

**MONGOLIA
CENTRAL GEOLOGICAL LABORATORY**



CATALOG

MINERAL RESOURCES

CERTIFIED REFERENCE MATERIALS

**Ulaanbaatar
2009**

	Contents	Page
Introduction		
	Foreword	2
	Standard acts by certification activity guideline	2
	CGL coding convention for CRMs	3
	How to use the catalog	3
Reference materials		
	Certified reference materials, overview (Table 1)	4
	Certified reference materials by CGL code (Table 2)	10
	Certified values by elements/compounds (Table 3)	31
Organizational information		
	Organizations involved	63
	Purchasing order form	67
	Price list	68

Foreword

The Central Geological Laboratory of Mongolia (CGL) was founded in 1957 and is specialized in analyzing the quantitative chemical and mineralogical composition of materials of geological origin (e.g. soils, rocks, ores, concentrates). Classical wet-chemical and modern instrumental analytical test methods like AAS, ICP-OES and WD-XRF are applied for quantitative analysis.

A modern and efficient quality management system and the regular participation in the GeoPT proficiency testing scheme guaranties best practises in testing and CRM-manufacturing.

Since 2000 the CGL was accredited for testing by the Mongolian National Agency for Metrology and Standardization (MASM). Since 2005, CGL also holds the accreditation as testing laboratory (ISO /IEC 17025) by the ILAC member and German accreditation body DAP/DAR. The accreditation had been regularly extended and it is still valid. For the coming years, CGL is aiming and actually preparing for an accreditation as CRM producer.

Alongside its analytical activities, since 35 years, CGL produces Certified Reference Materials of geological origin for the national public sector. So far 56 RMs of various kinds of rocks, ores and mineral processing products were certified at different levels, national and international. Actually the development of matrix reference materials at CGL follows the ISO Guide 30-series and CGL can offer the service to develop fit-for-purpose-Reference Materials for qualified prospects on order.

This catalog presents CRMs produced by CGL before January, 2010 with certified values and other relevant information. It is directed to analytical research workers and professionals in the field of mineral resources and quality assurance.

This catalog will not deputize certificate of CRMs.

Standards and Guides applied for the development of CGL CRMs

International Association of Geoanalysts' Protocol for the Certification of Geological and Environmental Reference Materials, International Association of Geoanalysts, 2003

MNS ISO Guide 30:2005, Terms and definitions used in connection with reference materials

MNS ISO Guide 31:2001, Contents of certificates of reference materials

MNS ISO Guide 32:2001, Calibration in analytical chemistry and use of certified reference materials

MNS ISO Guide 33:2001, The uses of reference materials

MNS ISO Guide 34:2005, General requirements for the competence of reference material producers

MNS ISO Guide 35:2005, Certification of reference materials – General and statistical principles

ISO Guide 35:2006, Certification of reference materials – General and statistical principles

СТ СЭВ 5892-87, ГОСТ 27872-88, Метрология. Стандартные образцы. Методика изготовления и аттестации стандартных образцов состава горных пород и минерального сырья

CGL coding convention for CRMs

CGL code	Type
CGL 001-099	Rocks
CGL 101-199	Ores
CGL 201-299	Mineral processing products
CGL 301-399	Environmental materials
CGL 401-499	Combustion raw materials
CGL 501-599	Radioactive materials

How to use the catalog

Table 1:

Classified by types of material according to the above mentioned coding system the table gives an overview on all CGL CRMs and helps to find materials of interest. The relevant **CGL code** number is the guide to further information on the chosen material in the catalog.

Table 2:

Certified values for CRMs are listed separately for for major and trace elements

Table 3:

The table gather certified values for a single element or compound from the whole set of CGL CRM. Parameters of measurement uncertainty are listed according to their availability.

Confidence interval (Δx) – error characteristic

We would be glad to receive your order. Please direct your requests to following address:

Address: Central Geological Laboratory
Trade Union Street
Songinokharkhan district
P.O.Box-437 Ulaanbaatar-211137
Mongolia

Tel: +976-11-632904, 632914, 632564

Fax: +976-11-632944, 632564

E-mail: cengeolab@mongol.net;
cengeolab@magicnet.mn;
cengeolab@mbox.mn

Web site: www.cengeolab.com

TABLE 1 : **ROCKS****CERTIFIED REFERENCE MATERIALS FROM MONGOLIA**

CGL code	Description	Designation	Certified values (n)	Registration number	Certifying body	Page
CGL 001	Serpentinite	MGL-GAS	12	IAG CRM-2 USZ 24.99	IAG, Mongolia, MNCSM	10-15
CGL 002	Alkaline granite	MGL-OShBO	30	IAG CRM-3 USZ 28.99	IAG, Mongolia, MNCSM	10-15
CGL 003	Graphite	BJBCh	16	USZ 32.2000	Mongolia, MNCSM	10-15
CGL 004	Graphite	ZBCh	10	USZ 33.2000	Mongolia, MNCSM	10-15
CGL 005	Magnesite	GM	8	USZ 37.2003	Mongolia, MNCSM	10-15
CGL 006	Nepheline syenite	LNS	29	USZ.45.2007	Mongolia, MNCSM	10-15
CGL 007	Basalt	MBL-1	53	USZ 46.2008	Mongolia, MNCSM	10-15
CGL 008	Granite	MGT-1	56	USZ 47.2008	Mongolia, MNCSM	10-15
CGL 009	Andesite	MGL-AND	37	USZ 48.2009	Mongolia, MNCSM	10-15
CGL 010	Zeolite, spiked	MGL-ZEO-S	33	USZ 49.2009	Mongolia, MNCSM	10-15
CGL 011	Diorite	MDR	33	USZ 50.2009	Mongolia, MNCSM	10-15
CGL 012	Gabbro	MGR-T	26	USZ 51.2009	Mongolia, MNCSM	10-15

Table 1 (continued) **ORES****CERTIFIED REFERENCE MATERIALS FROM MONGOLIA**

CGL code	Description	Designation	Certified values (n)	Registration number	Certifying body	Page
CGL 101	Fluorspar	HJ	12	UST 3138-81 ST SEV 2298-80	Mongolia, MASM, PCS of CMEA	16-21
CGL 102	Phosphorite	HF	1	ST SEV 3530-82	PCS of CMEA	16-21
CGL 103	Copper- molybdenum ore	CuMo	40	USZ 3.85 GSO 3319-85 ST SEV 5748-86	Mongolia, MASM, SSC OF USSR, PCS of CMEA	16-21
CGL 104	Silver ore	AAg-150 RS-1	23	USZ 7.91 GSO 6357-92	Mongolia, MASM, ASRIMRM	16-21
CGL 105	Silver ore	AAg-300 RS-2	13	USZ 8.91 GSO 6358-92	Mongolia, MASM, ASRIMRM	16-21
CGL 106	Silver ore	AAg-700 RS-3	2	USZ 9.91 GSO 6359-92	Mongolia, MASM, ASRIMRM	16-21
CGL 107	Phosphorite	BF	2	USZ 14.94	Mongolia, MASM	16-21
CGL 108	Silver -bearing complex ore	TsAg	2	USZ 17.94	Mongolia, MASM	16-21
CGL 109	Gold-quartz ore	ZB-1	12	USZ 20.98	Mongolia, MASM	16-21
CGL 110	Gold ore	ZB-2	1	USZ 21.98	Mongolia, MASM	16-21

Table 1 (continued) **ORES****CERTIFIED REFERENCE MATERIALS FROM MONGOLIA**

CGL code	Description	Designation	Certified values (n)	Registration number	Certifying body	Page
CGL 111	Rare-earth ore	TRM-2	40	USZ 25.2006	Mongolia, MASM	16-21
CGL 112	Tungsten-molybdenum ore	WMo	23	USZ 26.99	Mongolia, MASM	16-21
CGL 113	Iron ore	TTH	13	USZ 27.1999	Mongolia, MASM	16-21
CGL 114	Gold ore	B-7/1	2	USZ 29.2000	Mongolia, MASM	22-27
CGL 115	Gold ore	B-7/2	2	USZ 30.2000	Mongolia, MASM	22-27
CGL 116	Gold ore	B-7/3	2	USZ 31.2000	Mongolia, MASM	22-27
CGL 117	Epithermal gold ore	E Au-1	19	USZ 34.2002	Mongolia, MASM	22-27
CGL 118	Epithermal gold ore	E Au-2	2	USZ 35.2002	Mongolia, MASM	22-27
CGL 119	Chromium ore	HHH	18	USZ 36.2002	Mongolia, MASM	22-27
CGL 120	Gold-bearing complex ore	AHMH-1	20	USZ 38.2005	Mongolia, MASM	22-27

Table 1 (continued): **ORES****CERTIFIED REFERENCE MATERIALS FROM MONGOLIA**

CGL code	Description	Designation	Certified values (n)	Registration number	Certifying body	Page
CGL 121	Gold-bearing complex ore	AHMH-2	2	USZ 39.2005	Mongolia, MASM	22-27
CGL 122	Gold-bearing complex ore	AHMH-3	2	USZ 40.2005	Mongolia, MASM	22-27
CGL 123	Gold-copper ore	OTH	23	USZ 41.2006	Mongolia, MASM	22-27
CGL 124	Rare-earth ore	TRLK	37	USZ 42.2006	Mongolia, MASM	22-27
CGL 125	Mercury ore	Hg	18	USZ 43.2006	Mongolia, MASM	22-27
CGL 126	Rare-earth ore	TRHB	39	USZ.44.2007	Mongolia, MASM	22-27

Table 1 (continued): **MINERAL PROCESSING PRODUCTS****CERTIFIED REFERENCE MATERIALS FROM MONGOLIA**

CGL code	Description	Designation	Certified values (n)	Registration number	Certifying body	Page
CGL 201	Tailings of copper-molybdenum ore floatation	CuMoH	4	USZ 4.85 GSO 3320-85 SO SEV 528-89	Mongolia, MASM, SSC OF USSR, PCS of CMEA	28-30
CGL 202	Molybdenum concentrate	MoB	5	USZ 5.88 GSO 3587-86	Mongolia, MASM, SSC OF USSR, PCS of CMEA	28-30
CGL 203	Copper concentrate	CuB	9	USZ 6.88 GSO 3588-86 SO SEV 313-89	Mongolia, MASM, SSC OF USSR, PCS of CMEA	28-30
CGL 204	Tailings of gold ore processing	OBHAu	1	USZ 22.98	Mongolia, MASM	28-30
CGL 205	Tailings of gold ore processing	TsBHAu	2	USZ 23.98	Mongolia, MASM	28-30

Table 1 (continued): **ENVIRONMENTAL MATERILS**

CERTIFIED REFERENCE MATERIALS

CGL code	Description	Designation	Certified values (n)	Registration number	Certifying body	Page number
CGL 301	Chestnut soil	TsH-1	10	USZ 15.94	Mongolia, MASM	28
CGL 302	Soil	H-2	7	USZ 16.94	Mongolia, MASM	28

Abbreviations:

MNCSM	Mongolian National Centre for Standardization and Metrology (former name)
MASM	Mongolian Agency for Standardization and Metrology
IAG	International Association of Geoanalyst
PCS of CMEA	Permanent Commission on Standards of Commision Mutual Economical Assistance (former name)
ASRIMRM	Allunion Scientific Research Institute for Metrology of Reference Materials (former name)
SSC OF USSR	State Standards Committee of Union of Soviet Socialist Republics (former name)
TC OF CGL	Technical Commission of Central Geological Laboratory
USZ	State Standard
GSO	State Standard of USSR
BSZ	Institutional Standard

Table 2

CERTIFIED VALUES**Rocks**

CGL code	Description	Designation	Certified value, % (m/m)											
			SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O _{3total}	Fe ₂ O ₃	FeO	MnO	MgO	CaO	Na ₂ O	K ₂ O	P ₂ O ₅
CGL 001	Serpentine	MGL-GAS	38.54			8.00			0.082	38.22				
CGL 002	Alkaline granite	MGL-OshBO	71.72		16.12	0.50		0.299	0.149		0.388	5.34	3.58	0.0293
CGL 003	Graphite	BJBCh	52.20	0.57	9.33		3.48		0.03	1.94	7.05	0.47	2.54	
CGL 004	Graphite	ZBCh	52.84	0.49	8.46		3.61		0.07			0.51	2.09	
CGL 005	Magnesite	GM	0.25		0.04		0.05			45.80	1.69		0.011	
CGL 006	Nepheline syenite	LNS	51.88	0.37	22.58	2.63		0.80	0.14	0.24	2.28	6.78	9.10	0.04
CGL 007	Basalt	MBL-1	51.85	2.11	14.50		9.85	6.15	0.13	6.33	5.41	4.40	3.99	0.85
CGL 008	Granite	MGT-1	72.37	0.30	14.07		2.44	1.81	0.06	0.38	1.15	3.63	4.68	0.13
CGL 009	Andesite	MGL-AND	59.20	0.71	16.72	5.43			0.081	3.52	5.58	4.46	2.42	0.264
CGL 010	Zeolite, spiked	MGL-ZEO-S	67.64	0.158	12.98	1.27			0.033	0.573	1.34	3.44	3.19	0.032
CGL 011	Diorite	MDR	57.75	1.34	15.97	8.10		4.82	0.12	3.81	6.99	3.33	1.55	
CGL 012	Gabbro	MGR-T	48.00	0.37	26.26	4.22		2.00	0.08	2.85	13.61	2.42	0.31	0.078

Table 2 (continued)

CERTIFIED VALUES

Rocks													
CGL code	Description	Designation	Certified value, % (m/m)					Certified value, mg/kg					
			F _{total}	LoI	H ₂ O ⁻	H ₂ O ⁺	CO ₂	Ag	As	Au	Ba	Be	Bi
CGL 001	Serpentinite	MGL-GAS	13.33										
CGL 002	Alkaline granite	MGL-OshBO	1.13	1.10	0.074								
CGL 003	Graphite	BJBCh	22.21		4.10							14.43%	
CGL 004	Graphite	ZBCh	17.0		2.45							13.38%	
CGL 005	Magnesite	GM	51.35		48.31								
CGL 006	Nepheline syenite	LNS	3.35					23.8	447				
CGL 007	Basalt	MBL-1						772		2.81			
CGL 008	Granite	MGT-1	0.64					2.28	350	8.63	1.03		
CGL 009	Andesite	MGL-AND	1.39					672					
CGL 010	Zeolite, spiked	MGL-ZEO-S	8.80					60.5	371				
CGL 011	Diorite	MDR	0.51		0.35			425					
CGL 012	Gabbro	MGR-T	1.40					119					

Table 2 (continued)

CERTIFIED VALUES

Rocks

CGL code	Description	Designation	Certified value, mg/kg											
			Cd	Ce	Co	Cr	Cs	Cu	Dy	Er	Eu	Ga	Gd	Ge
CGL 001	Serpentine	MGL-GAS			106	2780								
CGL 002	Alkaline granite	MGL-OshBO		27.4				7.1						
CGL 003	Graphite	BJBCh												
CGL 004	Graphite	ZBCh												
CGL 005	Magnesite	GM												
CGL 006	Nepheline syenite	LNS		308		44						23		
CGL 007	Basalt	MBL-1		103	36.3	222	1.15	32.21	4.67	1.84	2.62	22.63	7.17	1.29
CGL 008	Granite	MGT-1		64.38	2.71	182	17.02	7.36	4.42	2.37	0.58	22.80	4.95	1.50
CGL 009	Andesite	MGL-AND		55.2	19.2	95.9	1.09	41.2			1.44	21.1		
CGL 010	Zeolite, spiked	MGL-ZEO-S		74.8	20.3	12.7	4.73	79.3				13.8		
CGL 011	Diorite	MDR		50.8	84.9	100		100				19.58		
CGL 012	Gabbro	MGR-T		7.90	14.93	69.97		45.32				18.87		

Table 2 (continued)

CERTIFIED VALUES

Rocks														
CGL code	Description	Designation	Certified value, mg/kg											
			Hf	Hg	Ho	La	Li	Lu	Mo	Nb	Nd	Ni	Pb	Pr
CGL 001	Serpentinite	MGL-GAS											2300	
CGL 002	Alkaline granite	MGL-OshBO				8.4	1730	0.326		64	15.5	10.7	63	
CGL 003	Graphite	BJBCh										70		
CGL 004	Graphite	ZBCh												
CGL 005	Magnesite	GM												
CGL 006	Nepheline syenite	LNS				163	54			40		114		
CGL 007	Basalt	MBL-1	6.63		0.78	55.99	11.08	0.19	5.20	52.21	46.62	162	8.70	11.9
CGL 008	Granite	MGT-1	4.75		0.85	29.59	124	0.35	3.06	15.22	27.10	5.76	24.81	7.27
CGL 009	Andesite	MGL-AND	3.80			26.2				3.23	27.2	61.2	18.7	
CGL 010	Zeolite, spiked	MGL-ZEO-S				37.2				14.1	27.3	14.6	84.2	
CGL 011	Diorite	MDR				24.40				6.92	30.48	40.94	8.97	
CGL 012	Gabbro	MGR-T										23.94	6.00	

Table 2 (continued)

CERTIFIED VALUES

Rocks

CGL code	Description	Designation	Certified value, mg/kg												
			Rb	Re	Sb	Sc	Se	Sm	Sn	Sr	Ta	Tb	Te	Th	
CGL 001	Serpentinite	MGL-GAS									7.3				
CGL 002	Alkaline granite	MGL-OshBO	2360			9.2		6.0		12.3	46.7				13.3
CGL 003	Graphite	BJBCh	140												
CGL 004	Graphite	ZBCh													
CGL 005	Magnesite	GM													
CGL 006	Nepheline syenite	LNS	207							1740					61.6
CGL 007	Basalt	MBL-1	63.05		0.28	10.1		8.72	2.66	927	3.20	0.95			6.95
CGL 008	Granite	MGT-1	275		0.19	4.36		5.54	13.30	111	2.56	0.79			19.35
CGL 009	Andesite	MGL-AND	49.7			11.8		5.16		1116		0.49			6.46
CGL 010	Zeolite, spiked	MGL-ZEO-S	106			3.27				635					17.2
CGL 011	Diorite	MDR	48.5			20.46				454					
CGL 012	Gabbro	MGR-T	6.58			12.33				1196					

Table 2 (continued)

CERTIFIED VALUES

Rocks												
CGL code	Description	Designation	Certified value, mg/kg									
			ΣTR_2O_3	Tl	Tm	U	V	W	Y	Yb	Zn	Zr
CGL 001	Serpentine	MGL-GAS				0.80	33.4					39
CGL 002	Alkaline granite	MGL-OshBO									2.38	92 40.1
CGL 003	Graphite	BJBCh										180 120
CGL 004	Graphite	ZBCh										
CGL 005	Magnesite	GM										
CGL 006	Nepheline syenite	LNS				12.4	30		23			98 600
CGL 007	Basalt	MBL-1		0.12	0.23	1.64	105	1.15	20.48	1.34	114	287
CGL 008	Granite	MGT-1		1.72	0.37	5.44	14.03	0.56	25.19	2.36	54.59	169
CGL 009	Andesite	MGL-AND				1.96	123		11.8	1.00	71.5	141
CGL 010	Zeolite, spiked	MGL-ZEO-S				3.09	42.3		18.6		79.3	177
CGL 011	Diorite	MDR					213	266	23.62	2.05	92.77	191
CGL 012	Gabbro	MGR-T					85.28		5.14		59.87	

Table 2 (continued)

CERTIFIED VALUES

Ores

CGL code	Designation	Description	Certified value, % (m/m)											
			SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O _{3total}	Fe ₂ O ₃	FeO	MnO	MgO	CaO	Na ₂ O	K ₂ O	P ₂ O ₅
CGL 101	HJ	Fluorspar	23.01	0.047	2.35	0.34					¹ 37.32		0.99	
CGL 102	HF	Phosphorite	28.04			0.37				8.30	33.80	0.12	0.077	13.81
CGL 103	CuMo	Copper-molybdenum ore	67.02	0.47	16.35	3.95			0.020	0.71	0.29	1.59	3.68	
CGL 104	AAg-150, PC-1	Silver ore												
CGL 105	AAg-300, PC-2	Silver ore	17.80	0.12	2.11	48.40			2.77	1.48	0.25		0.53	0.54
CGL 106	AAg-700, PC-3	Silver ore												
CGL 107	BF	Phosphorite	20.57		0.85	0.63				2.265	38.85		0.0925	26.38
CGL 108	TsAg	Silver -bearing complex ore	42.08	0.30	5.82	7.425				0.45	3.87		1.56	0.12
CGL 109	ZB-1	Gold-quartz ore	92.57	0.08	1.70		1.92		0.025		0.77	0.07	0.37	0.037
CGL 110	ZB-2	Gold ore												
CGL 111	TRM-2	Rare-earth ore	14.86	0.15	2.47		13.45	0.14	0.14	0.50	25.51	0.92	0.91	19.26
CGL 112	WMo	Tungsten-molybdenum ore	64.87	0.82	14.14	5.59		3.72	0.12	2.04	1.95	2.13	4.32	
CGL 113	TTH	Iron ore	3.37	0.101	1.37	¹ 62.20		21.06	0.105	2.78	0.56		0.07	

¹certified value by element

Table 2 (continued)

CERTIFIED VALUES

Ores														
CGL code	Designation	Description	Certified value, %					Certified value, mg/kg						
			F _{total}	SO ₃	LoI	H ₂ O ⁻	CO ₂	Ag	As	Au	Ba	Be	Bi	C
CGL 101	HJ	Fluorspar	34.92											
CGL 102	HF	Phosphorite												
CGL 103	CuMo	Copper-molybdenum ore		¹ 2.09	4.13			2.50	189		893			
CGL 104	AAg-150, PC-1	Silver ore						169						
CGL 105	AAg-300, PC-2	Silver ore		6.85				331	5300				1100	
CGL 106	AAg-700, PC-3	Silver ore						740						
CGL 107	BF	Phosphorite			6.43		5.84							
CGL 108	TsAg	Silver -bearing complex ore		21.25				347.92						
CGL 109	ZB-1	Gold-quartz ore			0.95			3.05		10.05				
CGL 110	ZB-2	Gold ore								1.06				
CGL 111	TRM-2	Rare-earth ore		4.58	6.78		1.04		155.83		917			
CGL 112	WMo	Tungsten-molybdenum ore							900				67	
CGL 113	TTH	Iron ore		7.14										

¹certified value by element

Table 2 (continued)

CERTIFIED VALUES**Ores**

CGL code	Designation	Description	Certified value, mg/kg													
			Cd	Ce	Co	Cr	Cs	Cu	Dy	Er	Eu	Ga	Gd	Ge		
CGL 101	HJ	Fluorspar														
CGL 102	HF	Phosphorite														
CGL 103	CuMo	Copper-molybdenum ore		45	13	21	2.3	8170								
CGL 104	AAg-150, PC-1	Silver ore	0.0015%					4600								
CGL 105	AAg-300, PC-2	Silver ore	0.0020%					8300								
CGL 106	AAg-700, PC-3	Silver ore						2,25%								
CGL 107	BF	Phosphorite														
CGL 108	TsAg	Silver -bearing complex ore						4400								
CGL 109	ZB-1	Gold-quartz ore														
CGL 110	ZB-2	Gold ore														
CGL 111	TRM-2	Rare-earth ore		2.90%	32.46			147	206	79.5	211.6				553	
CGL 112	WMo	Tungsten-molybdenum ore			11			220								
CGL 113	TTH	Iron ore			0.013%			300								

Table 2 (continued)

CERTIFIED VALUES

Ores

CGL code	Designation	Description	Certified value, mg/kg														
			Hf	Hg	Ho	La	Li	Lu	Mo	Nb	Nd	Ni	Pb	Pr			
CGL 101	HJ	Fluorspar															
CGL 102	HF	Phosphorite															
CGL 103	CuMo	Copper-molybdenum ore								170							
CGL 104	AAg-150, PC-1	Silver ore														1000	
CGL 105	AAg-300, PC-2	Silver ore														1300	
CGL 106	AAg-700, PC-3	Silver ore														410	
CGL 107	BF	Phosphorite															
CGL 108	TsAg	Silver -bearing complex ore														1,00%	
CGL 109	ZB-1	Gold-quartz ore															
CGL 110	ZB-2	Gold ore															
CGL 111	TRM-2	Rare-earth ore				36.6	1,93%		7.64			8900	70.8	1100	2800		
CGL 112	WMo	Tungsten-molybdenum ore								790			35	76			
CGL 113	TTH	Iron ore											80				

Table 2 (continued)

CERTIFIED VALUES

Ores													
CGL code	Designation	Description	Certified value, mg/kg										
			Rb	Re	Sb	Sc	Se	Sm	Sn	Sr	Ta	Tb	Te
CGL 101	HJ	Fluorspar											
CGL 102	HF	Phosphorite											
CGL 103	CuMo	Copper-molybdenum ore	81		24					172			
CGL 104	AAg-150, PC-1	Silver ore											
CGL 105	AAg-300, PC-2	Silver ore			5000								
CGL 106	AAg-700, PC-3	Silver ore											
CGL 107	BF	Phosphorite											
CGL 108	TsAg	Silver -bearing complex ore											
CGL 109	ZB-1	Gold-quartz ore											
CGL 110	ZB-2	Gold ore											
CGL 111	TRM-2	Rare-earth ore	43					900		2,24%		54.6	217.58
CGL 112	WMo	Tungsten-molybdenum ore	1060							78			
CGL 113	TTH	Iron ore											

Table 2 (continued)

CERTIFIED VALUES**Ores**

CGL code	Designation	Description	Certified value, mg/kg																	
			ΣTR_2O_3	Tl	Tm	U	V	W	Y	Yb	Zn	Zr								
CGL 101	HJ	Fluorspar																		
CGL 102	HF	Phosphorite																		
CGL 103	CuMo	Copper-molybdenum ore																	97	
CGL 104	AAg-150, PC-1	Silver ore																	4200	
CGL 105	AAg-300, PC-2	Silver ore																	5900	
CGL 106	AAg-700, PC-3	Silver ore																	2000	
CGL 107	BF	Phosphorite																		
CGL 108	TsAg	Silver -bearing complex ore																	8,72%	
CGL 109	ZB-1	Gold-quartz ore																		
CGL 110	ZB-2	Gold ore																		
CGL 111	TRM-2	Rare-earth ore	7,56%						138.6			959	54.52	600						
CGL 112	WMo	Tungsten-molybdenum ore							100	² 4100				170	170					
CGL 113	TTH	Iron ore																		

²certified value by oxide (WO₃)

Table 2 (continued)

CERTIFIED VALUES

Ores														
CGL code	Designation	Description	Certified value, %											
			SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O _{3total}	Fe ₂ O ₃	FeO	MnO	MgO	CaO	Na ₂ O	K ₂ O	P ₂ O ₅
CGL 114	B-7/1	Gold ore												
CGL 115	B-7/2	Gold ore												
CGL 116	B-7/3	Gold ore												
CGL 117	E Au-1	Epithermal gold ore	84.70	0.17	4.79	2.18			0.017	0.37	2.53	0.055	1.48	0.125
CGL 118	E Au-2	Epithermal gold ore												
CGL 119	HHH	Chromium ore	4.73	0.11	8.24	14.73			0.15	16.09	0.24			0.02
CGL 120	AHMH-1	Gold-bearing complex ore	77.37	0.15	2.03		14.71		0.03	1.01	0.56	0.17	0.64	0.05
CGL 121	AHMH-2	Gold-bearing complex ore												
CGL 122	AHMH-3	Gold-bearing complex ore												
CGL 123	OTH	Gold-copper ore	52.09	0.93	14.58				0.12	5.52	3.14	2.36	2.81	0.27
CGL 124	TRLK	Rare-earth ore	11.86	0.20	2.72		5.71		1.67	2.78	32.68	0.25	1.55	0.22
CGL 125	Hg	Mercury ore	41.01	0.018	0.53		4.66	0.49	0.29	9.93	17.39	0.07	0.03	
CGL 126	TRHB	Rare-earth ore	71.38	0.31	10.93	3.38			0.06		2.03	3.46	3.70	

Table 2 (continued)

CERTIFIED VALUES**Ores**

CGL code	Designation	Description	Certified value, %					Certified value, mg/kg							
			F _{total}	SO ₃	LoI	H ₂ O ⁻	CO ₂	Ag	As	Au	Ba	Be	Bi	C	
CGL 114	B-7/1	Gold ore						6.05		42.26					
CGL 115	B-7/2	Gold ore						1.18		5.92					
CGL 116	B-7/3	Gold ore						1.07		3.28					
CGL 117	E Au-1	Epithermal gold ore			2.84	0.10		1.70	0.12%	0.79					
CGL 118	E Au-2	Epithermal gold ore						1.25		0.57					
CGL 119	HHH	Chromium ore		0.07	1.07	0.11	0.47			0.03					
CGL 120	AHMH-1	Gold-bearing complex ore			2.59					31.28	200				
CGL 121	AHMH-2	Gold-bearing complex ore						49.33		10.92					
CGL 122	AHMH-3	Gold-bearing complex ore						27.06		7.38					
CGL 123	OTH	Gold-copper ore		3.87	5.43					0.91	249				
CGL 124	TRLK	Rare-earth ore			30.56		29.0		224		307				
CGL 125	Hg	Mercury ore			25.28										
CGL 126	TRHB	Rare-earth ore			1.64				43.70		95				

Table 2 (continued)

CERTIFIED VALUES

Ores														
CGL code	Designation	Description	Certified value, mg/kg											
			Cd	Ce	Co	Cr	Cs	Cu	Dy	Er	Eu	Ga	Gd	Ge
CGL 114	B-7/1	Gold ore												
CGL 115	B-7/2	Gold ore												
CGL 116	B-7/3	Gold ore												
CGL 117	E Au-1	Epithermal gold ore							14.84					
CGL 118	E Au-2	Epithermal gold ore												
CGL 119	HHH	Chromium ore			100	² 54,37%								
CGL 120	AHMH-1	Gold-bearing complex ore							4300					
CGL 121	AHMH-2	Gold-bearing complex ore												
CGL 122	AHMH-3	Gold-bearing complex ore												
CGL 123	OTH	Gold-copper ore			24.3	99.3		7500						
CGL 124	TRLK	Rare-earth ore		2,76%	7.89			27.37	57.63		87.22			
CGL 125	Hg	Mercury ore			47	2100		7.7						
CGL 126	TRHB	Rare-earth ore		1000		200	1.05	13	165		8.3	64	117	

²certified value by oxide

Table 2 (continued)

CERTIFIED VALUES

Ores														
CGL code	Designation	Description	Certified value, mg/kg											
			Hf	Hg	Ho	La	Li	Lu	Mo	Nb	Nd	Ni	Pb	Pr
CGL 114	B-7/1	Gold ore												
CGL 115	B-7/2	Gold ore												
CGL 116	B-7/3	Gold ore												
CGL 117	E Au-1	Epithermal gold ore											20	
CGL 118	E Au-2	Epithermal gold ore												
CGL 119	HHH	Chromium ore										900		
CGL 120	AHMH-1	Gold-bearing complex ore							1100			28.27		
CGL 121	AHMH-2	Gold-bearing complex ore												
CGL 122	AHMH-3	Gold-bearing complex ore												
CGL 123	OTH	Gold-copper ore							51.8			25.4	27	
CGL 124	TRLK	Rare-earth ore			7.86	21100	21.78	34.40	31	6500	13.18	1600	2300	
CGL 125	Hg	Mercury ore		689								1000		
CGL 126	TRHB	Rare-earth ore	400		37	434	37			434		149	122	

Table 2 (continued)

CERTIFIED VALUES

Ores														
CGL code	Designation	Description	Certified value, mg/kg											
			Rb	Re	Sb	Sc	Se	Sm	Sn	Sr	Ta	Tb	Te	Th
CGL 114	B-7/1	Gold ore												
CGL 115	B-7/2	Gold ore												
CGL 116	B-7/3	Gold ore												
CGL 117	E Au-1	Epithermal gold ore			1400									
CGL 118	E Au-2	Epithermal gold ore												
CGL 119	HHH	Chromium ore												
CGL 120	AHMH-1	Gold-bearing complex ore								88.71				
CGL 121	AHMH-2	Gold-bearing complex ore												
CGL 122	AHMH-3	Gold-bearing complex ore												
CGL 123	OTH	Gold-copper ore								259				
CGL 124	TRLK	Rare-earth ore	67.12					539		4900				946
CGL 125	Hg	Mercury ore								382				
CGL 126	TRHB	Rare-earth ore	641					120	126	158	123	25		202

Table 2 (continued)

CERTIFIED VALUES**Ores**

CGL code	Designation	Description	Certified value, mg/kg																	
			ΣTR_2O_3	Tl	Tm	U	V	W	Y	Yb	Zn	Zr								
CGL 114	B-7/1	Gold ore																		
CGL 115	B-7/2	Gold ore																		
CGL 116	B-7/3	Gold ore																		
CGL 117	E Au-1	Epithermal gold ore																	25	
CGL 118	E Au-2	Epithermal gold ore																		
CGL 119	HHH	Chromium ore							400										230	
CGL 120	AHMH-1	Gold-bearing complex ore							39.33	100									65.29	
CGL 121	AHMH-2	Gold-bearing complex ore																		
CGL 122	AHMH-3	Gold-bearing complex ore																		
CGL 123	OTH	Gold-copper ore								335									136	78.3
CGL 124	TRLK	Rare-earth ore	82700							115		167	17.85	469						
CGL 125	Hg	Mercury ore								38										
CGL 126	TRHB	Rare-earth ore							57		88	1102	123	534	15800					

Table 2 (continued)

CERTIFIED VALUES

Mineral processing products														
CGL code	Designation	Description	Certified value, % (m/m)											
			SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O _{3total}	Fe ₂ O ₃	FeO	MnO	MgO	CaO	Na ₂ O	K ₂ O	P ₂ O ₅
CGL 201	CuMoH	Tailings of copper-molybdenum ore floatation				3.90								
CGL 202	MoB	Molybdenum concentrate	4.50											¹ 0.014
CGL 203	CuB	Copper concentrate					¹ 19.80							
CGL 204	OBHAu	Tailings of gold ore processing												
CGL 205	TsBHAu	Tailings of gold ore processing												

Environmental materials

CGL 301	TsH-1	Chestnut soil	62.51	0.86	14.84	5.75		0.08	1.65	2.66	3.14	2.47	0.16
CGL 302	H-2	Soil	63.18	0.88			1.22		1.84	2.78	3.07	2.61	

Mineral processing products

CGL code	Designation	Description	Certified value, % (m/m)					Certified value, mg/kg						
			F _{total}	SO ₃	LoI	H ₂ O ⁻	CO ₂	Ag	As	Au	Ba	Be	Bi	C
CGL 201	CuMoH	Tailings of copper-molybdenum ore floatation		¹ 2.03										
CGL 202	MoB	Molybdenum concentrate												
CGL 203	CuB	Copper concentrate		¹ 33.94				66						
CGL 204	OBHAu	Tailings of gold ore processing								3.70				
CGL 205	TsBHAu	Tailings of gold ore processing						21.48		10.72				

¹certified value by element

Table 2 (continued)

CERTIFIED VALUES

Mineral processing products

CGL code	Designation	Description	Certified value, % (m/m)													
			Cd	Ce	Co	Cr	Cs	Cu	Dy	Er	Eu	Ga	Gd	Ge		
CGL 201	CuMoH	Tailings of copper-molybdenum ore floatation						0.115%								
CGL 202	MoB	Molybdenum concentrate						1.35%								
CGL 203	CuB	Copper concentrate						32.0%								
CGL 204	OBHAu	Tailings of gold ore processing														
CGL 205	TsBHAu	Tailings of gold ore processing														

Mineral processing products

CGL code	Designation	Description	Certified value, % (m/m)													
			Hf	Hg	Ho	La	Li	Lu	Mo	Nb	Nd	Ni	Pb	Pr		
CGL 201	CuMoH	Tailings of copper-molybdenum ore floatation							0.007%							
CGL 202	MoB	Molybdenum concentrate							51.6%							
CGL 203	CuB	Copper concentrate							0.14%						0.014%	
CGL 204	OBHAu	Tailings of gold ore processing														
CGL 205	TsBHAu	Tailings of gold ore processing														

Table 2 (continued)

CERTIFIED VALUES

Mineral processing products

CGL code	Designation	Material	Certified value, % (m/m)													
			Rb	Re	Sb	Sc	Se	Sm	Sn	Sr	Ta	Tb	Te	Th		
CGL 201	CuMoH	Tailings of copper-molybdenum ore flotation														
CGL 202	MoB	Molybdenum concentrate		0.05%												
CGL 203	CuB	Copper concentrate					0.0077%						0.0008%			
CGL 204	OBHAu	Tailings of gold ore processing														
CGL 205	TsBHAu	Tailings of gold ore processing														

Mineral processing products

CGL code	Designation	Material	Certified value, % (m/m)													
			ΣTR_2O_3	Tl	Tm	U	V	W	Y	Yb	Zn	Zr				
CGL 201	CuMoH	Tailings of copper-molybdenum ore flotation														
CGL 202	MoB	Molybdenum concentrate														
CGL 203	CuB	Copper concentrate											0.15%			
CGL 204	OBHAu	Tailings of gold ore processing														
CGL 205	TsBHAu	Tailings of gold ore processing														

Table 3

CERTIFIED VALUES BY ELEMENT AND COMPONENT

CGL code	Description	Designation	Certified value	Confidence --interval (Δx)
Ag	Silver		mg/kg	mg/kg
CGL 116	Gold ore	B-7/3	1.07	0.20
CGL 115	Gold ore	B-7/2	1.18	0.17
CGL 118	Epithermal gold ore	E Au-2	1.25	0.16
CGL 117	Epithermal gold ore	E Au-1	1.70	0.42
CGL 103	Copper-molybdenum ore	CuMo	2.50	0.50
CGL 109	Gold-quartz ore	ZB-1	3.05	0.29
CGL 114	Gold ore	B-7/1	6.05	0.44
CGL 205	Tailings of gold ore processing	TsBHAu	21.48	0.807
CGL 122	Gold-bearing complex ore	AHMH-3	27.06	1.99
CGL 121	Gold-bearing complex ore	AHMH-2	49.33	4.29
CGL 203	Copper concentrate	CuB	0.0066%	0.0002%
CGL 104	Silver ore	AAg-150, RS-1	169	5
CGL 105	Silver ore	AAg-300, RS-2	331	12
CGL 108	Silver -bearing complex ore	TsAg	347.9	5.25
CGL 106	Silver ore	AAg-700, RS-3	740	23

Table 3 (continued)

CGL code	Description	Designation	Certified value	Confidence interval (Δx)
Al₂O₃	Aluminiumoxide		%	%
CGL 005	Magnesite	GM	0.04	0.01
CGL 125	Mercury ore	Hg	0.53	0.13
CGL 107	Phosphorite	BF	0.85	0.0956
CGL 113	Iron ore	TTH	1.37	0.13
CGL 109	Gold-quartz ore	ZB-1	1.70	0.13
CGL 120	Gold-bearing complex ore	AHMH-1	2.03	0.09
CGL 105	Silver ore	AAg-300, RS-2	2.11	0.07
CGL 101	Fluorspar	HJ	2.35	0.05
CGL 111	Rare-earth ore	TRM-2	2.47	0.10
CGL 124	Rare-earth ore	TRLK	2.72	0.13
CGL 117	Epithermal gold ore	E Au-1	4.79	0.10
CGL 108	Silver -bearing complex ore	TsAg	5.82	0.22
CGL 119	Chromium ore	HHH	8.24	0.52
CGL 004	Graphite	ZBCh	8.46	0.08
CGL 003	Graphite	BJBCh	9.33	0.18
CGL 126	Rare-earth ore	TRHB	10.93	0.10
CGL 010	Zeolite, spiked	MGL-ZEO-S	12.98	0.13*
CGL 008	Granite	MGT-1	14.07	0.13
CGL 112	Tungsten-molybdenum ore	W Mo	14.14	0.43
CGL 007	Basalt	MBL-1	14.50	0.15
CGL 123	Gold-copper ore	OTH	14.58	0.16
CGL 301	Chestnut soil	TsH-1	14.84	0.20
CGL 011	Diorite	MDR	15.97	0.13
CGL 002	Alkaline granite	MGL-OShBO	16.12	0.12*
CGL 103	Copper-molybdenum ore	CuMo	16.35	0.25
CGL 009	Andesite	MGL-AND	16.72	0.24*
CGL 006	Nepheline syenite	LNS	22.58	0.13
CGL 012	Gabbro	MGR-T	26.26	0.31

*-measurement uncertainty

Table 3 (continued)

CGL code	Description	Designation	Certified value	Confidence interval (Δx)
As	Arsenic		mg/kg	mg/kg
CGL 008	Granite	MGT-1	2.28	0.24
CGL 006	Nepheline syenite	LNS	23.8	2.88
CGL 126	Rare-earth ore	TRHB	43.70	3.70
CGL 010	Zeolite, spiked	MGL-ZEO-S	60.5	12.3*
CGL 111	Rare-earth ore	TRM-2	155.83	26.58
CGL 103	Copper-molybdenum ore	CuMo	189	13
CGL 124	Rare-earth ore	TRLK	224	24
CGL 112	Tungsten-molybdenum ore	WMo	0.09%	0.01%
CGL 117	Epithermal gold ore	E Au-1	0.12%	0.02%
CGL 105	Silver ore	AAg-300, RS-2	0.53%	0.03%

*-measurement uncertainty

Au	Gold		mg/kg	mg/kg
CGL 119	Chromium ore	HHH	0.03	0.02
CGL 118	Epithermal gold ore	E Au-2	0.57	0.04
CGL 117	Epithermal gold ore	E Au-1	0.79	0.02
CGL 123	Gold-copper ore	OTH	0.91	0.09
CGL 110	Gold ore	ZB-2	1.06	0.16
CGL 116	Gold ore	B-7/3	3.28	0.19
CGL 204	Tailings of gold ore processing	OBHAu	3.70	0.28
CGL 115	Gold ore	B-7/2	5.92	0.21
CGL 122	Gold-bearing complex ore	AHMH-3	7.38	0.30
CGL 109	Gold-quartz ore	ZB-1	10.05	0.81
CGL 205	Tailings of gold ore processing	TsBHAu	10.72	0.78
CGL 121	Gold-bearing complex ore	AHMH-2	10.92	0.45
CGL 120	Gold-bearing complex ore	AHMH-1	31.28	1.30
CGL 114	Gold ore	B-7/1	42.26	2.49

Table 3 (continued)

CGL code	Description	Designation	Certified value	Confidence interval (Δx)
Ba	Barium		mg/kg	mg/kg
CGL 126	Rare-earth ore	TRHB	95	9
CGL 120	Gold-bearing complex ore	AHMH-1	0.02%	0.002%
CGL 012	Gabbro	MGR-T	119	3.3
CGL 123	Gold-copper ore	OTH	249	15
CGL 124	Rare-earth ore	TRLK	307	10
CGL 008	Granite	MGT-1	350	6.68
CGL 010	Zeolite, spiked	MGL-ZEO-S	371	9*
CGL 011	Diorite	MDR	425	23
CGL 006	Nepheline syenite	LNS	447	44
CGL 009	Andesite	MGL-AND	672	12*
CGL 007	Basalt	MBL-1	772	12
CGL 103	Copper-molybdenum ore	CuMo	893	12
CGL 111	Rare-earth ore	TRM-2	917	58
*-measurement uncertainty				
Be	Beryllium		mg/kg	mg/kg
CGL 007	Basalt	MBL-1	2.81	0.16
CGL 008	Granite	MGT-1	8.63	0.54
Bi	Bismuth		mg/kg	mg/kg
CGL 008	Granite	MGT-1	1.03	0.05
CGL 112	Tungsten-molybdenum ore	WMo	67	14
CGL 105	Silver ore	AAg-300, RS-2	0.11%	0.01%
C	Carbon		%	%
CGL 004	Graphite	ZBCh	13.38	0.67
CGL 003	Graphite	BJBCh	14.43	0.64

Table 3 (continued)

CGL code	Description	Designation	Certified value	Confidence interval (Δx)
CaO	Calcium oxide		%	%
CGL 119	Chromium ore	HHH	0.24	0.04
CGL 105	Silver ore	AAg-300, RS-2	0.25	0.03
CGL 103	Copper-molybdenum ore	CuMo	0.29	0.02
CGL 002	Alkaline granite	MGL-OShBO	0.388	0.011*
CGL 113	Iron ore	TTH	0.56	0.05
CGL 120	Gold-bearing complex ore	AHMH-1	0.56	0.06
CGL 109	Gold-quartz ore	ZB-1	0.77	0.06
CGL 008	Granite	MGT-1	1.15	0.02
CGL 010	Zeolite, spiked	MGL-ZEO-S	1.34	0.01*
CGL 005	Magnesite	GM	1.69	0.11
CGL 112	Tungsten-molybdenum ore	WMO	1.95	0.08
CGL 126	Rare-earth ore	TRHB	2.03	0.03
CGL 006	Nepheline syenite	LNS	2.28	0.25
CGL 117	Epithermal gold ore	E Au-1	2.53	0.14
CGL 301	Chestnut soil	TsH-1	2.66	0.13
CGL 302	Soil	H-2	2.78	0.20
CGL 123	Gold-copper ore	OTH	3.14	0.05
CGL 108	Silver -bearing complex ore	TsAg	3.87	0.15
CGL 007	Basalt	MBL-1	5.41	0.18
CGL 009	Andesite	MGL-AND	5.58	0.15*
CGL 011	Diorite	MDR	6.99	0.13
CGL 003	Graphite	BJBCh	7.05	0.24
CGL 012	Gabbro	MGR-T	13.61	0.23
CGL 125	Mercury ore	Hg	17.39	0.15
CGL 111	Rare-earth ore	TRM-2	25.51	0.50
CGL 124	Rare-earth ore	TRLK	32.68	0.40
CGL 102	Phosphorite	HF	33.80	0.16
CGL 101	Fluorspar	HJ	¹ 37.32	¹ 0.19
CGL 107	Phosphorite	BF	38.85	0.68

¹certified value by element

*-measurement uncertainty

Table 3 (continued)

CGL code	Description	Designation	Certified value	Confidence interval (Δx)
Cd	Cadmium		%	%
CGL 104	Silver ore	AAg-150, RS-1	0.0015	0.0001
CGL 105	Silver ore	AAg-300, RS-2	0.0020	0.0001
Ce	Cerium		mg/kg	mg/kg
CGL 012	Gabbro	MGR-T	7.90	1.11
CGL 002	Alkaline granite	MGL-OShBO	27.4	1.6*
CGL 103	Copper-molybdenum ore	CuMo	45	6
CGL 011	Diorite	MDR	50.8	2.58
CGL 009	Andesite	MGL-AND	55.2	2.0*
CGL 008	Granite	MGT-1	64.38	1.36
CGL 010	Zeolite, spiked	MGL-ZEO-S	74.8	3.0*
CGL 007	Basalt	MBL-1	103	1.98
CGL 006	Nepheline syenite	LNS	308	15
CGL 126	Rare-earth ore	TRHB	0.10%	0.008%
CGL 124	Rare-earth ore	TRLK	2.76%	0.05%
CGL 111	Rare-earth ore	TRM-2	2.90%	0.12%
*-measurement uncertainty				
CO₂	Carbon dioxide		%	%
CGL 119	Chromium ore	HHH	0.47	0.07
CGL 111	Rare-earth ore	TRM-2	1.04	0.07
CGL 004	Graphite	ZBCh	2.45	0.04
CGL 003	Graphite	BJBCh	4.10	0.21
CGL 107	Phosphorite	BF	5.84	0.1286
CGL 124	Rare-earth ore	TRLK	29.00	0.33
CGL 005	Magnesite	GM	48.31	0.28

Table 3 (continued)

CGL code	Description	Designation	Certified value	Confidence interval (Δx)
Co	Cobalt		mg/kg	mg/kg
CGL 008	Granite	MGT-1	2.71	0.10
CGL 124	Rare-earth ore	TRLK	7.89	0.81
CGL 112	Tungsten-molybdenum ore	WMo	11	3
CGL 103	Copper-molybdenum ore	CuMo	13	2
CGL 012	Gabbro	MGR-T	14.93	8
CGL 009	Andesite	MGL-AND	19.2	0.8*
CGL 010	Zeolite, spiked	MGL-ZEO-S	20.3	2.8*
CGL 123	Gold-copper ore	OTH	24.3	2.3
CGL 111	Rare-earth ore	TRM-2	32.46	6.03
CGL 007	Basalt	MBL-1	36.3	2.30
CGL 125	Mercury ore	Hg	47	3.04
CGL 011	Diorite	MDR	84.9	12.5
CGL 119	Chromium ore	HHH	0.01%	0.005%
CGL 001	Serpentinite	MGL-GAS	106	3*
CGL 113	Iron ore	TTH	0.013%	0.001%
Cr	Chromium		mg/kg	mg/kg
CGL 010	Zeolite, spiked	MGL-ZEO-S	12.7	6.7*
CGL 103	Copper-molybdenum ore	CuMo	21	2
CGL 006	Nepheline syenite	LNS	44	7
CGL 012	Gabbro	MGR-T	69.97	6.71
CGL 009	Andesite	MGL-AND	95.9	4.8*
CGL 123	Gold-copper ore	OTH	99.3	3.4
CGL 011	Diorite	MDR	100	17
CGL 008	Granite	MGT-1	182	6.58
CGL 126	Rare-earth ore	TRHB	200	16
CGL 007	Basalt	MBL-1	222	12.11
CGL 125	Mercury ore	Hg	0.21%	0.01%
CGL 001	Serpentinite	MGL-GAS	2780	30*
CGL 119	Chromium ore	HHH	² 54.37%	² 0.42%

²certified value by oxide (Cr₂O₃)

*-measurement uncertainty

Table 3 (continued)

CGL code	Description	Designation	Certified value	Confidence interval (Δx)
Cs	Cesium		mg/kg	mg/kg
CGL 126	Rare-earth ore	TRHB	1.05	0.15
CGL 009	Andesite	MGL-AND	1.09	0.20*
CGL 007	Basalt	MBL-1	1.15	0.03
CGL 103	Copper-molybdenum ore	CuMo	2.3	0.3
CGL 010	Zeolite, spiked	MGL-ZEO-S	4.73	0.41*
CGL 008	Granite	MGT-1	17.02	0.49
Cu	Copper		mg/kg	mg/kg
CGL 002	Alkaline granite	MGL-OShBO	7.1	1.1*
CGL 008	Granite	MGT-1	7.36	0.34
CGL 125	Mercury ore	Hg	7.7	1.8
CGL 126	Rare-earth ore	TRHB	13	3
CGL 117	Epithermal gold ore	E Au-1	14.84	3.86
CGL 124	Rare-earth ore	TRLK	27.37	6.43
CGL 007	Basalt	MBL-1	32.21	1.33
CGL 009	Andesite	MGL-AND	41.2	4.7*
CGL 012	Gabbro	MGR-T	45.32	2.86
CGL 010	Zeolite, spiked	MGL-ZEO-S	79.3	3.1*
CGL 011	Diorite	MDR	100	3.74
CGL 111	Rare-earth ore	TRM-2	147	58
CGL 112	Tungsten-molybdenum ore	W Mo	0.022%	0.002%
CGL 113	Iron ore	TTH	0.030%	0.006%
CGL 201	Tailings of copper-molybdenum ore floatation	CuMoH	0.115%	0.005%
CGL 120	Gold-bearing complex ore	AHMH-1	0.43%	0.013%
CGL 108	Silver -bearing complex ore	I Ag	0.44%	0.028%
CGL 104	Silver ore	AAg-150, RS-1	0.46%	0.03%
CGL 123	Gold-copper ore	OTH	0.75%	0.05%
CGL 103	Copper-molybdenum ore	CuMo	0.817%	0.014%
CGL 105	Silver ore	AAg-300, RS-2	0.83%	0.02%
CGL 202	Molybdenum concentrate	MoB	1.35%	0.03%
CGL 106	Silver ore	AAg-700, RS-3	2.25%	0.06%
CGL 203	Copper concentrate	CuB	32.0%	0.20%

*-measurement uncertainty

Table 3 (continued)

CGL code	Description	Designation	Certified value	Confidence interval (Δx)
Dy Dysprosium				
			mg/kg	mg/kg
CGL 008	Granite	MGT-1	4.42	0.15
CGL 007	Basalt	MBL-1	4.67	0.10
CGL 124	Rare-earth ore	TRLK	57.63	11.63
CGL 126	Rare-earth ore	TRHB	165	35
CGL 111	Rare-earth ore	TRM-2	206	32
Er Erbium				
			mg/kg	mg/kg
CGL 007	Basalt	MBL-1	1.84	0.05
CGL 008	Granite	MGT-1	2.37	0.10
CGL 111	Rare-earth ore	TRM-2	79.5	8.5
Eu Europium				
			mg/kg	mg/kg
CGL 008	Granite	MGT-1	0.58	0.02
CGL 009	Andesite	MGL-AND	1.44	0.06*
CGL 007	Basalt	MBL-1	2.62	0.06
CGL 126	Rare-earth ore	TRHB	8.3	1.1
CGL 124	Rare-earth ore	TRLK	87.22	8.68
CGL 111	Rare-earth ore	TRM-2	211.6	16.20
F Fluorine				
			%	%
CGL 002	Alkaline granite	MGL-OShBO	1.13	0.16*
CGL 101	Fluorspar	HJ	34.92	0.19

*-measurement uncertainty

Table 3 (continued)

CGL code	Description	Designation	Certified value	Confidence interval (Δx)
	Fe₂O_{3total}, Total ferric oxide		%	%
CGL 101	Fluorspar	HJ	0.34	0.014
CGL 102	Phosphorite	HF	0.37	0.03
CGL 002	Alkaline granite	MGL-OShBO	0.50	0.029*
CGL 107	Phosphorite	BF	0.63	0.067
CGL 010	Zeolite, spiked	MGL-ZEO-S	1.27	0.07*
CGL 117	Epithermal gold ore	E Au-1	2.18	0.15
CGL 006	Nepheline syenite	LNS	2.63	0.13
CGL 126	Rare-earth ore	TRHB	3.38	0.06
CGL 201	Tailings of copper-molybdenum ore floatation	CuMoH	3.90	0.20
CGL 103	Copper-molybdenum ore	CuMo	3.95	0.13
CGL 012	Gabbro	MGR-T	4.22	0.13
CGL 009	Andesite	MGL-AND	5.43	0.18*
CGL 112	Tungsten-molybdenum ore	W Mo	5.59	0.17
CGL 301	Chestnut soil	TsH-1	5.75	0.13
CGL 108	Silver -bearing complex ore	TsAg	7.425	0.18
CGL 001	Serpentinite	MGL-GAS	8.00	0.22*
CGL 011	Diorite	MDR	8.10	0.11
CGL 119	Chromium ore	HHH	14.73	0.38
CGL 105	Silver ore	AAg-300, RS-2	48.40	0.40
CGL 113	Iron ore	TTH	¹ 62.20	¹ 0.20

¹certified value by element

*-measurement uncertainty

Table 3 (continued)

CGL code	Description	Designation	Certified value	Confidence interval (Δx)
Fe₂O₃	Ferric oxide		%	%
CGL 005	Magnesite	GM	0.05	0.009
CGL 109	Gold-quartz ore	ZB-1	1.92	0.12
CGL 008	Granite	MGT-1	2.44	0.05
CGL 003	Graphite	BJBCh	3.48	0.16
CGL 004	Graphite	ZBCh	3.61	0.19
CGL 125	Mercury ore	Hg	4.66	0.11
CGL 124	Rare-earth ore	TRLK	5.71	0.17
CGL 007	Basalt	MBL-1	9.85	0.06
CGL 111	Rare-earth ore	TRM-2	13.45	0.26
CGL 120	Gold-bearing complex ore	AHMH-1	14.71	0.24
CGL 203	Copper concentrate	CuB	¹ 19.8	¹ 0.60
¹ certified value by element				
FeO	Ferrous oxide		%	%
CGL 111	Rare-earth ore	TRM-2	0.14	0.03
CGL 002	Alkaline granite	MGL-OShBO	0.299	0.004*
CGL 125	Mercury ore	Hg	0.49	0.075
CGL 006	Nepheline syenite	LNS	0.80	0.06
CGL 302	Soil	H-2	1.22	0.06
CGL 008	Granite	MGT-1	1.81	0.11
CGL 012	Gabbro	MGR-T	2.00	0.12
CGL 112	Tungsten-molybdenum ore	WMo	3.72	0.2
CGL 011	Diorite	MDR	4.82	0.22
CGL 007	Basalt	MBL-1	6.15	0.16
CGL 113	Iron ore	TTH	21.06	0.22

Table 3 (continued)

CGL code	Description	Designation	Certified value	Confidence interval (Δx)
Ga	Gallium		mg/kg	mg/kg
CGL 010	Zeolite, spiked	MGL-ZEO-S	13.8	0.8*
CGL 012	Gabbro	MGR-T	18.87	1.75
CGL 011	Diorite	MDR	19.58	1.46
CGL 009	Andesite	MGL-AND	21.1	0.8*
CGL 007	Basalt	MBL-1	22.63	0.45
CGL 008	Granite	MGT-1	22.80	0.52
CGL 006	Nepheline syenite	LNS	23	0.8
CGL 126	Rare-earth ore	TRHB	64	8
Gd	Gadolinium		mg/kg	mg/kg
CGL 008	Granite	MGT-1	4.95	0.13
CGL 007	Basalt	MBL-1	7.17	0.14
CGL 126	Rare-earth ore	TRHB	117	19
CGL 111	Rare-earth ore	TRM-2	553	83
Ge	Germanium		mg/kg	mg/kg
CGL 007	Basalt	MBL-1	1.29	0.10
CGL 008	Granite	MGT-1	1.50	0.17
Hf	Hafnium		mg/kg	mg/kg
CGL 009	Andesite	MGL-AND	3.80	0.28*
CGL 008	Granite	MGT-1	4.75	0.13
CGL 007	Basalt	MBL-1	6.63	0.21
CGL 126	Rare-earth ore	TRHB	400	30

*-measurement uncertainty

Table 3 (continued)

CGL code	Description	Designation	Certified value	Confidence interval (Δx)
Hg	Mercury		mg/kg	mg/kg
CGL 125	Mercury ore	Hg	689	46
Ho	Holmium		mg/kg	mg/kg
CGL 007	Basalt	MBL-1	0.78	0.02
CGL 008	Granite	MGT-1	0.85	0.03
CGL 124	Rare-earth ore	TRLK	7.86	1.72
CGL 111	Rare-earth ore	TRM-2	36.6	7.4
CGL 126	Rare-earth ore	TRHB	37	10
H₂O	Moisture		%	%
CGL 002	Alkaline granite	MGL-OShBO	0.074	0.02*
CGL 117	Epithermal gold ore	E Au-1	0.10	0.02
CGL 119	Chromium ore	HHH	0.11	0.03
*-measurement uncertainty				
K₂O	Potassium oxide		%	%
CGL 005	Magnesite	GM	0.011	0.005
CGL 125	Mercury ore	Hg	0.03	0.005
CGL 113	Iron ore	TTH	0.07	0.01
CGL 102	Phosphorite	HF	0.077	0.006
CGL 107	Phosphorite	BF	0.0925	0.015
CGL 012	Gabbro	MGR-T	0.31	0.03
CGL 109	Gold-quartz ore	ZB-1	0.37	0.03
CGL 105	Silver ore	AAg-300, RS-2	0.53	0.03
CGL 120	Gold-bearing complex ore	AHMH-1	0.64	0.03
CGL 111	Rare-earth ore	TRM-2	0.91	0.08
CGL 101	Fluorspar	HJ	0.99	0.05

Table 3 (continued)

CGL code	Description	Designation	Certified value	Confidence interval (Δx)
K₂O	Potassium oxide		%	%
CGL 117	Epithermal gold ore	E Au-1	1.48	0.09
CGL 124	Rare-earth ore	TRLK	1.55	0.05
CGL 011	Diorite	MDR	1.55	0.07
CGL 108	Silver -bearing complex ore	TsAg	1.56	0.10
CGL 004	Graphite	ZBCh	2.09	0.09
CGL 009	Andesite	MGL-AND	2.42	0.06*
CGL 301	Chestnut soil	TsH-1	2.47	0.02
CGL 003	Graphite	BJBCh	2.54	0.07
CGL 302	Soil	H-2	2.61	0.18
CGL 123	Gold-copper ore	OTH	2.81	0.14
CGL 010	Zeolite, spiked	MGL-ZEO-S	3.19	0.16*
CGL 002	Alkaline granite	MGL-OShBO	3.58	0.04*
CGL 103	Copper-molybdenum ore	CuMo	3.68	0.15
CGL 126	Rare-earth ore	TRHB	3.70	0.06
CGL 007	Basalt	MBL-1	3.99	0.04
CGL 112	Tungsten-molybdenum ore	WMo	4.32	0.07
CGL 008	Granite	MGT-1	4.68	0.04
CGL 006	Nepheline syenite	LNS	9.10	0.73

*-measurement uncertainty

Table 3 (continued)

CGL code	Description	Designation	Certified value	Confidence interval (Δx)
La	Lanthanum		mg/kg	mg/kg
CGL 002	Alkaline granite	MGL-OShBO	8.4	0.7*
CGL 011	Diorite	MDR	24.40	2.83
CGL 009	Andesite	MGL-AND	26.2	1.7*
CGL 008	Granite	MGT-1	29.59	0.57
CGL 010	Zeolite, spiked	MGL-ZEO-S	37.2	1.8*
CGL 007	Basalt	MBL-1	55.99	0.94
CGL 006	Nepheline syenite	LNS	163	12
CGL 126	Rare-earth ore	TRHB	434	34
CGL 111	Rare-earth ore	TRM-2	1.93%	0.10%
CGL 124	Rare-earth ore	TRLK	2.11%	0.11%
Li	Lithium		mg/kg	mg/kg
CGL 007	Basalt	MBL-1	11.08	0.55
CGL 124	Rare-earth ore	TRLK	21.78	2.23
CGL 126	Rare-earth ore	TRHB	37	6
CGL 006	Nepheline syenite	LNS	54	5
CGL 008	Granite	MGT-1	124	13.8
CGL 002	Alkaline granite	MGL-OShBO	1730	40*

*-measurement uncertainty

Table 3 (continued)

CGL code	Description	Designation	Certified value	Confidence interval (Δx)
LoI	Loss on ignition		%	%
CGL 011	Diorite	MDR	0.51	0.03
CGL 008	Granite	MGT-1	0.64	0.03
CGL 109	Gold-quartz ore	ZB-1	0.95	0.06
CGL 119	Chromium ore	HHH	1.07	0.06
CGL 002	Alkaline granite	MGL-OShBO	1.10	0.04*
CGL 009	Andesite	MGL-AND	1.39	0.05*
CGL 012	Gabbro	MGR-T	1.40	0.06
CGL 126	Rare-earth ore	TRHB	1.64	0.10
CGL 120	Gold-bearing complex ore	AHMH-1	2.59	0.11
CGL 117	Epithermal gold ore	E Au-1	2.84	0.10
CGL 006	Nepheline syenite	LNS	3.35	0.07
CGL 103	Copper-molybdenum ore	CuMo	4.13	0.12
CGL 123	Gold-copper ore	OTH	5.43	0.17
CGL 107	Phosphorite	BF	6.43	0.0624
CGL 111	Rare-earth ore	TRM-2	6.78	0.22
CGL 010	Zeolite, spiked	MGL-ZEO-S	8.80	0.46*
CGL 001	Serpentinite	MGL-GAS	13.33	0.14*
CGL 004	Graphite	ZBCh	17.0	0.09
CGL 003	Graphite	BJBCh	22.21	0.14
CGL 125	Mercury ore	Hg	25.28	0.15
CGL 124	Rare-earth ore	TRLK	30.56	0.12
CGL 005	Magnesite	GM	51.35	0.31
Lu	Lutetium		mg/kg	mg/kg
CGL 007	Basalt	MBL-1	0.19	0.01
CGL 002	Alkaline granite	MGL-OShBO	0.326	0.021*
CGL 008	Granite	MGT-1	0.35	0.01
CGL 111	Rare-earth ore	TRM-2	7.64	1.08

*-measurement uncertainty

Table 3 (continued)

CGL code	Description	Designation	Certified value	Confidence interval (Δx)
MgO	Magnesium oxide		%	%
CGL 006	Nepheline syenite	LNS	0.24	0.02
CGL 117	Epithermal gold ore	E Au-1	0.37	0.04
CGL 008	Granite	MGT-1	0.38	0.01
CGL 108	Silver -bearing complex ore	TsAg	0.45	0.04
CGL 111	Rare-earth ore	TRM-2	0.50	0.02
CGL 010	Zeolite, spiked	MGL-ZEO-S	0.573	0.026*
CGL 103	Copper-molybdenum ore	CuMo	0.71	0.02
CGL 120	Gold-bearing complex ore	AHMH-1	1.01	0.07
CGL 105	Silver ore	AAg-300, RS-2	1.48	0.04
CGL 301	Chestnut soil	TsH-1	1.65	0.11
CGL 302	Soil	H-2	1.84	0.1
CGL 003	Graphite	BJBCh	1.94	0.09
CGL 112	Tungsten-molybdenum ore	WMo	2.04	0.10
CGL 107	Phosphorite	BF	2.265	0.22
CGL 113	Iron ore	TTH	2.78	0.08
CGL 124	Rare-earth ore	TRLK	2.78	0.05
CGL 012	Gabbro	MGR-T	2.85	0.06
CGL 009	Andesite	MGL-AND	3.52	0.22*
CGL 011	Diorite	MDR	3.81	0.24
CGL 123	Gold-copper ore	OTH	5.52	0.10
CGL 007	Basalt	MBL-1	6.33	0.05
CGL 102	Phosphorite	HF	8.30	0.10
CGL 125	Mercury ore	Hg	9.93	0.15
CGL 119	Chromium ore	HHH	16.09	0.51
CGL 001	Serpentinite	MGL-GAS	38.22	0.34*
CGL 005	Magnesite	GM	45.80	0.45

*-measurement uncertainty

Table 3 (continued)

CGL code	Description	Designation	Certified value	Confidence interval (Δx)
MnO	Manganese oxide		%	%
CGL 117	Epithermal gold ore	EAu-1	0.017	0.002
CGL 103	Copper-molybdenum ore	CuMo	0.02	0.003
CGL 109	Gold-quartz ore	ZB-1	0.025	0.011
CGL 003	Graphite	BJBCh	0.03	0.01
CGL 120	Gold-bearing complex ore	AHMH-1	0.03	0.003
CGL 010	Zeolite, spiked	MGL-ZEO-S	0.033	0.005*
CGL 126	Rare-earth ore	TRHB	0.06	0.001
CGL 008	Granite	MGT-1	0.06	0.001
CGL 004	Graphite	ZBCh	0.07	0.01
CGL 301	Chestnut soil	TsH-1	0.08	0.01
CGL 012	Gabbro	MGR-T	0.08	0.02
CGL 009	Andesite	MGL-AND	0.081	0.001*
CGL 001	Serpentinite	MGL-GAS	0.082	0.009*
CGL 113	Iron ore	TTH	0.105	0.006
CGL 112	Tungsten-molybdenum ore	WMO	0.12	0.02
CGL 123	Gold-copper ore	OTH	0.12	0.03
CGL 011	Diorite	MDR	0.12	0.01
CGL 007	Basalt	MBL-1	0.13	0.002
CGL 111	Rare-earth ore	TRM-2	0.14	0.01
CGL 006	Nepheline syenite	LNS	0.14	0.01
CGL 002	Alkaline granite	MGL-OShBO	0.149	0.017*
CGL 119	Chromium ore	HHH	0.15	0.03
CGL 125	Mercury ore	Hg	0.29	0.006
CGL 124	Rare-earth ore	TRLK	1.67	0.05
CGL 105	Silver ore	AAg-300, RS-2	2.77	0.06

*-measurement uncertainty

Table 3 (continued)

CGL code	Description	Designation	Certified value	Confidence interval (Δx)
Mo	Molybdenum		mg/kg	mg/kg
CGL 008	Granite	MGT-1	3.06	0.16
CGL 007	Basalt	MBL-1	5.20	0.26
CGL 124	Rare-earth ore	TRLK	34.40	3.41
CGL 123	Gold-copper ore	OTH	51.8	6.3
CGL 201	Tailings of copper-molybdenum ore floatation	CuMoH	0.007%	0.0007%
CGL 103	Copper-molybdenum ore	CuMo	0.017%	0.001%
CGL 112	Tungsten-molybdenum ore	WMo	0.079%	0.003%
CGL 120	Gold-bearing complex ore	AHMH-1	0.11%	0.003%
CGL 203	Copper concentrate	CuB	0.14%	0.01%
CGL 202	Molybdenum concentrate	MoB	51.6%	0.20%
Na₂O	Sodium oxide		%	%
CGL 117	Epithermal gold ore	E Au-1	0.055	0.025
CGL 109	Gold-quartz ore	ZB-1	0.07	0.01
CGL 125	Mercury ore	Hg	0.07	0.012
CGL 102	Phosphorite	HF	0.12	0.02
CGL 120	Gold-bearing complex ore	AHMH-1	0.17	0.02
CGL 124	Rare-earth ore	TRLK	0.25	0.03
CGL 003	Graphite	BJBCh	0.47	0.04
CGL 004	Graphite	ZBCh	0.51	0.04
CGL 111	Rare-earth ore	TRM-2	0.92	0.05
CGL 103	Copper-molybdenum ore	CuMo	1.59	0.07
CGL 112	Tungsten-molybdenum ore	WMo	2.13	0.10
CGL 123	Gold-copper ore	OTH	2.36	0.07
CGL 012	Gabbro	MGR-T	2.42	0.15
CGL 302	Soil	H-2	3.07	0.19
CGL 301	Chestnut soil	TsH-1	3.14	0.14
CGL 011	Diorite	MDR	3.33	0.09

Table 3 (continued)

CGL code	Description	Designation	Certified value	Confidence interval (Δx)
Na₂O	Sodium oxide		%	%
CGL 010	Zeolite, spiked	MGL-ZEO-S	3.44	0.09*
CGL 126	Rare-earth ore	TRHB	3.46	0.06
CGL 008	Granite	MGT-1	3.63	0.03
CGL 007	Basalt	MBL-1	4.40	0.03
CGL 009	Andesite	MGL-AND	4.46	0.28*
CGL 002	Alkaline granite	MGL-OShBO	5.34	0.26*
CGL 006	Nepheline syenite	LNS	6.78	0.23
Nb	Niobium		mg/kg	mg/kg
CGL 009	Andesite	MGL-AND	3.23	0.69*
CGL 011	Diorite	MDR	6.92	0.31
CGL 010	Zeolite, spiked	MGL-ZEO-S	14.1	2.2*
CGL 008	Granite	MGT-1	15.22	0.48
CGL 124	Rare-earth ore	TRLK	31	4.54
CGL 006	Nepheline syenite	LNS	40	0.97
CGL 007	Basalt	MBL-1	52.21	1.28
CGL 002	Alkaline granite	MGL-OShBO	64	4*
Nd	Neodymium		mg/kg	mg/kg
CGL 002	Alkaline granite	MGL-OShBO	15.5	0.5*
CGL 008	Granite	MGT-1	27.10	2.21
CGL 009	Andesite	MGL-AND	27.2	0.80*
CGL 010	Zeolite, spiked	MGL-ZEO-S	27.3	2.2*
CGL 011	Diorite	MDR	30.48	4.22
CGL 007	Basalt	MBL-1	46.62	1.02
CGL 126	Rare-earth ore	TRHB	434	24
CGL 124	Rare-earth ore	TRLK	0.65%	0.03%
CGL 111	Rare-earth ore	TRM-2	0.89%	0.08%

*-measurement uncertainty

Table 3 (continued)

CGL code	Description	Designation	Certified value	Confidence interval (Δx)
Ni	Nickel		mg/kg	mg/kg
CGL 008	Granite	MGT-1	5.76	0.28
CGL 002	Alkaline granite	MGL-OShBO	10.7	1.6*
CGL 124	Rare-earth ore	TRLK	13.18	3.50
CGL 010	Zeolite, spiked	MGL-ZEO-S	14.6	0.9*
CGL 012	Gabbro	MGR-T	23.94	3.26
CGL 123	Gold-copper ore	OTH	25.4	5.8
CGL 120	Gold-bearing complex ore	AHMH-1	28.27	6.68
CGL 112	Tungsten-molybdenum ore	WMo	35	6
CGL 011	Diorite	MDR	40.94	3.24
CGL 009	Andesite	MGL-AND	61.2	4.1*
CGL 003	Graphite	BJBCh	0.007%	0.001%
CGL 111	Rare-earth ore	TRM-2	70.8	11.2
CGL 113	Iron ore	TTH	0.008%	0.001%
CGL 007	Basalt	MBL-1	162	11.66
CGL 119	Chromium ore	HHH	0.09%	0.02%
CGL 125	Mercury ore	Hg	0.1%	0.003%
CGL 001	Serpentinite	MGL-GAS	2300	120*
Pb	Lead		mg/kg	mg/kg
CGL 012	Gabbro	MGR-T	6.00	0.79
CGL 007	Basalt	MBL-1	8.70	0.20
CGL 011	Diorite	MDR	8.97	0.80
CGL 009	Andesite	MGL-AND	18.7	1.0*
CGL 117	Epithermal gold ore	E Au-1	0.002%	0.001%
CGL 008	Granite	MGT-1	24.81	0.69
CGL 123	Gold-copper ore	OTH	27	3
CGL 002	Alkaline granite	MGL-OShBO	63	6*
CGL 112	Tungsten-molybdenum ore	WMo	76	17
CGL 010	Zeolite, spiked	MGL-ZEO-S	84.2	5.1*

*-measurement uncertainty

Table 3 (continued)

CGL code	Description	Designation	Certified value	Confidence interval (Δx)
Pb Lead				
			%	%
CGL 006	Nepheline syenite	LNS	114 mg/kg	20 mg/kg
CGL 203	Copper concentrate	CuB	0.014	0.001
CGL 126	Rare-earth ore	TRHB	149 mg/kg	16 mg/kg
CGL 106	Silver ore	AAg-700, RS-3	0.041	0.003
CGL 104	Silver ore	AAg-150, RS-1	0.100	0.006
CGL 111	Rare-earth ore	TRM-2	0.11	0.014
CGL 105	Silver ore	AAg-300, RS-2	0.13	0.01
CGL 124	Rare-earth ore	TRLK	0.16	0.007
CGL 108	Silver -bearing complex ore	TsAg	10	0.23
P₂O₅ Phosphorus pentoxide				
			%	%
CGL 202	Molybdenum concentrate	MoB	¹ 0.014	¹ 0.002
CGL 119	Chromium ore	HHH	0.02	0.01
CGL 002	Alkaline granite	MGL-OShBO	0.0293	0.0017*
CGL 010	Zeolite, spiked	MGL-ZEO-S	0.032	0.002*
CGL 109	Gold-quartz ore	ZB-1	0.037	0.007
CGL 006	Nepheline syenite	LNS	0.04	0.05
CGL 120	Gold-bearing complex ore	AHMH-1	0.05	0.003
CGL 012	Gabbro	MGR-T	0.078	0.005
CGL 108	Silver -bearing complex ore	TsAg	0.12	0.01
CGL 117	Epithermal gold ore	E Au-1	0.125	0.027
CGL 008	Granite	MGT-1	0.13	0.008
CGL 301	Chestnut soil	TsH-1	0.16	0.01
CGL 124	Rare-earth ore	TRLK	0.22	0.01
CGL 009	Andesite	MGL-AND	0.26	0.004*
CGL 123	Gold-copper ore	OTH	0.27	0.02
CGL 105	Silver ore	AAg-300, RS-2	0.54	0.01
CGL 007	Basalt	MBL-1	0.85	0.04
CGL 102	Phosphorite	HF	13.81	0.11
CGL 111	Rare-earth ore	TRM-2	19.26	0.28
CGL 107	Phosphorite	BF	26.38	0.1349

¹certified value by element; *-measurement uncertainty

Table 3 (continued)

CGL code	Description	Designation	Certified value	Confidence interval (Δx)
Pr	Praseodymium		mg/kg	mg/kg
CGL 008	Granite	MGT-1	7.27	0.18
CGL 007	Basalt	MBL-1	11.90	0.24
CGL 126	Rare-earth ore	TRHB	122	10
CGL 124	Rare-earth ore	TRLK	0.23%	0.03%
CGL 111	Rare-earth ore	TRM-2	0.28%	0.03%
Rb	Rubidium		mg/kg	mg/kg
CGL 012	Gabbro	MGR-T	6.58	2.76
CGL 111	Rare-earth ore	TRM-2	43	10
CGL 011	Diorite	MDR	48.5	4.49
CGL 009	Andesite	MGL-AND	49.7	1.2*
CGL 007	Basalt	MBL-1	63.05	0.98
CGL 124	Rare-earth ore	TRLK	67.12	3.91
CGL 103	Copper-molybdenum ore	CuMo	81	8
CGL 010	Zeolite, spiked	MGL-ZEO-S	106	3*
CGL 003	Graphite	BJBCh	0.014%	0.002%
CGL 006	Nepheline syenite	LNS	207	16
CGL 008	Granite	MGT-1	275	3.35
CGL 126	Rare-earth ore	TRHB	641	51
CGL 112	Tungsten-molybdenum ore	WMo	0.106%	0.007%
CGL 002	Alkaline granite	MGL-OShBO	2360	110*
Re	Rhenium		%	%
CGL 202	Molybdenum concentrate	MoB	0.05	0.006

*-measurement uncertainty

Table 3 (continued)

CGL code	Description	Designation	Certified value	Confidence interval (Δx)
SO₃ Sulphur trioxide			%	%
CGL 119	Chromium ore	HHH	0.07	0.03
CGL 123	Gold-copper ore	OTH	3.87	0.15
CGL 111	Rare-earth ore	TRM-2	4.58	0.32
CGL 201	Tailings of copper-molybdenum ore floatation	CuMoH	¹ 2.03	¹ 0.04
CGL 103	Copper-molybdenum ore	CuMo	¹ 2.09	¹ 0.05
CGL 105	Silver ore	AAg-300, RS-2	6.85	0.01
CGL 113	Iron ore	TTH	7.14	0.30
CGL 108	Silver -bearing complex ore	TsAg	21.25	0.41
CGL 203	Copper concentrate	CuB	33.94 ¹	0.12 ¹
Sb Antimony			mg/kg	mg/kg
CGL 008	Granite	MGT-1	0.19	0.03
CGL 007	Basalt	MBL-1	0.28	0.04
CGL 103	Copper-molybdenum ore	CuMo	24	2
CGL 117	Epithermal gold ore	EAu-1	0.14%	0.02%
CGL 105	Silver ore	AAg-300, RS-2	0.50%	0.04%
Sc Scandium			mg/kg	mg/kg
CGL 010	Zeolite, spiked	MGL-ZEO-S	3.27	0.90*
CGL 008	Granite	MGT-1	4.36	0.20
CGL 002	Alkaline granite	MGL-OShBO	9.2	1.4*
CGL 007	Basalt	MBL-1	10.1	0.70
CGL 009	Andesite	MGL-AND	11.8	4.0*
CGL 012	Gabbro	MGR-T	12.33	1.40
CGL 011	Diorite	MDR	20.46	1.68
Se Selenium			%	%
CGL 203	Copper concentrate	CuB	0.0077	0.0004

¹certified value by element; *-measurement uncertainty

Table 3 (continued)

CGL code	Description	Designation	Certified value	Confidence interval (Δx)
SiO₂	Silicon dioxide		%	%
CGL 005	Magnesite	GM	0.25	0.04
CGL 113	Iron ore	TTH	3.37	0.11
CGL 202	Molybdenum concentrate	MoB	4.50	0.09
CGL 119	Chromium ore	HHH	4.73	0.24
CGL 124	Rare-earth ore	TRLK	11.86	0.15
CGL 111	Rare-earth ore	TRM-2	14.86	0.17
CGL 105	Silver ore	AAg-300, RS-2	17.80	0.20
CGL 107	Phosphorite	BF	20.57	0.163
CGL 101	Fluorspar	HJ	23.01	0.01
CGL 102	Phosphorite	HF	28.04	0.12
CGL 001	Serpentinite	MGL-GAS	38.54	0.23*
CGL 125	Mercury ore	Hg	41.01	0.14
CGL 108	Silver -bearing complex ore	TsAg	42.08	0.26
CGL 012	Gabbro	MGR-T	48.00	0.19
CGL 007	Basalt	MBL-1	51.85	0.15
CGL 006	Nepheline syenite	LNS	51.88	0.24
CGL 123	Gold-copper ore	OTH	52.09	0.32
CGL 003	Graphite	BJBCh	52.20	0.25
CGL 004	Graphite	ZBCh	52.84	0.30
CGL 011	Diorite	MDR	57.75	0.48
CGL 009	Andesite	MGL-AND	59.20	0.57*
CGL 301	Chestnut soil	TsH-1	62.51	0.11
CGL 302	Soil	H-2	63.18	0.34
CGL 112	Tungsten-molybdenum ore	WMo	64.87	0.34
CGL 103	Copper-molybdenum ore	CuMo	67.02	0.22
CGL 010	Zeolite, spiked	MGL-ZEO-S	67.64	0.96*
CGL 126	Rare-earth ore	TRHB	71.38	0.39
CGL 002	Alkaline granite	MGL-OShBO	71.72	0.29*
CGL 008	Granite	MGT-1	72.37	0.12
CGL 120	Gold-bearing complex ore	AHMH-1	77.37	0.26
CGL 117	Epithermal gold ore	E Au-1	84.70	0.84
CGL 109	Gold-quartz ore	ZB-1	92.57	0.39

*-measurement uncertainty

Table 3 (continued)

CGL code	Description	Designation	Certified value	Confidence interval (Δx)
Sm	Samarium		mg/kg	mg/kg
CGL 009	Andesite	MGL-AND	5.16	0.14*
CGL 008	Granite	MGT-1	5.54	0.15
CGL 002	Alkaline granite	MGL-OShBO	6.0	0.4*
CGL 007	Basalt	MBL-1	8.72	0.15
CGL 126	Rare-earth ore	TRHB	120	5
CGL 124	Rare-earth ore	TRLK	539	62
CGL 111	Rare-earth ore	TRM-2	0.09%	0.03%
Sn	Tin		mg/kg	mg/kg
CGL 007	Basalt	MBL-1	2.66	0.17
CGL 008	Granite	MGT-1	13.30	0.55
CGL 126	Rare-earth ore	TRHB	126	7
Sr	Strontium		mg/kg	mg/kg
CGL 001	Serpentinite	MGL-GAS	7.3	0.4*
CGL 002	Alkaline granite	MGL-OShBO	12.3	1.1*
CGL 112	Tungsten-molybdenum ore	WMo	78	20
CGL 120	Gold-bearing complex ore	AHMH-1	88.71	4.09
CGL 008	Granite	MGT-1	111	1.65
CGL 126	Rare-earth ore	TRHB	158	12
CGL 103	Copper-molybdenum ore	CuMo	172	32
CGL 123	Gold-copper ore	OTH	259	73
CGL 125	Mercury ore	Hg	382	30
CGL 011	Diorite	MDR	454	24
CGL 010	Zeolite, spiked	MGL-ZEO-S	634	27*
CGL 007	Basalt	MBL-1	927	12.35
CGL 009	Andesite	MGL-AND	1116	21*
CGL 012	Gabbro	MGR-T	1196	35
CGL 006	Nepheline syenite	LNS	1740	48
CGL 124	Rare-earth ore	TRLK	0.49%	0.04%
CGL 111	Rare-earth ore	TRM-2	2.24%	0.095%

*-measurement uncertainty

Table 3 (continued)

CGL code	Description	Designation	Certified value	Confidence interval (Δx)
Ta	Tantalum		mg/kg	mg/kg
CGL 008	Granite	MGT-1	2.56	0.12
CGL 007	Basalt	MBL-1	3.20	0.07
CGL 002	Alkaline granite	MGL-OShBO	46.7	2.4*
CGL 126	Rare-earth ore	TRHB	123	9
Tb	Terbium		mg/kg	mg/kg
CGL 009	Andesite	MGL-AND	0.49	0.03*
CGL 008	Granite	MGT-1	0.79	0.03
CGL 007	Basalt	MBL-1	0.95	0.03
CGL 126	Rare-earth ore	TRHB	25	4
CGL 111	Rare-earth ore	TRM-2	54.6	14.2
Te	Tellurium		%	%
CGL 203	Copper concentrate	CuB	0.0008	0.0003
Th	Thorium		mg/kg	mg/kg
CGL 009	Andesite	MGL-AND	6.46	0.65*
CGL 007	Basalt	MBL-1	6.95	0.24
CGL 002	Alkaline granite	MGL-OShBO	13.3	0.8*
CGL 010	Zeolite, spiked	MGL-ZEO-S	17.2	1.2*
CGL 008	Granite	MGT-1	19.35	0.46
CGL 006	Nepheline syenite	LNS	61.6	7.5
CGL 126	Rare-earth ore	TRHB	202	13
CGL 111	Rare-earth ore	TRM-2	217.58	40.42
CGL 124	Rare-earth ore	TRLK	946	51

*-measurement uncertainty

Table 3 (continued)

CGL code	Description	Designation	Certified value	Confidence interval (Δx)
TiO₂	Titanium dioxide		%	%
CGL 125	Mercury ore	Hg	0.018	0.004
CGL 101	Fluorspar	HJ	0.047	0.004
CGL 109	Gold-quartz ore	ZB-1	0.08	0.01
CGL 113	Iron ore	TTH	0.101	0.008
CGL 119	Chromium ore	HHH	0.11	0.01
CGL 105	Silver ore	AAg-300, RS-2	0.12	0.01
CGL 111	Rare-earth ore	TRM-2	0.15	0.04
CGL 120	Gold-bearing complex ore	AHMH-1	0.15	0.04
CGL 010	Zeolite, spiked	MGL-ZEO-S	0.158	0.004*
CGL 117	Epithermal gold ore	E Au-1	0.17	0.02
CGL 124	Rare-earth ore	TRLK	0.20	0.012
CGL 108	Silver-bearing complex ore	TsAg	0.30	0.011
CGL 008	Granite	MGT-1	0.30	0.007
CGL 126	Rare-earth ore	TRHB	0.31	0.06
CGL 006	Nepheline syenite	LNS	0.37	0.02
CGL 012	Gabbro	MGR-T	0.37	0.01
CGL 103	Copper-molybdenum ore	CuMo	0.47	0.02
CGL 004	Graphite	ZBCh	0.49	0.04
CGL 003	Graphite	BJBCh	0.57	0.03
CGL 009	Andesite	MGL-AND	0.71	0.03*
CGL 112	Tungsten-molybdenum ore	WMo	0.82	0.05
CGL 301	Chestnut soil	TsH-1	0.86	0.03
CGL 302	Soil	H-2	0.88	0.03
CGL 123	Gold-copper ore	OTH	0.93	0.17
CGL 011	Diorite	MDR	1.34	0.025
CGL 007	Basalt	MBL-1	2.11	0.02
ΣTR₂O₃	Summa rare-earth elements		%	%
CGL 111	Rare-earth ore	TRM-2	7.56	0.25
CGL 124	Rare-earth ore	TRLK	8.27	0.25

*-measurement uncertainty

Table 3 (continued)

CGL code	Description	Designation	Certified value	Confidence interval (Δx)
Tl Thallium				
			mg/kg	mg/kg
CGL 007	Basalt	MBL-1	0.12	0.01
CGL 008	Granite	MGT-1	1.72	0.17
Tm Thulium				
			mg/kg	mg/kg
CGL 007	Basalt	MBL-1	0.23	0.006
CGL 008	Granite	MGT-1	0.37	0.01
U Uranium				
			mg/kg	mg/kg
CGL 001	Serpentinite	MGL-GAS	0.80	0.04*
CGL 007	Basalt	MBL-1	1.64	0.09
CGL 009	Andesite	MGL-AND	1.96	0.12*
CGL 010	Zeolite, spiked	MGL-ZEO-S	3.09	0.31*
CGL 008	Granite	MGT-1	5.44	0.16
CGL 006	Nepheline syenite	LNS	12.4	1.5
CGL 126	Rare-earth ore	TRHB	57	6
V Vanadium				
			mg/kg	mg/kg
CGL 008	Granite	MGT-1	14.03	0.67
CGL 006	Nepheline syenite	LNS	30	3.6
CGL 001	Serpentinite	MGL-GAS	33.4	2.0*
CGL 125	Mercury ore	Hg	38	7.6
CGL 120	Gold-bearing complex ore	AHMH-1	39.33	8.67
CGL 010	Zeolite, spiked	MGL-ZEO-S	42.3	7.7*
CGL 012	Gabbro	MGR-T	85.28	7.51
CGL 112	Tungsten-molybdenum ore	WMo	0.01%	0.002%
CGL 007	Basalt	MBL-1	105	2.82
CGL 124	Rare-earth ore	TRLK	115	14.92
CGL 009	Andesite	MGL-AND	123	7*
CGL 111	Rare-earth ore	TRM-2	138.6	18.9
CGL 011	Diorite	MDR	213	38
CGL 123	Gold-copper ore	OTH	335	15
CGL 119	Chromium ore	HHH	0.04%	0.018%

*-measurement uncertainty

Table 3 (continued)

CGL code	Description	Designation	Certified value	Confidence interval (Δx)
W	Tungsten		mg/kg	mg/kg
CGL 008	Granite	MGT-1	0.56	0.05
CGL 007	Basalt	MBL-1	1.15	0.05
CGL 126	Rare-earth ore	TRHB	88	9
CGL 120	Gold-bearing complex ore	AHMH-1	0.01%	0.001%
CGL 011	Diorite	MDR	266	26
CGL 112	Tungsten-molybdenum ore	WMO	² 0.41%	² 0.03%
² certified value by oxide (WO ₃)				
Y	Yttrium		mg/kg	mg/kg
CGL 012	Gabbro	MGR-T	5.14	0.32
CGL 009	Andesite	MGL-AND	11.8	0.8*
CGL 010	Zeolite, spiked	MGL-ZEO-S	18.6	0.9*
CGL 007	Basalt	MBL-1	20.48	0.48
CGL 006	Nepheline syenite	LNS	23	4
CGL 011	Diorite	MDR	23.62	1.15
CGL 008	Granite	MGT-1	25.19	0.77
CGL 124	Rare-earth ore	TRLK	167	20
CGL 111	Rare-earth ore	TRM-2	959	40
CGL 126	Rare-earth ore	TRHB	1102	68
Yb	Ytterbium		mg/kg	mg/kg
CGL 009	Andesite	MGL-AND	1.00	0.05*
CGL 007	Basalt	MBL-1	1.34	0.02
CGL 011	Diorite	MDR	2.05	0.10
CGL 008	Granite	MGT-1	2.36	0.10
CGL 002	Alkaline granite	MGL-OShBO	2.38	0.13*
CGL 124	Rare-earth ore	TRLK	17.85	1.92
CGL 111	Rare-earth ore	TRM-2	54.52	5.24
CGL 126	Rare-earth ore	TRHB	123	27

*-measurement uncertainty

Table 3 (continued)

CGL code	Description	Designation	Certified value	Confidence interval (Δx)
Zn	Zinc		mg/kg	mg/kg
CGL 117	Epithermal gold ore	E Au-1	0.0025%	0.0006%
CGL 001	Serpentinite	MGL-GAS	39	3*
CGL 008	Granite	MGT-1	54.59	1.11
CGL 012	Gabbro	MGR-T	59.87	4.58
CGL 120	Gold-bearing complex ore	AHMH-1	65.29	12.54
CGL 009	Andesite	MGL-AND	71.5	4.20*
CGL 010	Zeolite, spiked	MGL-ZEO-S	79.3	3.5*
CGL 002	Alkaline granite	MGL-OShBO	92	6*
CGL 011	Diorite	MDR	92.77	6.06
CGL 103	Copper-molybdenum ore	CuMo	97	10
CGL 006	Nepheline syenite	LNS	98	6
CGL 007	Basalt	MBL-1	114	2.77
CGL 123	Gold-copper ore	OTH	136	6
CGL 112	Tungsten-molybdenum ore	W Mo	0.017%	0.003%
CGL 003	Graphite	BJBCh	0.018%	0.004%
CGL 119	Chromium ore	HHH	0.023%	0.016%
CGL 124	Rare-earth ore	TRLK	469	21
CGL 126	Rare-earth ore	TRHB	534	28
CGL 111	Rare-earth ore	TRM-2	0.06%	0.004%
CGL 203	Copper concentrate	CuB	0.15%	0.01%
CGL 106	Silver ore	AAg-700, RS-3	0.20%	0.01%
CGL 104	Silver ore	AAg-150, RS-1	0.42%	0.01%
CGL 105	Silver ore	AAg-300, RS-2	0.59%	0.01%
CGL 108	Silver -bearing complex ore	TsAg	8.72%	0.166%

*-measurement uncertainty

Table 3 (continued)

CGL code	Description	Designation	Certified value	Confidence interval (Δx)
Zr	Zirconium		mg/kg	mg/kg
CGL 002	Alkaline granite	MGL-OShBO	40.1	2.8*
CGL 123	Gold-copper ore	OTH	78.3	11.1
CGL 003	Graphite	BJBCh	0.012%	0.002%
CGL 009	Andesite	MGL-AND	141	11*
CGL 008	Granite	MGT-1	169	2.92
CGL 112	Tungsten-molybdenum ore	WMO	0.017%	0.001%
CGL 010	Zeolite, spiked	MGL-ZEO-S	177	20*
CGL 011	Diorite	MDR	191	43
CGL 007	Basalt	MBL-1	287	4.93
CGL 006	Nepheline syenite	LNS	600	145
CGL 126	Rare-earth ore	TRHB	1.58%	0.06%

*-measurement uncertainty

ORGANIZATIONS PARTICIPATING IN CERTIFICATIONS

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17. Шинжлэх ухаан технологийн их сургууль, Хүнс биотехнологийн сургууль, Mongolia
18. Монгол газар ХХК, Mongolia
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20. Magyar Allami Foldtani Intezet, Hungary
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22. VEB Bandstahlkombinat "Hermann Matern", Eisenhüttenkombinat Ost, Eisenhüttenstadt, Germany
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27. SDAG Wismut Aufbereitungsbetrieb, Germany
28. SDAG Wismut Geologischer Betrieb, Germany
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31. Instytut Geologiczny, Poland

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