Description:

Although this SRM is not of marine origin, it is one of the "classic" standards that has been used for many years and is included here for reference purposes. The livers for this SRM were obtained in Portland, Oregon, USA. The gross fat, major blood vessels, and "skin" were removed and the liver ground. This ground material was mixed, transferred to polyethylene-lined trays, and lyophilized. After lyophilization, the liver was powdered, packed in moisture-proof bags, and transported to the National Bureau of Standards.

Certified concentrations (µg/g dry weight unless noted):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
Na (%)	0.2423	0.006	Cu	160	8
Mg	601	28	Zn	127	16
P (%)	1.10	0.03	Se	0.73	0.06
S (%)	0.785	0.006	Rb	13.7	1.1
Cl (%)	0.278	0.006	Sr	0.136	0.001
K (%)	0.994	0.002	Mo	3.5	0.3
Ca	116	4	Ag	0.039	0.007
Mn	10.5	1.7	Cd	0.50	0.03
Fe	184	15	Pb	0.129	0.004

Noncertified concentrations (µg/g dry weight unless noted):

Element	Value	Element	Value
N (%)	10.6	As	0.05
Al	3	Br	9.7
V	0.123	Sb	0.003
Co	0.25	Hg	0.003

Order information:

SRM 1577b can be purchased for US$186 (50 g). Price subject to change without notice. Please contact NIST.

Reference:

National Institute of Standards and Technology (1991) SRM 1577b. Bovine liver. Certificate of analysis, National Institute of Standards and Technology, Gaithersburg, MD, USA.

SRM 1598

Inorganic Constituents in Bovine Serum

National Institute of Standards and Technology (USA)

Description:

SRM 1598 is intended primarily for use in calibrating instrumentation and evaluating analytical methods for selected elements in blood serum, plasma and similar body fluids. Blood was collected from four dairy cows, centrifuged and the separated serum was combined, mixed, bottled in acid-cleaned polypropylene vials and freeze dried. Further details of the preparation can be found in Veillon *et al.* (1985). This SRM could be used in studies of marine mammals.

Certified concentrations (ng/g unless noted):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
Al	3.7	0.9	Cu (µg/g)	0.72	0.04
Mg (µg/g)	20	0.4	Zn (µg/g)	0.89	0.06
K (µg/g)	196	5	Se	42.4	3.5
Cr	0.14	0.08	Rb (µg/g)	0.17	0.02
Mn	3.78	0.32	Mo	11.5	1.1
Fe (µg/g)	2.55	0.10	Cd	0.089	0.016
Co	1.24	0.18			

Noncertified concentrations (ng/g unless noted):

Element	Value	Element	Value
Na (mg/g)	3	Cs	0.1
Ca (mg/g)	0.09	Hg	0.2
V	0.06	Tl	0.4
Ni	0.7	Pb	0.6
As	0.2		

Order information:

SRM 1598 can be purchased for US$301 per unit (2 5-mL ampoules). Price subject to change without notice. Please contact NIST.

References:

National Institute of Standards and Technology (1990) SRM 1598. Inorganic constituents in bovine serum. Certificate of analysis. National Institute of Standards and Technology, Gaithersburg, MD, USA.

Veillon, C., S. A. Lewis, K. Y. Patterson, W. R. Wolf, J. M. Harnly, J. Versieck, L. Vanballenberghe, R. Cornelius, and T. C. O'Haver (1985) Characterization of a bovine serum reference material for major, minor and trace elements. Anal. Chem., 57:2106-9.

SRM 1945

Organics in Whale Blubber

National Institute of Standards and Technology (USA)

Description:

This SRM is a frozen whale blubber homogenate intended for use in evaluating analytical methods for the determination of selected PCN congeners and chlorinated pesticides. Whale blubber was collected from an adult female pilot whale which stranded on Cape Cod, MA, USA in 1991. The blubber tissue was frozen, cryogenically pulverized, homogenized, bottled and stored at -80°C.

Certified concentrations (µg/kg wet weight):

Compound	Value	Uncertainty (±)	Compound	Value	Uncertainty (±)
PCB 18	4.48	0.88	2,4'-DDD	18.1	2.8
PCB 44	12.2	1.4	2,4'-DDE	12.28	0.87
PCB 49	20.8	2.8	2,4'-DDT	106	14
PCB 52	43.6	2.5	4,4'-DDD	133	10
PCB 66	23.6	1.6	4,4'-DDE	445	37
PCB 87	16.7	1.4	4,4'-DDT	245	15
PCB 95	33.8	1.7	alpha-HCH	16.2	3.4
PCB 99	45.4	5.4	*cis*-Chlordane	46.9	2.8
PCB 101/90	65.2	5.6	*cis*-Nonachlor	48.7	7.6
PCB 105	30.1	2.3	gamma-HCH	3.30	0.81
PCB 110	23.3	4.0	Heptachlor epoxide	10.8	1.3
PCB 118	74.6	5.1	Hexachlorobenzene	32.9	1.7
PCB 128	23.7	1.7	Mirex	28.9	2.8
PCB 138/163/164	131.5	7.4	Oxychlordane	19.8	1.9
PCB 151	28.7	5.2	*trans*-Nonachlor	231	11
PCB 153	213	19			
PCB 156	10.3	1.1			
PCB 170/190	140.6	2.6			
PCB 180	106.7	5.3			
PCB 183	36.6	4.1			
PCB 187	105.1	9.1			
PCB 194	39.6	2.5			
PCB 195	17.7	4.3			
PCB 201	16.96	0.89			
PCB 206	31.1	2.7			
PCB 209	10.6	1.1			

Noncertified concentrations (μg/kg wet weight):

Compound	Value	Uncertainty (±)
PCB 28	14.1	1.4
PCB 31	3.12	0.69
Dieldrin	37.5	3.9
beta-HCH	8.0	1.4

Order information:

SRM 1945 can be purchased for US$213 per unit (2 15-g). Price subject to change without notice. Please contact NIST.

Reference:

National Institute of Standards and Technology (1994) SRM 1945. Organics in whale blubber. Certificate of analysis. National Institute of Standards and Technology, Gaithersburg, MD, USA.

SRM 1974

Organics in Mussel Tissue (*Mytilus edulis*)

National Institute of Standards and Technology (USA)

Description:

SRM 1974 is intended primarily for use in validating analytical methods for the determination of selected PAHs in marine bivalve tissue or materials of similar matrix. Development of this SRM was partially funded by the NOAA National Status and Trends Program. Complete preparation and analysis information can be found in the Certificate of Analysis (NIST, 1991) and in Wise *et al.* (1991).

The mussels (*Mytilus edulis*) used for the preparation of this SRM were collected on December 1, 1987 from Dorchester Bar within Boston Harbor, MA (42° 18.25' N, 71° 02.31' W). Approximately 2400 individual mussels were collected by hand at low tide. The samples were transported to the Battelle New England Laboratory (Duxbury, MA) where the mussels were rinsed in a tank supplied with pumped sea water. Rocks and other debris were removed. The samples were placed in insulated, Teflon-lined wooden containers, frozen ant transported to NIST on dry ice. The samples were transferred to Teflon bags and stored in a liquid nitrogen vapor freezer (-120°C) until shucked. The mussel tissue was removed from the shell using the following procedure. The mussels were allowed to warm up to about 0°C. The tissue was removed from the shell using a titanium knife, placed in Teflon bags, and immediately returned to a liquid nitrogen freezer. The frozen mussel tissue was pulverized using a cryogenic procedure. After mixing, the mussel tissue homogenate were aliquoted into pre-cooled glass bottles. The bottles of SRM 1974 have been stored at -80°C since preparation.

Certified concentrations

PAHs (ng/g dry weight):

Compound	Value	Uncertainty (±)	Compound	Value	Uncertainty (±)
Anthracene	6.1	1.7	Fluoranthene	272	47
Benzo[*b*]fluoranthene	52.3	9.4	Pyrene	276	30
Benzo[*ghi*]perylene	20.0	2.3	Perylene	8.5	2.4
Benzo[*a*]pyrene	18.6	3.8	Phenanthrene	45	11
Indeno[1,2,3-*cd*]=pyrene	14.6	2.7			

SRM 1974 (cont.)

Noncertified concentrations:

PAHs (ng/g dry weight):

Compound	Value	Uncertainty (±)
1-Methylnaphthalene	9	2
1-Methylphenanthrene	19	5
1,3-, 2,10-, 3,9-, and 3,10-Dimethylphenanthrenes	91	17
1,6- and 2,9-Dimethylphenanthrene	47	11
1,7-Dimethylphenanthrene	42	9
2,6-Dimethylphenanthrene	37	7
2,7-Dimethylphenanthrene	35	9
2- and 9-Ethylphenanthrenes and 3,6-dimethylphenanthrene	34	8
2-Methylnaphthalene	17	4
9-Methyl- and 4-methylphenanthrene	22	5
Benzo[*a*]fluoranthene	4.1	1.2
Benzo[*e*]pyrene	81	6
Benzo[*j*]fluoranthene and benzo[k]fluoranthene	35	6
Benzo[*k*]fluoranthene	24	1
Benz[*a*]anthracene	37	3
Chrysene/triphenylene	124	11
Dibenz[*a,h*]anthracene	2.8	0.1
Fluorene	12	2
Indeno[1,2,3-*cd*]fluoranthene	3.9	0.6

PCBs (ng/g dry weight):

Compound	Value	Uncertainty (±)	Compound	Value	Uncertainty (±)
PCB 18	24	9	PCB 128	15	2
PCB 28	62	3	PCB 138, PCB 163,		
PCB 44	65	23	PCB 164	110	11
PCB 52	98	39	PCB 153	145	8
PCB 66	110	5	PCB 180	13	1
PCB 101, PCB 90	105	11	PCB 187, PCB 182	30	1
PCB 105	45	3			
PCB 118	110	5			

PCBs are listed according to Ballschmitter and Zell (1980). The major PCB congener is listed first, the others listed are minor components.

Chlorinated Pesticides (ng/g dry weight)

Compound	Value	Uncertainty (±)	Compound	Value	Uncertainty (±)
2,4'-DDD	20	7	4,4'-DDT	3	2
2,4'-DDE	5.8	0.6	*cis*-Chlordane	26	1
2,4'-DDT	4	1	Dieldrin	8	4
4,4'-DDD	68	3	*trans*-Nonachlor	21	5
4,4'-DDE	48	2			

SRM 1974 (cont.)

Element (µg/g dry weight except where noted)

Compound	Value	Uncertainty	Compound	Value	Uncertainty
Na (%)	3.29	0.09	Rb	5.67	0.16
Mg (%)	0.48	0.03	Sr	60	14
Al	503	46	Mo	2.0	0.5
Cl (%)	6.04	0.17	Ag	0.854	0.021
K (%)	1.10	0.33	Cd	1.4	0.4
Sc	0.085	0.009	Sb	0.0262	0.0002
V	1.55	0.29	Cs	0.040	0.003
Cr	2.61	0.21	La	0.35	0.08
Mn	10.2	1.2	Ce	0.53	0.13
Co	0.38	0.01	Sm	0.064	0.014
Fe	500	27	Eu	0.012	0.002
Ni	1.00	0.08	Hf	0.05	0.03
Cu	9.2	1.9	Ta	0.018	0.003
Zn	91.6	3.8	Au	0.0476	0.0010
As	9.72	0.35	Hg	0.194	0.014
Se	2.00	0.06	Pb	9.7	0.6
Br	373	18	Th	0.07	0.02

Order information:

No price information available as of this writing. Please contact NIST.

References:

Ballschmitter, K., and M. Zell (1980) Analysis of polychlorinated biphenyls (PCB) by glass capillary gas chromatography - composition of technical Aroclor - and Clophen-PCB mixtures. Fresenius Z. Anal. Chem., 302:20-31.

National Institute of Standards and Technology (1991) Certificate of analysis, SRM 1974, Organics in mussel tissue (*Mytilus edulis*). National Institute of Standards and Technology, Gaithersburg, MD.

Wise, S. A., B. A. Benner, R. G. Christensen, B. J. Koster, J. Kurz, M. M. Schantz, and R. Zeisler (1991) Preparation and analysis of a frozen mussel tissue reference material for the determination of trace organic constituents. Env. Sci. Technol. 25(10):1695-1704.

TORT-2

Lobster Hepatopancreas

National Research Council (Canada)

Description:

Freshly frozen "edible grade" *Homarus americanus* lobster tomalley from Prince Edward Island, Canada, was homogenized, and spray-dried. The material was acetone extracted to remove the oil, vacuum-dried, blended, screened through a 0.058" mesh nylon screen, reblended, bottled, and radiation-sterilized.

Certified concentrations (µg/g dry weight):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
V	1.64	0.19	Se	5.63	0.67
Cr	0.77	0.15	Sr	45.2	1.9
Mn	13.6	1.2	Mo	0.95	0.10
Fe	105	13	Cd	26.7	0.6
Co	0.51	0.09	Hg	0.27	0.06
Ni	2.50	0.19	Pb	0.35	0.13
Cu	106	10			
Zn	180	6	Methyl Hg	0.152	0.013
As	21.6	1.8			

Information value (µg/g dry weight):

Sn	0.04

Order information:

TORT-2 can be purchased for US$165 per unit (35 g). Price subject to change without notice. Please contact NRCC.

Reference:

National Research Council Canada (1995) TORT-2. Lobster hepatopancreas marine reference material for trace metals. Description sheet. National Research Council Canada, Institute for Environmental Chemistry, Ottawa, Canada.

TY-1 - TY-4

Essential and Toxic Elements in Yeast

Nuclear Research Institute Řež plc (Czech Republic)

Description:

The TY-SET is composed of four plastic bottles, 25 g of yeast material (*Torulopsis ethanolitolerans*) in each. The materials were prepared by mixing chromium-free and chromium-rich (about 250 mg/kg) thermolysed dried yeast biomass in appropriate ratios to give four batches with increasing Cr-content. The yeast material was then resuspended in distilled water, stirred for 6 - 8 hours to be homogeneous and dried by injecting the suspension under continuous stirring into a spray-drying oven. The precleaned plastic bottles were used for packing the dry (moisture content 2.96 -3.82 %) yeast material and the sealed bottles were sterilized by gamma radiation with a dose of about 25 kGy. According to the tests of homogeneity the materials can be considered to be homogeneous for weights above 100 mg. The contents of Cr and 21 other essential and/or toxic elements were certified in an international network of 39 experienced analytical laboratories using various analytical methods. The certification criteria are as follows.

1. For a given concentration range the relative confidence limit of the overall mean (at a significance level of 0.05) does not exceed the following limits: > 100 mg/kg, ± 8 %; 10 - 100 mg/kg, ± 16 %; 0.1 -10 mg./kg, ± 24 %; and < 0.1 mg/kg, ± 32 %.
2. The overall mean is based on data obtained by at least two different methods.
3. The overall standard deviation is less than (a) 2.5 times or (b) 3.5 times, the average standard deviation of the accepted laboratory means.
4. The relative number of laboratory means rejected as outliers does not exceed: (a) 20 %, (b) 50 % and (c) 0%.
5. The overall mean is calculated on the basis of at least the following number of laboratory means: (a) 8, (b) 5, and (c) 3.

On the basis of these criteria, three classes of certification are defined:

A: When criteria 1, 2, 3(a), 4(a) and 5(a) are fulfilled.
B: When criteria 1, 2, 3(b), 4(a) and 5(b), or 1, 2, 4(a) and 5(a) are fulfilled.
C: Information value only. When at least criteria 4(c) and 5(c), or 4(b) and 5(b) are fulfilled and the confidence interval is reasonable for a given concentration level.

TY (cont.)

Concentrations (mg/kg dry weight unless noted):

Element	Mean	Confidence limit (±)	Cert. class
TY-1			
Na (g/kg)	0.745	0.055	A
Mg (g/kg)	3.20	0.17	B
Al	20.3	6.8	C
P (g/kg)	21.4	2.1	B
Cl	0.43	0.13	C
K (g/kg)	19.6	0.6	A
Ca	1.01	0.12	C
Cr	0.301	0.048	C
Mn	2.68	0.25	A
Fe	300	19	A
Co	0.115	0.023	A
Ni	0.93	0.20	A
Cu	65.7	1.8	A
Zn	383	12	A
As	0.103	0.023	B
Sb	0.137	0.012	B
Se	0.03	0.04	C
Br	0.85	0.07	C
Rb	4.91	0.37	A
Cd	0.264	0.037	B
Hg	0.063	0.008	B
Pb	0.26	0.10	C
TY-2			
Na (g/kg)	1.14	0.07	A
Mg (g/kg)	2.86	0.22	B
Al	19.4	6.7	C
P (g/kg)	19.5	1.6	B
Cl	0.56	0.24	C
K (g/kg)	19.1	0.5	A
Ca	1.84	0.24	C
Cr	32.0	1.6	A
Mn	3.47	0.11	B
Fe	240	11	A
Co	0.170	0.022	A
Ni	0.90	0.19	A
Cu	61.0	1.9	A
Zn	328	7	A
As	0.090	0.051	C
Sb	0.124	0.025	B
Se	0. 05	0. 05	C
Br	0.82	0.05	C
Rb	5.82	0.50	A
Cd	0.212	0.050	A
Hg	0.050	0.006	A
Pb	0.19	0.04	C
TY-3			
Na (g/kg)	1.72	0.10	A
Mg (g/kg)	2.47	0.19	B
Al	13.3	5 4	C
P (g/kg)	18.0	1.4	B
Cl	0.91	0.29	C
K (g/kg)	18.5	0.5	A
Ca	3.20	0.11	C
Cr	87.8	5.3	A
Mn	4.77	0.39	A
Fe	162	7	A
Co	0.199	0.026	A
Ni	0.75	0.10	B
Cu	52.8	2.0	A
Zn	226	8	A
As	0.09	0.19	C
Sb	0.102	0.010	B
Se	0.03	0.02	C
Br	0.82	0.10	C
Rb	6.93	0.59	B
Cd	0.084	0.011	C
Hg	0.029	0.003	A
Pb	0.23	0.07	C
TY-4			
Na (g/kg)	2.58	0.20	A
Mg (g/kg)	2.27	0.05	C
Al	20 6	4.0	C
P (g/kg)	16.4	1.0	B
Cl	1.85	0.53	C
K (g/kg)	16.7	0.3	A
Ca	7.14	0.83	C
Cr	221	13	A
Mn	3.85	0.35	A
Fe	156	9	A
Co	0.298	0.039	A
Ni	1.00	0.15	C
Cu	42.1	1.3	A
Zn	266	10	A
As	0.13	0.14	C
Sb	0.089	0.005	B
Se	0.03	0.03	C
Br	1.49	0.12	C
Rb	7.43	0.60	B
Cd	0.133	0.19	B
Hg	0.044	0.007	A
Pb	0.26	0.12	C

TY (cont.)

Order Information:

TY can be purchased for US$540 per unit (4 25-g bottles). Price subject to change. Please contact CAL-NRI.

Reference:

Central Analytical Laboratory (1995) TY-SET. Essential and toxic elements in the set of yeast reference materials. Provisional certificate of analysis. Nuclear Research Institute Řež plc, Central Analytical Laboratory, 250 68 Řež, Czech Republic.

V-10

Hay

International Atomic Energy Agency (Austria)

Description:

This material is ground lucerne hay (*Medicago satira*) which was grown on calcareous soil at Churn, Berkshire, UK, on the farm of the University of Reading. About 75 kg of the hay was ground in a grinder constructed entirely of wood and plastic to avoid major metallic contamination, and then it was well mixed. The material was reground in an iron grinder and then mixed in a rotating plastic drum. The use of the metal grinder did not cause a detectable increase in Fe concentration. The material was bottled in 50-g aliquots in plastic bottles. The bottles were sealed and radiation sterilized using ^{60}Co at 2.5 Megarads. Grain size was less than 125 µm.

Recommended values (mg/kg dry weight unless noted):

Element	Value	Confidence interval			Element	Value	Confidence interval		
Mg (g/kg)	1.36	1.33	-	1.45	Zn	24	21	-	27
P (g/kg)	2.3	2.1	-	2.5	Br	8	7	-	11
Ca (g/kg)	21.6	21.0	-	22.2	Pb	7.6	7.3	-	7.8
Sc (µg/kg)	14	12	-	15	Sr	40	37	-	44
Cr	6.5	5.6	-	7.1	Mo	0.9	0.6	-	1.1
Fe	185	177	-	190	Cd	0.03	0.02	-	0.05
Co	0.13	0.11	-	0.14	Ba	6	4	-	7
Ni	4.0	3.8	-	4.9	Hg (µg/kg)	13	9	-	16
Cu	9.4	8.8	-	9.7	Pb	1.6	0.8	-	1.9

Order Information:

V-10 can be purchased for US$110 per unit (50 g). Price subject to change. The price includes handling, postage (surface mail in Europe, airmail elsewhere), and insurance. Please contact IAEA.

References:

International Atomic Energy Agency (1994) AQCS (Analytical Quality Control Services) Intercomparison runs reference materials 1994 - 1995. Catalog. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 100 pp.

Pszonicki, L., and A. N. Hanna (1985) Report on intercomparison IAEA/V-10 of the determination of trace elements in hay powder. IAEA/RL/123. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 11 pp plus tables and diagrams.

WATERS

WATERS

AUD-06, GRM-02, ION-20, ION-92 - ION-96, ION-911, HURON-03, and SOUR-01

Fortified Distilled and Lake Waters

National Water Research Institute (Canada)

Description:

These CRMs are: AUD-06, soft natural lake water from Eagle Lake, ON; GRM-02, centrifuged rain water from Grimsby, ON; ION-20, fortified natural lake water; ION-92, fortified distilled water; ION-94, composite naturally colored water; ION-95, medium hard lake water from Lake Ontario; ION-96, hard river water from Grand River, ON; ION-911, soft lake water from Lake Superior; HURON-03, soft lake water from Lake Huron; and SOUR-1, medium hard river water from Souris River, MN.

Reference value (mg/L unless noted) (Information only values in brackets.) (Alkalinity and hardness reported as $CaCO_3$.):

	Value	Confidence interval	Value	Confidence interval
	AUD-06		GRM-02	
Acidity (to pH 8.3)	-	-	3.70	1.58
Al	-	-	0.0278	0.0217
NH_3 (as N)	0.023	0.015	0.516	0.060
Ca	5.79	0.54	3.33	0.30
Cl^-	0.951	0.185	0.539	0.208
Colour (units)	6.9	5.2	2.9	3.3
Conductance (µS)	53.3	4.1	49.12	3.86
DIC	3.18	0.74	0.26	0.28
DOC	3.17	0.87	1.06	0.61
F	0.050	0.020	0.053	0.044
Gran alkalinity	12.95	1.59	1.32	0.42
Hardness	-	-	13.23	2.65
K	0.728	0.115	0.195	0.052
Mg	1 62	0.17	1.087	0.085
Na	1.00	0.16	0.216	0.096
NO_3^- (IC as N)	-	-	2.427	0.164
$NO_3^- + NO_2^-$ (as N)	0.085	0.025	2.423	0.189
pH (units)	7 15	0.38	4.64	0.16
Si (as SiO_2)	2.27 (1.06)	0.28 (0.13)	0.164 (0.0769)	0.08 (0.0376)
SO_4^{2-}	8.38	0.87	6.81	0.67
TKN (as N)	0 207	0.111	0.606	0.109
Total N	-	-	3.04	0.56
Total alkalinity	13.61	2.17	-	-
Total hardness	21.27	2.36	-	-
Turbidity (NTU/JTU)	0.19	0.25	0.13	0.18

AUD-06, GRM-02, ION-20, ION 92 - ION-96, ION-911, HURON-03, and SOUR-01 (cont.)

	Value	Confidence interval	Value	Confidence interval
	ION-20		ION-92	
B	[0.012]	[0.010]	-	-
Ca	14.03	1.60	42.86	3.79
Cl^-	16.63	1.74	105.5	11.07
Colour (units)	2.4	3.6	2.7	4.5
Conductance (µS)	173.1	11.0	446.2	28.5
DIC	5.40	1.70	0.56	0.42
DOC	0.51	0.53	0.36	0.56
F	0.037	0.026	<0.02	-
Gran alkalinity	-	-	0.06	0.31
Hardness	47.16	4.64	147.9	12.48
K	1.21	0.22	0.884	0.157
Mg	2.90	0.30	9.60	1.08
Na	13.44	1.63	19.31	2.27
NH_3 (as N)	0.003	0.003	0.003	0.005
$NO_3^- + NO_2^-$ (as N)	0.044	0.018	0.027	0.019
pH	7.45	0.49	5.51	0.45
Silica (as SiO_2) (as Si)	1.42 (0.664)	0.236 (0.110)	<0.02 (<0.01)	-
SO_4^{2-}	29.66	2.89	37.01	4.87
TKN (as N)	0.055	0.062	0.033	0.027
Total alkalinity	23.0	2.80	1.0	1.8
Total N	[0.09]	[0.07]	0.047	0.040
Total P	[0.002]	[0.003]	<0.001	-
Turbidity (units)	0.13	0.18	0.15	0.17
	ION-94		ION-95	
Al	[0.229]	[0 035]	-	-
NH_3 (as N)	0.013	0.018	[0.004]	[0.008]
B	[0.007]	[0.006]	[0.022]	[0.014]
Ca	1.84	0.35	32.0	3.03
Cl^-	5.13	0.96	23.74	1.98
Colour (units)	134	44	3.4	4.8
Conductance (µS)	36.28	3.27	292.4	21.7
DIC	0.67	0.44	18.0	3.6
DOC	10.2	2.2	1.48	0.73
F	0.033	0.018	0.569	0.085
Gran alkalinity	3.38	0.594	[72.7]	[23.0]
K	0.289	0.066	3.15	0.39
Mg	0.673	0.073	6.58	0.70
Na	4.08	0.58	15.0	1.86
Nitrate (as N)	[0.061]	[0.019]	-	-
$NO_3^- + NO_2^-$ (as N)	0.063	0.022	0.332	0.053
pH	6.34	0.31	7.88	0.40
Silica (as SiO) (as Si)	2.398 (1.121)	0.346 (0.162)	2.148 (1.004)	0.279 (0.130)
SO_4^{2-}	3.12	1.68	29.88	3.49
TKN (as N)	0.267	0.116	0.136	0.072
Total alkalinity	4.15	3.08	75.97	4.26
Total Hardness	7.45	1.37	107.2	9.32
Total N	0.32	0.08	0.450	0.118
Total P	[0.006]	[0.004]	[0.005]	[0.004]
Turbidity (units)	0.26	0.19	0.17	0.13

AUD-06, GRM-02, ION-20, ION 92 - ION-96, ION-911, HURON-03, and SOUR-01 (cont.)

	Value	Confidence interval	Value	Confidence interval
	ION-96		ION-911	
Al	-	-	0.0099	0.0196
NH_3 (as N)	[0.005]	[0.005]	0.013	O.015
B	[0.044]	[0.027]	-	-
Ca	94.83	8.57	13.4	1.07
Cl-	71.82	5.99	1.34	0.267
Colour (units)	18.1	9.8	2.5	3.6
Conductance (µS)	808.1	48.5	95.56	6.02
DIC	47.4	6.5	10.0	1.31
DOC	5.9	1.8	1.30	0.62
F	0.169	0.045	0.042	0.029
Gran alkalinity	-	-	41.07	1.33
Hardness	-	-	45.62	4.40
K	3.95	0.495	0.501	0.085
Mg	22.76	2.34	2.79	0.21
Na	43.08	4.28	1.33	0.18
NO_3^- (IC, as N)	-	-	0.372	0.041
$NO_3^- + NO_2^-$ (as N)	4.66	0.51	0.378	0.033
pH	8.26	0.23	7.73	0.30
Silica (as SiO2) (as Si)	6.60 (3.09)	0.52 (0.25)	2.48 (1.16)	0.239 (0.112)
SO_4^{2-}	101.2	10.4	3.32	0.46
TKN (as N)	0.52	0.20	0.088	0.071
Total alkalinity	201.5	11.9	42.18	2.69
Total hardness	331.8	27.3	-	-
Total N	5.04	0.84	0.455	0.077
Total P	[0.031]	[0.014]	-	-
Turbidity (units)	0.20	0.24	0.15	0.24
	HURON-03		SOUR-1	
NH_3 (as N)	0.004	0.006	[0.027]	[0.013]
B	-	-	[0.077]	[0.019]
Ca	27.71	2.76	33.1	3.5
Cl^-	5.92	0.91	17.1	2.0
Colour (units)	2.9	5.7	9.1	5.5
Conductance (µS)	209.1	14.1	488.8	24.0
DIC	19.06	3.66	39.5	6.4
DOC	1.92	0.95	5.8	1.4
F	0.087	0.045	0.129	0.043
K	0.898	0.176	6.16	0.70
Mg	7.48	0.73	19.8	2.1
Na	3.54	0.52	41.0	4.1
$NO_3^- + NO_2^-$ (as N)	0.348	0.039	[0.034]	[0.011]
pH	7.98	0.32	8.28	0.31
Silica (as SiO2) (as Si)	1.54 (0.772)	0.186 (0.087)	0.256 (0.120)	0.066 (0.031)
SO_4^{2-}	15.87	1.86	64.6	7 0
TKN (as N)	0.136	0.096	0.45	0 13
Total alkalinity	81.03	4.55	167.9	9.7
Total Hardness	100.0	8.91	165.1	12.7
Total N	0.472	0.151	-	-
Total P	-	-	[0.028]	[0.003]
Turbidity (units)	0.16	0 21	0.17	0.27

Order information:

These CRMs can each be purchased for Canadian $150 per unit (500 mL). Price subject to change without notice. Please contact NWRI.

Reference:

National Water Research Institute (1995) Quality assurance reference materials and services. Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada. 48 pp.

CASS-3

Nearshore Seawater

National Research Council (Canada)

Description:

Seawater for CASS-3 was collected in the same location as that used for CASS-1 and CASS-2 in the outer part of the Halifax Harbor, Canada, at a depth of 5 m in water 25-40 m deep, 400-800 meters offshore. The salinity was 30.2 ‰ and the total dissolved organic carbon content was 0.5 mg/L. The seawater was peristaltically pumped through cleaned polyethylene-lined ethyl vinyl acetate tubing and 0.45 µm acrylic copolymer filters. It was acidified to pH 1.6 with ultrapure nitric acid during transfer to 50-L acid-leached polypropylene carboys previously conditioned with ultrapure water acidified to pH 1.6. The seawater was then homogenized in two linked 800-L polyethylene tanks in a clean room at the NRCC Division of Chemistry facilities in Ottawa, Canada, and immediately bottled in acid-cleaned 2-L polyethylene bottles.

Certified concentrations (µg/L):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
Cr	0.092	0.006	Zn	1.24	0.25
Mn	2.51	0.36	As	1.09	0.07
Fe	1.26	0.17	Se (IV)	0.020	0.005
Co	0.041	0.009	Mo	8.95	0.26
Cu	0.517	0.062	Cd	0.030	0.005
Ni	0.386	0.062	Pb	0.012	0.004

Information values (µg/L):

Se (total)	0.042
U	2.84

Order information:

CASS-3 can be purchased for US$145 per unit (2-L bottle). Price subject to change without notice. Please contact NRCC.

Reference:

National Research Council Canada (1995) CASS-3. Nearshore seawater reference material for trace metals. Description sheet. National Research Council Canada, Institute for Environmental Chemistry, Ottawa, Canada.

CRM 398 - 399

Major Elements in Freshwater

Community Bureau of Reference (Belgium)

Description:

CRM 398 and 399 were prepared in a single batch from deionized water to which the required quantities of elements were added in the form of salts. They are aicidified to 0.1 mol/L with HNO_3.

Certified concentrations (mg/kg unless noted):

CRM 398

Element	Value	Uncertainty (±)
Na	5.07	0.08
Mg	5.03	0.06
Al (µg/kg)	36.3	4.3
S	3.39	0.14
Cl	10.3	0.4
K	1.03	0.04
Ca	30.0	0.7
Mn	29.8	0.3
Fe (µg/kg)	29.3	1.4

CRM 399

Element	Value	Uncertainty (±)
Na	30.4	0.7
Mg	15.1	0.2
Al (µg/kg)	207	9
P	1.01	0.03
Cl	50.5	0.9
K	2.99	0.12
Ca	79.2	0.9
Mn	199	3
Fe (µg/kg)	202	3

Noncertified concentrations (nmol/kg):

CRM 398

Element	Value
P	105

CRM 399

Element	Value
S	8.7

Order information:

These CRMs can be purchased for ECU100 per unit (200 mL). Price includes handling and normal postage within the European Union except when special handling is required. Price subject to change without notice. Please contact BCR.

Reference:

Community Bureau of Reference (BCR) (1994) Reference Materials. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 86 pp.

CRM 403

Trace Elements in Seawater

Community Bureau of Reference (Belgium)

Description:

This material consists of seawater filtered through a 0.45 µm filter and acidified to a pH greater than 1.6.

Certified concentrations (nmol/kg):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
Ni	4.36	0.36	Mo	103	20
Cu	3.90	0.37	Cd	0.175	0.018
Zn	25.7	2.9	Pb	0.117	0.025

Noncertified concentrations (nmol/kg):

Element	Value
Al	17.1
V	22.3
As	19.5

Order information:

CRM 403 can be purchased for ECU300 per unit (2 L). Price includes handling and normal postage within the European Union except when special handling is required. Price subject to change without notice. Please contact BCR.

References:

Community Bureau of Reference (BCR) (1991) BCR CRM 403. Trace element in seawater. Certificate of analysis. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium.

Community Bureau of Reference (BCR) (1994) Reference Materials. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 86 pp.

CRM 408 - 409

Major Compounds in Simulated Rainwater

Community Bureau of Reference (Belgium)

Description:

These materials consist of artificial rainwater with a relatively low level of electrolytes. The water is stored in sealed 100-mL quartz ampoules. The samples were sterilized with ^{60}Co radiation.

Certified concentrations (mg/kg unless noted):

CRM 408

Compound	Value	Uncertainty (±)
H_3O^+	16.6	2.1
NO_3^-	20.1	0.4
Na	42.0	0.6
SO_4^{2-}	10.5	0.3
Ca	7.68	0.11
Cl	67.3	0.7
Hg	6.14	0.14

CRM 409

Compound	Value	Uncertainty (±)
H_3O^+	48.0	2.1
NO_3^-	78.1	1.0
NH_4^+	106	2
Na	82.9	1.2
SO_4^{2-}	53.2	0.7
K	4.25	0.21
Ca	15.5	0.3
Cl	113	2
Hg	12.3	0.2

Noncertified concentrations (nmol/kg):

CRM 408

Compound	Value
NH_4^+	21
K	2.3

Order information:

These CRMs can be purchased for ECU100 per unit (100 mL). Price includes handling and normal postage within the European Union except when special handling is required. Price subject to change without notice. Please contact BCR.

Reference:

Community Bureau of Reference (BCR) (1994) Reference Materials. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 86 pp.

CRM 479 - 480

Nitrate in Fresh Water

Community Bureau of Reference (Belgium)

Description:

No information available.

Certified concentrations (µmol/kg):

	CRM 479 (low level)		CRM 480 (high level)	
	Value	Uncertainty (±)	Value	Uncertainty (±)
NO_3^-	214	4	885	13

Order information:

These CRMs can be purchased for ECU125 per unit (200 mL). Price includes handling and normal postage within the European Union except when special handling is required. Price subject to change without notice. Please contact BCR.

Reference:

Community Bureau of Reference (BCR) (1995) Reference Materials. Addendum 1995. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 12 pp.

CRM 505

Trace Elements in Estuarine Water

Community Bureau of Reference (Belgium)

Description:

This CRM is filtered (0.45 µm) estuarine water acidified to pH of about 1.6 with nitric acid. It is stored in 1-L polyethylene bottles.

Certified concentrations (nmol/kg):

Compound	Value	Uncertainty (±)
Ni	24.1	2.0
Cu	29.4	1.5
Zn	172	11
Cd	0.80	0.04

Order information:

CRM 505 can be purchased for ECU300 per unit (1 L). Price includes handling and normal postage within the European Union except when special handling is required. Price subject to change without notice. Please contact BCR.

Reference:

Community Bureau of Reference (BCR) (1995) Reference Materials. Addendum 1995. Community Bureau of Reference, Commission of the European Communities, Directorate General for Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium. 12 pp.

CSK Nutrient Elements

CSK Nutrients in Seawater

Sagami Chemical Research Center (Japan)

Available from:

Wako Chemicals USA
1600 Bellwood Rd.
Richmond, VA 23237
USA

Wako Chemicals GmbH
Nissanstr. 2, 4040 Neuss 1
WEST GERMANY

Wako Pure Chemical Industries Ltd.
1-2, Doshomachi 3-Chome
Chuo-Ku, Osaka
JAPAN

Description:

The standard solutions of nutrient elements, phosphate-P, nitrite-N, nitrate-N, and silicate-Si, for chemical analysis by spectrophotometer were prepared by Wako under the supervision of the Sagami Chemical Research Center of Japan. The solutions have the highest accuracy and stability possible, and the concentrations cover the whole range of values found in seawater. The solutions were sealed in bottles or glass ampoules and sterilized. These standard solutions were used in the Cooperative Study of the Kuroshio and Adjacent Regions (CSK) Program of UNESCO/IOC, 1965-1979, and in other programs.

Concentrations (μg-at/L):

Element	Concentration	
NO_2-N	0.00	Water
	0.50	
	1.00	
	2.00	
NO_3-N	0.0	30.5% NaCl
	5.0	
	10.0	
	20.0	
	40.0	

Element	Concentration	
PO_4-P	0.00	30.5% NaCl
	0.05	
	1.00	
	2.00	
	3.00	
SiO_2-Si	0.0	30.5% NaCl (adjusted to pH 3 with H_2SO_4)
	5.0	
	10.0	
	25.0	
	50.0	
	100	
	200	

Order information:

The CSK nitrate, nitrite and silicate standard solutions can be purchased for between US$75 and US$120 per unit (50 mL) from Wako USA. The silicate solution is packaged in high density polyethylene bottles. Price subject to change without notice. Prices from Wako West Germany and Wako Japan not available.

References:

Ambe, M., J. Kajiwara, T. Yoshihara, and K. Sugawara (1975) Preparation of the standard solutions of nitrate and their application to seawater and freshwater. J. Oceanogr. Soc. Japan, 31:85-92.

Ambe, M. (1978) Note of the experience in the preparation of CSK standard solutions and the ICES-SCOR Intercalibration Experiment, 1969-1970. Mar. Chem., 6:171-8.

Sagami Chemical Research Center (1988?) General guide to the use of CSK standard solutions, No.1. Sagami Chemical Research Center, Sagamihara, Kanagawa Prefecture, Japan.

IAEA-298

Pacific Ocean Water

Source:

International Atomic Energy Agency
Analytical Quality Control Service
Laboratory Seibersdorf
P. O. Box 100
A-1400 Vienna
AUSTRIA

Description:

IAEA-298 is surface water collected outside the Muroroa Atoll.

Recommended activities (Bq/m^3 unless noted):

Radionuclide	Activity	Range		
^{90}Sr	1.32	1.28	-	1.36
^{137}Cs	2.34	2.28	-	2.40
$^{239+240}Pu$ (mBq/m^3)	2.1	1.2	-	3.0

Order information:

IAEA-298 can be purchased for US$110 per unit (3 30-mL). Price subject to change. Cost of shipment to be covered by customer. Please contact IAEA.

Reference:

International Atomic Energy Agency (1994) AQCS (Analytical Quality Control Services) Intercomparison runs reference materials 1994 - 1995. Catalog. International Atomic Energy Agency, Laboratory Seibersdorf, P.O. Box 100, A-1400 Vienna, Austria. 100 pp.

IAPSO Standard Seawater

Standard Seawater for Conductivity Measurements

Ocean Scientific International Ltd. (UK)

Description:

The seawater for these reference materials was collected from the North Atlantic in large quantities. It is transported and stored in polyethylene containers until it is filtered through 0.3-µm filters and transferred into PVC-lined tanks. Further filtration and irradiation with ultraviolet light reduce dissolved organic material and microbial degradation. The seawater is then slowly diluted with distilled water until a salinity of approximately 35 is achieved. The seawater is then sealed in 280-mL prewashed glass ampoules. Approximately 7,000 ampoules are produced in each batch. The seawater is then calibrated in accordance with the recommendations of the UNESCO, ICES, SCOR, IAPSO Joint Panel in Oceanographic Tables and Standards. The P-series standards are the main single point calibration standards for salinity measurements. The 38H series is used to determine salinometer offset and linearity at higher salinities. The 30L and 10L series are used for a similar purpose at lower salinities. The GPS standard is not suitable for primary calibration and is intended for general applications such as equipment testing and chemical analysis.

Certified values:

Conductivity ratios relative to a defined KCl solution at 15°C are available for each batch of seawater. The conductivity ratios vary from lot to lot and are printed on the label of the ampoules.

Standard	Approx. salinity	Ampoule (mL)
Normal seawater (P-series)	35	275
High salinity standard seawater (38H series)	38	275
Low salinity standard seawater (30L series)	30	275
Low salinity standard seawater (10L series)	10	275
Atlantic seawater (GPS)	35	5000

Order Information:

The seawater ampoules can be purchased from Ocean Scientific International Ltd., Wormley, for between 72 and 120£ British Sterling per 5-ampoule package, and the GPS seawater for 55£ British Sterling per 4-bottle pack. Freight and packaging are additional. Please contact OSI.

NASS-4

Open Ocean Seawater

National Research Council (Canada)

Description:

NASS-4 is the fourth in a series of open ocean CRMs certified for trace metals. The seawater (31.3 ‰ salinity) was collected in the North Atlantic at a depth of 10 m, 35 km southeast of Halifax, NS, Canada. The water was peristaltically pumped through cleaned polyethylene-lined ethyl vinyl acetate tubing and 0.45 µm acryclic copolymer filters. It was immediately acidified to pH 1.6 with ultrapure nitric acid during transfer to acid-cleaned 50-L polypropylene carboys previously conditioned with ultrapure water acidified to pH 1.6. The seawater was then homogenized in two linked 800-L polyethylene tanks in a clean room at the NRC Institute for Environmental Chemistry in Ottawa, Canada, and immediately bottled in acid-cleaned 2-L polyethylene bottles. Because the seawater for NASS-4 was collected at an entirely different location of the North Atlantic and at a different depth, the different trace metal profile is different from those of the previous NASS series CRMS. Within the precision of the measurements for 11 trace elements for NASS-1, no significant change in sample composition could be discerned over the 530-day storage period described in Berman *et al.* (1983). The effect of storage on the concentrations of the 11 elements will continue to be monitored until the supply of NASS-1 is exhausted. Further details of the handling, storage, and analytical procedures can be found in Berman *et al.* (1983).

Certified concentrations (µg/L):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
Cr	0.115	0.010	Zn	0.115	0.018
Mn	0.380	0.023	As	0.126	0.09
Fe	0.105	0.016	Mo	8.84	0.60
Co	0.009	0.001	Cd	0.016	0.003
Ni	0.228	0.009	Pb	0.013	0.005
Cu	0.228	0.011	U	2.68	0.12

Information only concentration (µg/L):

Element	Value
Se (IV)	0.018

Order information:

NASS-4 can be purchased for C$145 per unit (2-L bottle). Price subject to change without notice. Please contact NRCC.

References:

Berman, S.S., R.E. Sturgeon, J.A.H. Desaulniers, and A.P. Mykytiuk (1983) Preparation of the sea water reference material for trace metals, NASS-1. Mar. Pollut. Bull., 14(2):69-73.

National Research Council Canada (1995) NASS-4. Open ocean seawater reference material for trace metals. Provisional certificate. National Research Council Canada, Institute for Environmental Chemistry, Ottawa, K1A 0R6, Canada.

SLEW-2

Estuarine Water

National Research Council (Canada)

Description:

The water for SLEW-2 was collected in the St. Lawrence River estuary at 5 m depth, several kilometers upriver from Ile aux Coudres, and 50 km below the mixing zone, at the same location as its predecessor, SLEW-1. The salinity was 11.6 ‰ and the total dissolved organic carbon content was 1.2 mg/L. The water was peristaltically pumped through cleaned polyethylene-lined ethyl vinyl acetate tubing and 0.45 µm porosity acrylic copolymer filters. It was immediately acidified to pH 1.6 with ultrapure nitric acid during transfer to 50-L acid leached polypropylene carboys previously conditioned with pH 1.6 ultrapure water. The estuarine water was later refiltered through 0.2 µm porosity acrylic copolymer filters into an 800-L polyethylene tank in a clean room at the NRCC Division of Chemistry facilities in Ottawa, Canada.

Certified concentrations (µg/L):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
Cr	0.169	0.018	Cu	1.62	0.11
Mn	17.1	1.1	Zn	1.10	0.14
Fe	2.37	0.37	As	0.792	0.082
Co	0.055	0.008	Cd	0.019	0.002
Ni	0.709	0.054	Pb	0.027	0.005

Information values (µg/L):

Element	Value	Uncertainty (±)
Mo	3.7	
U	1.2	

Order information:

SLEW-2 can be purchased for US$145 per unit (2-L bottle). Price subject to change without notice. Please contact NRCC.

Reference:

National Research Council Canada (1995) SLEW-2. Estuarine water reference material for trace metals. Description sheet. National Research Council Canada, Institute for Environmental Chemistry, Ottawa, Canada.

SLRS-3

Riverine Water

National Research Council (Canada)

Description:

Riverine water was collected from the Ottawa River at Cheneaux, Ontario, about 100 km upstream from Ottawa, at the 2- to 3-meter level. The water was peristaltically pumped through cleaned polyethylene-lined ethyl vinyl acetate tubing and 0.45 µm acrylic copolymer filters. It was acidified to pH 1.6 with ultrapure nitric acid during transfer to 50-L acid-leached polypropylene carboys. The water was later filtered through 0.2 µm porosity acrylic coplymer filters into two 800-L polyethylene tanks in a clean room at NRCC Division of Chemistry facilities in Ottawa, Canada. It was subsequently blended by circulative pumping and bottled in precleaned polyethylene containers. The bottled water was irradiated to a minimum dose of 2.5 Mrads to inhibit any bacterial action.

Certified concentrations (µg/L unless noted):

Element	Value	Uncertainty (±)	Element	Value	Uncertainty (±)
Be	0.005	0.001	Co	0.027	0.003
Na (mg/L)	2.3	0.2	Ni	0.83	0.08
Mg (mg/L)	1.6	0.2	Cu	1.35	0.07
Al	31	3	Zn	1.04	0.09
K (mg/L)	0.7	0.1	As	0.72	0.05
Ca (mg/L)	6.0	0.4	Mo	0.19	0.01
V	0.30	0.02	Cd	0.013	0.002
Cr	0.30	0.04	Sb	0.12	0.01
Mn	3.9	0.3	Ba	13.4	0.6
Fe	100	2	Pb	0.086	0.007

Information values (µg/L):

Element	Value	Uncertainty (±)
Sr	28.1	
U	0.045	

Order Information:

SLRS-3 can be purchased for US$145 per unit (2-L bottle). Price subject to change without notice. Please contact NRCC.

Reference:

National Research Council Canada (1995) SLRS-3. Riverine water reference material for trace metals. Description sheet. National Research Council Canada, Marine Analytical Standards Program, Ottawa, Canada.

SRM 2694a

Simulated Rainwater

National Institute of Standards and Technology (USA)

Description:

This SRM was developed to aid in the analysis of acidic rainwater. was prepared by dissolution of high-purity salts and acids in high-purity distilled deionized water. Two levels of acidity are provided.

Certified values/concentrations (mg/L unless noted):

Elements/Parameters	SRM 2694a-I Value	SRM 2694a-I Uncertainty (±)	SRM 2694a-II Value	SRM 2694a-II Uncertainty (±)
pH at 25°C	4.30	0.03	3.60	0.03
Electrolytic conductivity (µS/cm at 20°C)	23.4	1.2	119.9	1.3
Electrolytic conductivity (µS/cm at 25°C)	25.4	1.2	129.3	1.3
Acidity (meq/L)	0.0544	0.0006	0.283	0.003
Flouride	0.057	0.005	0.108	0.004
Nitrate			7.19	0.16
Sulfate	2.69	0.03	10.6	0.1
Sodium	0.208	0.002	0.423	0.012
Potassium	0.056	0.002	0.108	0.003
Calcium	0.0126	0.0014	0.0364	0.0006
Magnesium	0.0242	0.0002	0.0484	0.0010

Noncertified values/concentrations (mg/L):

Elements/Parameters	SRM 2694a-I Value	SRM 2694a-II Value
Chloride	0.23	0.94
Nitrate	0.53	
Ammonium	0.12	1.06

Order information:

SRM 2694a can be purchased for US$308 per unit (set of 4 5-ml vials). Price subject to change without notice. Please contact NIST.

Reference:

National Institute of Standards and Technology (1995) SRM 2694a. Simulated rainwater. Certificate of analysis. National Institute of Standards and Technology, Gaithersburg, MD, USA.

TM-23 - TM-28

Trace Metal Fortified Water

National Water Research Institute (Canada)

Description:

These CRMs are water fortified with trace metals and preserved with 0.2% HNO_3. Background values for Na, Mg, K, and Ca are provided.

Certified concentrations (µg/L unless noted):

Element	Value	Uncertainty	Element	Value	Uncertainty	Element	Value	Uncertainty
TM-23			TM-24			TM-26		
Li	3.3 *	2.4 *	Li	4.7	2.1	Li	10	3.6
Be	0.6	0.4	Be	1.62	0.62	Be	3.5	1.3
Al	37	18	Al	20	13	Al	68	22
V	2.5	1.8	V	6.6	2.3	V	12.5	2.8
Cr	8.3	2.8	Cr	5.7	2.6	Cr	17.0	4.2
Mn	8.5	2.3	Mn	3.1	1.4	Mn	11.3	2.2
Fe	14.6	5.5	Fe	6.0	4.0	Fe	23.5	7.5
Co	8.0	2.7	Co	19.5	3.7	Co	4.1	2.3
Ni	8.6	2.9	Ni	3.3	1.6	Ni	19.2	3.8
Cu	9.2	2.3	Cu	7.7	2.8	Cu	13.6	3.8
Zn	5.6	2.4	Zn	13.8	4.8	Zn	24.8	5.9
As	9.9	3.6	As	2.82	1.3	As	4.4	1.6
Se	1.2	1.0	Se	4.02	1.8	Se	7.0	2.5
Sr	46.7	6.7	Sr	108.5	11.8	Sr	443	56.3
Mo	5.8	2.6	Mo	4.1	2.1	Mo	18.8	4.8
Ag	3.4 *	2.0 *	Cd	12.5	3.4	Ag	8.2	3.7
Cd	2.6	1.0	Ba	9.2	1.4	Cd	17.0	3.8
Ba	13.4	4.0	Pb	7.2	2.9	Ba	30.6	4.1
Pb	3.4	1.8	Sb	15.1	4.4	Pb	13.6	4.8
Sb	4.6	2.2	Bi	2.5 *	2.1 *	Sb	1.7	1.2
Bi	4.4 *	0.3 *				Bi	6.6	2.9
Na (mg/L)	1.2		Na (mg/L)	1.1		Na (mg/L)	1.1	
Mg (mg/L)	2.0		Mg (mg/L)	1.9		Mg (mg/L)	1.9	
K (mg/L)	0.3		K (mg/L)	0.3		K (mg/L)	0.3	
Ca (mg/L)	9.8		Ca (mg/L)	9.6		Ca (mg/L)	9.7	

* Information values only.

TM-23 - TM-28 (cont.)

Element	Value	Uncertainty	Element	Value	Uncertainty
TM-27			TM-28		
Li	4.5	3.7	Li	6.8	3.2
Be	1.1	0.6	Be	1.6	0.9
Al	65	22	Al	82	24
V	0.6	1.8	V	0.6	2.1
Cr	2.7	1.4	Cr	0.8	1.9
Mn	2.7	1.8	Mn	7.7	2.3
Fe	26.7	7.9	Fe	31.5	8.6
Co	4.3	2.1	Co	3.3	2.1
Ni	2.7	1.4	Ni	19.9	4.6
Cu	35.3	6.5	Cu	6.1	2.7
Zn	22.0	5.6	Zn	19.1	4.9
As	2.1	0.9	As	3.0	1.3
Se	4.1	1.4	Se	5.0	1.7
Sr	49.7	6.6	Sr	106.1	17.0
Mo	2.3	2.1	Mo	2.7	1.2
Cd	1.0	1.2	Cd	1.4	1.2
Sn	4.4	-	Sb	3.7	2.5
Ba	8.6	2.0	Ba	15.6	4.0
Pb	4.8	2.2	Pb	2.9	1.3
Sb	3.0	1.9			
Bi	2.0	0.5			
U	3.1	0.6			
Na (mg/L)	0.5		Ca (mg/L)	6.8	
Mg (mg/L)	0.9		Mg (mg/L)	1.4	
K (mg/L)	0.1		Na (mg/L)	1.1	
Ca (mg/L)	4.0		K (mg/L)	0.3	

* Information values only.

Order information:

These CRMs can each be purchased for Canadian $150 per unit (500 mL). Price subject to change without notice. Please contact NWRI.

Reference:

National Water Research Institute (1995) Quality assurance reference materials and services. Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada. 48 pp.

TMDA-51 - TMDA-54

Trace Metal Fortified Water

National Water Research Institute (Canada)

Description:

These CRMs are water fortified with trace metals and preserved with 0.2% HNO_3. Background values for Na, Mg, K, and Ca are provided.

Certified concentrations (µg/L unless noted):

Element	Value	Uncertainty	Element	Value	Uncertainty	Element	Value	Uncertainty
TMDA-51			TMDA-52			TMDA-54		
Li	15.1	6.1	Li	21.2	4.75	Li	32.3	6.73
Be	25.0	3.85	Be	17.6	2.84	Be	35.2	5.74
Al	85	26	Al	324	49.7	Al	487	72
Ti	17 *	1.0 *	Ti	19 *	1.0 *	Ti	38 *	3.2 *
V	81.2	10.3	V	151.5	17.3	V	333.0	31.6
Cr	61.7	8.8	Cr	176.1	18.8	Cr	440.5	56.7
Mn	35.9	5.5	Mn	349.9	32.0	Mn	223.8	23.4
Fe	150	19.2	Fe	460.7	47.0	Fe	282.5	29.2
Co	74.8	8.4	Co	273.8	28.4	Co	390.7	41.5
Ni	83.7	10.7	Ni	153.6	18.4	Ni	372.9	42.8
Cu	66.4	12.0	Cu	295.0	35.5	Cu	436.9	59.2
Zn	95.3	13.3	Zn	252.3	22.8	Zn	541.5	61.6
As	14.4	4.65	As	27.8	8.86	As	21.4	6.43
Se	9.86	2.78	Se	20.9	5.62	Se	39.1	9.15
Sr	121	13.4	Sr	296.8	25.6	Sr	622.0	66.0
Mo	93.5	14.6	Mo	352.1	36.8	Mo	475.4	55.8
Ag	17 *	5.7 *	Cd	96.2	12.0	Ag	27 *	20 *
Cd	36.1	6.0	Sb	18.8	5.64	Cd	174.2	21.3
Sb	13.5	4.14	Ba	157.9	12.9	Sb	37.5	8.99
Ba	78.3	8.5	Pb	377.0	36.5	Ba	274.1	26.3
Pb	66.6	13.1	Bi	18 *	9.4 *	Pb	554.2	67.1
Bi	5.0 *	2.4 *	U	16 *	2.4 *	Bi	19 *	8.4 *
U	33 *	4.9 *				U	68 *	9.4 *
			Ca (mg/L)	5.3				
Ca (mg/L)	5.4		Mg (mg/L)	1.1		Ca (mg/L)	3.4	
Mg (mg/L)	1.1		Na (mg/L)	2.6		Mg (mg/L)	0.7	
Na (mg/L)	2.1		K (mg/L)	0.2		Na (mg/L)	1.8	
K (mg/L)	0.2					K (mg/L)	<0.2	

* Information values only.

Order information:

These CRMs can each be purchased for Canadian $150 per unit (500 mL). Price subject to change without notice. Please contact NWRI.

Reference:

National Water Research Institute (1995) Quality assurance reference materials and services. Aquatic Ecosystem Protection Branch, National Water Research Institute, Burlington, Ontario, Canada. 48 pp.

INDICES

INDICES

18. Index of Elements with Associated Reference Materials

All available values are indexed. Oxides are indexed under the major element, i.e., Fe_2O_3 under Fe. Organometallic compounds are listed under the metal component, i.e., methylmercury under Hg. Ammonia, phosphate, sulfate, and other anions are listed under the non-oxygen element.

ASH: Ashes
INST: Instrumental performance
OIL: Oils
ROCK: Rocks and minerals
SED: Sediments
SLUD: Sludges
SOIL: Soils
TISS: Tissues
WATER: Waters

Ag. ASH: NIES 8, SRM 1648, SRM 1649, ZUK-1. INST: GBW 07701, GBW 07702, GBW 07703, GBW 07704, GBW 07705, GBW 07706, GBW 07707, GBW 07708, GBW 07709, GBW 07710, GBW 07711, GBW 07712, GBW 07713, GBW 07714, GBW 07715, GBW 07716, GBW 07717, GBW 07718, GBW 07719, GBW 07720, GBW 08610, LGC1313, SRM 1643d, SRM 3151, SRM 3172a, SRM 610, SRM 611, SRM 612, SRM 613, SRM 614, SRM 615. ROCK: AC-E, AGV-1, BHVO-1, BIR-1, DNC-1, DVG-N, FM, G-2, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GSR-2, GSR-3, GSR-4, GSR-5, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JP-1, JR-1, JR-2, KK, MAN-1, MK, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-7, MO-8, MO-9, QLO-1, RGM-1, SCo-1, SDC-1, SDO-7, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SKD-1, SpS, SSV-1, ST-1a, STM-1, SY-4, W-2. SED: GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GSD-10, GSD-11, GSD-12, GSD-9, IAEA-356, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, SL-1, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, SRM 2709, SRM 2710, SRM 2711, TILL-1, TILL-2, TILL-3, TILL-4. TISS: DOLT-2, DORM-2, LUTS-1, SRM 1566a, SRM 1577b, SRM 1974. WATER: TM-23, TM-26, TMDA-51, TMDA-54.

Al. ASH: CRM 176, CRM 542CO39, CRM 548GB41, CRM 549FR15, CRM 550DE38, CTA-FFA-2, NIES 8, SRM 1633b, SRM 1648, SRM 2689, SRM 2690, SRM 2691, ZUK-1. INST: LGC1301, RM 8416, RM 8418, RM 8432, SRM 1643d, SRM 1872, SRM 1873, SRM 3101a, SRM 3171a. ROCK: AC-E, AGV-1, AK, AL-1, AN-G, BCS-CRM 309, BCS-CRM 319, BCS-CRM 348, BCS-CRM 375, BCS-CRM 376, BCS-CRM 389, BCS-CRM 393, BCS-CRM 395, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DNC-1, DR-N, DT-N, DVG-N, FER-1, FER-2, FER-3, FER-4, FK-N, FM, G-2, GA, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GPOS301, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, IPT-28, IPT-32, IPT-35, IPT-42, IPT-44, IPT-48, IPT-53, IPT-61, IPT-62, IPT-72, JA-2, JA-3, JB-2, JB-3, JDo-1, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JGb-2, JH-1, JLs-1, JMn-1, JP-1, JR-1, JR-2, JR-3, JSd-1, JSd-2, JSd-3, JSI-1, JSI-2, JSy-1, KB, KK, MAN-1, MGR-1, Mica-Fe, Mica-Mg, MK, MK-1, MO-1, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-2, MO-3, MO-4, MO-5, MO-6, MO-7, MO-8, MO-9, MSCH-1, MSCH-2, MSCH-3, MSCH-4, MY-1, MY-3, MY-4, Nod-A-1, Nod-P-1, PM-S, QLO-1, RGM-1, SARM-1, SARM-2, SARM-3, SARM-39, SARM-4, SARM-40, SARM-41, SARM-43, SARM-44, SARM-45, SARM-47, SARM-

48, SARM-49, SARM-5, SARM-50, SARM-6, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-2, SDO-3, SDO-4, SDO-5, SDO-6, SDO-7, SDO-8, SDO-9, SDU-1, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SI-2, SI-3, SKD-1, SpS, SRM 120c, SRM 1c, SRM 278, SRM 600, SRM 688, SRM 694, SRM 696, SRM 697, SRM 698, SRM 69b, SRM 81a, SRM 88b, SRM 97b, SRM 98b, SSL-1, SSV-1, ST-1a, STM-1, SY-3, SY-4, TDB-1, UB-N, UM-2, UM-4, VS-N, W-2, WGB-1, WMG-1, WMS-1, WPR-1, WS-E, ZW-C. SED: BCSS-1, CRM 277, CRM 320, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, HR-1, IAEA-356, JLk-1, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, MESS-2, NIES 2, PACS-1, SARM 46, SARM 51, SARM 52, SD-M-2/TM, SL-1, SL-3, SRM 1646a, SRM 1941a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4, SUD-1, TH-1, TH-2, WQB-1, WQB-3. SOIL: BS-1, BS-2, BS-3, CRM 141, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GBW 08303, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SARM 42, SO-2, SO-3, SO-4, SRM 2709, SRM 2710, SRM 2711, SS-1, SS-2, SS-3, TILL-1, TILL-2, TILL-3, TILL-4. TISS: CLV-1, CLV-2, CRM 060, CRM 061, CRM 062, CRM 100, CRM 101, CRM 278, CTA-OTL-1, DOLT-2, DORM-2, GBW 08571, GBW 08572, IAEA-336, RM 8413, RM 8414, RM 8415, RM 8433, RM 8435, SRM 1515, SRM 1547, SRM 1566a, SRM 1570a, SRM 1575, SRM 1577b, SRM 1598, SRM 1974, TY-1, TY-2, TY-3, TY-4. WATER: CRM 398, CRM 399, CRM 403, GRM-02, ION-911, ION-94, SLRS-3, TM-23, TM-24, TM-26, TM-27, TM-28, TMDA-51, TMDA-52, TMDA-54.

As. ASH: CRM 038, CRM 176, CTA-FFA-2, GBW 08401, NIES 8, PD-1, SRM 1633b, SRM 1648, SRM 1649, SRM 2689, SRM 2690, SRM 2691, ZUK-1. INST: GBW 07510, GBW 07514, GBW 07701, GBW 07702, GBW 07703, GBW 07704, GBW 07705, GBW 07706, GBW 07707, GBW 07708, GBW 07712, GBW 07713, GBW 07714, GBW 07715, GBW 07716, GBW 07717, GBW 07718, GBW 07719, GBW 08605, GBW 08611, RM 8416, RM 8418, SRM 1643d, SRM 3103a, SRM 3172a. OIL: SRM 1634c. ROCK: AC-E, AGV-1, AK, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, DNC-1, DR-N, DT-N, DVG-N, FER-1, FER-2, FER-3, FER-4, FK-N, G-2, GA, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JDo-1, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JGb-2, JH-1, JLs-1, JMn-1, JP-1, JR-1, JR-2, JR-3, JSd-1, JSd-2, JSd-3, JSI-1, JSI-2, JSy-1, KB, KK, MAN-1, Mica-Fe, QLO-1, RGM-1, SCo-1, SDC-1, SDO-1 (USGS), SDO-4, SDO-5, SDO-6, SDO-7, SDO-8, SDO-9, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SKD-1, SRM 120c, SSV-1, ST-1a, STM-1, SY-4, UB-N, W-2, ZW-C. SED: BCSS-1, CRM 277, CRM 320, GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GBW 08301, GSD-10, GSD-11, GSD-12, GSD-9, HR-1, IAEA-356, JLk-1, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, MESS-2, NIES 2, PACS-1, SD-M-2/TM, SL-1, SL-3, SRM 1646a, SRM 1941a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4, SUD-1, TH-1, TH-2, WQB-1, WQB-3. SOIL: BS-1, BS-2, BS-3, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GBW 08303, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SOIL-7, SRM 2709, SRM 2710, SRM 2711, SS-1, SS-2, SS-3. TISS: A-11, CRM 060, CRM 061, CRM 062, CRM 184, CRM 185, CRM 186, CRM 278, CRM 279, CRM 281, CRM 402, CRM 414, CRM 422, CTA-OTL-1, DOLT-2, DORM-2, GBW 08501, GBW 08504, GBW 08505, GBW 08551, GBW 08571, GBW 08572, GBW 8509, IAEA-336, IAEA-350, LUTS-1, RM 8414, RM 8415, RM 8433, RM 8435, SRM 1515, SRM 1547, SRM

1566a, SRM 1570a, SRM 1575, SRM 1577b, SRM 1598, SRM 1974, TORT-2, TY-1, TY-2, TY-3, TY-4. WATER: CASS-3, CRM 403, NASS-4, SLEW-2, SLRS-3, TM-23, TM-24, TM-26, TM-27, TM-28, TMDA-51, TMDA-52, TMDA-54.

Au. ASH: ZUK-1. INST: SRM 3121, SRM 610, SRM 611, SRM 612, SRM 613, SRM 614, SRM 615, SRM 616, SRM 617. ROCK: AGV-1, AN-G, BHVO-1, BIR-1, DNC-1, G-2, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JP-1, JR-1, JR-2, KK, MAN-1, MO-12, QLO-1, RGM-1, SCo-1, SDC-1, SDO-4, SDO-5, SDO-6, SDO-8, SDO-9, SG-1a, SGD-1a, SGHM-2, SGHM-3, SGHM-4, SGR-1, ST-1a, STM-1, TDB-1, W-2, WGB-1, WMG-1, WMS-1, WPR-1. SED: GBW 07309, GBW 07311, GBW 07312, GSD-11, GSD-12, GSD-9, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, SL-1, SRM 1941a, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GSS-1, GSS-2, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, SRM 2709, SRM 2710, SRM 2711, TILL-1, TILL-2, TILL-3, TILL-4. TISS: CTA-OTL-1, GBW 08571, SRM 1515, SRM 1566a, SRM 1974.

B: ASH: ZUK-1. INST: CRM 127, GBW 07701, GBW 07702, GBW 07703, GBW 07704, GBW 07705, GBW 07706, GBW 07707, GBW 07708, GBW 07709, GBW 07712, GBW 07713, GBW 07714, GBW 07715, GBW 07716, GBW 07717, GBW 07718, GBW 07719, RM 8416, RM 8418, SRM 1643d, SRM 3107, SRM 610, SRM 611, SRM 612, SRM 613, SRM 614, SRM 615, SRM 616, SRM 617. ROCK: AC-E, AGV-1, BCS-CRM 319, BCS-CRM 389, BHVO-1, BIR-1, BR, CRM 811, DNC-1, DR-N, DVG-N, FER-2, FER-4, G-2, GA, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GPOS301, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JP-1, JR-1, JR-2, KB, KK, MAN-1, MK, MK-1, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-7, MO-8, MO-9, QLO-1, RGM-1, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-7, SDO-8, SDO-9, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SI-2, SI-3, SKD-1, SpS, SRM 278, SSL-1, SSV-1, ST-1a, STM-1, SY-4, UB-N, VS-N, W-2. SED: GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, SL-1, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: BS-1, BS-2, BS-3, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SS-1, SS-2, SS-3, TISS: CRM 060, CRM 061, CRM 062, CRM 281, GBW 08501, GBW 08571, RM 8414, RM 8415, RM 8433, RM 8435, SRM 1515, SRM 1547, SRM 1570a. WATER: ION-20, ION-94, ION-95, ION-96, SOUR-01.

Ba. ASH: CTA-FFA-2, GBW 08401, SRM 1633b, SRM 1648, SRM 1649, SRM 2689, SRM 2690, SRM 2691, ZUK-1. INST: GBW 07702, GBW 7703, GBW 7704, GBW 7705, GBW 7706, GBW 7707, GBW 7708, GBW 7709, GBW 7710, GBW 7711, GBW 7712, GBW 7713, GBW 7714, GBW 7715, GBW 7716, GBW 7717, GBW 7718, GBW 7719, LGC1302, RM 8416, RM 8418, SRM 1643d, SRM 1872, SRM 1873, SRM 3104a, SRM 3172a, SRM 612, SRM 613, V-9. OIL: SRM 1634c. ROCK: AC-E, AGV-1, AK, AL-1, AN-G, BCS-CRM 309, BCS-CRM 348, BCS-CRM 393, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, FER-1, FER-2, FER-3, FER-4, FK-N, G-2, GA, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GPOS301, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JMn-1, JP-1, JR-1, JR-2, JSy-1, KK, MAN-1, Mica-Fe, Mica-

Mg, MK, MK-1, MO-1, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-2, MO-3, MO-4, MO-5, MO-6, MO-7, MO-8, MO-9, MSCH-1, MSCH-2, MSCH-3, MSCH-4, MY-1, MY-3, MY-4, Nod-A-1, Nod-P-1, PM-S, QLO-1, RGM-1, SARM-1, SARM-2, SARM-2, SARM-3, SARM-39, SARM-4, SARM-40, SARM-41, SARM-43, SARM-44, SARM-45, SARM-47, SARM-48, SARM-5, SARM-50, SARM-6, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-2, SDO-3, SDO-4, SDO-5, SDO-6, SDO-7, SDO-8, SDO-9, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SI-2, SI-3, SKD-1, SpS, SRM 278, SRM 688, SRM 97b, SRM 98b, SSL-1, SSV-1, ST-1a, STM-1, SY-4, UB-N, VS-N, W-2, WS-E, ZW-C. SED: CRM 277, CRM 320, GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GBW 08301, GSD-10, GSD-11, GSD-12, GSD-9, IAEA-356, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, SARM 46, SARM 51, SARM 52, SD-M-2/TM, SL-1, SRM 1646a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4, SOIL: BS-1, BS-2, BS-3, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GBW 08303, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SARM 42, SO-2, SO-3, SRM 2709, SRM 2710, SRM 2711, SS-1, SS-2, SS-3, TILL-1, TILL-2, TILL-3, TILL-4, TISS: CLV-1, CLV-2, CRM 278, CTA-OTL-1, GBW 08501, GBW 08505, GBW 08552, GBW 08571, GBW 08572, RM 8414, RM 8415, RM 8433, RM 8435, SRM 1515, SRM 1547, V-10. WATER: SLRS-3, TM-23, TM-24, TM-26, TM-27, TM-28, TMDA-51, TMDA-52, TMDA-54.

Be: ASH: CTA-FFA-2, GBW 08401, SRM 2689, SRM 2690, SRM 2691, ZUK-1. INST: GBW 07701, GBW 07702, GBW 07703, GBW 07704, GBW 07705, GBW 07706, GBW 07707, GBW 07708, GBW 07709, GBW 07710, GBW 07711, GBW 07712, GBW 07713, GBW 07714, GBW 07715, GBW 07716, GBW 07717, GBW 07718, GBW 07719, GBW 07720, SRM 1643d, SRM 3105a. ROCK: SRM 3171a, AC-E, AGV-1, AK, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, DVG-N, DVG-N, FER-1, FER-2, FER-4, FK-N, G-2, GA, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GH, GL-O, GPOS301, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JDo-1, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JGb-2, JH-1, JLs-1, JMn-1, JP-1, JR-1, JR-2, JR-3, JSd-1, JSd-2, JSd-3, JSI-1, JSI-2, JSy-1, KB, KK, MAN-1, Mica-Fe, MK, MK-1, MO-1, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-2, MO-4, MO-5, MO-6, MO-8, MO-9, MSCH-1, MSCH-2, MSCH-3, MSCH-4, MY-4, PM-S, QLO-1, RGM-1, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-2, SDO-3, SDO-7, SDO-8, SDO-9, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SI-2, SI-3, SKD-1, SSL-1, SSV-1, ST-1a, STM-1, SY-4, UB-N, W-2, WS-E, WS-E, ZW-C. SED: BCSS-1, CRM 277, CRM 320, GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 08301, GSD-10, GSD-11, GSD-12, GSD-9, JLk-1, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, MESS-2, SRM 1646a, STSD-1, STSD-2, STSD-3, STSD-4, SOIL: BS-1, BS-2, BS-3, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GBW 08303, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SS-1, SS-2, SS-3. WATER: SLRS-3, TM-23, TM-24, TM-26, TM-27, TM-28, TMDA-51, TMDA-52, TMDA-54.

Bi: INST: GBW 07701, GBW 07702, GBW 07703, GBW 07704, GBW 07705, GBW 07706, GBW 07707, GBW 07708, GBW 07709, GBW 07710, GBW 07712, GBW 07713, GBW 07714, GBW 07715, GBW 07716, GBW 07717, GBW 07718, GBW 07719, GBW 07720, SRM 1643d, SRM 3106. ROCK: AC-E, AGV-1, AL-1, BHVO-1, BIR-1, BX-N, DNC-1, DR-N, DT-N, DVG-N, FER-1, FK-N, FM, G-2, GBW 07103, GBW

07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GL-O, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, JA-2, JA-3, JB-2, JB-3, JG-1a, JG-2, JG-3, JGb-1, JMn-1, JR-1, JR-2, JSy-1, KK, Mica-Fe, MK, QLO-1, RGM-1, SCo-1, SDC-1, SG-1a, SGHM-3, SGHM-4, SGR-1, STM-1, SY-4, UB-N, VS-N, W-2, ZW-C. SED: GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GSD-10, GSD-11, GSD-12, GSD-9, MAG-1, SL-1, SOIL: GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8. WATER: TM-23, TM-24, TM-26, TM-27, TMDA-51, TMDA-52, TMDA-54.

Br: ASH: NIES 8, SRM 1633b, SRM 1648, SRM 1649. INST: CRM 071, CRM 073, LGC4008, RM 8418, SRM 2142, SRM 3184. ROCK: AC-E, AGV-1, BHVO-1, BIR-1, G-2, GBW 07101, GBW 07102, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, JB-2, JR-1, KK, QLO-1, RGM-1, SCo-1, SDC-1, SG-3, ST-1a, STM-1, SY-4, W-2. SED: CRM 277, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GSD-10, GSD-11, GSD-9, IAEA-356, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, NIES 2, SD-M-2/TM, SL-1, SL-3, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, SRM 2710, SRM 2711, TILL-1, TILL-2, TILL-3, TILL-4. TISS: A-13, CLV-1, CLV-2, CRM 278, CRM 422, CTA-OTL-1, GBW 08505, GBW 08552, GBW 08571, GBW 08572, GBW 8509, IAEA-153, RM 8414, RM 8433, RM 8435, SRM 1515, SRM 1547, SRM 1575, SRM 1577b, SRM 1974, TY-1, TY-2, TY-3, TY-4, V-10.

C: ASH: CRM 542CO39, CRM 548GB41, CRM 549FR15, CRM 550DE38, ZUK-1. INST: CRM 034, CRM 035, CRM 036, CRM 071, CRM 072, CRM 073, CRM 127, CRM 183, GBW 07505, LGC4002, LGC4007, SRM 141c, SRM 143c, SRM 148. ROCK: AC-E, AK, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, DVG-N, FER-1, FER-2, FER-3, FER-4, FK-N, FM, G-2, GA, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GPOS301, GS-N, JA-2, JA-3, JB-2, JB-3, JDo-1, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JGb-2, JH-1, JLs-1, JP-1, JR-1, JR-2, JR-3, JSd-1, JSd-2, JSd-3, JSI-1, JSI-2, KK, MAN-1, Mica-Fe, Mica-Mg, MK, MK-1, MO-1, MO-10, MO-15, MO-4, MO-5, MO-6, MO-8, MO-9, MSCH-2, MY-1, MY-2, MY-4, PM-S, QLO-1, RGM-1, SARM-1, SARM-2, SARM-3, SARM-4, SARM-5, SARM-6, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-2, SDO-3, SDO-4, SDO-5, SDO-6, SDO-8, SDO-8, SDO-9, SDU-1, SG-1a, SGD-1a, SGR-1, SKD-1, SRM 278, SRM 278, SRM 688, SRM 88b, SSV-1, ST-1a, STM-1, SY-3, SY-4, UB-N, UM-2, UM-4, W-2, WS-E, ZW-C. SED: BCSS-1, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, JLk-1, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, MESS-2, PACS-1, SRM 1941a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, SRM 2709, SRM 2710, SRM 2711.

Ca. ASH: CRM 176, CRM 542CO39, CRM 548GB41, CRM 549FR15, CRM 550DE38, CTA-FFA-2, NIES 8, SRM 1633b, SRM 2689, SRM 2690, SRM 2691, ZUK-1, INST: GBW 07506, LGC1304, RM 8416, RM 8418, RM 8432, SRM 1643d, SRM 3109a, SRM 3172a, V-9, ROCK: AC-E, AGV-1, AK, AL-1, AN-G, BCS-CRM 309, BCS-CRM 319, BCS-CRM 348, BCS-CRM 375, BCS-CRM 376, BCS-CRM 389, BCS-CRM 393, BCS-CRM 395, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DNC-1, DR-N, DT-N, DVG-N, FER-1, FER-2, FER-3, FER-4, FK-N, FM, G-2, GA, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW

07113, GBW 07114, GBW 07249, GH, GL-O, GPOS301, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, IPT-28, IPT-32, IPT-35, IPT-42, IPT-44, IPT-48, IPT-53, IPT-61, IPT-62, IPT-72, JA-2, JA-3, JB-2, JB-3, JDo-1, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JGb-2, JH-1, JLs-1, JMn-1, JP-1, JR-1, JR-2, JR-2, JR-3, JSd-1, JSd-2, JSd-3, JSI-1, JSI-2, JSy-1, KB, KK, MAN-1, MGR-1, Mica-Fe, Mica-Mg, MK, MK-1, MO-1, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-2, MO-3, MO-4, MO-5, MO-6, MO-7, MO-8, MO-9, MSCH-1, MSCH-2, MSCH-3, MSCH-4, MY-1, MY-3, MY-4, Nod-A-1, Nod-P-1, PM-S, QLO-1, RGM-1, SARM-1, SARM-2, SARM-3, SARM-39, SARM-4, SARM-40, SARM-41, SARM-43, SARM-44, SARM-45, SARM-47, SARM-48, SARM-49, SARM-5, SARM-50, SARM-6, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-2, SDO-3, SDO-4, SDO-5, SDO-6, SDO-7, SDO-8, SDO-9, SDU-1, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SI-2, SI-3, SKD-1, SpS, SRM 1c, SRM 278, SRM 600, SRM 688, SRM 694, SRM 696, SRM 697, SRM 698, SRM 69b, SRM 88b, SRM 97b, SRM 98b, SSL-1, SSV-1, ST-1a, STM-1, SY-3, SY-4, SY-4, TDB-1, UB-N, UM-2, UM-4, VS-N, W-2, WGB-1, WMG-1, WMS-1, WPR-1, WS-E, ZW-C, SED: BCSS-1, CRM 277, CRM 320, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, IAEA-356, JLk-1, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, NIES 2, PACS-1, SARM 46, SARM 51, SARM 52, SD-M-2/TM, SL-1, SL-3, SRM 1646a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4, SOIL: BS-1, BS-2, BS-3, CRM 141, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GBW 08303, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SARM 42, SO-2, SO-3, SO-4, SRM 2709, SRM 2710, SRM 2711, SS-1, SS-2, SS-3, TILL-1, TILL-2, TILL-3, TILL-4, TISS: A-11, A-13, A-14, CLV-1, CLV-2, CRM 063R, CRM 100, CRM 101, CRM 129, CRM 184, CRM 185, CRM 186, CRM 278, CRM 279, CRM 422, CTA-OTL-1, GBW 08504, GBW 08505, GBW 08551, GBW 08552, GBW 08571, GBW 08572, GBW 8509, IAEA-153, IAEA-350, LUTS-1, NIES 3, RM 8412, RM 8413, RM 8414, RM 8415, RM 8433, RM 8435, SRM 1515, SRM 1547, SRM 1566a, SRM 1570a, SRM 1570a, SRM 1575, SRM 1577b, SRM 1598, TY-1, TY-2, TY-3, TY-4, V-10, WATER: AUD-06, CRM 408, CRM 398, CRM 399, CRM 409, GRM-02, HURON-03, ION-20, ION-911, ION-92, ION-94, ION-95, ION-96, SLRS-3, SOUR-01, SRM 2694a, TM-23, TM-24, TM-26, TM-27, TM-28, TMDA-51, TMDA-52, TMDA-54.

Cd. ASH: CRM 038, CRM 176, CTA-FFA-2, GBW 08401, NIES 8, PD-1, SRM 1633b, SRM 1648, SRM 1649, SRM 2689, SRM 2690, SRM 2691. INST: GBW 07508, GBW 07509, GBW 07701, GBW 07702, GBW 07703, GBW 07704, GBW 07705, GBW 07706, GBW 07707, GBW 07708, GBW 07709, GBW 07710, GBW 07711, GBW 07712, GBW 07713, GBW 07714, GBW 07715, GBW 07716, GBW 07717, GBW 07718, GBW 07719, GBW 07720, GBW 08602, GBW 08607, GBW 08608, GBW 08612, LGC1303, RM 8416, RM 8418, RM 8432, SRM 1643d, SRM 3108, SRM 3171a, SRM 614, SRM 615. ROCK: AC-E, AGV-1, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, DNC-1, DR-N, DT-N, DVG-N, FER-2, FK-N, G-2, GA, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GH, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JMn-1, JP-1, JR-1, JR-2, KB, KK, MAN-1, Mica-Mg, MK, PM-S, QLO-1, RGM-1, SCo-1, SDC-1, SDO-1 (USGS), SDO-4, SDO-5, SDO-6, SG-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SpS, SRM 694, ST-1a, STM-1, SY-4, VS-N, W-2, WS-E, ZW-C. SED: BCSS-1, CRM 277, CRM 277, CRM 320, CRM 320, GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07314, GBW 08301, GSD-10, GSD-11, GSD-12, GSD-9, HR-1, IAEA-356, LKSD-1, LKSD-2, LKSD-3, LKSD-4,

MAG-1, MESS-2, NIES 2, PACS-1, SD-M-2/TM, SL-1, SRM 1646a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4, SUD-1, TH-1, TH-2, WQB-1, WQB-3. SLUD: CRM 145R, CRM 146. SOIL: BS-1, BS-2, BS-3, CRM 141, CRM 142R, CRM 143R, CRM 143R, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GBW 08303, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SRM 2709, SRM 2710, SRM 2711, SS-1, SS-2, SS-3, TILL-1, TILL-2, TILL-3, TILL-4. TISS: A-11, CRM 060, CRM 061, CRM 062, CRM 100, CRM 101, CRM 150, CRM 151, CRM 184, CRM 185, CRM 186, CRM 194, CRM 195, CRM 196, CRM 278, CRM 279, CRM 281, CRM 414, CRM 422, CTA-OTL-1, DOLT-2, DORM-2, GBW 08501, GBW 08504, GBW 08505, GBW 08551, GBW 08571, GBW 08572, IAEA-336, IAEA-350, LUTS-1, NIES 3, RM 8414, RM 8415, RM 8433, RM 8435, SRM 1515, SRM 1547, SRM 1566a, SRM 1570a, SRM 1575, SRM 1577b, SRM 1598, SRM 1974, TORT-2, TY-1, TY-2, TY-3, TY-4, V-10. WATER: CASS-3, CRM 403, CRM 505, NASS-4, SLEW-2, SLRS-3, TM-23, TM-24, TM-26, TM-27, TM-28, TMDA-51, TMDA-52, TMDA-54.

Ce. ASH: CTA-FFA-2, NIES 8, SRM 1633b, SRM 1648, SRM 1649, ZUK-1. INST: GBW 07701, GBW 07702, GBW 07703, GBW 07704, GBW 07705, GBW 07706, GBW 07707, GBW 07708, GBW 07709, GBW 07712, GBW 07713, GBW 07714, GBW 07715, GBW 07716, GBW 07717, GBW 07718, GBW 07719, SRM 1872, SRM 1873, SRM 3110, SRM 612, SRM 613. ROCK: AC-E, AGV-1, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, DVG-N, FK-N, FM, G-2, GA, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JMn-1, JP-1, JR-1, JR-2, JSy-1, KB, KK, MAN-1, Mica-Fe, Mica-Mg, MK, PM-S, QLO-1, RGM-1, SARM-1, SARM-2, SARM-3, SARM-39, SARM-4, SARM-40, SARM-41, SARM-43, SARM-44, SARM-45, SARM-47, SARM-48, SARM-50, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-2, SDO-4, SDO-5, SDO-6, SDO-7, SDO-8, SDO-9, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGR-1, SKD-1, SpS, SRM 278, SRM 688, SRM 88b, SSL-1, SSV-1, ST-1a, STM-1, SY-4, UB-N, W-2, WS-E, ZW-C. SED: CRM 277, CRM 320, GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, IAEA-356, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, SARM 46, SARM 51, SARM 52, SD-M-2/TM, SL-1, SL-3, SRM 1646a, SRM 1941a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: BS-1, BS-2, BS-3, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SARM 42, SOIL-7, SRM 2709, SRM 2710, SRM 2711, SS-1, SS-2, SS-3, TILL-1, TILL-2, TILL-3, TILL-4. TISS: CTA-OTL-1, GBW 08505, GBW 08571, SRM 1515, SRM 1547, SRM 1566a, SRM 1575, SRM 1974.

Cl. ASH: CRM 542CO39, CRM 548GB41, CRM 549FR15, CRM 550DE38, SRM 1648, SRM 1649, SRM 1649. INST: CRM 034, CRM 071, CRM 072, CRM 073, GBW 08606, LGC4004, RM 8416, RM 8418, RM 8432, SRM 2144, SRM 3182, V-9. OIL: SRM 1634c. ROCK: AC-E, AGV-1, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, DNC-1, DR-N, DT-N, FER-1, FER-2, FER-4, FK-N, G-2, GA, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JB-2, JB-3, JG-1a, JG-3, JGb-1, JP-1, JR-1, JR-2, MAN-1, Mica-Fe, Mica-Mg, MK, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-7, MO-8, MO-9, QLO-1, QLO-1, RGM-1, SARM-3, SCo-1, SDC-1, SDO-4, SDO-5, SDO-6, SGD-1a, SGR-1, SKD-1, ST-1a, STM-1, SY-4, UB-

N, W-2, ZW-C. SED: BCSS-1, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GSD-10, GSD-11, GSD-12, GSD-9, MAG-1, PACS-1, SL-1, SRM 1941a, SRM 2704. SOIL: GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8. TISS: A-11, CLV-1, CLV-2, CRM 060, CRM 061, CRM 062, CRM 063R, CRM 100, CRM 101, CRM 184, CRM 185, CRM 186, CRM 278, CRM 279, CTA-OTL-1, GBW 08552, GBW 08571, GBW 8509, RM 8412, RM 8413, RM 8414, RM 8415, RM 8433, RM 8435, SRM 1515, SRM 1547, SRM 1566a, SRM 1577b, SRM 1974, TY-1, TY-2, TY-3, TY-4. WATER: AUD-06, CRM 408, CRM 398, CRM 399, CRM 409, GRM-02, HURON-03, ION-20, ION-911, ION-92, ION-94, ION-95, ION-96, SOUR-01, SRM 2694a.

Co. ASH: CRM 038, CRM 176, CTA-FFA-2, GBW 08401, NIES 8, SRM 1633b, SRM 1648, SRM 1649, SRM 2689, SRM 2690, SRM 2691, ZUK-1. INST: GBW 07701, GBW 07702, GBW 07703, GBW 07704, GBW 07705, GBW 07706, GBW 07707, GBW 07708, GBW 07712, GBW 07713, GBW 07714, GBW 07715, GBW 07716, GBW 07717, GBW 07718, GBW 08613, LGC1305, RM 8416, RM 8418, RM 8432, SRM 1643d, SRM 3113, SRM 3172a, SRM 610, SRM 611, SRM 612, SRM 613, SRM 614, SRM 615. OIL: SRM 1634c. ROCK: AC-E, AGV-1, AK, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, DVG-N, FER-1, FER-2, FER-3, FER-4, FK-N, FM, G-2, GA, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GPOS301, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JDo-1, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JGb-2, JH-1, JLs-1, JMn-1, JP-1, JR-1, JR-2, JR-3, JSd-1, JSd-2, JSd-3, JSI-1, JSI-2, JSy-1, KB, KK, MAN-1, Mica-Fe, Mica-Mg, MK, MK-1, MO-1, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-2, MO-3, MO-4, MO-5, MO-6, MO-7, MO-8, MO-9, MSCH-1, MSCH-3, MSCH-4, MY-1, MY-2, MY-3, MY-4, Nod-A-1, Nod-P-1, PM-S, QLO-1, RGM-1, SARM-2, SARM-39, SARM-4, SARM-40, SARM-41, SARM-43, SARM-44, SARM-45, SARM-47, SARM-5, SARM-50, SARM-6, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-2, SDO-3, SDO-4, SDO-5, SDO-6, SDO-7, SDO-8, SDO-9, SDU-1, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SI-2, SI-3, SKD-1, SpS, SRM 120c, SRM 278, SRM 688, SRM 88b, SRM 97b, SRM 98b, SSL-1, SSV-1, ST-1a, STM-1, SY-4, UB-N, UM-2, UM-4, VS-N, W-2, WMS-1, WS-E, ZW-C. SED: BCSS-1, CRM 277, CRM 320, GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GBW 08301, GSD-10, GSD-11, GSD-12, GSD-9, HR-1, IAEA-356, JLk-1, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, MESS-2, NIES 2, PACS-1, SARM 46, SARM 51, SARM 52, SD-M-2/TM, SL-1, SRM 1646a, SRM 1941a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4, SUD-1, TH-1, TH-2, WQB-1, WQB-3. SLUD: CRM 145R, CRM 146. SOIL: BS-1, BS-2, BS-3, CRM 141, CRM 142R, CRM 142R, CRM 143R, CRM 143R, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GBW 08303, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SARM 42, SO-2, SO-3, SO-4, SOIL-7, SRM 2709, SRM 2710, SRM 2711, SS-1, SS-2, SS-3, TILL-1, TILL-2, TILL-3, TILL-4. TISS: A-11, CLV-1, CLV-2, CRM 278, CRM 281, CRM 402, CRM 414, CRM 422, CTA-OTL-1, DOLT-2, DORM-2, GBW 08501, GBW 08505, GBW 08551, GBW 08552, GBW 08571, GBW 08572, IAEA-350, LUTS-1, NIES 3, RM 8414, RM 8415, RM 8433, RM 8435, SRM 1515, SRM 1547, SRM 1566a, SRM 1570a, SRM 1575, SRM 1577b, SRM 1598, SRM 1974, TORT-2, TY-1, TY-2, TY-3, TY-4, V-10. WATER: CASS-3, NASS-4, SLEW-2, SLRS-3, TM-23, TM-24, TM-26, TM-27, TM-28, TMDA-51, TMDA-52, TMDA-54.

Cr. ASH: CRM 038, CRM 176, CTA-FFA-2, GBW 08401, NIES 8, SRM 1633b, SRM 1648, SRM 1649, SRM 2689, SRM 2690,

SRM 2691, ZUK-1. INST: GBW 07701, GBW 07702, GBW 07703, GBW 07704, GBW 07705, GBW 07706, GBW 07707, GBW 07708, GBW 07709, GBW 07712, GBW 07713, GBW 07714, GBW 07715, GBW 07716, GBW 07717, GBW 07718, GBW 08607, GBW 08608, GBW 08614, LGC1307, RM 8416, RM 8418, RM 8432, SRM 1643d, SRM 1872, SRM 1873, SRM 2109, SRM 3112a, SRM 3171a, V-9. ROCK: AC-E, AGV-1, AK, AL-1, AN-G, BCS-CRM 319, BCS-CRM 348, BCS-CRM 375, BCS-CRM 376, BCS-CRM 389, BCS-CRM 395, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, DVG-N, FER-1, FER-2, FER-3, FER-4, FK-N, FM, G-2, GA, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GPOS301, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JDo-1, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JGb-2, JH-1, JLs-1, JMn-1, JP-1, JR-1, JR-2, JR-3, JSd-1, JSd-2, JSd-3, JSI-1, JSI-2, JSy-1, KB, KK, MAN-1, Mica-Fe, Mica-Mg, MK, MK-1, MO-1, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-2, MO-3, MO-4, MO-5, MO-6, MO-7, MO-8, MO-9, MSCH-1, MSCH-2, MSCH-3, MSCH-4, MY-1, MY-3, MY-4, PM-S, QLO-1, RGM-1, SARM-1, SARM-2, SARM-3, SARM-39, SARM-4, SARM-40, SARM-41, SARM-43, SARM-44, SARM-45, SARM-47, SARM-48, SARM-5, SARM-5, SARM-50, SARM-6, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-2, SDO-3, SDO-4, SDO-5, SDO-6, SDO-7, SDO-8, SDO-9, SDU-1, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SI-2, SI-3, SKD-1, SpS, SRM 120c, SRM 278, SRM 600, SRM 670, SRM 688, SRM 694, SRM 696, SRM 697, SRM 698, SRM 69b, SRM 81a, SRM 88b, SRM 97b, SRM 98b, SSL-1, SSV-1, ST-1a, STM-1, SY-4, UB-N, UM-2, UM-4, VS-N, W-2, WS-E, ZW-C. SED: BCSS-1, CRM 277, CRM 277, CRM 320, CRM 320, GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GBW 08301, GSD-10, GSD-11, GSD-12, GSD-9, IAEA-356, JLk-1, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, MESS-2, NIES 2, PACS-1, SARM 46, SARM 51, SARM 52, SL-1, SRM 1646a, SRM 1941a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4, TH-2. SLUD: CRM 146. SOIL: BS-1, BS-2, BS-3, CRM 141, CRM 141, CRM 142R, CRM 142R, CRM 143R, CRM 143R, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GBW 08303, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SARM 42, SO-2, SO-3, SO-4, SOIL-7, SRM 2709, SRM 2710, SRM 2711, SS-1, SS-2, SS-3, TILL-1, TILL-2, TILL-3, TILL-4. TISS: A-11, CRM 101, CRM 184, CRM 185, CRM 186, CRM 278, CRM 279, CRM 281, CRM 402, CRM 414, CTA-OTL-1, DOLT-2, DORM-2, GBW 08501, GBW 08505, GBW 08551, GBW 08552, GBW 08571, GBW 08572, IAEA-336, IAEA-350, LUTS-1, RM 8414, RM 8415, RM 8433, RM 8435, SRM 1515, SRM 1547, SRM 1566a, SRM 1575, SRM 1598, SRM 1974, TORT-2, TY-1, TY-2, TY-3, TY-4, V-10. WATER: CASS-3, NASS-4, SLEW-2, SLRS-3, TM-23, TM-24, TM-26, TM-27, TM-28, TMDA-51, TMDA-52, TMDA-54.

Cs. ASH: CTA-FFA-2, NIES 8, SRM 1633b, SRM 1648, SRM 1649, SRM 2689, SRM 2690, SRM 2691, ZUK-1. INST: SRM 3111a. ROCK: AC-E, AGV-1, AK, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, DVG-N, FER-2, FER-2, FER-4, FER-4, FK-N, FM, G-2, GA, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GH, GL-O, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, JA-2, JA-3, JB-2, JB-3, JDo-1, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JGb-2, JH-1, JLs-1, JMn-1, JP-1, JR-1, JR-2, JR-3, JSd-1, JSd-2, JSd-3, JSI-1, JSI-2, JSy-1, KB, KK, MAN-1, Mica-Fe, Mica-Mg, MK, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-7, MO-8, MO-9, PM-S, QLO-1, RGM-1, SCo-1, SDC-1, SDO-1 (USGS), SDO-7, SDO-8, SDO-9, SG-1a, SG-3, SGD-

1a, SGH-1, SGH-3, SGH-5, SGHM-4, SGR-1, SI-2, SKD-1, SpS, SRM 278, SRM 88b, SRM 97b, SRM 98b, SSL-1, SSV-1, ST-1a, STM-1, SY-4, UB-N, VS-N, W-2, WS-E, ZW-C. SED: CRM 277, CRM 320, GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, IAEA-356, JLk-1, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, SD-M-2/TM, SL-1, SL-3, SRM 1941a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: BS-1, BS-2, BS-3, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SOIL-7, SRM 2709, SRM 2710, SRM 2711, SS-1, SS-2, SS-3, TILL-1, TILL-2, TILL-3, TILL-4. TISS: CTA-OTL-1, GBW 08505, GBW 08552, RM 8414, SRM 1566a, SRM 1598, SRM 1974.

Cu. ASH: CRM 038, CRM 176, CTA-FFA-2, GBW 08401, NIES 8, PD-1, SRM 1633b, SRM 1648, ZUK-1. INST: CRM 183, GBW 07701, GBW 07702, GBW 07703, GBW 07704, GBW 07705, GBW 07706, GBW 07707, GBW 07708, GBW 07709, GBW 07710, GBW 07711, GBW 07712, GBW 07713, GBW 07714, GBW 07715, GBW 07716, GBW 07717, GBW 07718, GBW 07719, GBW 07720, GBW 08607, GBW 08608, GBW 08615, LGC1306, RM 8416, RM 8418, RM 8432, SRM 1643d, SRM 3114, SRM 3172a, SRM 610, SRM 611, SRM 612, SRM 613, SRM 614, SRM 615, SRM 616, SRM 617, V-9. ROCK: AC-E, AGV-1, AK, AL-1, AN-G, BCS-CRM 375, BCS-CRM 376, BCS-CRM 389, BCS-CRM 395, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, DVG-N, FER-1, FER-2, FER-3, FER-4, FK-N, FM, G-2, GA, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GPOS301, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JDo-1, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JGb-2, JH-1, JLs-1, JMn-1, JP-1, JR-1, JR-2, JR-3, JSd-1, JSd-2, JSd-3, JSI-1, JSI-2, JSy-1, KB, KK, MAN-1, Mica-Fe, Mica-Mg, MK, MK-1, MO-1, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-2, MO-4, MO-5, MO-6, MO-7, MO-8, MO-9, MSCH-1, MSCH-2, MSCH-3, MSCH-4, MY-1, MY-2, MY-3, MY-4, Nod-A-1, Nod-P-1, PM-S, QLO-1, RGM-1, SARM-1, SARM-2, SARM-3, SARM-39, SARM-4, SARM-40, SARM-41, SARM-43, SARM-44, SARM-45, SARM-47, SARM-48, SARM-5, SARM-50, SARM-6, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-2, SDO-3, SDO-4, SDO-5, SDO-6, SDO-7, SDO-8, SDO-9, SDU-1, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SI-2, SI-3, SKD-1, SpS, SRM 120c, SRM 278, SRM 688, SSL-1, SSV-1, ST-1a, STM-1, SY-4, UB-N, UM-2, UM-4, VS-N, W-2, WMS-1, WS-E, ZW-C. SED: BCSS-1, CRM 277, CRM 277, CRM 320, CRM 320, GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GBW 08301, GSD-10, GSD-11, GSD-12, GSD-9, HR-1, IAEA-356, JLk-1, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, MESS-2, NIES 2, PACS-1, SARM 46, SARM 51, SARM 52, SD-M-2/TM, SL-1, SRM 1646a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4, SUD-1, TH-1, TH-2, WQB-1, WQB-3. SLUD: CRM 145R, CRM 146. SOIL: BS-1, BS-2, BS-3, CRM 141, CRM 142R, CRM 143R, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GBW 08303, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SARM 42, SO-2, SO-3, SO-4, SOIL-7, SRM 2709, SRM 2710, SRM 2711, SS-1, SS-2, SS-3, TILL-1, TILL-2, TILL-3, TILL-4. TISS: A-11, A-13, CLV-1, CLV-2, CRM 060, CRM 061, CRM 062, CRM 063R, CRM 100, CRM 101, CRM 129, CRM 150, CRM 151, CRM 184, CRM 185, CRM 186, CRM 278, CRM 279, CRM 281, CRM 414, CRM 422, CTA-OTL-1, DOLT-2, DORM-2, GBW 08501, GBW 08504, GBW 08505, GBW 08551, GBW 08552, GBW 08571, GBW 08572, GBW 8508, GBW

8509, IAEA-336, IAEA-350, LUTS-1, NIES 3, RM 8412, RM 8413, RM 8414, RM 8415, RM 8433, RM 8435, SRM 1515, SRM 1547, SRM 1566a, SRM 1570a, SRM 1575, SRM 1577b, SRM 1598, SRM 1974, TORT-2, TY-1, TY-2, TY-3, TY-4, V-10. WATER: CASS-3, CRM 403, CRM 505, NASS-4, SLEW-2, SLRS-3, TM-23, TM-24, TM-26, TM-27, TM-28, TMDA-51, TMDA-52, TMDA-54, AUD-06, GRM-02, HURON-03, ION-20, ION-911, ION-92, ION-94, ION-95, ION-95, ION-96, SOUR-01.

Dy. ASH: CTA-FFA-2, SRM 1633b, ZUK-1. INST: SRM 3115a, SRM 612, SRM 613. ROCK: AC-E, AGV-1, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, DNC-1, DR-N, DT-N, DVG-N, FK-N, G-2, GA, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JMn-1, JP-1, JR-1, JR-2, JSy-1, MAN-1, Mica-Fe, Mica-Mg, PM-S, QLO-1, RGM-1, SARM-1, SARM-2, SCo-1, SDC-1, SDO-1 (USGS), SG-1a, SG-3, SGD-1a, SGR-1, SKD-1, SSV-1, ST-1a, STM-1, SY-4, UB-N, W-2, WS-E, ZW-C. SED: GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, SL-1, SL-3, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, SOIL-7, SRM 2709, SRM 2710, SRM 2711. TISS: CLV-1, CLV-2.

Er. ASH: CTA-FFA-2, ZUK-1. INST: SRM 3116a, SRM 612, SRM 613. ROCK: AC-E, AGV-1, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, DNC-1, DR-N, DT-N, DVG-N, FK-N, G-2, GA, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JMn-1, JP-1, JR-1, JR-2, JSy-1, MAN-1, Mica-Fe, Mica-Mg, PM-S, QLO-1, RGM-1, SCo-1, SDC-1, SDO-1 (USGS), SG-1a, SGD-1a, SGR-1, SKD-1, SSV-1, STM-1, SY-4, UB-N, W-2, WS-E, ZW-C. SED: GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, MAG-1. SOIL: GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8.

Eu. ASH: CTA-FFA-2, NIES 8, SRM 1633b, SRM 1648, SRM 1649, SRM 2689, SRM 2690, SRM 2691, ZUK-1. INST: SRM 1872, SRM 1873, SRM 3117a, SRM 612, SRM 613, SRM 614, SRM 615. ROCK: AC-E, AGV-1, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, DNC-1, DR-N, DT-N, FK-N, FM, G-2, GA, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JMn-1, JP-1, JR-1, JR-2, JSy-1, KB, KK, MAN-1, Mica-Fe, Mica-Mg, MK, QLO-1, RGM-1, SARM-1, SARM-2, SARM-3, SARM-4, SARM-5, SCo-1, SDC-1, SDO-1 (USGS), SG-1a, SG-3, SGD-1a, SGR-1, SKD-1, SpS, SRM 120c, SRM 278, SRM 688, SRM 88b, SRM 97b, SRM 98b, ST-1a, STM-1, SY-4, UB-N, W-2, WS-E, ZW-C. SED: CRM 277, CRM 320, GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, IAEA-356, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, SD-M-2/TM, SL-1, SL-3, SRM 1941a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405,

GBW 07406, GBW 07407, GBW 07408, GBW 08302, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, SOIL-7, SRM 2709, SRM 2710, SRM 2711, TILL-1, TILL-2, TILL-3, TILL-4. TISS: CTA-OTL-1, GBW 08571, SRM 1515, SRM 1547, SRM 1566a, SRM 1570a, SRM 1575, SRM 1974.

F. ASH: CTA-FFA-2, GBW 08402, ZUK-1. INST: CRM 073, CRM 183, GBW 08604, RM 8416, RM 8418, RM 8432, SRM 2143, SRM 3183. ROCK: AC-E, AGV-1, AK, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, DVG-N, FER-1, FER-2, FER-3, FER-4, FK-N, FM, G-2, GA, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GPOS301, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JP-1, JR-1, JR-2, KK, MAN-1, MGR-1, Mica-Fe, Mica-Mg, MK, MO-1, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-2, MO-3, MO-5, MO-7, MO-8, MO-9, PM-S, QLO-1, RGM-1, SARM-1, SARM-3, SCo-1, SDC-1, SG-1a, SG-3, SGD-1a, SGR-1, SKD-1, SRM 278, SRM 688, SRM 694, ST-1a, STM-1, SY-3, SY-4, UB-N, W-2, WS-E, ZW-C. SED: GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GSD-10, GSD-11, GSD-12, GSD-9, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, MAG-1, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: BS-1, BS-2, BS-3, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3. TISS: GBW 08572, GBW 8506, GBW 8507, RM 8412, RM 8413, RM 8414, RM 8435, SRM 1566a. WATER: AUD-06, GRM-02, HURON-03, ION-20, ION-911, ION-92, ION-94, ION-95, ION-96, SOUR-01, SRM 2694a.

Fe. ASH: CRM 038, CRM 176, CRM 542CO39, CRM 548GB41, CRM 549FR15, CRM 550DE38, CTA-FFA-2, GBW 08401, PD-1, SRM 1633b, SRM 1648, SRM 1649, SRM 2689, SRM 2690, SRM 2691, ZUK-1. INST: GBW 07507, GBW 07507, GBW 08616, LGC1308, RM 8416, RM 8418, RM 8432, SRM 1643d, SRM 1872, SRM 1873, SRM 3126a, SRM 3171a, SRM 610, SRM 611, SRM 612, SRM 613, SRM 614, SRM 615, SRM 616, SRM 617. ROCK: AC-E, AGV-1, AK, AL-1, AN-G, BCS-CRM 309, BCS-CRM 319, BCS-CRM 348, BCS-CRM 375, BCS-CRM 376, BCS-CRM 389, BCS-CRM 393, BCS-CRM 395, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, DVG-N, FER-1, FER-2, FER-3, FER-4, FK-N, FM, G-2, GA, GBW 07101, GBW 07101, GBW 07102, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GPOS301, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, IPT-28, IPT-32, IPT-35, IPT-42, IPT-44, IPT-48, IPT-53, IPT-61, IPT-62, IPT-72, JA-2, JA-3, JB-2, JB-3, JDo-1, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JGb-2, JH-1, JLs-1, JMn-1, JP-1, JR-1, JR-2, JR-3, JSd-1, JSd-2, JSd-3, JSd-3, JSI-1, JSI-1, JSI-2, JSI-2, JSy-1, KB, KK, MAN-1, MGR-1, Mica-Fe, Mica-Mg, MK, MK-1, MO-1, MO-10, MO-11, MO-12, MO-13, MO-13, MO-14, MO-15, MO-2, MO-3, MO-4, MO-5, MO-6, MO-7, MO-8, MO-9, MSCH-1, MSCH-2, MSCH-3, MSCH-4, MY-1, MY-2, MY-3, MY-4, Nod-A-1, Nod-P-1, PM-S, QLO-1, RGM-1, SARM-1, SARM-2, SARM-3, SARM-39, SARM-4, SARM-40, SARM-41, SARM-43, SARM-44, SARM-45, SARM-47, SARM-48, SARM-49, SARM-5, SARM-50, SARM-6, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-2, SDO-3, SDO-3, SDO-4, SDO-5, SDO-6, SDO-7, SDO-8, SDO-9, SDU-1, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-3, SGHM-3, SGHM-4, SGHM-4, SGR-1, SI-2, SI-3, SKD-1, SpS, SRM 120c, SRM 1c, SRM 278, SRM 600, SRM 670, SRM 688, SRM 694, SRM 696, SRM 697, SRM 698, SRM 69b, SRM 81a, SRM 88b, SRM 97b, SRM 98b, SSL-1, SSV-1, ST-1a, STM-1, SY-3, SY-4, TDB-1, UB-N, UM-2, UM-4, W-2, WGB-1, WMG-1, WMS-1, WS-E, ZW-C. SED: BCSS-

1, CRM 277, CRM 320, GBW 07309, GBW 07309, GBW 07310, GBW 07310, GBW 07311, GBW 07311, GBW 07312, GBW 07312, GBW 07313, GBW 07313, GBW 07314, GBW 08301, GSD-10, GSD-11, GSD-12, GSD-9, HR-1, IAEA-356, JLk-1, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, MESS-2, NIES 2, PACS-1, SARM 46, SARM 51, SARM 52, SD-M-2/TM, SL-1, SRM 1646a, SRM 1941a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4, SUD-1, TH-1, TH-2, WQB-1, WQB-3. SOIL: BS-1, BS-2, BS-3, CRM 141, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GBW 08303, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SARM 42, SO-2, SO-3, SO-4, SRM 2709, SRM 2710, SRM 2711, SS-1, SS-2, SS-3, TILL-1, TILL-2, TILL-3, TILL-4. TISS: A-11, A-13, CRM 063R, CRM 100, CRM 101, CRM 129, CRM 150, CRM 151, CRM 184, CRM 185, CRM 186, CRM 278, CRM 279, CRM 281, CRM 402, CRM 414, CRM 422, CTA-OTL-1, DOLT-2, DORM-2, GBW 08501, GBW 08504, GBW 08505, GBW 08551, GBW 08552, GBW 08571, GBW 08572, GBW 8508, GBW 8509, IAEA-153, IAEA-336, IAEA-350, LUTS-1, NIES 3, RM 8412, RM 8413, RM 8414, RM 8415, RM 8433, RM 8435, SRM 1515, SRM 1547, SRM 1566a, SRM 1575, SRM 1577b, SRM 1598, SRM 1974, TORT-2, TY-1, TY-2, TY-3, TY-4, V-10. WATER: CASS-3, CRM 398, CRM 399, NASS-4, SLEW-2, SLRS-3, TM-23, TM-24, TM-26, TM-27, TM-28, TMDA-51, TMDA-52, TMDA-54.

Ga. ASH: CTA-FFA-2, ZUK-1. INST: GBW 07510, GBW 07712, GBW 07713, GBW 07714, GBW 07715, GBW 07716, GBW 07717, GBW 07718, SRM 3119a, SRM 614, SRM 615, SRM 616, SRM 617. ROCK: AC-E, AGV-1, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, DVG-N, FK-N, G-2, GA, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JMn-1, JP-1, JR-1, JR-2, JSy-1, KB, KK, MAN-1, Mica-Fe, Mica-Mg, MK-1, MO-1, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-2, MO-3, MO-4, MO-5, MO-6, MO-8, MO-9, MSCH-1, MSCH-2, MSCH-3, MSCH-4, MY-1, MY-3, MY-4, PM-S, QLO-1, RGM-1, SARM-1, SARM-2, SARM-3, SARM-39, SARM-4, SARM-40, SARM-41, SARM-44, SARM-45, SARM-47, SARM-5, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-2, SDO-3, SDO-7, SDO-8, SDO-9, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SKD-1, SpS, SSL-1, SSV-1, ST-1a, STM-1, SY-4, UB-N, VS-N, W-2, WS-E, ZW-C. SED: CRM 320, GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, MAG-1, SARM 51, SARM 52, SL-1, SRM 1646a, SRM 2704. SOIL: BS-1, BS-2, BS-3, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SARM 42, SRM 2709, SRM 2710, SRM 2711, SS-1, SS-2, SS-3.

Gd. ASH: CTA-FFA-2, SRM 1633b, ZUK-1. INST: SRM 3118a, SRM 612, SRM 613. ROCK: AC-E, AGV-1, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, DNC-1, DR-N, DT-N, DVG-N, FK-N, FM, G-2, GA, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JMn-1, JP-1, JR-1, JR-2, JSy-1, MAN-1, Mica-Fe, Mica-Mg, PM-S, QLO-1, RGM-1, SARM-1, SCo-1, SDC-1, SDO-1 (USGS), SG-1a, SGD-1a, SGR-1, SKD-1, SRM 278, SSV-1, ST-1a, STM-1, SY-4, UB-N, W-2, WS-E, ZW-C. SED: GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW

07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, MAG-1, SL-1. SOIL: GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8. TISS: SRM 1515, SRM 1547.

Ge. ASH: ZUK-1. INST: SRM 1872, SRM 1873, SRM 3120. ROCK: AGV-1, AL-1, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, DVG-N, FER-1, FER-2, FER-3, FER-4, FK-N, G-2, GA, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GH, GL-O, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JB-2, JB-3, JG-1a, JG-2, JG-3, JGb-1, JMn-1, JP-1, JR-1, JR-2, JSy-1, Mica-Fe, Mica-Mg, MK-1, MO-1, MO-2, MO-3, MO-4, MSCH-1, MSCH-2, MSCH-4, QLO-1, RGM-1, SCo-1, SDC-1, SDO-1 (USGS), SDU-1, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGR-1, SI-2, SKD-1, SSL-1, SSV-1, ST-1a, STM-1, SY-4, UB-N, W-2. SED: GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GSD-10, GSD-11, GSD-12, GSD-9, MAG-1, SL-1. SOIL: GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8.

H. ASH: PD-1, ZUK-1. INST: CRM 034, CRM 035, CRM 036, CRM 071, CRM 072, CRM 073, CRM 127, CRM 183, LGC4002, LGC4007, SRM 141c, SRM 143c, SRM 148. ROCK: AC-E, AGV-1, AK, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, DVG-N, FER-1, FER-2, FER-3, FER-4, FK-N, FM, G-2, GA, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07110, GBW 07112, GBW 07113, GBW 07114, GH, GL-O, GPOS301, GS-N, IF-G, JDo-1, JGb-2, JH-1, JLs-1, JR-3, JSd-1, JSd-2, JSd-3, JSI-1, JSI-2, KB, KK, MAN-1, Mica-Fe, Mica-Mg, MK, MK-1, MO-1, MO-10, MO-11, MO-12, MO-12, MO-13, MO-14, MO-15, MO-2, MO-5, MO-6, MO-7, MO-8, MO-9, MY-2, PM-S, QLO-1, RGM-1, SARM-1, SARM-2, SARM-3, SARM-4, SARM-5, SARM-6, SCo-1, SDC-1, SDO-1 (USGS), SDU-1, SG-1a, SG-3, SGD-1a, SGR-1, SKD-1, SSV-1, ST-1a, STM-1, SY-3, SY-4, UB-N, UM-2, UM-4, W-2, WS-E, ZW-C. SED: GBW 07309, GBW 07310, GBW 07311, GBW 07312, JLk-1, MAG-1, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408.

Hf. ASH: CTA-FFA-2, SRM 1633b, SRM 1648, SRM 1649, SRM 2689, SRM 2690, SRM 2691, ZUK-1. INST: SRM 3122. ROCK: AC-E, AGV-1, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, DNC-1, DR-N, DT-N, DVG-N, FK-N, FM, GA, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GH, GL-O, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JMn-1, JP-1, JR-1, JR-2, JSy-1, KB, KK, MAN-1, Mica-Fe, Mica-Mg, MK, PM-S, QLO-1, RGM-1, SCo-1, SDC-1, SDO-1 (USGS), SG-3, SGR-1, SKD-1, SpS, SRM 278, SRM 688, SRM 88b, SRM 97b, SRM 98b, STM-1, SY-4, UB-N, W-2, WS-E, ZW-C. SED: GBW 07302, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, IAEA-356, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, SD-M-2/TM, SL-1, SL-3, SRM 1941a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, SOIL-7, SRM 2709, SRM 2710, SRM 2711, TILL-1, TILL-2, TILL-3, TILL-4. TISS: CTA-OTL-1, GBW 08571, SRM 1566a, SRM 1974.

Hg. ASH: CRM 038, CRM 176, GBW 08401, PD-1, SRM 1633b, SRM 2689, SRM 2690, SRM 2691, ZUK-1. INST: CRM 036, GBW 07503, GBW 08603, GBW 08609, GBW 08617, RM 8416, RM 8418, RM 8432, SRM 1641b, SRM 3133, V-9. ROCK: AGV-

1, AN-G, BE-N, BHVO-1, BIR-1, DNC-1, FER-2, G-2, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JP-1, JR-1, JR-2, KB, KK, MAN-1, QLO-1, RGM-1, SCo-1, SDC-1, SDO-1 (USGS), SGR-1, STM-1, SY-4, W-2. SED: CRM 277, CRM 320, GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07314, GBW 08301, GSD-10, GSD-11, GSD-12, GSD-9, HR-1, IAEA-356, IAEA-356, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, MESS-2, NIES 2, PACS-1, SD-M-2/TM, SL-1, SRM 1646a, SRM 1941a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4, SUD-1, TH-2, WQB-1, WQB-3. SLUD: CRM 145R, CRM 146. SOIL: BS-1, BS-2, BS-3, CRM 141, CRM 143R, CRM 143R, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GBW 08303, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SO-2, SO-3, SO-4, SRM 2709, SRM 2710, SRM 2711, SS-1, SS-2, SS-3, TILL-1, TILL-2, TILL-3, TILL-4. TISS: A-11, CRM 060, CRM 061, CRM 062, CRM 150, CRM 151, CRM 184, CRM 185, CRM 186, CRM 278, CRM 279, CRM 281, CRM 414, CRM 422, CRM 422, CRM 463, CRM 463, CRM 464, CRM 464, CTA-OTL-1, DOLT-2, DORM-2, GBW 08501, GBW 08505, GBW 08552, GBW 08571, GBW 08572, GBW 8508, GBW 8509, IAEA-336, IAEA-350, LUTS-1, RM 8414, RM 8415, RM 8433, SRM 1515, SRM 1547, SRM 1566a, SRM 1570a, SRM 1575, SRM 1577b, SRM 1598, SRM 1974, TORT-2, TORT-2, TY-1, TY-2, TY-3, TY-4, V-10. WATER: CRM 408, CRM 409.

Ho. ASH: SRM 1633b, ZUK-1. INST: SRM 3123a. ROCK: AC-E, AGV-1, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, DNC-1, DR-N, DT-N, DVG-N, FK-N, G-2, GA, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JMn-1, JP-1, JR-1, JR-2, JSy-1, MAN-1, Mica-Fe, Mica-Mg, MK-1, PM-S, QLO-1, RGM-1, SCo-1, SDC-1, SDO-1 (USGS), SG-1a, SGD-1a, SGR-1, SKD-1, SSV-1, ST-1a, STM-1, SY-4, UB-N, W-2, WS-E, ZW-C. SED: GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, MAG-1, SL-1. SOIL: GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, SRM 2709, SRM 2710, SRM 2711. WATER: CRM 408, CRM 409.

I. ASH: SRM 1648. INST: CRM 072, LGC4009, RM 8416, RM 8418. ROCK: AGV-1, G-2, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, JA-2, JB-2, JB-3, JR-1, JR-2. SED: GBW 07309, GBW 07310, GBW 07311, GBW 07312, GSD-10, GSD-11, GSD-12, GSD-9, MAG-1, SL-1, SRM 2704. SOIL: GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, SRM 2709, SRM 2711. TISS: A-11, CLV-1, CLV-2, CRM 063R, CRM 129, CRM 150, CRM 151, CRM 184, CRM 185, CRM 186, CRM 279, CRM 422, RM 8414, RM 8415, RM 8433, RM 8435, SRM 1515, SRM 1547, SRM 1566a.

In. ASH: CTA-FFA-2, SRM 1648. INST: GBW 07512, GBW 07513, GBW 07514, SRM 3124a. ROCK: AGV-1, AL-1, BHVO-1, BR, BX-N, DR-N, DT-N, DVG-N, FK-N, G-2, GA, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GH, GL-O, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JB-2, JB-3, JG-1a, JG-2, JMn-1, JR-1, Mica-Fe, Mica-Mg, QLO-1, RGM-1, SCo-1, SDC-1, SDO-1 (USGS), SGR-1, STM-1, SY-4, UB-N. SED: GBW 07301, GBW 07302, GBW 07303,

GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GSD-10, GSD-11, GSD-12, GSD-9, MAG-1, SL-1. SOIL: GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, SRM 2710, SRM 2711.

Ir. ROCK: BHVO-1, BIR-1, DNC-1, GBW 07101, GBW 07102, JA-2, JA-3, JB-3, JG-2, JG-3, JP-1, JR-2, QLO-1, RGM-1, SCo-1, SDC-1, SGR-1, STM-1, TDB-1, WGB-1, WMG-1, WMS-1, WPR-1. SED: MAG-1, SL-1.

K. ASH: CRM 176, CRM 542CO39, CRM 548GB41, CRM 549FR15, CRM 550DE38, CTA-FFA-2, NIES 8, SRM 1633b, SRM 1648, SRM 2689, SRM 2690, SRM 2691, ZUK-1. INST: RM 8418, RM 8432, SRM 1643d, SRM 3141a, SRM 3171a, SRM 610, SRM 611, SRM 612, SRM 613, SRM 614, SRM 615, SRM 616, SRM 617. ROCK: AC-E, AGV-1, AK, AL-1, AN-G, BCS-CRM 309, BCS-CRM 319, BCS-CRM 348, BCS-CRM 375, BCS-CRM 376, BCS-CRM 389, BCS-CRM 393, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, DVG-N, FER-1, FER-2, FER-3, FER-4, FK-N, FM, G-2, GA, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GPOS301, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, IPT-28, IPT-32, IPT-35, IPT-42, IPT-44, IPT-48, IPT-53, IPT-61, IPT-62, IPT-72, JA-2, JA-3, JB-2, JB-3, JDo-1, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JGb-2, JH-1, JLs-1, JMn-1, JP-1, JR-1, JR-1, JR-2, JR-2, JR-3, JSd-1, JSd-2, JSd-3, JSI-1, JSI-2, JSy-1, KB, KK, MAN-1, MGR-1, Mica-Fe, Mica-Mg, MK, MK-1, MO-1, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-2, MO-3, MO-4, MO-5, MO-6, MO-7, MO-8, MO-9, MSCH-1, MSCH-2, MSCH-3, MSCH-4, MY-1, MY-3, MY-4, Nod-A-1, Nod-P-1, PM-S, QLO-1, RGM-1, SARM-1, SARM-2, SARM-3, SARM-39, SARM-4, SARM-40, SARM-41, SARM-43, SARM-44, SARM-45, SARM-47, SARM-48, SARM-49, SARM-5, SARM-50, SARM-6, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-2, SDO-3, SDO-4, SDO-5, SDO-6, SDO-7, SDO-8, SDO-9, SDU-1, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SI-2, SI-3, SKD-1, SpS, SRM 120c, SRM 1c, SRM 278, SRM 600, SRM 688, SRM 694, SRM 696, SRM 697, SRM 698, SRM 69b, SRM 88b, SRM 97b, SRM 98b, SSL-1, SSV-1, ST-1a, STM-1, STM-1, SY-3, SY-4, SY-4, TDB-1, UB-N, UM-2, UM-4, VS-N, W-2, W-2, WGB-1, WMG-1, WMS-1, WPR-1, WS-E, ZW-C. SED: BCSS-1, CRM 277, CRM 320, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, IAEA-356, JLk-1, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, NIES 2, PACS-1, SARM 46, SARM 51, SARM 52, SD-M-2/TM, SL-1, SL-3, SRM 1646a, SRM 1941a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: BS-1, BS-2, BS-3, CRM 141, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08303, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SARM 42, SO-2, SO-3, SO-4, SRM 2709, SRM 2710, SRM 2711, SS-1, SS-2, SS-3, TILL-1, TILL-2, TILL-3, TILL-4. TISS: A-11, A-13, A-14, CLV-1, CLV-2, CRM 063R, CRM 100, CRM 101, CRM 129, CRM 184, CRM 185, CRM 186, CRM 278, CRM 279, CRM 281, CRM 414, CRM 422, CTA-OTL-1, GBW 08501, GBW 08504, GBW 08505, GBW 08551, GBW 08552, GBW 08571, GBW 08572, GBW 8509, IAEA-153, IAEA-336, LUTS-1, NIES 3, RM 8412, RM 8413, RM 8414, RM 8415, RM 8433, RM 8435, SRM 1515, SRM 1547, SRM 1566a, SRM 1570a, SRM 1575, SRM 1577b, SRM 1598, SRM 1974, TY-1, TY-2, TY-3, TY-4. WATER: AUD-06, CRM 408, CRM 398, CRM 399, CRM 409, GRM-02, HURON-03, ION-20, ION-911, ION-92, ION-94, ION-95, ION-96, SLRS-3, SOUR-01, SRM 2694a, TM-23, TM-24, TM-26, TM-27, TM-28, TMDA-51, TMDA-52, TMDA-54

La. ASH: CTA-FFA-2, NIES 8, SRM 1633b, SRM 1648, SRM 1649, ZUK-1. INST: GBW 07701, GBW 07702, GBW 07703, GBW 07704, GBW 07705, GBW 07706, GBW

07707, GBW 07708, GBW 07712, GBW 07713, GBW 07714, GBW 07715, GBW 07716, GBW 07717, GBW 07718, SRM 3127a, SRM 612, SRM 613, SRM 614, SRM 615, SRM 616, SRM 617. ROCK: AC-E, AGV-1, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, DNC-1, DR-N, DT-N, DVG-N, FER-1, FER-2, FER-3, FER-4, FK-N, FM, G-2, GA, GBW 07101, GBW 07102, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JMn-1, JP-1, JR-1, JR-2, JSy-1, KB, KK, MAN-1, Mica-Fe, Mica-Mg, MK, MO-1, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-2, MO-4, MO-7, MO-8, MO-9, MSCH-1, MSCH-2, MSCH-3, MSCH-4, PM-S, QLO-1, RGM-1, SARM-1, SARM-2, SARM-3, SARM-4, SARM-5, SARM-6, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-2, SDO-3, SDO-4, SDO-5, SDO-6, SDO-7, SDO-8, SDO-9, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SI-2, SI-3, SKD-1, SpS, ST-1a, STM-1, SY-4, UB-N, W-2, WS-E, ZW-C. SED: CRM 277, CRM 320, GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, IAEA-356, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, NIES 2, SD-M-2/TM, SL-1, SL-3, SRM 1646a, SRM 1941a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: BS-1, BS-2, BS-3, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GBW 08303, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SOIL-7, SRM 2709, SRM 2710, SRM 2711, SS-1, SS-2, SS-3, TILL-1, TILL-2, TILL-3, TILL-4. TISS: CTA-OTL-1, GBW 08505, GBW 08571, SRM 1515, SRM 1547, SRM 1566a, SRM 1575, SRM 1974.

Li: ASH: CTA-FFA-2, ZUK-1. INST: GBW 07701, GBW 07702, GBW 07703, GBW 07704, GBW 07705, GBW 07706, GBW 07707, GBW 07708, GBW 07709, GBW 07712, GBW 07713, GBW 07714, GBW 07715, GBW 07716, GBW 07717, GBW 07718, GBW 07719, SRM 1643d, SRM 3129a. ROCK: AC-E, AGV-1, AK, AL-1, AN-G, BCS-CRM 309, BCS-CRM 319, BCS-CRM 389, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, DVG-N, FER-1, FER-2, FER-4, FK-N, G-2, GA, GBW 07101, GBW 07102, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JB-2, JB-3, JDo-1, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JGb-2, JH-1, JLs-1, JP-1, JR-1, JR-2, JR-3, JSd-1, JSd-2, JSd-3, JSI-1, JSI-2, KB, KK, MAN-1, Mica-Fe, Mica-Mg, MK, MK-1, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-2, MO-4, MO-7, MO-8, MO-9, MSCH-1, MSCH-2, MSCH-3, MSCH-4, PM-S, QLO-1, RGM-1, SARM-1, SARM-3, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-2, SDO-3, SDO-4, SDO-5, SDO-6, SDO-8, SDO-9, SDO-9, SDU-1, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SKD-1, SpS, SRM 97b, SRM 98b, SSV-1, ST-1a, STM-1, SY-4, UB-N, W-2, WS-E, ZW-C. SED: GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GSD-10, GSD-11, GSD-12, GSD-9, JLk-1, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, SL-1, SRM 1646a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: BS-1, BS-2, BS-3, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SS-1, SS-2, SS-3, TILL-1, TILL-2, TILL-3, TILL-4. TISS: CTA-OTL-1, GBW 08571. WATER: TM-23, TM-24, TM-26, TM-27, TM-28, TMDA-51, TMDA-52, TMDA-54.

Lu. ASH: CTA-FFA-2, NIES 8, SRM 1633b, ZUK-1. INST: SRM 3130a. ROCK: AC-E, AGV-1, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, DNC-1, DR-N, DT-N, FER-1, FK-N, FM, G-2, GA, GBW 07101, GBW 07102, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GS-N,

GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JMn-1, JP-1, JR-1, JR-2, JSy-1, KK, MAN-1, Mica-Fe, Mica-Mg, MK, PM-S, QLO-1, RGM-1, SARM-1, SARM-3, SARM-4, SCo-1, SDC-1, SDO-1 (USGS), SG-1a, SG-3, SGD-1a, SGR-1, SI-2, SKD-1, SpS, SRM 278, SRM 688, SSL-1, ST-1a, STM-1, SY-4, UB-N, W-2, WS-E, ZW-C. SED: GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, SD-M-2/TM, SL-1, SL-3, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8.

Mg. ASH: CRM 176, CRM 542CO39, CRM 548GB41, CRM 549FR15, CRM 550DE38, CTA-FFA-2, NIES 8, SRM 1633b, SRM 1648, SRM 2689, SRM 2690, SRM 2691, ZUK-1. INST: LGC1310, RM 8418, RM 8432, SRM 1643d, SRM 1872, SRM 1873, SRM 3131a, SRM 3171a, V-9. ROCK: AC-E, AGV-1, AK, AL-1, AN-G, BCS-CRM 309, BCS-CRM 319, BCS-CRM 348, BCS-CRM 375, BCS-CRM 376, BCS-CRM 389, BCS-CRM 393, BCS-CRM 395, BE-N, BHVO-1, BIR-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, DVG-N, FER-1, FER-2, FER-3, FER-4, FK-N, FM, G-2, GA, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GPOS301, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, IPT-28, IPT-32, IPT-35, IPT-42, IPT-44, IPT-48, IPT-53, IPT-61, IPT-62, IPT-72, JA-2, JA-3, JB-2, JB-3, JDo-1, JF-1, JF-2, JG-1a, JG-2, JG-2, JG-3, JGb-1, JGb-2, JH-1, JLs-1, JMn-1, JP-1, JR-1, JR-2, JR-2, JR-3, JSd-1, JSd-2, JSd-3, JSI-1, JSI-2, JSy-1, KB, KK, MAN-1, MGR-1, Mica-Fe, Mica-Mg, MK, MK-1, MO-1, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-2, MO-3, MO-4, MO-5, MO-6, MO-7, MO-8, MO-9, MSCH-3, MSCH-4, MY-1, MY-2, MY-3, MY-4, Nod-A-1, Nod-P-1, PM-S, QLO-1, RGM-1, SARM-1, SARM-2, SARM-3, SARM-39, SARM-4, SARM-40, SARM-41, SARM-43, SARM-44, SARM-45, SARM-47, SARM-48, SARM-49, SARM-5, SARM-50, SARM-6, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-2, SDO-3, SDO-4, SDO-5, SDO-6, SDO-7, SDO-8, SDO-9, SDU-1, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SI-2, SI-3, SKD-1, SpS, SRM 1c, SRM 278, SRM 600, SRM 688, SRM 694, SRM 696, SRM 697, SRM 698, SRM 69b, SRM 88b, SRM 97b, SRM 98b, SSL-1, SSV-1, ST-1a, STM-1, SY-3, SY-4, SY-4, TDB-1, UB-N, UM-2, UM-4, VS-N, W-2, W-2, WGB-1, WMG-1, WMS-1, WPR-1, WS-E, ZW-C. SED: BCSS-1, CRM 277, CRM 320, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, JLk-1, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, PACS-1, SARM 46, SARM 51, SARM 52, SL-1, SL-3, SRM 1646a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: BS-1, BS-2, BS-3, CRM 141, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GBW 08303, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SARM 42, SO-2, SO-3, SO-4, SRM 2709, SRM 2710, SRM 2711, SS-1, SS-2, SS-3, TILL-1, TILL-2, TILL-3, TILL-4. TISS: A-11, CLV-1, CLV-2, CRM 063R, CRM 100, CRM 101, CRM 129, CRM 184, CRM 185, CRM 186, CRM 278, CRM 279, CRM 281, CRM 422, CTA-OTL-1, GBW 08501, GBW 08504, GBW 08505, GBW 08551, GBW 08552, GBW 08571, GBW 08572, GBW 8509, IAEA-153, LUTS-1, NIES 3, RM 8412, RM 8413, RM 8414, RM 8415, RM 8433, RM 8435, SRM 1515, SRM 1547, SRM 1566a, SRM 1570a, SRM 1577b, SRM 1598, SRM 1974, TY-1, TY-2, TY-3, TY-4, V-10. WATER: AUD-06, CRM 398, CRM 399, GRM-02, HURON-03, ION-20, ION-911, ION-92, ION-94, ION-95, ION-96, SLRS-3, SOUR-01, SRM 2694a, TM-23, TM-24, TM-26, TM-27, TM-28, TMDA-51, TMDA-52, TMDA-54.

Mn. ASH: CRM 038, CRM 176, CRM 542CO39, CRM 548GB41, CRM 549FR15, CRM 550DE38, CTA-FFA-2, GBW 08401, SRM 1633b, SRM 1648, SRM 2689, SRM 2690, SRM 2691, ZUK-1. INST: GBW 07507, GBW 07701, GBW 07702, GBW 07703, GBW 07704, GBW 07705, GBW 07706, GBW 07707, GBW 07708, GBW 07709, GBW 07712, GBW 07713, GBW 07714, GBW 07715, GBW 07716, GBW 07717, GBW 07718, GBW 07719, GBW 07720, LGC1311, RM 8416, RM 8418, RM 8432, SRM 1643d, SRM 3132, SRM 3171a, SRM 610, SRM 611, SRM 612, SRM 613, V-9. ROCK: AC-E, AGV-1, AK, AL-1, AN-G, BCS-CRM 309, BCS-CRM 319, BCS-CRM 375, BCS-CRM 376, BCS-CRM 389, BCS-CRM 393, BCS-CRM 395, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, DVG-N, FER-1, FER-2, FER-3, FER-4, FK-N, FM, G-2, GA, GBW 07101, GBW 07102, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GPOS301, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, IPT-35, IPT-44, IPT-48, JA-2, JA-3, JB-2, JB-3, JDo-1, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JGb-2, JH-1, JLs-1, JMn-1, JP-1, JR-1, JR-2, JR-2, JR-3, JSd-1, JSd-2, JSd-3, JSI-1, JSI-2, JSy-1, KB, KK, MAN-1, MGR-1, Mica-Fe, Mica-Mg, MK, MK-1, MO-1, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-2, MO-3, MO-4, MO-5, MO-6, MO-7, MO-8, MO-9, MSCH-1, MSCH-2, MSCH-3, MSCH-4, MY-1, MY-2, MY-3, MY-4, Nod-A-1, Nod-P-1, PM-S, QLO-1, RGM-1, SARM-1, SARM-2, SARM-3, SARM-3, SARM-39, SARM-4, SARM-4, SARM-40, SARM-41, SARM-43, SARM-44, SARM-45, SARM-47, SARM-48, SARM-49, SARM-5, SARM-5, SARM-50, SARM-6, SARM-6, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-2, SDO-3, SDO-4, SDO-5, SDO-6, SDO-7, SDO-8, SDO-9, SDU-1, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SI-2, SI-3, SKD-1, SpS, SRM 120c, SRM 1c, SRM 278, SRM 600, SRM 688, SRM 694, SRM 696, SRM 697, SRM 698, SRM 69b, SRM 88b, SRM 97b, SRM 98b, SSL-1, SSV-1, ST-1a, STM-1, SY-3, SY-4, TDB-1, UB-N, UM-2, UM-4, VS-N, W-2, WGB-1, WMG-1, WMS-1, WPR-1, WS-E, ZW-C. SED: BCSS-1, CRM 277, CRM 277, CRM 320, GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GBW 08301, GSD-10, GSD-11, GSD-12, GSD-9, HR-1, IAEA-356, JLk-1, LKSD-1, LKSD-1, LKSD-2, LKSD-2, LKSD-3, LKSD-3, LKSD-4, LKSD-4, MAG-1, MESS-2, NIES 2, PACS-1, SARM 46, SARM 51, SARM 52, SD-M-2/TM, SL-1, SRM 1646a, SRM 1941a, SRM 2704, STSD-1, STSD-1, STSD-2, STSD-2, STSD-3, STSD-3, STSD-4, STSD-4, SUD-1, TH-1, TH-2, WQB-1, WQB-3. SLUD: CRM 145R, CRM 146. SOIL: BS-1, BS-2, BS-3, CRM 141, CRM 141, CRM 142R, CRM 142R, CRM 143R, CRM 143R, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GBW 08303, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SARM 42, SO-2, SO-3, SO-4, SOIL-7, SRM 2709, SRM 2710, SRM 2711, SS-1, SS-2, SS-3, TILL-1, TILL-2, TILL-3, TILL-4. TISS: A-11, CLV-1, CLV-2, CRM 060, CRM 061, CRM 062, CRM 100, CRM 101, CRM 129, CRM 184, CRM 185, CRM 186, CRM 278, CRM 279, CRM 281, CRM 414, CRM 422, CTA-OTL-1, DOLT-2, DORM-2, GBW 08501, GBW 08504, GBW 08505, GBW 08551, GBW 08552, GBW 08571, GBW 08572, GBW 8508, GBW 8509, IAEA-336, IAEA-350, LUTS-1, NIES 3, RM 8412, RM 8413, RM 8414, RM 8415, RM 8433, RM 8435, SRM 1515, SRM 1547, SRM 1566a, SRM 1570a, SRM 1575, SRM 1577b, SRM 1598, SRM 1974, TORT-2, TY-1, TY-2, TY-3, TY-4. WATER: CASS-3, CRM 398, CRM 399, NASS-4, SLEW-2, SLRS-3, TM-23, TM-24, TM-26, TM-27, TM-28, TMDA-51, TMDA-52, TMDA-54.

Mo. ASH: CTA-FFA-2, NIES 8, SRM 1649, ZUK-1. INST: GBW 07701, GBW 07702, GBW 07703, GBW 07704, GBW 07705, GBW 07706, GBW 07707, GBW 07708, GBW 07709, GBW 07710, GBW 07711, GBW 07712, GBW 07713, GBW 07714, GBW 07715, GBW 07716, GBW 07717, GBW 07718, GBW 07719, GBW 07720, RM 8416, RM 8418, RM 8432, SRM 1643d,

SRM 3134, SRM 3171a, V-9. ROCK: AC-E, AGV-1, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, DVG-N, FER-2, FK-N, FM, G-2, GA, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JMn-1, JP-1, JR-1, JR-2, JSy-1, KK, MAN-1, Mica-Fe, Mica-Mg, MK-1, MO-1, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-2, MO-3, MO-4, MO-8, MO-9, MSCH-1, MSCH-2, MSCH-3, MSCH-4, MY-1, MY-2, MY-3, MY-4, Nod-A-1, Nod-P-1, PM-S, QLO-1, RGM-1, SARM-39, SARM-40, SARM-41, SARM-44, SARM-48, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-2, SDO-3, SDO-4, SDO-5, SDO-6, SDO-8, SDO-9, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SKD-1, SRM 120c, SSL-1, SSV-1, ST-1a, STM-1, SY-4, UB-N, VS-N, W-2, WS-E, ZW-C. SED: BCSS-1, CRM 277, CRM 320, GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, IAEA-356, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, MESS-2, PACS-1, SARM 46, SL-1, SRM 1646a, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: BS-1, BS-2, BS-3, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08303, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SARM 42, SRM 2709, SRM 2710, SS-1, SS-2, SS-3, TILL-1, TILL-2, TILL-3, TILL-4. TISS: A-11, CRM 060, CRM 061, CRM 062, CRM 063R, CRM 100, CRM 101, CRM 129, CRM 150, CRM 151, CRM 281, CRM 402, CRM 414, CTA-OTL-1, GBW 08551, GBW 08552, GBW 08571, RM 8414, RM 8415, RM 8433, RM 8435, SRM 1515, SRM 1547, SRM 1577b, SRM 1598, SRM 1974, TORT-2, V-10. WATER: CASS-3, CRM 403, NASS-4, SLEW-2, SLRS-3, TM-23, TM-24, TM-26, TM-27, TM-28, TMDA-51, TMDA-52, TMDA-54.

N. ASH: CRM 542CO39, CRM 548GB41, CRM 549FR15, CRM 550DE38, SRM 1649. INST: CRM 035, CRM 036, CRM 071, CRM 072, CRM 073, CRM 127, GBW 08606, LGC4002, LGC4005, RM 8416, RM 8418, RM 8432, SRM 141c, SRM 143c, SRM 148, SRM 2141, SRM 3185. ROCK: BHVO-1, G-2, SDO-1 (USGS). SED: MAG-1. SOIL: GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302. TISS: CRM 060, CRM 061, CRM 062, CRM 063R, CRM 063R, CRM 100, CRM 101, CRM 129, CRM 129, CRM 279, GBW 08504, GBW 08505, GBW 08551, GBW 08552, GBW 08572, GBW 8509, RM 8412, RM 8413, RM 8414, RM 8415, RM 8433, RM 8435, SRM 1515, SRM 1515, SRM 1547, SRM 1566a, SRM 1570a, SRM 1570a, SRM 1575, SRM 1577b. WATER: AUD-06, CRM 408, CRM 409, CRM 479, CRM 480, CSK NUT, GRM-02, HURON-03, ION-20, ION-911, ION-92, ION-94, ION-94, ION-95, ION-96, SOUR-01, SRM 2694a.

Na. ASH: CRM 038, CRM 176, CRM 542CO39, CRM 548GB41, CRM 549FR15, CRM 550DE38, CTA-FFA-2, NIES 8, SRM 1633b, SRM 1648, SRM 2689, SRM 2690, SRM 2691, ZUK-1. INST: RM 8416, RM 8418, RM 8432, SRM 1643d, SRM 3152a, SRM 3171a, V-9. OIL: SRM 1634c. ROCK: AC-E, AGV-1, AK, AL-1, AN-G, BCS-CRM 309, BCS-CRM 319, BCS-CRM 348, BCS-CRM 375, BCS-CRM 376, BCS-CRM 389, BCS-CRM 393, BE-N, BHVO-1, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DNC-1, DR-N, DT-N, DVG-N, FER-1, FER-2, FER-3, FER-4, FK-N, FM, G-2, GA, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GPOS301, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, IF-G, IPT-28, IPT-32, IPT-35, IPT-42, IPT-44, IPT-48, IPT-53, IPT-61, IPT-62, IPT-72, JA-2, JA-3, JB-2, JB-3, JDo-1, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JGb-2, JH-1, JLs-1, JMn-1, JP-1, JR-1, JR-2, JR-3, JSd-1, JSd-2, JSd-3, JSI-1, JSI-2, JSy-1, KB, KK, MAN-1, MGR-1, Mica-Fe, Mica-Mg, MK, MK-1, MO-1, MO-10, MO-11, MO-12, MO-

13, MO-14, MO-15, MO-2, MO-3, MO-4, MO-5, MO-6, MO-7, MO-8, MO-9, MSCH-1, MSCH-2, MSCH-3, MSCH-4, MY-1, MY-3, MY-4, Nod-A-1, Nod-P-1, PM-S, QLO-1, RGM-1, SARM-1, SARM-2, SARM-3, SARM-39, SARM-4, SARM-40, SARM-41, SARM-43, SARM-44, SARM-45, SARM-47, SARM-48, SARM-49, SARM-5, SARM-50, SARM-6, SCo-1, SDC-1, SDO-1 (USGS), SDO-2, SDO-3, SDO-4, SDO-5, SDO-6, SDO-7, SDO-8, SDO-9, SDU-1, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SI-2, SI-3, SKD-1, SpS, SRM 120c, SRM 1c, SRM 278, SRM 600, SRM 688, SRM 694, SRM 88b, SRM 97b, SRM 98b, SSL-1, SSV-1, ST-1a, STM-1, SY-3, SY-4, TDB-1, UB-N, UM-2, UM-4, VS-N, W-2, WGB-1, WMG-1, WS-E, ZW-C. SED: BCSS-1, CRM 277, CRM 320, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, IAEA-356, JLk-1, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, NIES 2, PACS-1, SARM 46, SARM 51, SARM 52, SARM 52, SD-M-2/TM, SL-1, SL-3, SRM 1646a, SRM 1941a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: BS-1, BS-2, BS-3, CRM 141, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GBW 08303, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SARM 42, SO-2, SO-3, SO-4, SRM 2709, SRM 2710, SRM 2711, SS-1, SS-2, SS-3, TILL-1, TILL-2, TILL-3, TILL-4. TISS: A-11, A-13, A-14, CLV-1, CLV-2, CRM 063R, CRM 184, CRM 185, CRM 186, CRM 278, CRM 422, CTA-OTL-1, GBW 08504, GBW 08505, GBW 08551, GBW 08552, GBW 08571, GBW 08572, GBW 8509, IAEA-153, RM 8412, RM 8414, RM 8415, RM 8433, RM 8435, SRM 1515, SRM 1547, SRM 1566a, SRM 1570a, SRM 1577b, SRM 1598, SRM 1974, TY-1, TY-2, TY-3, TY-4. WATER: AUD-06, CRM 408, CRM 398, CRM 399, CRM 409, GRM-02, HURON-03, ION-20, ION-911, ION-92, ION-94, ION-95, ION-96, SLRS-3, SOUR-01, SRM 2694a, TM-23, TM-24, TM-26, TM-27, TM-28, TMDA-51, TMDA-52, TMDA-54.

Nb. ASH: ZUK-1. INST: GBW 07507, GBW 07701, GBW 07702, GBW 07703, GBW 07704, GBW 07705, GBW 07706, GBW 07707, GBW 07708, GBW 07712, GBW 07713, GBW 07714, GBW 07715, GBW 07716, GBW 07717, GBW 07718, SRM 3137. ROCK: AC-E, AGV-1, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, DVG-N, FK-N, G-2, GA, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JMn-1, JP-1, JR-1, JR-2, JSy-1, KB, KK, MAN-1, Mica-Fe, Mica-Mg, MK-1, MO-1, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-7, MO-8, MO-9, MSCH-1, MSCH-2, MSCH-3, MSCH-4, MY-4, PM-S, QLO-1, RGM-1, SARM-1, SARM-3, SARM-3, SARM-39, SARM-40, SARM-41, SARM-44, SARM-45, SARM-48, SARM-50, SCo-1, SDC-1, SDO-1 (USGS), SDO-4, SDO-5, SDO-6, SDO-7, SDO-8, SDO-9, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SI-2, SKD-1, SpS, SSL-1, SSV-1, ST-1a, STM-1, SY-4, UB-N, W-2, WS-E, ZW-C. SED: GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, SARM 51, SARM 52, SL-1, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: BS-1, BS-2, BS-3, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SARM 42, SS-1, SS-2, SS-3, TILL-1, TILL-2, TILL-3, TILL-4.

Nd. ASH: CTA-FFA-2, SRM 1633b, ZUK-1. INST: SRM 3135a, SRM 612, SRM 613. ROCK: AC-E, AGV-1, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, DNC-1, DR-N, DT-N, DVG-N, FK-N, FM, G-2, GA, GBW 07101, GBW 07102, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GS-N, GSR-1, GSR-2, GSR-3, GSR-4,

GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JMn-1, JP-1, JR-1, JR-2, JSy-1, KK, MAN-1, Mica-Fe, Mica-Mg, PM-S, QLO-1, RGM-1, SARM-1, SARM-2, SARM-3, SARM-4, SCo-1, SDC-1, SDO-1 (USGS), SDO-4, SDO-5, SDO-6, SDO-8, SG-1a, SG-3, SGD-1a, SGR-1, SKD-1, SpS, ST-1a, STM-1, SY-4, UB-N, W-2, WS-E, ZW-C. SED: GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, SD-M-2/TM, SL-1, SL-3, SRM 1646a, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, SOIL-7, SRM 2709, SRM 2710, SRM 2711. TISS: SRM 1515, SRM 1547.

Ni. ASH: CRM 038, CRM 176, CTA-FFA-2, NIES 8, SRM 1633b, SRM 1648, SRM 2689, SRM 2690, SRM 2691, ZUK-1. INST: GBW 07702, GBW 7703, GBW 7704, GBW 7705, GBW 7706, GBW 7707, GBW 7708, GBW 7709, GBW 7710, GBW 7711, GBW 7712, GBW 7713, GBW 7714, GBW 7715, GBW 7716, GBW 7717, GBW 7718, GBW 7719, GBW 7720, LGC1312, RM 8416, RM 8418, RM 8432, SRM 1643d, SRM 1872, SRM 1873, SRM 3136, SRM 3171a, SRM 610, SRM 611, SRM 612, SRM 613, SRM 614, SRM 615, V-9. OIL: SRM 1618, SRM 1634c. ROCK: AC-E, AGV-1, AL-1, AN-G, BCS-CRM 375, BCS-CRM 376, BCS-CRM 389, BCS-CRM 395, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, DVG-N, FER-1, FER-2, FER-3, FER-4, FK-N, FM, G-2, GA, GBW 07101, GBW 07102, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GPOS301, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JDo-1, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JGb-2, JH-1, JLs-1, JMn-1, JP-1, JR-2, JR-3, JSd-1, JSd-2, JSd-3, JSI-1, JSI-2, JSy-1, KB, KK, MAN-1, Mica-Fe, Mica-Mg, MK, MK-1, MO-1, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-2, MO-3, MO-4, MO-5, MO-6, MO-7, MO-8, MO-9, MSCH-1, MSCH-2, MSCH-3, MSCH-4, MY-1, MY-2, MY-3, MY-4, Nod-A-1, Nod-P-1, PM-S, QLO-1, RGM-1, SARM-1, SARM-2, SARM-39, SARM-4, SARM-40, SARM-41, SARM-43, SARM-44, SARM-45, SARM-47, SARM-5, SARM-50, SARM-6, SARM-6, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-2, SDO-3, SDO-4, SDO-5, SDO-6, SDO-7, SDO-8, SDO-9, SDU-1, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SI-2, SI-3, SKD-1, SpS, SRM 120c, SRM 278, SRM 688, SSL-1, SSV-1, ST-1a, STM-1, SY-4, UB-N, UM-2, UM-4, VS-N, W-2, WMS-1, WS-E, ZW-C. SED: BCSS-1, CRM 277, CRM 277, CRM 320, CRM 320, GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GBW 08301, GSD-10, GSD-11, GSD-12, GSD-9, HR-1, IAEA-356, JLk-1, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, MESS-2, NIES 2, PACS-1, SARM 46, SARM 51, SARM 52, SD-M-2/TM, SL-1, SRM 1646a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4, SUD-1, TH-1, TH-2, WQB-1, WQB-3. SLUD: CRM 145R, CRM 146. SOIL: BS-1, BS-2, BS-3, CRM 141, CRM 142R, CRM 143R, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GBW 08303, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SARM 42, SO-2, SO-3, SO-4, SRM 2709, SRM 2710, SRM 2711, SS-1, SS-2, SS-3, TILL-1, TILL-2, TILL-3, TILL-4. TISS: CRM 060, CRM 061, CRM 062, CRM 150, CRM 151, CRM 184, CRM 185, CRM 186, CRM 278, CRM 281, CRM 402, CRM 414, CTA-OTL-1, DOLT-2, DORM-2, GBW 08505, GBW 08571, IAEA-350, LUTS-1, RM 8414, RM 8433, RM 8435, SRM 1515, SRM 1547, SRM 1566a, SRM 1570a, SRM 1575, SRM 1598, SRM 1974, TORT-2, TY-1, TY-2, TY-3, TY-4, V-10. WATER: CASS-3, CRM 403, CRM 505, NASS-4, SLEW-2, SLRS-3, TM-23, TM-24, TM-26, TM-27, TM-28, TMDA-51, TMDA-52, TMDA-54.

O. INST: CRM 034, CRM 036, CRM 071, CRM 072, LGC4003, SRM 143c, SRM 1872, SRM 1873. ROCK: AGV-1, G-2, QLO-1, RGM-1, SCo-1. SED: MAG-1.

Os. ROCK: AGV-1, BHVO-1, G-2, GBW 07101, GBW 07102, JP-1, QLO-1, RGM-1, SCo-1, SDC-1, SGR-1, STM-1, WMG-1, WMS-1, WPR-1. SED: MAG-1.

P. ASH: CRM 176, CRM 542CO39, CRM 548GB41, CRM 549FR15, CRM 550DE38, CTA-FFA-2, NIES 8, SRM 1633b, SRM 1649, SRM 2689, SRM 2690, SRM 2691, ZUK-1. INST: CRM 183, GBW 07513, LGC4006, RM 8416, RM 8418, RM 8432, SRM 1872, SRM 1873, SRM 3139a, SRM 3186. ROCK: AC-E, AGV-1, AK, AL-1, AN-G, BCS-CRM 348, BCS-CRM 393, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, DVG-N, FER-1, FER-2, FER-3, FER-4, FK-N, FM, G-2, GA, GBW 07101, GBW 07102, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GPOS301, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, IPT-28, IPT-32, IPT-35, IPT-42, IPT-44, IPT-48, IPT-53, IPT-72, JA-2, JA-3, JB-2, JB-3, JB-3, JDo-1, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JGb-2, JH-1, JLs-1, JMn-1, JP-1, JR-1, JR-2, JR-2, JR-3, JSd-1, JSd-2, JSd-3, JSI-1, JSI-2, JSy-1, KB, KK, MAN-1, MGR-1, Mica-Fe, Mica-Mg, MK, MK-1, MO-1, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-2, MO-3, MO-4, MO-5, MO-6, MO-7, MO-8, MO-9, MSCH-1, MSCH-3, MY-4, Nod-A-1, Nod-P-1, PM-S, QLO-1, RGM-1, SARM-2, SARM-2, SARM-3, SARM-39, SARM-4, SARM-40, SARM-41, SARM-43, SARM-44, SARM-45, SARM-47, SARM-48, SARM-5, SARM-50, SARM-6, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-2, SDO-3, SDO-4, SDO-5, SDO-6, SDO-7, SDO-8, SDO-9, SDU-1, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SI-2, SI-3, SKD-1, SpS, SRM 1c, SRM 278, SRM 600, SRM 688, SRM 694, SRM 696, SRM 697, SRM 698, SRM 69b, SRM 88b, SRM 97b, SRM 98b, SSL-1, SSV-1, ST-1a, STM-1, SY-3, SY-4, TDB-1, UB-N, UM-2, UM-4, W-2, WGB-1, WMG-1, WPR-1, WS-E, ZW-C. SED: BCSS-1, CRM 277, CRM 320, GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, JLk-1, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, MAG-1, MESS-2, NIES 2, PACS-1, SARM 46, SARM 51, SARM 52, SL-1, SRM 1646a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: BS-1, BS-2, BS-3, CRM 141, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GBW 08303, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SARM 42, SO-2, SO-3, SO-4, SRM 2709, SRM 2710, SRM 2711, SS-1, SS-2, SS-3, TILL-1, TILL-2, TILL-3, TILL-4. TISS: A-11, CRM 063R, CRM 100, CRM 101, CRM 129, CRM 184, CRM 185, CRM 186, CRM 278, CRM 279, CTA-OTL-1, GBW 08504, GBW 08505, GBW 08551, GBW 08552, GBW 08571, GBW 08572, GBW 8509, IAEA-153, NIES 3, RM 8414, RM 8415, RM 8433, RM 8435, SRM 1515, SRM 1547, SRM 1566a, SRM 1570a, SRM 1575, SRM 1577b, TY-1, TY-2, TY-3, TY-4, V-10. WATER: CRM 398, CRM 399, CSK NUT, ION-20, ION-92, ION-94, ION-95, ION-96, SOUR-01.

Pb. ASH: CRM 038, CRM 176, CTA-FFA-2, GBW 08401, NIES 8, PD-1, SRM 1633b, SRM 1648, SRM 2689, SRM 2690, SRM 2691, ZUK-1. INST: CRM 035, GBW 07501, GBW 07505, GBW 07701, GBW 07702, GBW 07703, GBW 07704, GBW 07705, GBW 07706, GBW 07707, GBW 07708, GBW 07709, GBW 07710, GBW 07711, GBW 07712, GBW 07713, GBW 07714, GBW 07715, GBW 07716, GBW 07717, GBW 07718, GBW 07719, GBW 07720, GBW 08601, GBW 08607, GBW 08608, GBW 08619, LGC1309, RM 8416, RM 8418, RM 8432, SRM 1643d, SRM 1872, SRM 1873, SRM 3128, SRM 3172a, SRM 610, SRM 611, SRM 612, SRM 613, SRM 614, SRM 615, SRM 616, SRM 617, V-9. ROCK: AC-E, AGV-1, AK, AL-1, AN-G, BCS-CRM 375, BCS-CRM 376, BCS-CRM 389, BCS-CRM 395, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, DVG-N, FER-1, FER-2, FER-3, FER-4, FK-N, FM, G-2, GA, GBW 07101, GBW

07102, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GPOS301, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, JA-2, JA-3, JB-2, JB-3, JDo-1, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JGb-2, JH-1, JLs-1, JMn-1, JP-1, JR-1, JR-2, JR-3, JSd-1, JSd-2, JSd-3, JSI-1, JSI-2, JSy-1, KB, KK, MAN-1, Mica-Fe, Mica-Mg, MK, MK-1, MO-1, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-2, MO-3, MO-4, MO-5, MO-6, MO-7, MO-8, MO-9, MSCH-1, MSCH-2, MSCH-3, MSCH-4, MY-1, MY-3, MY-4, Nod-A-1, Nod-P-1, PM-S, QLO-1, RGM-1, SARM-1, SARM-2, SARM-3, SARM-39, SARM-40, SARM-41, SARM-44, SARM-45, SARM-47, SARM-48, SARM-50, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-2, SDO-3, SDO-4, SDO-5, SDO-6, SDO-7, SDO-8, SDO-9, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SI-2, SI-3, SKD-1, SpS, SRM 120c, SRM 278, SRM 688, SSL-1, SSV-1, ST-1a, STM-1, SY-4, UB-N, VS-N, W-2, WS-E, ZW-C. SED: BCSS-1, CRM 277, CRM 277, CRM 320, CRM 320, GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GBW 08301, GSD-10, GSD-11, GSD-12, GSD-9, HR-1, IAEA-356, JLk-1, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, MESS-2, NIES 2, PACS-1, SARM 46, SARM 51, SARM 52, SD-M-2/TM, SL-1, SRM 1646a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4, SUD-1, TH-1, TH-2, WQB-1, WQB-3. SLUD: CRM 145R, CRM 146. SOIL: BS-1, BS-2, BS-3, CRM 141, CRM 141, CRM 142R, CRM 142R, CRM 143R, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GBW 08303, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SARM 42, SO-2, SO-3, SO-4, SOIL-7, SRM 2709, SRM 2710, SRM 2711, SS-1, SS-2, SS-3, TILL-1, TILL-2, TILL-3, TILL-4. TISS: A-11, CRM 060, CRM 061, CRM 062, CRM 063R, CRM 100, CRM 101, CRM 150, CRM 151, CRM 184, CRM 185, CRM 186, CRM 194, CRM 195, CRM 196, CRM 278, CRM 279, CRM 281, CRM 414, CRM 422, CTA-OTL-1, DOLT-2, DORM-2, GBW 08501, GBW 08504, GBW 08505, GBW 08551, GBW 08552, GBW 08571, GBW 08572, GBW 8509, IAEA-336, IAEA-350, LUTS-1, NIES 3, RM 8414, RM 8415, RM 8433, RM 8435, SRM 1515, SRM 1547, SRM 1566a, SRM 1570a, SRM 1575, SRM 1577b, SRM 1598, SRM 1974, SRM 955a, TORT-2, TY-1, TY-2, TY-3, TY-4, V-10. WATER: CASS-3, CRM 403, NASS-4, SLEW-2, SLRS-3, TM-23, TM-24, TM-26, TM-27, TM-28, TMDA-51, TMDA-52, TMDA-54.

Pd. INST: SRM 3138. ROCK: BHVO-1, BIR-1, DNC-1, GBW 07101, GBW 07102, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JP-1, JR-1, JR-2, MO-12, Nod-A-1, Nod-P-1, QLO-1, RGM-1, SCo-1, SDC-1, SDO-6, SGR-1, STM-1, TDB-1, W-2, WGB-1, WMG-1, WMS-1, WPR-1. SED: MAG-1.

Pr. ASH: ZUK-1. INST: SRM 3142a. ROCK: AC-E, AGV-1, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, DNC-1, DR-N, DT-N, FK-N, G-2, GA, GBW 07101, GBW 07102, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JMn-1, JP-1, JR-1, JR-2, JSy-1, MAN-1, Mica-Fe, Mica-Mg, PM-S, QLO-1, RGM-1, SCo-1, SDC-1, SDO-1 (USGS), SG-1a, SGD-1a, SGR-1, SKD-1, SSV-1, ST-1a, STM-1, SY-4, UB-N, W-2, WS-E, ZW-C. SED: GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, MAG-1. SOIL: GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8.

Pt. INST: SRM 3140. ROCK: BHVO-1, BIR-1, DNC-1, G-2, GBW 07101, GBW 07102, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JP-1, JR-1, JR-2, Nod-A-1, Nod-P-1, QLO-1, RGM-1, SCo-1, SDC-1, SDO-4, SDO-5, SDO-6,

SGR-1, STM-1, TDB-1, WGB-1, WMG-1, WMS-1, WPR-1. SED: MAG-1, SL-1.

Ra. ROCK: CRM 811, G-2, GPOS301.

Rb. ASH: CTA-FFA-2, NIES 8, SRM 1633b, SRM 1648, SRM 1649, ZUK-1. INST: RM 8418, SRM 1643d, SRM 3145a, SRM 610, SRM 611, SRM 612, SRM 613, SRM 614, SRM 615, SRM 616, SRM 617. ROCK: AC-E, AGV-1, AK, AL-1, AN-G, BCS-CRM 375, BCS-CRM 376, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, DVG-N, FER-2, FER-4, FK-N, FM, G-2, GA, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GPOS301, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-4, GSR-5, GSR-6, JA-2, JA-3, JB-2, JB-3, JDo-1, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JGb-2, JH-1, JLs-1, JMn-1, JP-1, JR-1, JR-2, JR-3, JSd-1, JSd-2, JSd-3, JSI-1, JSI-2, JSy-1, KB, KK, MAN-1, MAN-1, Mica-Fe, Mica-Mg, MK, MK-1, MO-1, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-2, MO-4, MO-7, MO-8, MO-9, MSCH-1, MSCH-2, MSCH-3, MSCH-4, PM-S, QLO-1, RGM-1, SARM-1, SARM-2, SARM-3, SARM-39, SARM-40, SARM-41, SARM-44, SARM-45, SARM-48, SARM-50, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-2, SDO-3, SDO-4, SDO-5, SDO-6, SDO-7, SDO-8, SDO-9, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SI-2, SI-3, SKD-1, SpS, SRM 278, SRM 688, SRM 97b, SRM 98b, SSL-1, SSV-1, ST-1a, STM-1, SY-4, UB-N, VS-N, W-2, WS-E, ZW-C. SED: GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, IAEA-356, JLk-1, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, NIES 2, SARM 46, SARM 51, SARM 52, SD-M-2/TM, SL-1, SL-3, SRM 1646a, SRM 1941a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: BS-1, BS-2, BS-3, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GBW 08303, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SARM 42, SO-2, SO-3, SOIL-7, SRM 2709, SRM 2710, SS-1, SS-2, SS-3. TISS: A-11, A-13, CRM 278, CTA-OTL-1, GBW 08504, GBW 08505, GBW 08571, GBW 8509, IAEA-153, IAEA-350, RM 8414, RM 8433, RM 8435, SRM 1515, SRM 1547, SRM 1566a, SRM 1570a, SRM 1575, SRM 1577b, SRM 1598, SRM 1974, TY-1, TY-2, TY-3, TY-4, V-10.

Re. INST: SRM 3143. ROCK: AGV-1, BHVO-1, G-2, JA-2, JA-3, JB-2, JB-3, JG-1a, JG-2, JG-3, JGb-1, JP-1, JR-1, JR-2, MAG-1, QLO-1, RGM-1, SCo-1, SDC-1, STM-1. SED: SGR-1.

Rh. INST: AGV-1. ROCK: BHVO-1, BIR-1, DNC-1, G-2, GBW 07101, GBW 07102, MAG-1, QLO-1, RGM-1, SCo-1, SDC-1, SGR-1, SRM 3144, STM-1, TDB-1, WGB-1, WMG-1, WMS-1. SED: WPR-1.

Ru. ROCK: AGV-1, BHVO-1, G-2, GBW 07101, GBW 07102, JP-1, Nod-A-1, Nod-P-1, QLO-1, RGM-1, SCo-1, SDC-1, SGR-1, STM-1, TDB-1, WGB-1, WMG-1, WMS-1, WPR-1. SED: MAG-1, SL-1.

S. ASH: CRM 176, CRM 542CO39, CRM 548GB41, CRM 549FR15, CRM 550DE38, PD-1, SRM 1633b, SRM 1648, SRM 1649, SRM 2689, SRM 2690, SRM 2691, ZUK-1. INST: CRM 071, CRM 072, CRM 183, GBW 07501, GBW 07502, GBW 07504, GBW 08606, RM 8416, RM 8418, RM 8432, SRM 142, SRM 3154, SRM 3181. OIL: SRM 1616a, SRM 1617a, SRM 1634c. ROCK: AC-E, AK, AL-1, AN-G, BCS-CRM 389, BCS-CRM 393, BE-N, BHVO-1, BR, CRM 811, DNC-1, DR-N, DVG-N, FER-1, FER-2, FER-3, FER-4, FK-N, FM, GA, GBW 07101, GBW 07102, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GPOS301, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JDo-1, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JGb-2, JH-1, JLs-1, JP-1, JR-1, JR-2, JR-3, JSd-1, JSd-2, JSd-3, JSI-1, JSI-2, KB, KK, MAN-1, MGR-1, Mica-Fe, Mica-Mg, MK, MK-1, MO-1, MO-10, MO-11, MO-12, MO-13, MO-15, MO-3, MO-5, MO-6, MO-7, MO-8, MO-9, MY-1, MY-3, MY-4, PM-S, QLO-1, RGM-1, SARM-3, SARM-39, SARM-40, SARM-41, SARM-43, SARM-44, SARM-45, SARM-47, SARM-50, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-2, SDO-3, SDO-4, SDO-5, SDO-6, SDO-8, SDO-9, SDU-1, SG-1a, SG-

3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SKD-1, SRM 120c, SRM 600, SRM 696, SRM 697, SRM 698, SRM 69b, SSV-1, ST-1a, STM-1, SY-3, SY-4, SY-4, TDB-1, UB-N, UM-2, UM-4, W-2, WGB-1, WMG-1, WMS-1, WPR-1, WS-E, ZW-C. SED: BCSS-1, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GSD-10, GSD-11, GSD-12, GSD-9, JLk-1, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, MESS-2, PACS-1, SARM 46, SARM 51, SARM 52, SL-1, SRM 1646a, SRM 1941a, SRM 2704. SOIL: BS-1, BS-2, BS-3, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SARM 42, SRM 2709, SRM 2710, SRM 2711. TISS: A-13, CRM 060, CRM 061, CRM 062, CRM 100, CRM 101, CRM 129, CRM 422, CTA-OTL-1, GBW 08505, GBW 08509, GBW 08572, RM 8414, RM 8415, RM 8433, RM 8435, SRM 1515, SRM 1547, SRM 1566a, SRM 1570a, SRM 1577b. WATER: AUD-06, CRM 408, CRM 398, CRM 399, CRM 409, GRM-02, HURON-03, ION-20, ION-911, ION-92, ION-94, ION-95, ION-96, SOUR-01, SRM 2694a.

Sb. ASH: CRM 176, CTA-FFA-2, NIES 8, SRM 1633b, SRM 1648, SRM 1649, SRM 2689, SRM 2690, SRM 2691. INST: GBW 07512, GBW 07701, GBW 07702, GBW 07703, GBW 07704, GBW 07705, GBW 07706, GBW 07707, GBW 07708, GBW 07709, GBW 07710, GBW 07711, GBW 07712, GBW 07713, GBW 07714, GBW 07715, GBW 07716, GBW 07717, GBW 07718, GBW 07719, GBW 07720, RM 8418, SRM 1643d, SRM 3102a, SRM 614, SRM 615, SRM 616, SRM 617. ROCK: AC-E, AGV-1, AK, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, DNC-1, DR-N, DT-N, DVG-N, FER-1, FER-2, FER-3, FER-4, FK-N, FM, G-2, GA, GBW 07101, GBW 07102, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GL-O, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JMn-1, JP-1, JR-1, JR-2, JSy-1, KB, KK, MAN-1, MK, QLO-1, RGM-1, SCo-1, SDC-1, SG-1a, SG-3, SGD-1a, SGH-3, SGH-5, SGHM-4, SGR-1, SKD-1, SpS, SRM 278, SRM 97b, SRM 98b, ST-1a, STM-1, SY-4, UB-N, VS-N, W-2, WS-E, ZW-C. SED: BCSS-1, CRM 277, CRM 320, GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, IAEA-356, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, MESS-2, NIES 2, PACS-1, SD-M-2/TM, SL-1, SL-3, SRM 1646a, SRM 1941a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, SOIL-7, SRM 2709, SRM 2710, SRM 2711, TILL-1, TILL-2, TILL-3, TILL-4. TISS; CRM 281, CTA-OTL-1, GBW 08505, GBW 08571, IAEA-350, RM 8414, RM 8415, RM 8433, SRM 1515, SRM 1547, SRM 1566a, SRM 1575, SRM 1577b, SRM 1974, TY-1, TY-2, TY-3, TY-4. WATER: SLRS-3, TM-23, TM-24, TM-26, TM-27, TM-28, TMDA-51, TMDA-52, TMDA-54.

Sc. ASH: CTA-FFA-2, NIES 8, SRM 1633b, SRM 1648, SRM 1649, SRM 2689, SRM 2690, SRM 2691, ZUK-1. INST: SRM 3148a, SRM 614, SRM 615, SRM 616, SRM 617. ROCK: AC-E, AGV-1, AK, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, DVG-N, FER-1, FER-2, FER-4, FK-N, FM, G-2, GA, GBW 07101, GBW 07102, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JP-1, JR-1, JR-2, KB, KK, MAN-1, Mica-Fe, Mica-Mg, MK, MK-1, MO-1, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-2, MO-3, MO-4, MO-5, MO-6, MO-8, MO-9, MY-1, MY-3, MY-4, PM-S, QLO-1, RGM-1, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-2, SDO-3, SDO-4, SDO-5, SDO-6, SDO-7, SDO-8, SDO-9, SDU-1, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SI-2, SI-3, SKD-1,

SpS, SRM 278, SRM 688, SRM 88b, SRM 97b, SRM 98b, SSL-1, SSV-1, ST-1a, STM-1, SY-4, UB-N, VS-N, W-2, WS-E, ZW-C. SED: CRM 277, CRM 320, GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, IAEA-356, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, NIES 2, SD-M-2/TM, SL-1, SL-3, SRM 1646a, SRM 1941a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: BS-1, BS-2, BS-3, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GBW 08303, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SOIL-7, SRM 2709, SRM 2710, SRM 2711, SS-1, SS-2, SS-3, TILL-1, TILL-2, TILL-3, TILL-4. TISS: CRM 414, CTA-OTL-1, GBW 08505, GBW 08571, NIES 3, SRM 1515, SRM 1547, SRM 1566a, SRM 1570a, SRM 1575, SRM 1974, V-10.

Se. ASH: CRM 176, CTA-FFA-2, GBW 08401, NIES 8, SRM 1633b, SRM 1648, SRM 1649, SRM 2689, SRM 2690, SRM 2691. INST: GBW 07509, GBW 07511, RM 8416, RM 8418, RM 8432, SRM 1643d, SRM 3149, SRM 3172a. OIL: SRM 1634c. ROCK: AN-G, BHVO-1, BIR-1, DNC-1, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, JB-2, JB-3, JGb-1, JR-1, JR-2, MO-10, MO-13, MO-14, MO-8, MO-9, QLO-1, RGM-1, SCo-1, SDC-1, SGR-1, STM-1, SY-4, W-2. SED: BCSS-1, CRM 277, CRM 320, GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 08301, GSD-10, GSD-11, GSD-12, GSD-9, HR-1, IAEA-356, MAG-1, MESS-2, PACS-1, SL-1, SRM 1646a, SRM 1941a, SRM 2704, SUD-1, TH-1, TH-2, WQB-1, WQB-3. SLUD: CRM 145R, CRM 146. SOIL: BS-1, BS-2, BS-3, CRM 141, CRM 143R, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GBW 08303, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SRM 2709, SRM 2711, SS-1, SS-2, SS-3. TISS: A-13, CRM 060, CRM 061, CRM 062, CRM 063R, CRM 129, CRM 150, CRM 151, CRM 184, CRM 185, CRM 186, CRM 278, CRM 279, CRM 281, CRM 402, CRM 414, CRM 422, CTA-OTL-1, DOLT-2, DORM-2, GBW 08501, GBW 08504, GBW 08505, GBW 08551, GBW 08552, GBW 08571, GBW 08572, GBW 8509, IAEA-336, IAEA-350, LUTS-1, RM 8412, RM 8413, RM 8414, RM 8415, RM 8433, RM 8435, SRM 1515, SRM 1547, SRM 1566a, SRM 1570a, SRM 1577b, SRM 1598, SRM 1974, TORT-2, TY-1, TY-2, TY-3, TY-4. WATER: CASS-3, CASS-3, NASS-4, TM-23, TM-24, TM-26, TM-27, TM-28, TMDA-51, TMDA-52, TMDA-54.

Si. ASH: CRM 176, CRM 542CO39, CRM 548GB41, CRM 549FR15, CRM 550DE38, CTA-FFA-2, PD-1, SRM 1633b, SRM 2689, SRM 2690, SRM 2691, ZUK-1. INST: SRM 1643d, SRM 1872, SRM 1873, SRM 3150. ROCK: AC-E, AGV-1, AK, AL-1, AN-G, BCS-CRM 309, BCS-CRM 319, BCS-CRM 348, BCS-CRM 375, BCS-CRM 376, BCS-CRM 389, BCS-CRM 393, BCS-CRM 395, BE-N, BHVO-1, BIR-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DNC-1, DR-N, DT-N, DVG-N, FER-1, FER-2, FER-3, FER-4, FK-N, FM, G-2, GA, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GPOS301, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, IPT-28, IPT-32, IPT-35, IPT-42, IPT-44, IPT-48, IPT-53, IPT-61, IPT-62, IPT-72, JA-2, JA-3, JB-2, JB-3, JDo-1, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JGb-2, JH-1, JLs-1, JMn-1, JP-1, JR-1, JR-2, JR-2, JR-3, JSd-1, JSd-2, JSd-3, JSI-1, JSI-2, JSy-1, KB, KK, MAN-1, MGR-1, Mica-Fe, Mica-Mg, MK, MK-1, MO-1, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-2, MO-3, MO-4, MO-5, MO-6, MO-7, MO-8, MO-9, MSCH-1, MSCH-2, MSCH-3, MSCH-4, MY-1, MY-2, MY-3, MY-4, Nod-A-1, Nod-P-1, PM-S, QLO-1, RGM-1, SARM-1, SARM-2, SARM-3, SARM-39, SARM-4, SARM-40, SARM-41, SARM-43, SARM-44, SARM-45,

SARM-47, SARM-48, SARM-49, SARM-5, SARM-50, SARM-6, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-2, SDO-3, SDO-4, SDO-5, SDO-6, SDO-7, SDO-8, SDO-9, SDU-1, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SI-2, SI-3, SKD-1, SpS, SRM 1c, SRM 278, SRM 600, SRM 670, SRM 688, SRM 694, SRM 696, SRM 697, SRM 698, SRM 69b, SRM 88b, SRM 97b, SRM 98b, SSL-1, SSV-1, ST-1a, STM-1, SY-3, SY-4, TDB-1, UB-N, UM-2, UM-4, VS-N, W-2, WGB-1, WMG-1, WMS-1, WPR-1, WS-E, ZW-C. SED: BCSS-1, CRM 277, CRM 320, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, JLk-1, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, MESS-2, NIES 2, PACS-1, SARM 46, SARM 51, SARM 52, SRM 1646a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: BS-1, BS-2, BS-3, CRM 141, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GBW 08303, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SARM 42, SO-2, SO-3, SO-4, SRM 2709, SRM 2710, SRM 2711, SS-1, SS-2, SS-3, TILL-1, TILL-2, TILL-3, TILL-4. WATER: AUD-06, CSK NUT, GRM-02, HURON-03, ION-20, ION-911, ION-92, ION-94, ION-95, ION-96, SOUR-01.

Sm. ASH: CTA-FFA-2, NIES 8, SRM 1633b, SRM 1648, SRM 1649, ZUK-1. INST: SRM 3147a, SRM 612, SRM 613. ROCK: AC-E, AGV-1, AK, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, DNC-1, DR-N, DT-N, FER-1, FER-2, FER-3, FER-4, FK-N, FM, G-2, GA, GBW 07101, GBW 07102, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JMn-1, JP-1, JR-1, JR-2, JSy-1, KB, KK, MAN-1, Mica-Fe, Mica-Mg, PM-S, QLO-1, RGM-1, SARM-1, SARM-2, SARM-3, SARM-4, SCo-1, SDC-1, SDO-1 (USGS), SDO-4, SDO-5, SDO-6, SDO-8, SDO-9, SG-1a, SG-3, SGD-1a, SGR-1, SpS, SRM 278, SRM 688, ST-1a, STM-1, SY-4, UB-N, W-2, WS-E, ZW-C. SED: GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, IAEA-356, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, SD-M-2/TM, SL-1, SL-3, SRM 1941a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, SOIL-7, SRM 2709, SRM 2710, SRM 2711, TILL-1, TILL-2, TILL-3, TILL-4. TISS: CTA-OTL-1, GBW 08505, GBW 08571, SRM 1515, SRM 1547, SRM 1566a, SRM 1974.

Sn. ASH: SRM 1649, ZUK-1. INST: CRM 034, GBW 07701, GBW 07702, GBW 07703, GBW 07704, GBW 07705, GBW 07706, GBW 07707, GBW 07708, GBW 07709, GBW 07710, GBW 07711, GBW 07712, GBW 07713, GBW 07714, GBW 07715, GBW 07716, GBW 07717, GBW 07718, GBW 07719, GBW 07720, SRM 3161a. ROCK: AC-E, AGV-1, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DR-N, DT-N, DVG-N, FER-2, FK-N, G-2, GA, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GH, GL-O, GPOS301, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JMn-1, JP-1, JR-1, JR-2, JSy-1, KB, KK, MAN-1, Mica-Fe, Mica-Mg, MK-1, MO-1, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-2, MO-3, MO-4, MO-5, MO-8, MO-9, MSCH-1, MSCH-2, MSCH-3, MSCH-4, MY-1, MY-2, MY-3, MY-4, PM-S, QLO-1, RGM-1, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-2, SDO-3, SDO-8, SDO-9, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SKD-1, SpS, SSL-1, ST-1a, STM-1, SY-4, VS-N, WS-E, ZW-C. SED: BCSS-1, CRM 320, CRM 462, GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GSD-10, GSD-11, GSD-12, GSD-9, IAEA-356, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, MESS-2, PACS-

1, PACS-1, PACS-1, PACS-1, RM 424, SL-1, SRM 1646a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: BS-1, BS-2, BS-3, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SS-1, SS-2, SS-3. TISS: DOLT-2, DORM-2, NIES 11, SRM 1515, SRM 1547, SRM 1566a, TORT-2. WATER: TM-27.

Sr. ASH: CTA-FFA-2, NIES 8, SRM 1633b, SRM 2689, SRM 2690, SRM 2691, ZUK-1. INST: GBW 07701, GBW 07702, GBW 07703, GBW 07704, GBW 07705, GBW 07706, GBW 07707, GBW 07708, GBW 07709, GBW 07710, GBW 07711, GBW 07712, GBW 07713, GBW 07714, GBW 07715, GBW 07716, GBW 07717, GBW 07718, GBW 07719, RM 8416, RM 8418, RM 8432, SRM 1643d, SRM 3153a, SRM 3172a, SRM 610, SRM 611, SRM 612, SRM 613, SRM 614, SRM 615, SRM 616, SRM 617, V-9. ROCK: AC-E, AGV-1, AK, AL-1, AN-G, BCS-CRM 309, BCS-CRM 375, BCS-CRM 376, BCS-CRM 389, BCS-CRM 393, BCS-CRM 395, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, DVG-N, FER-1, FER-2, FER-3, FER-4, FK-N, FM, G-2, GA, GBW 07101, GBW 07102, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GL-O, GPOS301, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IPT-35, IPT-44, IPT-48, JA-2, JA-3, JB-2, JB-3, JDo-1, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JGb-2, JH-1, JLs-1, JMn-1, JP-1, JR-1, JR-2, JR-3, JSd-1, JSd-2, JSd-3, JSI-1, JSI-2, JSy-1, KB, KK, MAN-1, Mica-Fe, Mica-Mg, MK, MK-1, MO-1, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-2, MO-3, MO-4, MO-7, MO-8, MO-9, MSCH-1, MSCH-2, MSCH-3, MSCH-4, MY-4, Nod-A-1, Nod-P-1, PM-S, QLO-1, RGM-1, SARM-1, SARM-2, SARM-3, SARM-3, SARM-39, SARM-4, SARM-40, SARM-41, SARM-43, SARM-44, SARM-45, SARM-47, SARM-48, SARM-49, SARM-5, SARM-50, SARM-6, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-2, SDO-3, SDO-4, SDO-5, SDO-6, SDO-7, SDO-8, SDO-9, SDU-1, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SI-2, SI-3, SKD-1, SpS, SRM 120c, SRM 1c, SRM 278, SRM 688, SRM 88b, SRM 97b, SRM 98b, SSL-1, SSV-1, ST-1a, STM-1, SY-4, UB-N, VS-N, W-2, WS-E, ZW-C. SED: BCSS-1, GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, IAEA-356, JLk-1, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, MESS-2, NIES 2, PACS-1, SARM 46, SARM 51, SARM 52, SD-M-2/TM, SL-1, SL-3, SRM 1646a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: BS-1, BS-2, BS-3, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GBW 08303, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SARM 42, SO-2, SO-3, SO-4, SOIL-7, SRM 2709, SRM 2710, SRM 2711, SS-1, SS-2, SS-3, TILL-1, TILL-2, TILL-3, TILL-4. TISS: CLV-1, CLV-2, CRM 278, CRM 414, CRM 422, CTA-OTL-1, GBW 08501, GBW 08504, GBW 08505, GBW 08552, GBW 08571, GBW 08572, LUTS-1, NIES 3, RM 8412, RM 8414, RM 8415, RM 8433, RM 8435, SRM 1515, SRM 1547, SRM 1566a, SRM 1570a, SRM 1575, SRM 1577b, SRM 1974, TORT-2, V-10. WATER: SLRS-3, TM-23, TM-24, TM-26, TM-27, TM-28, TMDA-51, TMDA-52, TMDA-54.

Ta. ASH: CTA-FFA-2, SRM 1633b, ZUK-1. INST: GBW 07507, SRM 1872, SRM 1873, SRM 3155. ROCK: AC-E, AGV-1, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, FK-N, FM, G-2, GA, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GH, GL-O, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JMn-1, JP-1, JR-1, JR-2, JSy-1, KB, KK, MAN-1, Mica-Fe, Mica-Mg, PM-S, QLO-1, RGM-1, SCo-1, SDC-1, SDO-1 (USGS), SG-1a, SG-3, SGD-1a, SGR-1, SKD-1, SpS, SRM 278, SSV-1, ST-1a, STM-1, SY-4, UB-N, W-2, WS-E, ZW-C. SED: GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW

07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, IAEA-356, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, SL-1, SL-3, SRM 1941a, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, SOIL-7, TILL-1, TILL-2, TILL-3, TILL-4. TISS: SRM 1566a, SRM 1974.

Tb. ASH: CTA-FFA-2, SRM 1633b, ZUK-1. INST: SRM 3157a. ROCK: AC-E, AGV-1, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, DNC-1, DR-N, DT-N, DVG-N, FK-N, FM, G-2, GA, GBW 07101, GBW 07102, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JMn-1, JP-1, JR-1, JR-2, JSy-1, KB, KK, MAN-1, Mica-Fe, Mica-Mg, PM-S, QLO-1, RGM-1, SARM-1, SARM-3, SCo-1, SDC-1, SDO-1 (USGS), SG-1a, SG-3, SGD-1a, SGR-1, SKD-1, SpS, SRM 278, SRM 688, SSV-1, ST-1a, STM-1, SY-4, UB-N, W-2, WS-E, ZW-C. SED: GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, SD-M-2/TM, SL-1, SL-3, SRM 1941a, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, SOIL-7, TILL-1, TILL-2, TILL-3, TILL-4. TISS: CTA-OTL-1, SRM 1515, SRM 1547, SRM 1566a.

Te. INST: GBW 07508, SRM 1643d, SRM 3156. ROCK: AGV-1, BHVO-1, BIR-1, DNC-1, G-2, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GL-O, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, QLO-1, RGM-1, SCo-1, SDC-1, SGR-1, ST-1a, STM-1, W-2. SED: GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GSD-10, GSD-11, GSD-12, GSD-12, GSD-9, IAEA-356, MAG-1, SL-1. SOIL: GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07408, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-8.

Th. ASH: CRM 038, CTA-FFA-2, NIES 8, SRM 1633b, SRM 1648, SRM 1649, SRM 2689, SRM 2690, SRM 2691, ZUK-1. INST: SRM 1872, SRM 1873, SRM 3159, SRM 610, SRM 611, SRM 612, SRM 613, SRM 614, SRM 615, SRM 616, SRM 617. ROCK: AC-E, AGV-1, AL-1, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, DVG-N, FER-2, G-2, GA, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GPOS301, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JMn-1, JP-1, JR-1, JR-2, JSy-1, KB, KK, MAN-1, Mica-Fe, Mica-Mg, MK, MO-10, MO-12, MO-13, MO-14, MO-15, MO-7, MO-9, PM-S, QLO-1, RGM-1, SARM-1, SARM-2, SARM-3, SARM-39, SARM-40, SARM-41, SARM-44, SARM-45, SARM-48, SARM-50, SCo-1, SDC-1, SDO-1, SDO-2, SDO-3, SDO-4, SDO-5, SDO-6, SDO-8, SDO-9, SG-1a, SG-3, SGD-1a, SGR-1, SI-2, SI-3, SKD-1, SpS, SRM 278, SRM 688, SRM 88b, SRM 97b, SRM 98b, SSL-1, SSV-1, ST-1a, STM-1, SY-4, UB-N, W-2, WS-E, ZW-C. SED: CRM 277, CRM 320, GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, IAEA-356, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, SARM 51, SARM 52, SD-M-2/TM, SL-1, SL-3, SRM 1646a, SRM 1941a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GBW 08303, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, IAEA-312, IAEA-375, SARM 42, SOIL-7, SRM 2709, SRM 2710, SRM 2711, TILL-1, TILL-2, TILL-3, TILL-4. TISS: CLV-1, CLV-

2, CTA-OTL-1, GBW 08505, GBW 08571, SRM 1515, SRM 1547, SRM 1566a, SRM 1570a, SRM 1575, SRM 1974.

Ti. ASH: CRM 176, CRM 542CO39, CRM 548GB41, CRM 549FR15, CRM 550DE38, CTA-FFA-2, SRM 1633b, SRM 1648, SRM 2689, SRM 2690, SRM 2691, ZUK-1. INST: GBW 07701, GBW 07702, GBW 07703, GBW 07704, GBW 07705, GBW 07706, GBW 07707, GBW 07708, GBW 07709, GBW 07710, GBW 07712, GBW 07713, GBW 07714, GBW 07715, GBW 07716, GBW 07717, GBW 07718, GBW 07719, RM 8418, SRM 1872, SRM 1873, SRM 3162a, SRM 610, SRM 611, SRM 612, SRM 613, SRM 614, SRM 615, SRM 616, SRM 617. ROCK: AC-E, AGV-1, AK, AL-1, AN-G, BCS-CRM 309, BCS-CRM 319, BCS-CRM 348, BCS-CRM 375, BCS-CRM 376, BCS-CRM 389, BCS-CRM 393, BCS-CRM 395, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, DVG-N, FER-1, FER-2, FER-3, FER-4, FK-N, FM, G-2, GA, GBW 07101, GBW 07102, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GPOS301, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, IPT-28, IPT-32, IPT-35, IPT-42, IPT-44, IPT-48, IPT-53, IPT-61, IPT-62, IPT-72, JA-2, JA-3, JB-2, JB-3, JDo-1, JF-1, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JGb-2, JH-1, JLs-1, JMn-1, JP-1, JR-1, JR-2, JR-2, JR-3, JSd-1, JSd-2, JSd-3, JSI-1, JSI-2, JSy-1, KB, KK, MAN-1, MGR-1, Mica-Fe, Mica-Mg, MK, MK-1, MO-1, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-2, MO-3, MO-4, MO-5, MO-6, MO-7, MO-8, MO-9, MSCH-1, MSCH-2, MSCH-3, MSCH-4, MY-1, MY-3, MY-4, Nod-A-1, Nod-P-1, PM-S, QLO-1, RGM-1, SARM-1, SARM-2, SARM-3, SARM-3, SARM-39, SARM-4, SARM-4, SARM-40, SARM-41, SARM-43, SARM-44, SARM-45, SARM-47, SARM-48, SARM-49, SARM-5, SARM-5, SARM-50, SARM-6, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-1 (USGS), SDO-2, SDO-3, SDO-4, SDO-5, SDO-6, SDO-7, SDO-8, SDO-9, SDU-1, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SI-2, SI-3, SKD-1, SpS, SRM 120c, SRM 1c, SRM 278, SRM 600, SRM 670, SRM 688, SRM 694, SRM 696, SRM 697, SRM 698, SRM 69b, SRM 81a, SRM 88b, SRM 97b, SRM 98b, SSL-1, SSV-1, ST-1a, STM-1, SY-3, SY-4, SY-4, TDB-1, UB-N, UM-2, UM-4, VS-N, W-2, WGB-1, WMG-1, WMS-1, WPR-1, WS-E, ZW-C. SED: BCSS-1, CRM 277, CRM 320, GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, IAEA-356, JLk-1, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, MAG-1, NIES 2, PACS-1, SARM 46, SARM 51, SARM 52, SL-1, SL-3, SRM 1646a, SRM 1941a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: BS-1, BS-2, BS-3, CRM 141, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GBW 08303, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SARM 42, SO-2, SO-3, SO-4, SRM 2709, SRM 2710, SRM 2711, SS-1, SS-2, SS-3, TILL-1, TILL-2, TILL-3, TILL-4. TISS: CLV-1, CLV-2, CRM 278, GBW 08505, GBW 08571, GBW 08572, RM 8435. WATER: TMDA-51, TMDA-52, TMDA-54.

Tl. ASH: CRM 176, SRM 1633b. INST: SRM 1643d, SRM 3158, SRM 3172a, SRM 610, SRM 611, SRM 612, SRM 613, SRM 614, SRM 615, SRM 616, SRM 617. ROCK: AC-E, AGV-1, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, DNC-1, DR-N, G-2, GA, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JDo-1, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JLs-1, JMn-1, JP-1, JR-1, JR-2, JSd-1, JSI-1, MAN-1, Mica-Fe, Mica-Mg, PM-S, QLO-1, RGM-1, SCo-1, SDC-1, SGR-1, SRM 278, STM-1, SY-4, UB-N, W-2, WS-E, ZW-C. SED: CRM 320, GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GSD-10, GSD-11, GSD-12, GSD-9, JLk-1, MAG-1, MESS-2, SRM 1646a, SRM 2704. SOIL: GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW

07406, GBW 07407, GBW 07408, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, SRM 2709, SRM 2710, SRM 2711. TISS: CRM 150, CRM 151, DORM-2, SRM 1575, SRM 1598.

Tm. ASH: CTA-FFA-2, SRM 1633b, ZUK-1. INST: SRM 3160a. ROCK: AC-E, AGV-1, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, DNC-1, DR-N, DT-N, FK-N, G-2, GA, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JMn-1, JP-1, JR-1, JR-2, JSy-1, KK, MAN-1, Mica-Fe, Mica-Mg, PM-S, QLO-1, RGM-1, SARM-1, SCo-1, SDC-1, SDO-1 (USGS), SG-1a, SGD-1a, SGR-1, SKD-1, SSV-1, ST-1a, STM-1, SY-4, UB-N, W-2, WS-E, ZW-C. SED: GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, MAG-1, SL-1. SOIL: GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8.

U. ASH: CTA-FFA-2, SRM 1633b, SRM 1648, SRM 1649, ZUK-1. INST: SRM 1872, SRM 1873, SRM 3164, SRM 610, SRM 611, SRM 612, SRM 613, SRM 614, SRM 615, SRM 616, SRM 617. ROCK: AC-E, AGV-1, AK, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, DVG-N, FK-N, FM, G-2, GA, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GPOS301, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JMn-1, JP-1, JR-1, JR-2, JSy-1, KB, KK, MAN-1, Mica-Fe, Mica-Mg, MO-12, MO-13, MO-14, PM-S, QLO-1, RGM-1, SARM-1, SARM-3, SCo-1, SDC-1, SDO-1 (USGS), SDO-4, SDO-5, SDO-6, SDO-8, SDO-9, SG-1a, SG-3, SGD-1a, SGR-1, SI-2, SKD-1, SpS, SRM 120c, SRM 278, SRM 688, SRM 694, SSL-1, SSV-1, ST-1a, STM-1, SY-4, UB-N, W-2, WS-E, ZW-C. SED: CRM 277, CRM 320, GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, IAEA-356, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, SD-M-2/TM, SL-1, SL-3, SRM 1646a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GBW 08303, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, IAEA-312, IAEA-375, SOIL-7, SRM 2709, SRM 2710, SRM 2711, TILL-1, TILL-2, TILL-3, TILL-4. TISS: CTA-OTL-1, SRM 1515, SRM 1547, SRM 1566a, SRM 1570a, SRM 1575. WATER: CASS-3, NASS-4, SLEW-2, SLRS-3, TM-27, TMDA-51, TMDA-52, TMDA-54.

V. ASH: CRM 038, CRM 176, CTA-FFA-2, GBW 08401, NIES 8, SRM 1633b, SRM 1648, ZUK-1. INST: GBW 07701, GBW 07702, GBW 07703, GBW 07704, GBW 07705, GBW 07706, GBW 07707, GBW 07708, GBW 07709, GBW 07712, GBW 07713, GBW 07714, GBW 07715, GBW 07716, GBW 07717, GBW 07718, GBW 07719, LGC1316, RM 8416, RM 8418, SRM 1643d, SRM 3165, SRM 3171a. OIL: SRM 1618, SRM 1634c. ROCK: AC-E, AGV-1, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, DVG-N, FER-1, FER-2, FER-3, FER-4, FK-N, FM, G-2, GA, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GPOS301, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JDo-1, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JGb-2, JH-1, JLs-1, JMn-1, JP-1, JR-1, JR-2, JR-3, JSd-1, JSd-2, JSd-3, JSI-1, JSI-2, JSy-1, KB, KK, MAN-1, Mica-Fe, Mica-Mg, MK, MK-1, MO-1, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-2, MO-3, MO-4, MO-5, MO-6, MO-7, MO-8,

MO-9, MSCH-1, MSCH-2, MSCH-3, MSCH-4, MY-1, MY-2, MY-3, MY-4, Nod-A-1, Nod-P-1, PM-S, QLO-1, RGM-1, SARM-1, SARM-2, SARM-3, SARM-39, SARM-4, SARM-40, SARM-41, SARM-44, SARM-45, SARM-47, SARM-48, SARM-5, SARM-50, SARM-6, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-2, SDO-3, SDO-4, SDO-5, SDO-6, SDO-7, SDO-8, SDO-9, SDU-1, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SI-2, SI-3, SKD-1, SpS, SRM 120c, SRM 600, SRM 670, SRM 688, SRM 694, SRM 696, SRM 697, SRM 698, SRM 69b, SSL-1, SSV-1, ST-1a, STM-1, SY-4, UB-N, VS-N, W-2, WS-E, ZW-C. SED: BCSS-1, CRM 277, CRM 320, GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GBW 08301, GSD-10, GSD-11, GSD-12, GSD-9, HR-1, IAEA-356, JLk-1, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, MESS-2, NIES 2, PACS-1, SARM 46, SARM 51, SARM 52, SD-M-2/TM, SL-1, SRM 1646a, SRM 1941a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4, SUD-1, TH-1, TH-2, WQB-1, WQB-3. SOIL: BS-1, BS-2, BS-3, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SARM 42, SO-2, SO-3, SO-4, SOIL-7, SRM 2709, SRM 2710, SRM 2711, SS-1, SS-2, SS-3. TISS: CLV-1, CLV-2, CRM 414, CTA-OTL-1, IAEA-336, RM 8414, RM 8415, RM 8433, SRM 1515, SRM 1547, SRM 1566a, SRM 1570a, SRM 1577b, SRM 1598, SRM 1974, TORT-2. WATER: CRM 403, SLRS-3, TM-23, TM-24, TM-26, TM-27, TM-28, TMDA-51, TMDA-52, TMDA-54.

W. ASH: CTA-FFA-2, SRM 1633b, SRM 1648, SRM 1649, ZUK-1. INST: GBW 07506, GBW 07701, GBW 07702, GBW 07703, GBW 07704, GBW 07705, GBW 07706, GBW 07707, GBW 07708, GBW 07709, GBW 07710, GBW 07711, GBW 07712, GBW 07713, GBW 07714, GBW 07715, GBW 07716, GBW 07717, GBW 07718, GBW 07719, GBW 07720, RM 8432, SRM 3163. ROCK: AC-E, AGV-1, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, DNC-1, DR-N, DT-N, DVG-N, FK-N, FM, G-2, GA, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JMn-1, JP-1, JR-1, JR-2, JSy-1, KB, KK, MAN-1, Mica-Fe, Mica-Mg, PM-S, QLO-1, RGM-1, SCo-1, SDC-1, SG-1a, SG-3, SGD-1a, SGR-1, SpS, ST-1a, STM-1, SY-4, UB-N, W-2, WS-E, ZW-C. SED: GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, SL-1, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, SRM 2709, SRM 2710, SRM 2711, TILL-1, TILL-2, TILL-3, TILL-4. TISS: RM 8435, SRM 1515.

Y. ASH: CTA-FFA-2, ZUK-1. INST: GBW 07701, GBW 07702, GBW 07703, GBW 07704, GBW 07705, GBW 07706, GBW 07707, GBW 07708, GBW 07712, GBW 07713, GBW 07714, GBW 07715, GBW 07716, GBW 07717, GBW 07718, SRM 3167a. ROCK: AC-E, AGV-1, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, DVG-N, FER-2, FER-3, FER-4, FK-N, FM, G-2, GA, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JMn-1, JP-1, JR-1, JR-2, JSy-1, KB, KK, MAN-1, Mica-Fe, Mica-Mg, MK, MO-1, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-2, MO-4, MO-8, MO-9, MSCH-1, MSCH-2, MSCH-3, MSCH-4, MY-4, PM-S, QLO-1, RGM-1, SARM-1,

SARM-3, SARM-39, SARM-4, SARM-40, SARM-41, SARM-44, SARM-45, SARM-47, SARM-48, SARM-5, SARM-50, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-2, SDO-3, SDO-4, SDO-5, SDO-6, SDO-7, SDO-8, SDO-9, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SI-2, SI-3, SKD-1, SpS, SSL-1, ST-1a, STM-1, SY-4, UB-N, W-2, WS-E, ZW-C. SED: GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, SARM 46, SARM 51, SARM 52, SL-1, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: BS-1, BS-2, BS-3, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SARM 42, SOIL-7, SRM 2709, SRM 2710, SRM 2711, SS-1, SS-2, SS-3, TILL-1, TILL-2, TILL-3, TILL-4.

Yb. ASH: CTA-FFA-2, SRM 1633b, ZUK-1. INST: GBW 07701, GBW 07702, GBW 07703, GBW 07704, GBW 07705, GBW 07706, GBW 07707, GBW 07708, GBW 07709, GBW 07712, GBW 07713, GBW 07714, GBW 07715, GBW 07716, GBW 07717, GBW 07718, GBW 07719, GBW 07720, SRM 3166a, SRM 612, SRM 613. ROCK: AC-E, AGV-1, AL-1, AN-G, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, DVG-N, FER-1, FER-2, FER-3, FER-4, FK-N, FM, G-2, GA, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JMn-1, JP-1, JR-1, JR-2, JSy-1, KB, KK, MAN-1, Mica-Fe, Mica-Mg, MK, MO-1, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-2, MO-3, MO-4, MO-8, MO-9, MSCH-1, MSCH-2, MSCH-3, MSCH-4, MY-1, MY-3, PM-S, QLO-1, RGM-1, SARM-1, SARM-2, SARM-3, SARM-4, SARM-5, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-4, SDO-5, SDO-6, SDO-7, SDO-8, SDO-9, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SI-2, SI-3, SKD-1, SpS, SRM 278, SRM 688, SSL-1, ST-1a, STM-1, SY-4, UB-N, VS-N, W-2, WS-E, ZW-C. SED: GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, SD-M-2/TM, SL-1, SL-3, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4. SOIL: BS-1, BS-2, BS-3, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SOIL-7, SRM 2709, SRM 2710, SRM 2711, SS-1, SS-2, SS-3, TILL-1, TILL-2, TILL-3, TILL-4. TISS: CTA-OTL-1, SRM 1515, SRM 1547.

Zn. ASH: CRM 038, CRM 176, CTA-FFA-2, GBW 08401, NIES 8, PD-1, SRM 1633b, SRM 1648, SRM 1649, SRM 2689, SRM 2690, SRM 2691, ZUK-1. INST: GBW 07502, GBW 07511, GBW 07701, GBW 07702, GBW 07703, GBW 07704, GBW 07705, GBW 07706, GBW 07707, GBW 07708, GBW 07709, GBW 07710, GBW 07711, GBW 07712, GBW 07713, GBW 07714, GBW 07715, GBW 07716, GBW 07717, GBW 07718, GBW 07719, GBW 07720, GBW 08607, GBW 08608, GBW 08620, LGC1314, RM 8416, RM 8418, RM 8432, SRM 1643d, SRM 1873, SRM 3168a, SRM 3172a, SRM 610, SRM 611. ROCK: AC-E, AGV-1, AK, AL-1, AN-G, BCS-CRM 375, BCS-CRM 376, BCS-CRM 389, BCS-CRM 395, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, DVG-N, FER-1, FER-2, FER-3, FER-4, FK-N, FM, G-2, GA, GBW 07101, GBW 07102, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IF-G, JA-2, JA-3, JB-2, JB-3, JDo-1, JF-1,

JF-2, JG-1a, JG-2, JG-3, JGb-1, JGb-2, JH-1, JLs-1, JMn-1, JP-1, JR-1, JR-2, JR-3, JSd-1, JSd-2, JSd-3, JSI-1, JSI-2, JSy-1, KB, KK, MAN-1, Mica-Fe, Mica-Mg, MK, MK-1, MO-1, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-2, MO-3, MO-4, MO-5, MO-6, MO-7, MO-8, MO-9, MSCH-1, MSCH-2, MSCH-3, MSCH-4, MY-1, MY-2, MY-3, MY-4, Nod-A-1, Nod-P-1, PM-S, QLO-1, RGM-1, SARM-1, SARM-2, SARM-3, SARM-39, SARM-4, SARM-40, SARM-41, SARM-43, SARM-44, SARM-45, SARM-47, SARM-48, SARM-5, SARM-50, SARM-6, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-2, SDO-3, SDO-4, SDO-5, SDO-6, SDO-7, SDO-8, SDO-9, SDU-1, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SI-2, SI-3, SKD-1, SpS, SRM 120c, SRM 278, SRM 600, SRM 688, SRM 694, SRM 696, SRM 697, SRM 698, SRM 69b, SRM 97b, SRM 98b, SSL-1, SSV-1, ST-1a, STM-1, SY-4, UB-N, UM-2, UM-4, VS-N, W-2, WS-E, ZW-C. SED: BCSS-1, CRM 277, CRM 277, CRM 320, CRM 320, GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW 07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GBW 08301, GSD-10, GSD-11, GSD-12, GSD-9, HR-1, IAEA-356, JLk-1, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, MESS-2, NIES 2, PACS-1, SARM 46, SARM 51, SARM 52, SD-M-2/TM, SL-1, SRM 1646a, SRM 1941a, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4, SUD-1, TH-1, TH-2, WQB-1, WQB-3. SLUD: CRM 145R, CRM 146. SOIL: BS-1, BS-2, BS-3, CRM 141, CRM 141, CRM 142R, CRM 142R, CRM 143R, CRM 143R, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GBW 08302, GBW 08303, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SARM 42, SO-2, SO-3, SO-4, SOIL-7, SRM 2709, SRM 2710, SRM 2711, SS-1, SS-2, SS-3, TILL-1, TILL-2, TILL-3, TILL-4. TISS: A-11, A-13, CRM 060, CRM 061, CRM 062, CRM 063R, CRM 100, CRM 101, CRM 129, CRM 150, CRM 151, CRM 184, CRM 185, CRM 186, CRM 278, CRM 279, CRM 281, CRM 402, CRM 414, CRM 422, CTA-OTL-1, DOLT-2, DORM-2, GBW 08501, GBW 08504, GBW 08505, GBW 08551, GBW 08552, GBW 08571, GBW 08572, GBW 8508, GBW 8509, IAEA-153, IAEA-336, IAEA-350, LUTS-1, NIES 3, RM 8412, RM 8413, RM 8414, RM 8415, RM 8433, RM 8435, SRM 1515, SRM 1547, SRM 1566a, SRM 1570a, SRM 1577b, SRM 1598, SRM 1974, TORT-2, TY-1, TY-2, TY-3, TY-4, V-10. WATER: CASS-3, CRM 403, CRM 505, NASS-4, SLEW-2, SLRS-3, TM-23, TM-24, TM-26, TM-27, TM-28, TMDA-51, TMDA-52, TMDA-54.

Zr. ASH: ZUK-1. INST: GBW 07701, GBW 07702, GBW 07703, GBW 07704, GBW 07705, GBW 07706, GBW 07707, GBW 07708, GBW 07709, GBW 07712, GBW 07713, GBW 07714, GBW 07715, GBW 07716, GBW 07717, GBW 07718, GBW 07719, SRM 1872, SRM 1873, SRM 3169. ROCK: AC-E, AC-E, AGV-1, AK, AL-1, AN-G, BCS-CRM 348, BE-N, BHVO-1, BIR-1, BR, BX-N, CRM 811, DNC-1, DR-N, DT-N, DVG-N, FER-1, FER-2, FER-3, FER-4, FK-N, FM, G-2, GA, GBW 07103, GBW 07104, GBW 07105, GBW 07106, GBW 07107, GBW 07108, GBW 07109, GBW 07110, GBW 07111, GBW 07112, GBW 07113, GBW 07114, GBW 07249, GH, GL-O, GPOS301, GS-N, GSR-1, GSR-2, GSR-3, GSR-4, GSR-5, GSR-6, IPT-61, IPT-62, JA-2, JA-3, JB-2, JB-3, JF-1, JF-2, JG-1a, JG-2, JG-3, JGb-1, JMn-1, JP-1, JR-1, JR-2, JSy-1, KB, KK, MAN-1, Mica-Fe, Mica-Mg, MK-1, MO-1, MO-10, MO-11, MO-12, MO-13, MO-14, MO-15, MO-2, MO-4, MO-5, MO-6, MO-7, MO-8, MO-9, MSCH-1, MSCH-2, MSCH-3, MY-1, MY-3, MY-4, PM-S, QLO-1, RGM-1, SARM-1, SARM-2, SARM-3, SARM-3, SARM-39, SARM-4, SARM-40, SARM-41, SARM-44, SARM-45, SARM-48, SARM-50, SCo-1, SDC-1, SDO-1, SDO-1 (USGS), SDO-2, SDO-3, SDO-4, SDO-5, SDO-6, SDO-7, SDO-8, SDO-9, SG-1a, SG-3, SGD-1a, SGH-1, SGH-3, SGH-5, SGHM-1, SGHM-2, SGHM-3, SGHM-4, SGR-1, SI-2, SI-3, SKD-1, SpS, SRM 600, SRM 670, SRM 696, SRM 697, SRM 698, SRM 69b, SRM 81a, SRM 97b, SRM 98b, SSL-1, SSV-1, ST-1a, STM-1, SY-4, UB-N, VS-N, W-2, WS-E, ZW-C. SED: GBW 07301, GBW 07302, GBW 07303, GBW 07304, GBW

07305, GBW 07306, GBW 07307, GBW 07308, GBW 07309, GBW 07310, GBW 07311, GBW 07312, GBW 07313, GBW 07314, GSD-10, GSD-11, GSD-12, GSD-9, IAEA-356, LKSD-1, LKSD-2, LKSD-3, LKSD-4, MAG-1, SARM 46, SARM 51, SARM 52, SD-M-2/TM, SL-1, SRM 2704, STSD-1, STSD-2, STSD-3, STSD-4, SOIL: BS-1, BS-2, BS-3, GBW 07401, GBW 07402, GBW 07403, GBW 07404, GBW 07405, GBW 07406, GBW 07407, GBW 07408, GS-1, GS-2, GS-3, GSS-1, GSS-2, GSS-3, GSS-4, GSS-5, GSS-6, GSS-7, GSS-8, RS-1, RS-2, RS-3, SARM 42, SOIL-7, SRM 2709, SRM 2711, SS-1, SS-2, SS-3, TILL-1, TILL-2, TILL-3, TILL-4.

19. Index of Organic Compounds with Associated Reference Materials

All available values are indexed.

ASH: Ashes
INST: Instrumental performance
OIL: Oils
SED: Sediments
SLUD: Sludges
TISS: Tissues

1,2,3,4,6,7,8-HpCDD. SED: CARP-1, DX-1, DX-2.
1,2,3,4,6,7,8-HpCDF. SED: DX-1, DX-2.
1,2,3,4,7,8,9-HpCDF. SED: DX-1, DX-2.
1,2,3,4,7,8-H6CDD. ASH: CRM 429.
1,2,3,4,7,8-HCDD. INST: RM 434. TISS: RM 532, RM 533, RM 534.
1,2,3,4,7,8-HCDF. INST: RM 440. TISS: RM 532, RM 533, RM 534.
1,2,3,4,7,8-HxCDD. SED: CARP-1, DX-1, DX-2.
1,2,3,4,7,8-HxCDF. SED: DX-1, DX-2.
1,2,3,4-Tetrachlorobenzene. SED: EC-1, EC-2, EC-3, EC-4, EC-5, EC-6, EC-7.
1,2,3,5-Tetrachlorobenzene. SED: EC-1, EC-2, EC-3, EC-4, EC-5.
1,2,3,6,7,8-H6CDD. ASH: CRM 429.
1,2,3,6,7,8-H6CDF. ASH: CRM 429.
1,2,3,6,7,8-HCDD. INST: RM 435. TISS: RM 532, RM 533, RM 534.
1,2,3,6,7,8-HCDF. INST: RM 441. TISS: RM 532, RM 533, RM 534.
1,2,3,6,7,8-HxCDD. SED: CARP-1, DX-1, DX-2.
1,2,3,6,7,8-HxCDF. SED: DX-1, DX-2.
1,2,3,7,8,9-H6CDF. ASH: CRM 429.
1,2,3,7,8,9-HCDD. INST: RM 436. TISS: RM 532, RM 533, RM 534.
1,2,3,7,8,9-HCDF. INST: RM 442.
1,2,3,7,8,9-HxCDD. SED: CARP-1, DX-1, DX-2.
1,2,3,7,8,9-HxCDF. SED: DX-1, DX-2.
1,2,3,7,8-P5CDD. ASH: CRM 429..
1,2,3,7,8-P5CDF. ASH: CRM 429.
1,2,3,7,8-PCDD. INST: RM 433. SED: CARP-1. TISS: RM 532, RM 533, RM 534.
1,2,3,7,8-PCDF. INST: RM 438. SED: CARP-1. TISS: RM 532, RM 533, RM 534.
1,2,3,7,8-PeCDD. SED: DX-1, DX-2, DX-1, DX-2.
1,2,3,7,8,9-H6CDD. ASH: CRM 429.
1,2,3-Trichlorobenzene. SED: EC-1, EC-2, EC-3, EC-4, EC-5, EC-7.
1,2,4,5-Tetrachlorobenzene. SED: EC-1, EC-2, EC-3, EC-4, EC-5, EC-6, EC-7.
1,2,4-Trichlorobenzene. SED: EC-1, EC-2, EC-3, EC-4, EC-5, EC-6, EC-7.
1,2-Dichlorobenzene. SED: EC-1, EC-2, EC-3, EC-4, EC-5, EC-7.
1,3,5-Trichlorobenzene. SED: EC-1, EC-2, EC-3, EC-4, EC-5, EC-6, EC-7.
1,3-, 2,10-, 3,9-, and 3,10-Dimethylphenanthrenes. TISS: SRM 1974.
1,3-Dichlorobenzene. SED: EC-1, EC-2, EC-3, EC-4, EC-5, EC-7.
1,3-Dinitropyrene. INST: SRM 1596.
1,4-Dichlorobenzene. SED: EC-1, EC-2, EC-3, EC-5, EC-7.
1,6- and 2,9-Dimethylphenanthrene. TISS: SRM 1974.
1,6-Dinitropyrene. INST: SRM 1596.
1,7-Dimethylphenanthrene. TISS: SRM 1974.
1,8-Dinitropyrene. INST: SRM 1596.
1-Methylbenz[*a*]anthracene. INST: CRM 093.
1-Methylchrysene. INST: CRM 077.
1-Methylnaphthalene. INST: SRM 1491. INST: SRM 2260. TISS: IAEA-142, SRM 1974.
1-Methylphenanthrene. INST: SRM 1491. INST: SRM 2260. SED: SRM 1941a. TISS: IAEA-142, SRM 1974.
1-Nitronaphthalene. INST: CRM 306.
1-Nitropyrene. ASH: SRM 1650. INST: CRM 168, CRM 305, SRM 1587, SRM 1596.
10-Azabenzo[*a*]pyrene. INST: CRM 092.
2,2',3,4,4',5,5'-Heptachlorobiphenyl. INST: CRM 298.
2,2',3,4,4',5-Hexachlorobiphenyl. INST: CRM 296.
2,2',4,4',5,5'-Hexachlorobiphenyl. INST: CRM 297.
2,2',4,5,5'-Pentachlorobiphenyl. INST: CRM 294.
2,2',5,5'-Tetrachlorobiphenyl. INST: CRM 293.
2,2'-Bipyridyl. INST: LGC1607.
2,3,3'-Trichlorobiphenyl. INST: CRM 290.
2,3,4,6,7,8-H6CDF. ASH: CRM 429.
2,3,4,6,7,8-HCDF. INST: RM 443. TISS: RM 532, RM 533, RM 534.
2,3,4,6,7,8-HxCDF. SED: DX-1, DX-2.
2,3,4,7,8-P5CDF. ASH: CRM 429.

2,3,4,7,8-PCDF. INST: RM 439. TISS: RM 532, RM 533, RM 534.
2,3,4,7,8-PeCDF. SED: DX-1, DX-2.
2,3,5-Trimethylnaphthalene. INST: SRM 1491, SRM 2260.
2,3,7,8-T4CDD. ASH: CRM 429.
2,3,7,8-T4CDF. ASH: CRM 429.
2,3,7,8-TCDD. INST: RM 432, SRM 1614. SED: CARP-1, DX-1, DX-2. TISS: RM 532, RM 533, RM 534.
2,3,7,8-TCDD-13C. INST: SRM 1614.
2,3,7,8-TCDF. INST: RM 437. SED: CARP-1. TISS: RM 532, RM 533, RM 534.
2,4'-DDD. INST: SRM 1492, SRM 2261. SED: IAEA-357. TISS: SRM 1945, SRM 1974.
2,4'-DDE. INST: LGC1109, SRM 1492, SRM 2261. SED: SRM 1941a. TISS: SRM 1945, SRM 1974.
2,4'-DDT. INST: GBW 06406, LGC1000, LGC1111, SRM 1492, SRM 2261. OIL: SRM 1588. TISS: SRM 1945, SRM 1974.
2,4'-Dichlorobiphenyl. INST: CRM 289.
2,4,4'-Trichlorobiphenyl. INST: CRM 291.
2,4,5-T (acid). INST: LGC1310.
2,4,5-T (methyl ester). INST: LGC1311.
2,4,6-TBA (acid). INST: LGC1312.
2,4,6-Trichlorophenol. INST: SRM 1584.
2,4,6-Trimethylphenol. OIL: SRM 1580.
2,4-D. INST: LGC1006.
2,4-D (acid). INST: LGC1302.
2,4-D (methyl ester). INST: LGC1303.
2,4-DB. INST: LGC1304.
2,4-Dichlorobenzoic acid. INST: LGC1305.
2,4-Dichlorophenol. INST: SRM 1584, SRM 1586.
2,4-Dichlorophenol-d3. INST: SRM 1586.
2,4-Dimethylphenol. INST: SRM 1584. OIL: SRM 1580.
2,4-Dinitrophenol. INST: SRM 1584.
2,5,6-Trimethylphenol. OIL: SRM 1580.
2,5-Dimethylphenol. OIL: SRM 1580.
2,6-Dimethylnaphthalene. INST: SRM 1491, SRM 2260. TISS: IAEA-142.
2,6-Dimethylphenanthrene. TISS: SRM 1974.
2,6-Dimethylphenol. OIL: SRM 1580.
2,7-Dimethylphenanthrene. TISS: SRM 1974.
2- and 9-Ethylphenanthrenes and 3,6-dimethylphenanthrene. TISS: SRM 1974.
2-Chlorophenol. INST: SRM 1584.
2-Methylchrysene. INST: CRM 078.
2-Methylnaphthalene. INST: SRM 1491, SRM 2260. TISS: IAEA-142, SRM 1974.
2-Methylphenanthrene. SED: SRM 1941a. TISS: IAEA-142.
2-Nitro-7-methoxynaphtho[2,1-*b*]furan. INST: CRM 312.
2-Nitrofluoranthene. INST: SRM 1587. ASH: SRM 1650. INST: SRM 1587.
2-Nitronaphthalene. INST: CRM 307. INST: SRM 1584, SRM 1586.
2-Nitrophenol-d4. INST: SRM 1586.
2-Phenylphenol. TISS: LGC7010.
3,3',4-Trichlorobiphenyl. INST: CRM 292.
3,4,7,8-TCDF. SED: DX-1, DX-2.
3-Hydroxybenzo[*a*]pyrene. INST: CRM 343 .
3-Methylchrysene. INST: CRM 079.
3-Methylphenanthrene. SED: SRM 1941a.
3-Nitrofluoranthene. INST: CRM 310.
4,4'-Bipyridyl. INST: LGC1608.
4,4'-DDD. INST: GBW 06408, SRM 1492, SRM 2261. OIL: CRM 349, CRM 350, SRM 1588. SED: IAEA-357, SRM 1939, SRM 1941a. TISS: IAEA-142, IAEA-351, MA-A-1/OC, MA-A-3/OC, MA-B-3/OC, SRM 1945, SRM 1974.
4,4'-DDE. INST: GBW 06407, LGC1000, LGC1007, RM 8467, SRM 1492, SRM 1583, SRM 2261. OIL: CRM 349, CRM 350, SRM 1588. SED: IAEA-357, SRM 1939, SRM 1941a. TISS: CRM 187, CRM 188, IAEA-142, IAEA-351, LGC7008, LGC7009, MA-A-1/OC, MA-A-3/OC, MA-B-3/OC, SRM 1945, SRM 1974.
4,4'-DDT. INST: GBW 06405, LGC1000, LGC1112, RM 8469, SRM 1492, SRM 1583, SRM 2261. OIL: CRM 349, CRM 350, SRM 1588. SED: IAEA-357, SRM 1941a. TISS: CRM 188, IAEA-142, IAEA-351, MA-A-1/OC, MA-A-3/OC, MA-B-3/OC, SRM 1945, SRM 1974.
4,4'-TDE. INST: LGC1000.
4,6-Dinitro-o-cresol. INST: SRM 1584.
4-Chloro-m-cresol. INST: SRM 1584.
4-CPA. INST: LGC1301.
4-Methylchrysene. INST: CRM 080.
4-Nitrophenol. INST: SRM 1584.
4H-Cyclopenta[def]phenanthrene-4-one. INST: CRM 338 . SED: SRM 1941a.
5-Methylchrysene. INST: CRM 081R.
6-Nitrobenzo[*a*]pyrene. ASH: SRM 1650. INST: CRM 311.
6-Nitrochrysene. INST: CRM 309, SRM 1587.
7-Nitrobenz[*a*]anthracene. ASH: SRM 1650. INST: SRM 1587.
7H-Dibenzo[c,g]carbazole. INST: CRM 266.
9-Fluorenone. ASH: SRM 1650.
9-Methyl- and 4-methylphenanthrene. TISS: SRM 1974.

9-Nitroanthracene. INST: CRM 308, SRM 1587.

Acenaphathene. INST: SRM 1491, SRM 1647c, SRM 2260. SED: EC-2, EC-3, EC-4, EC-5, EC-6, EC-7, HS-3, HS-4, SES-1, SRM 1941a. TISS: IAEA-142.

Acenaphthylene. INST: SRM 1491, SRM 1647c, SRM 2260. SED: EC-2, EC-3, EC-4, EC-5, EC-6, EC-7, HS-3, HS-4, HS-5, HS-6, SRM 1941a. TISS: IAEA-142.

Acephenanthrylene.SED: SRM 1941a.

Aldrin. INST: LGC1001, LGC1123, RM 8464, SRM 1492, SRM 1583, SRM 2261. TISS: IAEA-142, IAEA-351, MA-A-1/OC, MA-A-3/OC, MA-B-3/OC.

alpha-BHC. INST: GBW 06401.

alpha-Chlordane. OIL: CRM 349, CRM 350.

alpha-Endosulfan. INST: LGC1119. TISS: IAEA-142.

alpha-HCH. INST: LGC1000, LGC1101. OIL: SRM 1588. TISS: CRM 187, CRM 188, IAEA-142, MA-A-1/OC, MA-B-3/OC, SRM 1945.

alpha-Tocopherol. OIL: SRM 1588.

Anthanthrene. INST: CRM 091. SED: SRM 1941a.

Anthracene. INST: SRM 1491. INST: SRM 1647c, SRM 2260. SED: EC-1, EC-2, EC-3, EC-4, EC-5, EC-6, EC-7, HS-3, HS-4, HS-5, HS-6, IAEA-357, SES-1, SRM 1941a. TISS: IAEA-142, SRM 1974.

Anthraquinone. INST: LGC1601.

Aroclor 1242. TISS: MA-A-1/OC.

Aroclor 1243. OIL: SRM 1581.

Aroclor 1254. SED: CS-1, HS-1, HS-2, IAEA-357. TISS: IAEA-142, IAEA-351, MA-A-1/OC, MA-A-3/OC, MA-B-3/OC.

Aroclor 1260. OIL: SRM 1581. TISS: IAEA-142, IAEA-351, MA-B-3/OC.

Asulam. INST: LGC1602.

Atrazine. INST: LGC1004, LGC1603.

Azobenzene. INST: LGC1604.

Bentranil .INST: LGC1605.

Benzene. INST: GBW 06104, SRM 1586.

Benzene-d6. INST: SRM 1586.

Benzo[*a*]anthracene. SLUD: CRM 088. TISS: IAEA-142.

Benzo[*a*]fluoranthene. INST: CRM 097. SED: SRM 1941a. TISS: SRM 1974.

Benzo[*a*]fluorenone. INST: CRM 342 .

Benzo[*a*]pyrene. ASH: SRM 1649. ASH: SRM 1650. INST: CRM 051R, SRM 1491, SRM 1586, SRM 1647c, SRM 2260. OIL: SRM 1580, SRM 1582. SED: EC-1, EC-2, EC-3, EC-4, EC-5, EC-6, EC-7, HS-3, HS-4, HS-5, HS-6, IAEA-357, SES-1, SRM 1941a. SLUD: CRM 088. TISS: IAEA-142, SRM 1974.

Benzo[*a*]pyrene-d12. INST: SRM 1586.

Benzo[*b*]chrysene. INST: CRM 046. SED: SRM 1941a.

Benzo[*b*]fluoranthene. ASH: SRM 1649. INST: CRM 047 , SRM 1491, SRM 1647c, SRM 2260. SED: EC-1, EC-2, EC-3, EC-4, EC-5, EC-6, EC-7, HS-3, HS-4, HS-5, HS-6, SES-1, SRM 1941a. SLUD: CRM 088. TISS: IAEA-142, SRM 1974.

Benzo[*b*]naphtho[1,2-*d*]thiophene. INST: CRM 137. SLUD: CRM 088.

Benzo[*b*]naphtho[2,1-*d*]thiophene. INST: CRM 135.

Benzo[*b*]naphtho[2,3-*d*]thiophene. INST: CRM 136.

Benzo[*b*]naphto[1,2-*d*]furan. INST: CRM 340 .

Benzo[*b*]naphto[2,1-*d*]furan. INST: CRM 341 .

Benzo[*c,d*]pyren-6-one. INST: CRM 339 .

Benzo[*c*]chrysene. INST: CRM 140.

Benzo[*c*]phenanthrene. INST: CRM 134. SED: SRM 1941a.

Benzo[*e*]pyrene. ASH: SRM 1649, SRM 1650. INST: CRM 050, SRM 1491, SRM 2260. OIL: SRM 1580, SRM 1582. SED: EC-1, EC-2, EC-3, EC-4, EC-5, IAEA-357, SRM 1941a. SLUD: CRM 088. TISS: IAEA-142, SRM 1974.

Benzo[*f*]quinoline. OIL: SRM 1580.

Benzo[*ghi*]fluoranthene. INST: CRM 139. SED: SRM 1941a.

Benzo[*ghi*]perylene. ASH: SRM 1649, SRM 1650. INST: CRM 052, SRM 1491, SRM 1647c, SRM 2260. OIL: SRM 1582. SED: EC-1, EC-2, EC-3, EC-4, EC-5, EC-6, EC-7, HS-3, HS-4, HS-5, HS-6, IAEA-357, SES-1, SRM 1941a. TISS: IAEA-142, SRM 1974.

Benzo[*j*]fluoranthene. INST: CRM 049. SED: SRM 1941a.

Benzo[*j*]fluoranthene and benzo[*k*]fluoranthene. TISS: SRM 1974.

Benzo[*k*]fluoranthene. ASH: SRM 1649, SRM 1650. INST: CRM 048, SRM 1491, SRM 1647c, SRM 2260. SED: EC-1, EC-2, EC-3, EC-4, EC-5, EC-6, EC-7, HS-3, HS-4, HS-5, HS-6, SES-1, SRM 1941a. SLUD: CRM 088. TISS: IAEA-142, SRM 1974.

Benz[*a*]acridine. INST: CRM 157.

Benz[*a*]anthracene. ASH: SRM 1649, SRM 1650. INST: CRM 271, SRM 1491, SRM 1647c, SRM 2260. OIL: SRM 1582. SED:

EC-1, EC-2, EC-3, EC-4, EC-5, EC-6, EC-7, HS-3, HS-4, HS-5, HS-6, IAEA-357, SES-1, SRM 1939, SRM 1941a. TISS: SRM 1974.

Benz[*c*]acridine. INST: CRM 158.

beta-BHC. INST: GBW 06402.

beta-Endosulfan. INST: LGC1120.

beta-HCH. INST: LGC1000, LGC1102. TISS: CRM 188, SRM 1945.

beta-HEPO. TISS: CRM 187, CRM 188.

Biphenyl. INST: LGC1606, SRM 1491, SRM 2260. SED: SRM 1941a. TISS: IAEA-142, LGC7010.

bis(2-Ethyl hexyl)phthalate-d4. INST: SRM 1586.

bis(2-Ethyl hexyl)phthlate. INST: SRM 1586.

Bromodichloromethane. INST: SRM 1639.

Bromoform. INST: SRM 1639.

Bromoxynil octanoate. INST: LGC1610.

Bupirimate. INST: LGC1636.

Carbaryl .INST: LGC1611.

Carbazole. OIL: SRM 1582.

Carbon tetrachloride. INST: SRM 1586, SRM 1639.

Carbon tetrachloride-13C. INST: SRM 1586.

Chlorbenside. INST: LGC1106.

Chlordane. INST: LGC1108.

Chlorfenvinphos. INST: LGC1003.

Chlorobenzene.INST: SRM 1586.

Chlorobenzene-d5. INST: SRM 1586.

Chlorobromuron. INST: LGC1401.

Chlorodibromomethane. INST: SRM 1639.

Chloroform. INST: SRM 1639.

Chloropyifos-methyl. INST: LGC1002.

Chlorotoluron. INST: LGC1402.

Chlorpyrifos-methyl. TISS: LGC7008, LGC7009.

Chlorpyriphos. INST: LGC1003.

Chlortoluron. INST: LGC1005.

Chrysene. ASH: SRM 1649, SRM 1650. INST: CRM 269, SRM 1491, SRM 1647c, SRM 2260. SED: HS-3, HS-4, HS-5, HS-6, IAEA-357, SES-1, SRM 1941a. TISS: IAEA-142.

Chrysene/triphenylene. SED: EC-1, EC-2, EC-3, EC-4, EC-5, EC-6, EC-7, SRM 1939. TISS: SRM 1974.

cis-Chlordane. INST: SRM 1492, SRM 2261. OIL: SRM 1588. SED: SRM 1939, SRM 1941a. TISS: SRM 1945, SRM 1974.

cis-Nonachlor. TISS: SRM 1945.

cis-Permethrin. INST: LGC1701.

Clofentezine. INST: LGC1637.

Coronene. INST: CRM 272.

Cyanazine. INST: LGC1635.

DEET. INST: LGC1612.

delta-BHC. INST: GBW 06404.

delta-HCH. INST: SRM 1583, LGC1103.

Desmetryn. INST: LGC1632.

Diazonon. INST: LGC1003.

Dibenzothiophene. OIL: SRM 1582. SED: SRM 1941a.

Dibenzo[*a,e*]fluoranthene. INST: CRM 265.

Dibenzo[*a,e*]pyrene. INST: CRM 133.

Dibenzo[*a,h*]anthracene. TISS: IAEA-142.

Dibenzo[*a,h*]pyrene. INST: CRM 159.

Dibenzo[*a,i*]pyrene. INST: CRM 268.

Dibenzo[*a,l*]pyrene. INST: CRM 096.

Dibenzo[*b,d*]furan. INST: CRM 337.

Dibenz[*a,c*]acridine. INST: CRM 155.

Dibenz[*a,c*]anthracene. INST: CRM 094. SED: SRM 1941a.

Dibenz[*a,h*]acridine. INST: CRM 153.

Dibenz[*a,h*]anthracene. ASH: SRM 1649. INST: CRM 138, SRM 1491, SRM 1647c, SRM 2260. SED: EC-1, EC-2, EC-3, EC-4, EC-5, EC-6, EC-7, HS-3, HS-4, HS-5, HS-6, IAEA-357, SES-1, SRM 1941a. TISS: SRM 1974.

Dibenz[*a,i*]acridine. INST: CRM 152.

Dibenz[*a,j*]acridine. INST: CRM 154.

Dibenz[*a,j*]anthracene. INST: CRM 095. SED: SRM 1941a.

Dibenz[*c,h*]acridine. INST: CRM 156.

Dichlobenil. INST: LGC1113.

Dichlone. INST: LGC1114.

Dichlorprop. INST: LGC1313.

Dichlorprop (2-ethylhexyl ester). INST: LGC1317.

Dicloran. INST: LGC1116.

Dieldrin. INST: LGC1000, LGC1007, LGC1122, RM 8465, SRM 1492, SRM 2261. OIL: CRM 349, CRM 350, SRM 1588. SED: SRM 1941a. TISS: CRM 187, CRM 188, IAEA-142, LGC7008, SRM 1945, SRM 1974.

Dimethirimol. INST: LGC1633.

Dinobuton. INST: LGC1613.

Dinoseb. INST: LGC1614.

Dinoterb. INST: LGC1615.

Dinoterb acetate. INST: LGC1616.

Diphenyl sulphone. INST: LGC1617.

Diquat dibromide. INST: LGC1618.

Diuron. INST: LGC1005.

Domoic acid. INST: DACS-1B. TISS: MUS-1.

DTX-1. TISS: MUS-2.

Endosulfan I. INST: LGC1001.

Endosulfan II. INST: LGC1001.

Endosulfan sulphate. INST: LGC1001.

Endrin. INST: LGC1001. INST: LGC1121. TISS: CRM 188.
Ethion. INST: LGC1003, LGC1212.
Ethirimol. INST: LGC1634.
Etrimfos. INST: LGC1002.
Fenitronthion. INST: LGC1002.
Fenoprop. INST: LGC1306.
Fenthion. INST: LGC1003.
Fluoranthene. ASH: SRM 1649, SRM 1650. INST: CRM 160, SRM 1491, SRM 1647c, SRM 2260. OIL: SRM 1580, SRM 1582. SED: EC-1, EC-2, EC-3, EC-4, EC-5, EC-6, EC-7, HS-3, HS-4, HS-5, HS-6, SES-1, SRM 1939, SRM 1941a. TISS: IAEA-142, SRM 1974.
Fluorene. INST: SRM 1491, SRM 1647c, SRM 2260. SED: EC-2, EC-3, EC-4, EC-5, EC-6, EC-7, HS-3, HS-4, HS-5, HS-6, IAEA-357, SES-1, SRM 1941a. TISS: IAEA-142, SRM 1974.
gamma-BHC. INST: GBW 06403, LGC1104.
gamma-Endosulfan. TISS: IAEA-142.
gamma-HCH. INST: LGC1000, LGC1007, RM 8466, SRM 1492, SRM 1583, SRM 2261. OIL: CRM 349, CRM 350. TISS: CRM 187, CRM 188, IAEA-142, LGC7008, LGC7009, MA-A-3/OC, MA-A-3/OC, MA-B-3/OC, SRM 1945.
Gonyautoxin 2. INST: PSP-1.
Gonyautoxin 3. INST: PSP-1.
HCB. INST: LGC1000. SED: IAEA-357. TISS: CRM 187, CRM 188, IAEA-142, IAEA-351, MA-A-3/OC, MA-B-3/OC.
Heptachlor. INST: LGC1001, RM 8468, SRM 1492, SRM 2261. SED: IAEA-357.
Heptachlor epoxide. INST: LGC1001, SRM 1492, SRM 1583, SRM 2261. TISS: IAEA-142, SRM 1945.
Heptachlorepoxide/oxychlordane. SED: SRM 1939.
Hexachlorobenzene. INST: LGC1131, SRM 1492, SRM 2261. OIL: SRM 1588. SED: EC-1, EC-2, EC-3, EC-4, EC-5, EC-6, EC-7, SRM 1941a. TISS: SRM 1945.
Hexachlorobutadiene. SED: EC-1, EC-2, EC-3, EC-4, EC-5, EC-6, EC-7.
Hexachloroethylene. SED: EC-6, EC-7.
Indeno[1,2,3-*cd*]fluoranthene. INST: CRM 267. SED: SRM 1941a. TISS: SRM 1974.
Indeno[1,2,3-*cd*]perylene. ASH: SRM 1649.
Indeno[1,2,3-*cd*]pyrene. ASH: SRM 1650. INST: CRM 053, SRM 1491, SRM 1647c, SRM 2260. OIL: SRM 1582. SED: EC-1, EC-2, EC-3, EC-4, EC-5, EC-6, EC-7, HS-3, HS-4, HS-5, HS-6, IAEA-357, SES-1, SRM 1941a. SLUD: CRM 088. TISS: IAEA-142, SRM 1974.
Ioxynil. INST: LGC1620.
Ioxynil octanoate. INST: LGC1621.
Isoproturon. INST: LGC1005, LGC1406.
Lindane. TISS: IAEA-351.
Linuron. INST: LGC1404.
m-Cresol. OIL: SRM 1580.
Malathion. INST: LGC1002. TISS: LGC7008, LGC7009.
MCPA .INST: LGC1006.
MCPA (2-butoxyethyl ester). INST: LGC1316.
MCPA (acid). INST: LGC1307.
MCPB (acid). INST: LGC1308.
Mecaprop. INST: LGC1006.
Mecarbam. INST: LGC1003, LGC1206.
Mecoprop. (2-butoxyethyl ester) INST: LGC1315.
Mecoprop (MCPP). INST: LGC1309.
Metalaxyl. INST: LGC1638.
Methacrifos. INST: LGC1002.
Methidathion. INST: LGC1207.
Methyl mercury chloride. INST: LGC1502.
Mirex. INST: SRM 1492. INST: SRM 2261. OIL: CRM 349, CRM 350. TISS: SRM 1945.
Monuron. INST: LGC1405.
n-C17. TISS: IAEA-142.
n-Decane. SED: SRM 1941a.
n-Docosane. SED: SRM 1941a.
n-Dodecane. SED: SRM 1941a.
n-Eicosane. SED: SRM 1941a.
n-Heptadecane. SED: SRM 1941a.
n-Hexacosane. SED: SRM 1941a.
n-Hexadecane. SED: SRM 1941a.
n-Nonadecane. SED: SRM 1941a.
n-Octacosane. SED: SRM 1941a.
n-Octadecane. SED: SRM 1941a.
n-Pentadecane. SED: SRM 1941a.
n-Tetracosane. SED: SRM 1941a.
n-Tetradecane. SED: SRM 1941a.
n-Triacontane. SED: SRM 1941a.
n-Tridecane. SED: SRM 1941a.
Naphthalene. INST: SRM 1491, SRM 1586, SRM 1647c, SRM 2260. SED: EC-2, EC-3, EC-4, EC-5, EC-6, EC-7, HS-3, HS-4, HS-5, HS-6, SES-1, SRM 1941a. TISS: IAEA-142.
Naphthalene-d8. INST: SRM 1586.
Neosaxitoxin. INST: PSP-1.
Nicotine. INST: LGC1801.
Nitrobenzene. INST: SRM 1586.
Nitrobenzene-d5. INST: SRM 1586.
o,p'-TDE. INST: LGC1126.

o-Cresol. OIL: SRM 1580, SRM 1582.
OCDF. SED: DX-1, DX-2.
Octachlorostyrene. SED: EC-1, EC-2, EC-3, EC-4, EC-5, EC-6, EC-7.
Okadaic acid. INST: OACS-1. TISS: MUS-2.
Oxychlordane. SED: SRM 1941a. TISS: SRM 1945.
p,p'-TDE. INST: LGC1127.
p,p'-TDE (olefin). INST: LGC1129.
p-Cresol. OIL: SRM 1580.
p-Dichlorobenzene. INST: LGC1115.
Paraquat dichloride. INST: LGC1622.
Parathion-methyl. INST: LGC1003.
PCB 1. INST: SRM 2262.
PCB 3. INST: SRM 1585.
PCB 8. INST: CRM 365, SRM 1493, SRM 2262. SED: SRM 1941a. TISS: IAEA-142.
PCB 15. INST: CLB-1, SRM 1585.
PCB 20. INST: CRM 365.
PCB 26. SED: SRM 1939.
PCB 28. INST: CRM 365, SRM 1493, SRM 1585, SRM 2262. OIL: CRM 349, CRM 350. SED: IAEA-357, SRM 1939, SRM 1941a. SLUD: CRM 392. TISS: CRM 392, CRM 450, IAEA-142, SRM 1945, SRM 1974.
PCB 29. INST: SRM 2262.
PCB 31. INST: CLB-1. SED: SRM 1939, SRM 1941a. TISS: IAEA-142, SRM 1945.
PCB 35. INST: CRM 365.
PCB 40. INST: CLB-1.
PCB 44. INST: CLB-1, SRM 1493, SRM 2262. OIL: CRM 349, CRM 350. SED: IAEA-357, SRM 1939, SRM 1941a. TISS: IAEA-142, SRM 1945, SRM 1974.
PCB 49. INST: CLB-1. SED: SRM 1939, SRM 1941a. TISS: SRM 1945.
PCB 50. INST: SRM 2262.
PCB 52. INST: CLB-1, CRM 365, SRM 1493, SRM 1585, SRM 2262. OIL: CRM 349, CRM 350. SED: CARP-1, IAEA-357, SRM 1939, SRM 1941a. SLUD: CRM 392. TISS: CRM 392, CRM 450, IAEA-142, SRM 1945, SRM 1974.
PCB 54. INST: CLB-1.
PCB 60. INST: CLB-1.
PCB 66. INST: SRM 1493, SRM 2262. SED: SRM 1939, SRM 1941a. TISS: IAEA-142, SRM 1945, SRM 1974.
PCB 70. TISS: IAEA-142.
PCB 77. INST: CLB-1, SRM 1493, SRM 1585, SRM 2262.
PCB 86. INST: CLB-1.
PCB 87. INST: CLB-1, SRM 2262. SED: SRM 1941a. TISS: SRM 1945.
PCB 95. SED: SRM 1941a. TISS: SRM 1945.
PCB 99. SED: SRM 1941a. TISS: IAEA-142, SRM 1945.
PCB 101. INST: CLB-1. INST: CRM 365, RM 481, SRM 1493, SRM 1585, SRM 2262. OIL: CRM 349, CRM 350, SRM 1588. SED: HS-1, HS-2, IAEA-357, SRM 1939, SRM 1941a. SLUD: CRM 392. TISS: CRM 392, CRM 450, IAEA-142, IAEA-351, MA-B-3/OC.
PCB 101/PCB 90. SED: CARP-1. TISS: SRM 1945, SRM 1974.
PCB 103. INST: CLB-1.
PCB 104. INST: SRM 2262.
PCB 105. INST: CLB-1, SRM 1493, SRM 2262. SED: CARP-1, IAEA-357, SRM 1939, SRM 1941a. TISS: IAEA-142, SRM 1945, SRM 1974.
PCB 110. SED: SRM 1941a. TISS: SRM 1945.
PCB 114. INST: CLB-1.
PCB 118. INST: CLB-1, CRM 365, RM 481, SRM 1493, SRM 2262. OIL: CRM 349, CRM 350. SED: CARP-1, IAEA-357, SRM 1939, SRM 1941a. SLUD: CRM 392. TISS: CRM 392, CRM 450, IAEA-142, IAEA-351, SRM 1945, SRM 1974.
PCB 121. INST: CLB-1.
PCB 126. INST: SRM 1493, SRM 2262.
PCB 128. INST: CLB-1, RM 481, SRM 1493, SRM 2262. OIL: CRM 349, CRM 350. SED: IAEA-357, SRM 1939, SRM 1941a. TISS: IAEA-142, SRM 1945, SRM 1974.
PCB 129. INST: CLB-1.
PCB 137. INST: CLB-1.
PCB 138. INST: CLB-1. INST: CRM 365, SRM 1493, SRM 1585, SRM 2262. OIL: SRM 1588. SED: HS-1, HS-2, IAEA-357, SRM 1939. TISS: IAEA-142, IAEA-351.
PCB 138 + 163. OIL: CRM 349, CRM 350. SLUD: CRM 392. TISS: CRM 392.
PCB 138/163/164. SED: CARP-1, SRM 1941a. TISS: SRM 1945, SRM 1974.
PCB 141. INST: CLB-1.
PCB 143. INST: CLB-1.
PCB 149. INST: RM 481. SED: SRM 1941a. TISS: IAEA-142.
PCB 151. INST: CLB-1. SED: HS-1, HS-2, SRM 1941a. TISS: SRM 1945.
PCB 153. INST: CLB-1, CLB-2, CRM 365, RM 481, SRM 1493, SRM 1585, SRM 2262. OIL: CRM 349, CRM 350, SRM 1588. SED: CARP-1, HS-1, HS-2, IAEA-357, SRM 1939, SRM 1941a. SLUD: CRM 392. TISS:

CRM 392, CRM 450, IAEA-142, IAEA-351, MA-B-3/OC, SRM 1945, SRM 1974.
PCB 154. INST: CLB-1, SRM 2262.
PCB 156. INST: CLB-1, RM 481. SED: IAEA-357, SRM 1941a. TISS: IAEA-142, SRM 1945.
PCB 164. TISS: SRM 1974.
PCB 170. INST: CLB-1, RM 481, SRM 1493, SRM 2262. OIL: SRM 1588. SED: HS-1, HS-2, IAEA-357, SRM 1939.
PCB 170/190. SED: CARP-1, SRM 1941a. TISS: SRM 1945.
PCB 171. INST: CLB-1.
PCB 173. INST: CLB-1.
PCB 18. INST: CLB-1, SRM 1493, SRM 2262. SED: SRM 1939, SRM 1941a. TISS: IAEA-142, SRM 1945, SRM 1974.
PCB 180. INST: CLB-1, CRM 365, RM 481, SRM 1493, SRM 2262. OIL: CRM 349, CRM 350, SRM 1588. SED: CARP-1, HS-1, HS-2, IAEA-357, SRM 1939, SRM 1941a. SLUD: CRM 392. TISS: CRM 392, CRM 450, IAEA-142, IAEA-351, SRM 1945, SRM 1974.
PCB 182. INST: CLB-1.
PCB 183. INST: CLB-1. SED: SRM 1941a. TISS: SRM 1945.
PCB 185. INST: CLB-1.
PCB 187. INST: CLB-1, SRM 1493, SRM 2262. SED: SRM 1939. TISS: IAEA-142, SRM 1945.
PCB 187/182. SED: CARP-1, SRM 1941a. TISS: SRM 1974.
PCB 188. INST: SRM 2262.
PCB 189. INST: CLB-1.
PCB 191. INST: CLB-1.
PCB 194. INST: CLB-1, SRM 2262. OIL: CRM 349, CRM 350. SED: HS-1, HS-2, IAEA-357, SRM 1941a. TISS: SRM 1945.
PCB 195. INST: CLB-1, SRM 1493, SRM 2262. TISS: SRM 1945.
PCB 196. INST: CLB-1. SED: HS-1, HS-2.
PCB 199. INST: CLB-1. SED: HS-1, HS-2.
PCB 201. INST: CLB-1, SRM 2262. TISS: SRM 1945.
PCB 202. INST: CLB-1.
PCB 203. INST: CLB-1.
PCB 205. INST: CLB-1.
PCB 206. INST: CLB-1, SRM 1493, SRM 2262. SED: SRM 1941a. TISS: SRM 1945.
PCB 207. INST: CLB-1.
PCB 208. INST: CLB-1.
PCB 209. INST: CLB-1, SRM 1493, SRM 2262. SED: HS-1, HS-2, SRM 1941a. TISS: SRM 1945.
Pentachlorobenzene. SED: EC-1, EC-2, EC-3, EC-4, EC-5, EC-6, EC-7.
Pentachlorophenol. INST: LGC1623, SRM 1584.
Pentaphene. SED: SRM 1941a.
Perylene. ASH: SRM 1649, SRM 1650. INST: SRM 1491, SRM 2260. OIL: SRM 1580, SRM 1582. SED: EC-1, EC-2, EC-3, EC-4, EC-5, SRM 1941a. TISS: IAEA-142, SRM 1974.
Phenanthrene. ASH: SRM 1649, SRM 1650. INST: SRM 1491, SRM 1647c, SRM 2260. OIL: SRM 1582. SED: EC-1, EC-2, EC-3, EC-4, EC-5, EC-6, EC-7, HS-3, HS-4, HS-5, HS-6, IAEA-357, SES-1, SRM 1939, SRM 1941a. TISS: IAEA-142, SRM 1974.
Phenanthridine. OIL: SRM 1580.
Phenol. INST: SRM 1584, SRM 1586. OIL: SRM 1580, SRM 1582.
Phenol-d5. INST: SRM 1586.
Phytane. SED: IAEA-357, SRM 1941a. TISS: IAEA-142.
Picene. SED: SRM 1941a.
Piperonyl butoxide. INST: LGC1625.
Pirimicarb. INST: LGC1626.
Pirimiphos-methyl. INST: LGC1002. TISS: LGC7008, LGC7009.
Pristane. SED: SRM 1941a. TISS: IAEA-142.
Prometryn. INST: LGC1627.
Propetamphos. INST: LGC1209. TISS: LGC7008, LGC7009.
Pyrene. ASH: SRM 1649, SRM 1650. INST: CRM 177, SRM 1491, SRM 1647c, SRM 2260. OIL: SRM 1580, SRM 1582. SED: EC-1, EC-2, EC-3, EC-4, EC-5, EC-6, EC-7, HS-3, HS-4, HS-5, HS-6, IAEA-357, SES-1, SRM 1939, SRM 1941a. SLUD: CRM 088. TISS: IAEA-142, SRM 1974.
Quintozene. INST: LGC1125.
Saxitoxin. INST: PSP-1.
Siamizine. INST: LGC1004.
Tecnazene. INST: LGC1130.
Terbutylazine. INST: LGC1004.
Tetrachloroethylene. INST: SRM 1639.
Thiabendazole. INST: LGC1210. TISS: LGC7010.
trans-Chlordane. OIL: SRM 1588.
trans-Nonachlor. INST: SRM 1492, SRM 2261. OIL: SRM 1588. SED: SRM 1939, SRM 1941a. TISS: SRM 1945, SRM 1974.
Triazophos. INST: LGC1003.

Trichlorodibenzo-*p*-dioxin. INST: SRM 1614.
Trichlorodibenzo-*p*-dioxin-^{13}C. INST: SRM 1614.
Trichloroethylene. INST: SRM 1639.
Trietazine. INST: LGC1004, LGC1631.
Triphenylene. ASH: SRM 1649. INST: CRM 270. SED: SRM 1941a.

20. Index of Isotopes with Associated Reference Materials

All available values are indexed.

INST: Instrumental performance
SED: Sediments
SOIL: Soils
TISS: Tissues
WATER: Waters

Ac-228. SOIL: SRM 4353..
Ag-110m. TISS: IAEA-307, IAEA-308.
Am-241. INST: SRM 4322B. SED: IAEA-135, IAEA-300, IAEA-367, IAEA-368, SRM 4350B, SRM 4354. SOIL: IAEA-375, SRM 4353, SRM 4355. TISS: IAEA-134, IAEA-307, IAEA-308.
Am-243. INST: SRM 4332C.
Au-195. INST: SRM 4421L.
Au-198. INST: SRM 4405B.
Ba-133. INST: SRM 4251C.
Cl-36. INST: SRM 4943.
Cm-243. INST: SRM 4329.
Cm-244. INST: SRM 4320.
Co-57. SED: IAEA-135.
Co-60. INST: SRM 4408D, SRM 4915E. SED: GBW 08304, IAEA-135, IAEA-300, IAEA-367, IAEA-368, SRM 4350B, SRM 4354. SOIL: SRM 4355. TISS: IAEA-134.
Cr-51. INST: SRM 4400N.
Cs-134. SED: IAEA-135, IAEA-300. SOIL: IAEA-375. TISS: IAEA-134, IAEA-153, IAEA-156, IAEA-307, IAEA-308, IAEA-321, IAEA-373.
Cs-137. INST: SRM 4233C. SED: GBW 08304, IAEA-135, IAEA-300, IAEA-367, IAEA-368, SD-N-2, SL-2, SRM 4350B, SRM 4354. SOIL: IAEA-375, SOIL-6, SRM 4353, SRM 4355. TISS: A-14, CLV-1, CLV-2, IAEA-134, IAEA-153, IAEA-156, IAEA-307, IAEA-308, IAEA-321, IAEA-352, IAEA-373, MA-B-3/RN. WATER: IAEA-298.
Eu-152. INST: SRM 4370. SED: SRM 4350B. SOIL: SRM 4355.
Eu-154. INST: SRM 4276C. SED: IAEA-135, SRM 4350B. SOIL: SRM 4355. TISS: IAEA-134.
Eu-155. INST: SRM 4276C. SED: IAEA-135, IAEA-300, IAEA-367, IAEA-368. SOIL: SRM 4355. TISS: IAEA-134.
Fe-55. INST: SRM 4929-D.
Fe-59. INST: SRM 4411B.
Ga-67. INST: SRM 4416O.
H-3. INST: SRM 4361B, SRM 4926D, SRM 4927D, SRM 4947C.
Hg-203. INST: SRM 4418L.
I-123. INST: SRM 4414C.
I-125. INST: SRM 4407S.
I-129. INST: SRM 4949C.
I-131. INST: SRM 4401T.
In-111. INST: SRM 4417N.
K-40. SED: GBW 08304, IAEA-135, IAEA-300, IAEA-367, IAEA-368, SD-N-2, SL-2. SOIL: IAEA-375, SRM 4353. TISS: A-14, CLV-1, CLV-2, IAEA-134, IAEA-153, IAEA-156, IAEA-307, IAEA-308, IAEA-321, IAEA-352, IAEA-373, MA-B-3/RN.
Mn-54. SED: IAEA-300.
Mo-99 + Tc-99m. INST: SRM 4412S.
Ni-63. INST: SRM 4226B.
P-32. INST: SRM 4406M.
Pb-203. INST: SRM 4420B.
Pb-210. SED: IAEA-135, IAEA-300, IAEA-368. TISS: CLV-1, CLV-2, IAEA-134, IAEA-307, IAEA-308, IAEA-352.
Po-210. SED: IAEA-300. TISS: CLV-1, CLV-2, IAEA-352.
Pu-238. INST: SRM 4323A. SED: IAEA-135, IAEA-300, IAEA-367, IAEA-368, SRM 4350B, SRM 4354. SOIL: SRM 4353. TISS: IAEA-134, IAEA-307, IAEA-308.
Pu-239. SOIL: SOIL-6.
Pu-239 + Pu-240. SED: GBW 08304.
Pu-239 + Pu-240, IAEA-135.
Pu-239 + Pu-240, IAEA-300.
Pu-239 + Pu-240, IAEA-367.
Pu-239 + Pu-240, IAEA-368.
Pu-239 + Pu-240, SRM 4350B.
Pu-239 + Pu-240, SRM 4354.
Pu-239 + Pu-240. SOIL: SRM 4353.
Pu-239 + Pu-240, SRM 4355.
Pu-239 + Pu-240. TISS: IAEA-134.
Pu-239 + Pu-240, IAEA-307.
Pu-239 + Pu-240, IAEA-308.
Pu-239 + Pu-240. WATER: IAEA-298.
Pu-240. INST: SRM 4338.
Pu-241. SED: IAEA-367.
Pu-242. INST: SRM 4334D.

Ra-226. SED: GBW 08304, IAEA-135, IAEA-300, IAEA-313, IAEA-314, IAEA-367, IAEA-368, SRM 4350B. SOIL: IAEA-312, IAEA-375, SOIL-6, SRM 4353. TISS: A-12, CLV-1, CLV-2, IAEA-134, IAEA-307.

Ra-228. SED: IAEA-135, IAEA-300. SOIL: IAEA-375. TISS: IAEA-134.

Ru-106. SED: IAEA-135. SOIL: IAEA-375. TISS: IAEA-134, IAEA-307, IAEA-308.

S-35. INST: SRM 4424.

Sb-125. INST: SRM 4276C. SED: IAEA-135, IAEA-300. SOIL: IAEA-375, SRM 4355. TISS: IAEA-134.

Se-75. INST: SRM 4409D.

Sm-153. INST: SRM 4425A.

Sn-113/In-113. INST: SRM 4402C.

Sr-85. INST: SRM 4403B.

Sr-89. INST: SRM 4426A.

Sr-90. INST: SRM 4919-G. SED: GBW 08304, IAEA-135, IAEA-300, IAEA-367, IAEA-368, SRM 4354. SOIL: IAEA-375, SOIL-6, SRM 4353. TISS: A-12, A-14, IAEA-134, IAEA-153, IAEA-156, IAEA-307, IAEA-321, IAEA-352, IAEA-373. WATER: IAEA-298.

Tc-99. INST: SRM 4288A.

Tc-99m. INST: SRM 4410HT.

Th-228. SED: IAEA-135, IAEA-300, IAEA-367, IAEA-368, SRM 4354. SOIL: IAEA-375, SRM 4353, SRM 4355. TISS: IAEA-134, IAEA-307, IAEA-308.

Th-229. INST: SRM 4328.

Th-230. SED: IAEA-135, IAEA-300, IAEA-367, IAEA-368. SOIL: SRM 4353, SRM 4355. TISS: CLV-1, CLV-2, IAEA-134.

Th-232. SED: GBW 08304, IAEA-135, IAEA-300, IAEA-368, SD-N-2, SRM 4354. SOIL: IAEA-375, SRM 4353, SRM 4355. TISS: CLV-1, CLV-2, IAEA-134.

Tl-201. INST: SRM 4404Q.

U-232. INST: SRM 4324A.

U-234. SED: IAEA-135, IAEA-135, IAEA-300, IAEA-367, IAEA-368. SOIL: SRM 4353. TISS: CLV-1, CLV-2, IAEA-134.

U-235. SED: GBW 08304, IAEA-135, IAEA-300, IAEA-367, IAEA-368, SRM 4354. TISS: IAEA-134.

U-238. INST: SRM 4321B. SED: GBW 08304, IAEA-135, IAEA-135, IAEA-300, IAEA-367, IAEA-368, SRM 4354. SOIL: IAEA-375, SRM 4353. TISS: CLV-1, CLV-2, IAEA-134, IAEA-307.

Xe-133. INST: SRM 4415R.

Y-90. INST: SRM 4427A.

Yb-169. INST: SRM 4419C.

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