

Appendix 1-2 (7) Sample List (7)

SAMPLE No.	LOCALITY	ROCK NAME	WTDP ORE XP						REMARKS					
			F	P	G	P	C	S						
			A	S	T	L	M	V	C	B	R	D	I	
331	3 TS 13	Arin-Nuur	Mo ore						X					stock pile
332	3 TS 14	Tumurtiin-Ovoo	skarn, gar, sp, mgt	X	X									
333	3 TS 15	Tumurtiin-Ovoo	skarn, gar, sp, mgt	X	X									
334	3 TS 16	Tumurtiin-Ovoo	skarn, gar, sp, mgt	X	X									
335	3 TS 17	Tumurtiin-Ovoo	skarn, hem, mgt, sp	X	X									
336	3 TS 18	Tumurtiin-Ovoo	skarn, oxd, send carb		X					X				
337	3 TS 19	Tumurtiin-Ovoo	skarn, oxd, mgt, fl		X									
338	3 TS 20	Tumurtiin-Ovoo	skarn, oxd		X									
339	3 TS 21	Tumurtiin-Ovoo	skarn, mgt, gar, lm		X									
340	3 TS 22	Tumurtiin-Ovoo	skarn, mgt, lm, grn-Cu		X									
341	3 TS 23	Tumurtiin-Ovoo	skarn, mgt, lm		X									
342	3 TS 24	Tumurtiin-Ovoo	skarn, specul?	X	X						X			
343	3 TS 25	Tumurtiin-Ovoo	skarn, gar, Mn-oxd		X									
344	3 TS 26	Tumurtiin-Ovoo	skarn, gar, Mn-oxd		X									
345	3 TS 27	Tumurtiin-Ovoo	ls, gar, Mn-oxd, blueCu		X						X			
346	3 TS 28	Tumurtiin-Ovoo	sk, gar, qz, mgt, Mn-oxd		X									
347	3 TS 29	Tumurtiin-Ovoo	marble	X	X									
348	3 TS 30	Tumurtiin-Ovoo	skarn, gar sp	X	X	X					X			stock pile
349	3 TS 31	Tumurtiin-Ovoo	granophyre, wthd	X										
350	3 TS 32	Salaa	gabbro	XX										
351	3 TS 33	Salaa	qz, mo	X	X									
352	3 TS 34	Salaa	qz, wf	X	X									
353	3 TS 35	Salaa	qz, wf		X									
354	3 TS 36	Salaa	qz, lm		X						X			
355	3 TS 37	Salhiit core strage	limestone, wk sk											DDH
356	3 TS 38	Salhiit core strage	skarn, mgt	X	X						X			DDH
357	3 TS 39	Salhiit core strage	granite, mo vlt		X									DDH
358	3 TS 40	Salhiit core strage	granite	X	X									DDH
359	3 TS 41	Salhiit core strage	limestone											DDH
360	3 TS 42	Salhiit core strage	granite	XX										DDH
361	3 TS 43	Salhiit core strage	qzv, wf?	X	X									DDH
362	3 TS 44	Salhiit	skarn, mgt, oxd	X	X									
363	3 TS 45	Salhiit	skarn, mgt, oxd		X									
364	3 TY 1	Tumurtiin-Ovoo area	granite, aplitic	XX										
365	3 TY 2	Tumurtiin-Ovoo area	skarnized slt		X						X			
366	3 TY 3	Tumurtiin-Ovoo area	porphyrite											
367	3 TY 4	Tumurtiin-Ovoo area	granite	XXX										
368	3 TY 5	Tumurtiin-Ovoo area	rhyolite											
369	3 TY 6	Tumurtiin-Ovoo area	aplite											
370	3 TY 7	Tumurtiin-Ovoo area	granite porphyry											
371	3 TY 8	Tumurtiin-Ovoo area	hornfels(sh~ss)											
372	3 UN 1	Olon-Ovoot area	graphic granite	XXX										
373	3 UN 2	Olon-Ovoot area	gabbro	XXX										
374	3 UN 3	Mushgia-Hudak	granite	XXX										
375	3 UN 4	Olon-Ovoot area	granodiorite	XXX										
376	3 UN 5	Olon-Ovoot area	alkali rh, topaz-bg	X					X	X				ongonite
377	3 UN 6	Bayan-Ovoot	fl ore											
378	3 UN 7	Hanbogd	alkali granite	XXX										
379	3 UN 8	Olon-Ovoot	qzv						X					No. 68 trench
380	3 UN 9	Olon-Ovoot	qzv						X					No. 68 trench
381	3 UN 10	Olon-Ovoot	qzv						X					No. 68 trench
382	3 UN 11	Olon-Ovoot	qzv						X					No. 68 trench
383	3 UN 12	Olon-Ovoot	qzv						X					No. 68 trench
384	3 UN 13	Olon-Ovoot	qzv						X					No. 69 trench
385	3 UN 14	Olon-Ovoot	qzv						X					No. 69 trench

Appendix 1-2 (8) Sample List (8)

SAMPLE No.	LOCALITY	ROCK NAME	WTFDP ORE XF				REMARKS
			ASTL	MVC	BRD	J	
386	3 UN 15	Olon-Ovoot			X		No. 69trench
387	3 UN 16	Olon-Ovoot			X	X	No. 69trench
388	3 UN 17	Olon-Ovoot			X		No. 69trench
389	3 UN 18	Mushgia-Hudak	XX		X		fresh
390	3 UN 19	Mushgia-Hudak	X		X		
391	3 UN 20	Mushgia-Hudak	X		X		
392	3 US 1	Mushgia-Hudak			X	X	
393	3 US 2	Mushgia-Hudak			X	X	
394	3 US 3	Mushgia-Hudak					
395	3 US 4	Mushgia-Hudak					
396	3 US 5	Mushgia-Hudak			X		
397	3 US 6	Mushgia-Hudak			X	X	
398	3 US 7	Mushgia-Hudak					
399	3 US 8	Mushgia-Hudak			X		
400	3 US 9	Mushgia-Hudak	X	X	X	X	
401	3 US 10	Mushgia-Hudak					
402	3 US 11	Mushgia-Hudak			X		
403	3 US 12	Mushgia-Hudak			X		
404	3 US 13	Mushgia-Hudak			X		
405	3 US 14	Mushgia-Hudak					apatite hill
406	3 US 15	Mushgia-Hudak			X	X	apatite hill
407	3 US 16	Mushgia-Hudak					apatite hill
408	3 US 17	Mushgia-Hudak			X		apatite hill
409	3 US 18	Mushgia-Hudak			X	X	apatite hill
410	3 US 19	Mushgia-Hudak	XXX		X		
411	3 US 20	Mushgia-Hudak			X		
412	3 US 21	Mushgia-Hudak			X	X	
413	3 US 22	Mushgia-Hudak	XX		X		
414	3 US 23	Mushgia-Hudak			X		
415	3 US 24	Mushgia-Hudak	XX		X		
416	3 US 25	Mushgia-Hudak					
417	3 US 26	Mushgia-Hudak			X	X	
418	3 US 27	Mushgia-Hudak			X		
419	3 US 28	Olon-Ovoot			X	X	No. 59trench
420	3 US 29	Olon-Ovoot			X		No. 59trench
421	3 US 30	Olon-Ovoot			X		No. 59trench
422	3 US 31	Olon-Ovoot			X	X	No. 59trench
423	3 US 32	Olon-Ovoot			X		No. 59trench
424	3 US 33	Olon-Ovoot			X		No. 59trench
425	3 US 34	Olon-Ovoot			X		No. 59trench
426	3 US 35	Olon-Ovoot			X	X	No. 59trench
427	3 US 36	Olon-Ovoot	X		X	X	No. 59trench
428	3 US 37	Olon-Ovoot			X		No. 59trench
429	3 US 38	Olon-Ovoot			X		No. 59trench
430	3 US 39	Olon-Ovoot			X		No. 59trench
431	3 US 40	Olon-Ovoot	X		X	X	No. 59trench
432	3 US 41	Olon-Ovoot			X	X	No. 59trench
433	3 US 42	Olon-Ovoot			X		No. 59trench
434	3 US 43	Olon-Ovoot			X	X	No. 59trench
435	3 US 44	Olon-Ovoot			X		No. 59trench
436	3 US 45	Olon-Ovoot			X		No. 59trench
437	3 US 46	Olon-Ovoot			X		No. 59trench
438	3 US 47	Olon-Ovoot			X	XX	No. 59trench
439	3 US 48	Olon-Ovoot			X	X	No. 59trench
440	3 US 49	Olon-Ovoot			X		No. 59trench

Appendix 1-2 (9) Sample List (9)

	SAMPLE No.	LOCALITY	ROCK NAME	WTDP ORE XF						REMARKS
				AST	LL	MV	CB	RD	DI	
441	3 US 50	Olon-Ovoot	diorite					X		No. 59trench
442	3 US 51	Olon-Ovoot	diorite					X	X	No. 59trench
443	3 US 52	Olon-Ovoot	meta-dolerite	X				X		No. 59trench
444	3 US 53	Olon-Ovoot	diorite					X		No. 59trench
445	3 US 54	Olon-Ovoot	qzv with visible Au	X					X	No. 59trench
446	3 US 55	Olon-Ovoot	grano-dio, qzvl, py					X		DDH24, 72m
447	3 US 56	Olon-Ovoot	diorite, arg, py					X		DDH24, 80m
448	3 US 57	Olon-Ovoot	qz, massive					X		No. 60trench
449	3 US 58	Olon-Ovoot	diorite, oxd arg					X		No. 60trench
450	3 US 59	Olon-Ovoot	diorite, oxd arg					X		No. 60trench
451	3 US 60	Olon-Ovoot	qzv					X		No. 60trench
452	3 US 61	Olon-Ovoot	qzv					X		No. 60trench
453	3 US 62	Olon-Ovoot	qzv					X		No. 61trench
454	3 US 63	Olon-Ovoot	qzv					X		No. 61trench
455	3 US 64	Olon-Ovoot	qzv in siltstone					X		No. 62trench
456	3 US 65	Olon-Ovoot	qzv in siltstone					X		No. 62trench
457	3 US 66	Olon-Ovoot	qzv					X		No. 67trench
458	3 US 67	Olon-Ovoot	siltstone with qzv					X	X	No. 67trench
459	3 US 68	Olon-Ovoot	diorite					X		No. 67trench
460	3 US 69	Olon-Ovoot	diorite					X		No. 67trench
461	3 US 70	Olon-Ovoot	diorite					X	X	No. 67trench
462	3 US 71	Olon-Ovoot	qzv					X		No. 67trench
463	3 US 72	Olon-Ovoot	diorite, py, oxd	X				X	X	No. 67trench
464	3 US 73	Olon-Ovoot	qzv					X		No. 67trench
465	3 US 74	Olon-Ovoot	diorite, py					X	X	No. 67trench
466	3 US 75	Olon-Ovoot	diorite with qz-vlt					X		No. 67trench
467	3 US 76	Olon-Ovoot	diorite with qz-vlt					X		No. 67trench
468	3 US 77	Olon-Ovoot	qzv					X		No. 67trench
469	3 US 78	Olon-Ovoot	siltstone with qzvl					X	X	No. 67trench
470	3 US 79	Olon-Ovoot	diorite+siltstone					X		No. 67trench
471	3 US 80	Olon-Ovoot	qzv, py, visible Au	X				X		No. 67trench
472	3 US 81	Bayan-Hoshoo	rhyolitic tuff						X	
473	3 US 82	Bayan-Hoshoo	rhyolitic tuff						X	
474	3 US 83	Bayan-Hoshoo	apatite-bt rock, fl	X					X	
475	3 US 84	Bayan-Hoshoo	carbonatite, bre						X	
476	3 US 85	Bayan-Hoshoo	rhyolitic ff, cel, qz						X	trench
477	3 US 86	Bayan-Hoshoo	rhyolitic ff, cel, qz						X	trench
478	3 US 87	Bayan-Hoshoo	rhyolitic ff, cel, qz						X	trench
479	3 US 88	Bayan-Hoshoo	rhyolitic ff, cel, qz						XX	trench
480	3 US 89	Bayan-Hoshoo	rhyolitic ff, cel, qz						X	trench
481	3 US 90	Bayan-Hoshoo	rhyolitic ff, cel, qz						XX	trench
482	3 US 91	Bayan-Hoshoo	rhyolitic ff, cel, qz						X	trench
483	3 US 92	Bayan-Hoshoo	rhyolitic ff, cel, qz						X	trench
484	3 US 93	Bayan-Hoshoo	rhyolitic ff, cel, qz						X	trench
485	3 US 94	Bayan-Hoshoo	rhyolitic ff, cel, qz						X	trench
486	3 US 95	Bayan-Hoshoo	rhyolitic ff, cel, qz						X	trench
487	3 US 96	Bayan-Hoshoo	rhyolitic ff, cel, qz						X	trench
488	3 US 97	Bayan-Hoshoo	rhyolitic ff, cel, qz						X	trench
489	3 US 98	Bayan-Hoshoo	rhyolitic ff, cel, qz						X	trench
490	3 US 99	Bayan-Hoshoo	rhyolitic ff, cel, qz						X	trench
491	3 US100	Bayan-Hoshoo	qzv?, fl						X	trench
492	3 US101	Bayan-Hoshoo	monzonite, apt	XX						
493	3 US102	Bayan-Hoshoo	carbonatite, cel, ba						XXX	trench
494	3 US103	Bayan-Hoshoo	cbt, ba, qz, fl, py						X X	trench
495	3 US104	Bayan-Hoshoo	monzonite, apt, fl	XX						

Appendix 1-2 (10) Sample List (10)

	SAMPLE No.	LOCALITY	ROCK NAME	WTDP ORE XF		REMARKS
				FPGPS	ASTLMVCBRDI	
496	3 US105	Olon-Ovoot	qzv, 65cm	X		No. 64trench
497	3 US106	Olon-Ovoot	diorite, qzvl, py, Au	X		No. 64trench
498	3 US107	Olon-Ovoot	qzv, 150cm	X		No. 64trench
499	3 US108	Olon-Ovoot	qzv, 80cm	X		No. 64trench
500	3 US109	Olon-Ovoot	qzv, 20cm	X		No. 65trench
501	3 US110	Olon-Ovoot	qzv, 40cm	X		No. 65trench
502	3 UY 1	Onh	qzv	X	X	
503	3 UY 2	Onh	qzv	X		
504	3 UY 3	Onh	qzv	X		
505	3 UY 4	Onh	qzv	X		
506	3 UY 5	Tsogt-Ovoo	granite	XX		Tsogt Ovoo massive
507	3 UY 6	Dugshih	qzv	X	X	
508	3 UY 7	Dugshih	qzv	X	X	

		Laboratory works	Numbers for laboratory works	
W	A	WHOLE ROCK ANALYSIS	51	
T	S	THIN SECTION	82	
D	T	DATING (25K-Ar, 5Pb-Pb)	25	25K-Ar, 5Pb-Pb
P	L	POLISH	52	
F	L	ASSAY fl ore	31	CaF2, SiO2, CaCO3, Fe2O3
O	P M	polimetal v, sk	104	Cu, Pb, Zn, Ag, Au, Mo, W
R	G V	qzv with Au	92	Au, Ag
E	P M	po-Cu	103	Cu, Mo, Ag, Au
C	B	cbt, apt rock	33	TRE, Sr, Ba, P
S	R	Sr ore	22	SrSO4, BaSO4, CaSO4, Fe2O3
		X-RAY DIFFRACTION	102	
X	D	FLUID INCLUSION	14	

Appendix I-4 (2) Microscopic Observations (Polished Section) (2)

No.	SAMPLE No.	LOCALITY	ROCK NAME	Chalcopyrite	Tetrahedrite-series	Chalcocite	Bornite	Covellite	Bournonite	Galena	Boulangerite	Sphalerite	Spectrum	Ag bearing mineral	Holypentite	Kolframite series	Stibnite	Magnetite	Pyrite	Pyrrhohite	Marcasite	Renardite	Goethite	Arsenopyrite	Quartz	K-feldspar	Plagioclase	Biotite	Clinopyroxene	Calcite	Chlorite	Sericite	Kaocovite	Garnet	Epidote	Actinolite	Veauvillite	Cerussite	Anglesite	Smithsonite	Apatite	Fluorite				
27	3 SY 14	Tsaganavraga	Qz-ser, v, ccp, bn, mal	○		●	△	●																◎																						
28	3 SY 15	Tsaganavraga	Qzv, ccp, bn, mal	○				●														●		◎																						
29	3 SY 20	Tsaganavraga	Ccp, bn, mal, mo	△			●	●														△		○																						
30	3 SY 22	Tsaganavraga	Ccp, bn, mo, fl	◎			○	●														○		◎																						
31	3 SY 24	Tsaganavraga	Qzv, ccp, mal, bn	◎			○	●														○		◎																						
32	3 SY 32	Tsaganavraga	Ccp, cv, mal, mo	○				△														△		○																						
33	3 TS 2	Arin-Naur	Granite, mo, py, qz, vl	△				△															○		○																					
34	3 TS 7	Arin-Naur	Granite, mo, py, qz, Cu	○				△														△		◎																						
35	3 TS 33	Salaa	Qz, mo																			△		◎																						
36	3 TS 34	Salaa	Qz, wf																			△		◎																						
37	3 TN 4	Salhit	Skarn																			△		◎																						
38	3 TS 44	Salhit	Skarn, mgt, cxd																			△		○																						
39	3 TS 38	Salhit	Skarn, mgt																			○		◎																						
40	3 TS 40	Salhit core strage	Gz/ak(sed), contact																			○		◎																						
41	3 TS 43	Salhit core strage	Qzv, wf?																			○		◎																						
42	3 TN 1	Tumurtiin-Ovoo	Skarn, gar, mgt, sp																			△		○																						
43	3 TS 14	Tumurtiin-Ovoo	Skarn, gar, sp, mgt																			○		◎																						
44	3 TS 15	Tumurtiin-Ovoo	Skarn, gar, sp, mgt																			△		◎																						
45	3 TS 16	Tumurtiin-Ovoo	Skarn, gar, sp, mgt																			△		◎																						
46	3 TS 17	Tumurtiin-Ovoo	Skarn, hem, mgt, sp																			○		◎																						
47	3 TS 24	Tumurtiin-Ovoo	Skarn, specul?																			○		◎																						
48	3 TS 30	Tumurtiin-Ovoo	Skarn, gar, sp																			○		◎																						
49	3 US 9	Mushgig-Budak	Apatite rock, martite																			○		◎																						
50	3 US 54	Olon-Ovoot	Qzv with visible Au																			○		◎																						
51	3 US 72	Olon-Ovoot	Chlorite, py cxd																			○		◎																						
52	3 US 80	Olon-Ovoot	Qzv																			○		◎																						

◎: Abundant ○: Common △: Poor * : Rare

Appendix 1-5 Results of Whole Rock Analyses

SAMPLE NO.	LOCALITY	ROCK NAME	SiO2 %	TiO2 %	Al2O3 %	Fe2O3 %	FeO %	MnO %	MgO %	CeO %	Na2O %	K2O %	P2O5 %	BaO %	CO2 %	LOI %	TOTAL %	+H2O %	-H2O %	MTBP, OIB, XF, FPGPCS, ASTLMWCBBDI	REMARKS
17	3 DM 17 Tsav	monodiorite	47.82	2.02	16.39	4.82	6.35	0.30	4.44	8.50	3.55	1.85	1.30	0.07	-	0.76	98.27	1.02	0.36	XXX	
18	3 DM 18 Tsav	granite porphyry	66.55	15.01	11.78	1.88	1.61	0.15	1.00	2.10	4.26	4.38	0.16	0.08	-	0.90	100.69	0.71	0.71	DDH, Habirgan capix	
19	3 DM 19 Tsav	granite, schistose	76.68	0.31	11.78	1.46	1.01	0.15	0.34	0.79	2.72	4.17	0.06	0.10	-	1.95	100.83	0.85	0.23	XXX	
20	3 DM 20 Tsav	alkali basalt	57.30	1.28	16.17	2.42	4.46	0.12	2.30	5.35	4.46	2.72	0.84	0.10	-	0.74	98.23	0.78	0.43	XXX	
21	3 DM 21 Tsav	nepheline basalt	55.52	1.41	15.89	6.95	1.41	0.12	2.50	5.52	4.46	2.72	0.84	0.10	-	0.96	99.00	0.92	0.50	XXX	
22	3 DM 22 Bayan-Uul	granite, schistose	70.09	0.50	16.22	1.41	0.34	0.04	0.32	0.63	5.83	2.80	0.07	0.09	-	1.73	100.98	1.46	0.85	XXX	
32	3 DM 32 Ulaan area	rhyolite	71.15	12.15	1.11	1.11	0.40	0.04	0.02	0.15	3.84	4.85	<0.01	0.01	-	0.95	98.96	0.98	0.48	XXX	
37	3 DM 37 Tsagaan-Chuluut Hud.	granite	73.13	0.20	13.82	1.13	0.45	0.04	0.38	0.88	4.30	4.39	0.08	0.11	-	0.53	99.44	0.59	0.12	XXX	
38	3 DM 38 Ulaan area	granite	76.33	0.13	13.34	0.65	0.20	0.01	<0.01	0.18	4.39	4.76	<0.01	0.08	-	0.66	100.74	0.55	0.23	XXX	
55	3 DS 16 Salhiit	meta-tonalite	66.38	0.53	14.12	2.56	1.55	0.05	1.57	3.53	4.02	2.15	0.15	0.04	<0.2	1.90	98.67	2.57	0.42	XXX	
59	3 DS 16 Ulaan	rhyolite	73.94	0.16	11.94	1.51	0.71	0.07	<0.01	0.08	1.75	5.93	<0.01	<0.01	-	0.94	99.05	0.53	0.21	XXX	
105	3 DY 4 Tsav	granite, schistose	70.85	0.26	15.35	0.77	0.57	0.06	0.43	1.17	3.01	5.46	0.04	0.08	0.5	2.11	100.74	1.76	1.00	XXX	
114	3 DY 13 Bayan-Uul	meta-dolerite	47.35	0.98	17.97	3.11	5.61	0.22	6.47	11.71	1.97	9.98	0.08	0.02	0.3	0.92	98.47	2.70	0.53	XXX	
116	3 DY 15 Tsagaan-Chuluut Hud.	monodiorite	58.84	0.89	15.54	2.28	4.15	0.11	4.87	6.11	3.74	3.08	0.24	0.08	-	0.85	100.76	0.82	0.25	XXX	
117	3 DY 16 Tsagaan-Chuluut Hud.	granite, porphyry	72.07	0.29	14.55	0.77	1.03	0.03	0.92	0.92	3.87	3.54	0.29	0.03	-	1.00	100.95	1.06	0.20	XXX	
118	3 DY 17 Tsagaan-Chuluut Hud.	monodiorite	51.35	0.87	15.57	4.28	4.71	0.17	6.10	6.51	3.22	2.20	0.15	0.10	<0.2	2.59	97.90	3.54	0.54	XXX	
120	3 DM 37 Tsagaan-Chuluut Hud.	meta-granite po	73.61	0.28	13.58	1.37	0.70	0.07	0.52	0.61	4.43	3.12	0.09	0.18	-	1.19	108.27	1.38	0.38	XXX	
139	3 HN 16 Bor-Uundur No. 11	meta-dolerite	74.92	0.27	14.60	1.21	0.59	0.16	0.12	0.05	2.09	2.65	0.10	0.03	<0.2	2.80	99.76	3.73	0.74	XXX	
144	3 HN 21 Adag No. 1	granophyre	77.76	0.12	12.39	0.81	0.26	0.02	<0.01	0.03	3.54	4.60	<0.01	<0.01	-	0.76	100.41	0.56	0.33	XXX	
177	3 NS 3 Yuguer	glaucous	80.00	0.04	9.72	0.83	0.85	0.27	0.21	0.89	0.80	4.14	0.08	<0.01	-	1.32	99.95	1.52	0.24	XXX	
186	3 RS 12 Yenir	granite, gneissized	75.66	0.02	13.51	0.44	2.33	0.20	0.05	0.13	3.77	2.21	<0.01	<0.01	-	0.99	100.13	0.55	0.26	XXX	
191	3 RS 2 Lugingol	hornfels, corundum	57.35	0.02	26.48	1.71	0.33	0.03	<0.01	1.62	6.44	4.80	<0.01	0.01	0.3	0.93	101.03	1.03	0.45	XXX	
192	3 RS 3 Lugingol	carbonatite	60.31	0.07	7.06	12.56	0.01	1.49	1.07	5.54	0.12	0.42	0.20	0.01	5.9	94.28	2.02	1.05	XXX		
193	3 RS 4 Lugingol	syenite	43.83	1.07	15.81	3.78	5.80	0.27	3.05	5.72	2.91	6.51	0.57	0.11	<0.2	1.54	98.38	1.76	0.37	XXX	
194	3 RS 6 Lugingol	syenite	43.89	2.53	14.72	11.35	2.53	0.34	1.02	4.37	2.85	3.44	0.22	0.11	0.5	1.33	92.53	2.77	0.51	XXX	
198	3 RS 9 Lugingol	nepheline syenite, fi	61.26	0.32	23.90	1.08	0.63	0.09	<0.01	1.51	6.74	9.32	<0.01	0.02	0.8	2.22	98.90	2.11	0.37	XXX	
203	3 RS 14 Lugingol	syenite	57.64	0.42	19.29	1.54	2.73	0.15	0.54	2.63	4.95	7.34	0.17	0.05	0.5	0.84	98.79	1.07	0.24	XXX	
204	3 RS 15 Lugingol	nepheline syenite	49.89	0.40	22.99	1.20	1.10	0.16	<0.01	1.98	10.38	7.19	<0.01	0.03	1.5	1.57	101.42	2.05	0.24	XXX	
214	3 SW 10 Tsagaan-suvraga	quartz monzonite	66.91	0.29	18.23	1.02	0.26	0.03	0.23	0.56	5.85	4.58	0.03	0.03	0.3	0.93	99.31	1.01	0.38	XXX	
225	3 SW 21 Tsagaan-suvraga	glaucous	71.89	0.23	13.54	0.05	2.11	0.01	0.25	1.02	0.48	6.07	<0.01	<0.01	0.5	2.35	100.25	2.00	0.23	XXX	
226	3 SW 22 Tsagaan-suvraga area	quartz monzonite	59.23	0.64	18.10	2.33	2.50	0.15	1.56	4.52	5.02	3.95	0.33	0.05	-	0.88	106.27	0.98	0.27	XXX	
233	3 SS 7 Tsagaan-suvraga area	keratophyre	64.38	0.74	16.30	2.89	0.38	0.11	1.08	0.73	6.76	2.95	0.20	0.08	0.3	2.95	98.73	2.40	1.06	XXX	
250	3 SS 24 Tsagaan-suvraga	quartz monzonite, Cu	64.01	0.78	18.01	<0.01	0.13	0.01	0.10	<0.01	6.20	9.82	0.02	0.11	-	0.70	101.26	0.55	0.31	XXX	
260	3 SS 34 Tsagaan-suvraga	keratophyre	74.16	0.19	14.64	0.94	0.20	0.06	0.24	0.14	4.21	4.82	0.05	0.14	<0.2	1.23	101.22	1.03	0.61	XXX	
313	3 P 3 Saita	granite	76.34	0.14	13.27	0.36	0.39	0.11	<0.01	0.23	3.95	4.81	<0.01	0.04	0.8	0.96	100.75	0.48	0.23	XXX	
350	3 TS 32 Saita	gabbro	47.73	1.89	15.68	4.14	6.32	0.26	6.28	7.31	2.95	1.60	0.16	0.04	-	2.25	97.42	3.93	0.81	XXX	
364	3 TY 4 Salhiit core strage	granite	72.55	0.38	14.27	1.16	0.88	0.13	0.39	1.12	4.58	4.15	0.06	0.07	-	1.67	101.29	0.96	0.30	XXX	
367	3 TY 1 Tsaurtiin-Ovoo area	granite, splitic	78.94	0.13	12.53	0.14	0.23	0.01	<0.01	0.15	3.74	5.14	<0.01	0.03	-	0.94	101.62	0.43	0.26	XXX	
372	3 UN 4 Tsaurtiin-Ovoo area	granite	76.43	0.19	12.97	0.61	0.29	0.05	0.07	0.18	3.74	5.30	<0.01	0.03	-	0.76	100.62	0.58	0.32	XXX	
373	3 UN 2 Olon-Ovoot area	gabbro, granite	77.70	0.17	12.36	1.49	0.41	0.03	0.27	<0.01	6.87	0.14	<0.01	<0.01	-	0.89	100.35	0.74	0.27	XXX	
374	3 UN 3 Mushgia-Hudak	granite	49.15	1.20	14.76	5.39	7.00	0.20	5.82	9.15	2.80	7.79	0.41	<0.2	2.56	98.35	3.67	0.41	XXX		
375	3 UN 4 Olon-Ovoot area	granite	73.04	0.50	13.79	1.85	0.29	0.04	0.23	0.55	3.28	5.22	0.11	<0.01	-	0.50	99.40	0.49	0.19	XXX	
376	3 UN 7 Mushgia-Hudak	granodiorite	68.77	0.63	15.11	0.98	2.70	0.06	0.41	1.53	3.89	3.59	0.04	-	0.55	97.86	0.50	0.20	XXX		
378	3 UN 11 Olon-Ovoot area	alkali granite	74.75	0.16	10.02	3.47	0.27	0.27	<0.01	<0.01	4.49	4.48	<0.01	0.01	-	0.99	98.51	0.23	0.21	XXX	
388	3 UN 19 Hombog	carbonatite, fi	41.72	<0.01	13.99	1.54	0.10	0.09	0.22	0.29	0.97	0.94	1.39	0.83	12.4	0.32	97.57	0.54	0.23	XXX	
410	3 US 19 Mushgia-Hudak	syenite	38.12	0.35	17.54	2.54	0.86	0.05	1.21	2.67	5.13	7.67	0.21	0.32	<0.2	1.99	98.45	0.67	0.49	XXX	
413	3 US 22 Mushgia-Hudak	gabbro	47.94	0.93	17.34	4.22	3.26	0.16	6.25	7.66	4.92	5.13	0.44	0.10	0.3	1.99	98.43	1.67	0.56	XXX	
415	3 US 24 Mushgia-Hudak	phonolite	51.27	1.06	17.11	4.22	3.07	0.10	3.07	5.12	8.27	1.28	0.28	0.2	1.73	98.78	1.86	0.39	XXX		
492	3 US101 Bayan-Hoshoo	monzonite, opt	55.83	1.29	16.24	3.91	1.30	0.11	3.07	4.56	5.12	5.01	0.88	0.4	1.15	99.23	0.54	0.43	XXX		
495	3 US104 Bayan-Hoshoo	monzonite, opt, fi	55.82	1.53	16.46	3.80	2.26	0.11	3.04	4.35	4.63	4.05	0.77	0.39	<0.2	0.95	98.16	0.48	0.40	XXX	
506	3 UY 5 Tsogt-Ovoo	granite	66.63	0.68	15.62	2.02	1.22	0.07	1.27	1.51	3.74	4.51	<0.01	0.08	-	1.53	98.89	1.57	0.42	XXX	

Appendix 1-6 (1) Chemical Compositions and CIPW Norms (1)

No.	1	2	3	4	5	6
SAMPLE No.	3 DN 17	3 DN 18	3 DN 19	3 DN 20	3 DN 21	3 DN 22
LOCALITY	Tsav	Tsav	Tsav	Tsav	Tsav	Bayan-Uul
ROCK NAME	Monzo- diorite	Granite porphyry	Schistose granite	Alkali basalt	Nepheline basalt	Schistose granite
SiO ₂	47.82	68.55	76.69	57.30	55.42	70.90
TiO ₂	2.02	0.68	0.31	1.38	1.47	0.50
Al ₂ O ₃	16.39	15.01	11.78	16.37	16.89	16.22
Fe ₂ O ₃	4.92	1.98	1.46	2.42	6.45	1.41
FeO	6.35	1.61	1.01	4.46	1.44	0.34
MnO	0.30	0.08	0.15	0.13	0.12	0.04
MgO	4.44	1.00	0.34	3.13	2.30	0.32
CaO	8.50	2.10	0.79	5.36	5.62	0.63
Na ₂ O	3.55	4.26	2.72	4.48	4.14	5.83
K ₂ O	1.85	4.38	4.17	2.72	3.50	2.90
P ₂ O ₅	1.30	0.16	0.06	0.64	0.59	0.07
H ₂ O ⁺	1.02	0.71	0.85	0.78	0.63	1.46
H ₂ O ⁻	0.36	0.28	0.22	0.43	0.50	0.65
BaO	0.07	0.08	0.10	0.10	0.08	0.09
Total	98.89	100.88	100.65	99.70	99.15	101.36
FeO*	10.78	3.39	2.32	6.64	7.24	1.61
FeO*/MgO	2.43	3.39	6.83	2.12	3.15	5.03
SOLIDIFY INDEX	21.53	7.67	3.56	18.44	13.38	3.00
CIPW NORM						
Q	0.00	21.38	42.61	5.82	5.58	24.25
C	0.00	0.00	1.43	0.00	0.00	2.55
or	10.93	25.88	24.64	16.07	20.68	17.14
ab	30.04	36.05	23.02	37.91	35.03	49.33
an	23.32	8.90	3.71	16.52	17.16	2.57
lc	0.00	0.00	0.00	0.00	0.00	0.00
ne	0.00	0.00	0.00	0.00	0.00	0.00
kp	0.00	0.00	0.00	0.00	0.00	0.00
ac	0.00	0.00	0.00	0.00	0.00	0.00
wo	0.00	0.00	0.00	0.00	0.00	0.00
di-wo	4.41	0.26	0.00	2.55	2.94	0.00
di-en	2.86	0.21	0.00	1.57	2.54	0.00
di-fs	1.25	0.03	0.00	0.84	0.00	0.00
hy-en	5.49	2.28	0.85	6.23	3.19	0.80
hy-fs	2.39	0.32	0.42	3.32	0.00	0.00
fo	1.89	0.00	0.00	0.00	0.00	0.00
fa	0.91	0.00	0.00	0.00	0.00	0.00
es	0.00	0.00	0.00	0.00	0.00	0.00
mt	7.14	2.87	2.11	3.51	0.77	0.00
hm	0.00	0.00	0.00	0.00	5.92	1.41
il	3.84	1.23	0.59	2.62	2.79	0.80
ru	0.00	0.00	0.00	0.00	0.00	0.00
ap	3.08	0.38	0.14	1.52	1.40	0.17
ΣFEMIC	33.26	7.64	4.11	22.15	19.55	3.18
D. I.	40.97	83.31	90.27	59.80	61.29	90.72
SERIES	TH	CA	TH	CA	TH	TH

*: Total Fe as FeO

Appendix 1-6 (2) Chemical Compositions and CIPW Norms (2)

No.	7	8	9	10	11	12
SAMPLE No.	3 DN 32	3 DN 37	3 DN 38	3 DS 12	3 DS 16	3 DY 4
LOCALITY	Ulaan area	Tsagaan- Chuluut Hud.	Ulaan area	Salhiit	Ulaan	Tsav
ROCK NAME	Rhyolite	Granite	Granite	Meta- tonalite	Rhyolite	Schistose granite
SiO ₂	76.09	73.13	76.33	66.38	73.84	70.85
TiO ₂	0.15	0.20	0.13	0.53	0.16	0.26
Al ₂ O ₃	12.15	13.82	13.34	14.12	11.94	15.35
Fe ₂ O ₃	1.11	1.13	0.65	2.56	1.61	0.77
FeO	0.40	0.45	0.20	1.65	0.71	0.57
MnO	0.04	0.04	0.01	0.06	0.07	0.06
MgO	0.02	0.38	0.01	1.67	0.01	0.43
CaO	0.15	0.88	0.18	3.53	0.08	1.17
Na ₂ O	3.04	4.30	4.39	4.02	3.75	3.01
K ₂ O	4.85	4.39	4.76	2.16	5.93	5.46
P ₂ O ₅	0.01	0.08	0.01	0.15	0.01	0.04
H ₂ O+	0.88	0.59	0.55	2.27	0.53	1.76
H ₂ O-	0.48	0.12	0.23	0.42	0.21	1.00
BaO	0.01	0.11	0.08	0.04	0.01	0.06
Total	99.37	99.62	100.86	99.56	98.85	100.79
FeO*	1.39	1.47	0.78	3.95	2.16	1.26
FeO*/MgO	69.71	3.86	156.62	2.37	431.92	2.93
SOLIDIFY INDEX	0.21	3.61	0.05	14.15	0.04	4.23
CIPW NORM						
Q	39.50	29.00	32.14	25.54	29.78	29.32
C	1.63	0.51	0.60	0.00	0.00	2.42
or	28.66	25.94	28.13	12.76	35.04	32.27
ab	25.72	36.39	37.15	34.02	28.40	25.47
an	0.73	4.05	1.01	14.10	0.00	5.65
lc	0.00	0.00	0.00	0.00	0.00	0.00
ne	0.00	0.00	0.00	0.00	0.00	0.00
kp	0.00	0.00	0.00	0.00	0.00	0.00
ac	0.00	0.00	0.00	0.00	2.94	0.00
wo	0.00	0.00	0.00	0.00	0.00	0.00
di-wo	0.00	0.00	0.00	1.05	0.00	0.00
di-en	0.00	0.00	0.00	0.88	0.00	0.00
di-fs	0.00	0.00	0.00	0.03	0.00	0.00
hy-en	0.05	0.95	0.01	3.28	0.01	1.07
hy-fs	0.00	0.00	0.00	0.12	0.68	0.10
fo	0.00	0.00	0.00	0.00	0.00	0.00
fa	0.00	0.00	0.00	0.00	0.00	0.00
cs	0.00	0.00	0.00	0.00	0.00	0.00
mt	0.98	1.00	0.30	3.71	0.86	1.11
hm	0.43	0.44	0.44	0.00	0.00	0.00
il	0.28	0.38	0.25	1.01	0.30	0.49
ru	0.00	0.00	0.00	0.00	0.00	0.00
ap	0.01	0.19	0.01	0.36	0.01	0.09
ΣFEMIC	1.76	2.96	1.01	10.43	4.81	2.87
D. I.	93.89	91.33	97.41	72.32	93.22	87.06
SERIES	TH	CA	TH	CA	TH	CA

*: Total Fe as FeO

Appendix 1-6 (3) Chemical Compositions and CIPW Norms (3)

No.	13	14	15	16	17	18
SAMPLE No.	3 DY 13	3 DY 15	3 DY 16	3 DY 17	3 DY 19	3 HN 16
LOCALITY	Bayan-Uul	Tsagaan- Chuluut Hud.	Tsagaan- Chuluut Hud.	Tsagaan- Chuluut Hud.	Tsagaan- Chuluut Hud.	Bor-Undur No. 11
ROCK NAME	Meta- dolerite	Monzo- diorite	Granite porphyry	Monzo- diorite	Meta-granite porphyry	Meta- dacite
SiO ₂	47.35	58.84	72.07	51.35	73.61	74.92
TiO ₂	0.98	0.89	0.29	0.87	0.28	0.27
Al ₂ O ₃	17.97	15.54	14.65	15.57	13.58	14.60
Fe ₂ O ₃	3.11	2.28	0.93	4.26	1.97	1.21
FeO	5.61	4.15	1.05	4.71	0.70	0.59
MnO	0.22	0.11	0.03	0.17	0.07	0.16
MgO	6.47	4.87	0.62	6.10	0.52	0.12
CaO	11.71	6.11	0.83	6.51	0.61	0.05
Na ₂ O	1.97	3.74	3.87	3.22	4.43	2.09
K ₂ O	0.98	3.08	5.34	2.20	3.12	2.66
P ₂ O ₅	0.08	0.24	0.08	0.15	0.09	0.10
H ₂ O ⁺	2.70	0.82	1.06	3.34	1.38	3.73
H ₂ O ⁻	0.53	0.25	0.26	0.54	0.38	0.74
BaO	0.02	0.06	0.09	0.10	0.10	0.09
Total	99.70	100.98	101.17	99.09	100.84	101.33
FeO*	8.40	6.20	1.89	8.54	2.47	1.68
FeO*/MgO	1.30	1.27	3.05	1.40	4.76	14.02
SOLIDIFY INDEX	36.30	27.22	5.29	30.41	4.93	1.83
CIPW NORM						
Q	0.00	6.20	26.24	1.82	33.99	52.51
C	0.00	0.00	1.12	0.00	1.95	8.37
or	5.79	18.20	31.56	13.00	18.44	15.72
ab	16.67	31.65	32.75	27.25	37.49	17.68
an	37.29	16.52	3.76	21.53	2.63	0.00
lc	0.00	0.00	0.00	0.00	0.00	0.00
ne	0.00	0.00	0.00	0.00	0.00	0.00
kp	0.00	0.00	0.00	0.00	0.00	0.00
ac	0.00	0.00	0.00	0.00	0.00	0.00
wo	0.00	0.00	0.00	0.00	0.00	0.00
di-wo	8.48	5.16	0.00	4.17	0.00	0.00
di-en	5.60	3.48	0.00	3.00	0.00	0.00
di-fs	2.27	1.28	0.00	0.79	0.00	0.00
hy-en	8.02	8.65	1.54	12.20	1.30	0.30
hy-fs	3.25	3.19	0.73	3.22	0.00	0.00
fo	1.74	0.00	0.00	0.00	0.00	0.00
fa	0.78	0.00	0.00	0.00	0.00	0.00
cs	0.00	0.00	0.00	0.00	0.00	0.00
mt	4.50	3.30	1.35	6.17	1.67	1.64
hm	0.00	0.00	0.00	0.00	0.82	0.08
il	1.86	1.69	0.55	1.65	0.53	0.51
ru	0.00	0.00	0.00	0.00	0.00	0.00
ap	0.19	0.57	0.19	0.36	0.21	0.24
Σ FEMIC	36.70	27.32	4.37	31.55	4.53	2.77
D. I.	22.46	56.05	90.54	42.07	89.92	85.91
SERIES	TH	CA	CA	TH	CA	TH

*: Total Fe as FeO

Appendix 1-6 (4) Chemical Compositions and CIPW Norms (4)

No.	19	20	21	22	23	24
SAMPLE No.	3 HN 21	3 NS 3	3 NS 12	3 RS 2	3 RS 3	3 RS 4
LOCALITY	Adag No. 1	Yuguzer	Tsentr	Lugiingol	Lugiingol	Lugiingol
ROCK NAME	Granophyre	Greisen	Granite, greisenized	Hornfels	Carbonatite	Syenite
SiO ₂	77.76	80.00	76.66	57.35	60.31	49.83
TiO ₂	0.12	0.04	0.02	0.02	0.77	1.07
Al ₂ O ₃	12.39	9.72	13.31	26.48	2.06	16.81
Fe ₂ O ₃	0.91	0.93	0.44	1.71	12.66	3.78
FeO	0.26	0.85	2.32	0.33	0.01	5.80
MnO	0.02	0.37	0.20	0.03	1.49	0.27
MgO	0.01	0.21	0.05	0.01	1.07	3.05
CaO	0.03	0.89	0.53	1.62	5.64	5.72
Na ₂ O	3.54	0.80	3.37	6.84	0.12	3.50
K ₂ O	4.60	4.14	2.23	4.80	0.42	6.51
P ₂ O ₅	0.01	0.08	0.01	0.01	0.20	0.57
H ₂ O ⁺	0.56	1.52	0.65	1.03	3.02	1.76
H ₂ O ⁻	0.33	0.24	0.26	0.45	1.06	0.37
BaO	0.01	0.01	0.01	0.01	0.01	0.11
Total	100.54	99.79	100.05	100.68	88.84	99.15
FeO*	1.08	1.68	2.72	1.87	11.40	9.20
FeO*/MgO	215.95	8.01	54.35	374.28	10.65	3.02
SOLIDIFY INDEX	0.05	3.07	0.60	0.04	8.22	13.70
CIPW NORM						
Q	39.50	56.86	45.40	0.00	49.81	0.00
C	1.54	2.49	4.40	7.09	0.00	0.00
or	27.18	24.47	13.18	28.37	2.48	38.47
ab	29.95	6.77	28.52	48.56	1.02	11.32
an	0.13	3.91	2.61	8.01	3.84	10.93
lc	0.00	0.00	0.00	0.00	0.00	0.00
ne	0.00	0.00	0.00	5.05	0.00	9.91
kp	0.00	0.00	0.00	0.00	0.00	0.00
ac	0.00	0.00	0.00	0.00	0.00	0.00
wo	0.00	0.00	0.00	0.00	6.46	0.00
di-wo	0.00	0.00	0.00	0.00	3.08	5.83
di-en	0.00	0.00	0.00	0.00	8.25	3.10
di-fs	0.00	0.00	0.00	0.00	0.00	2.55
hy-en	0.01	0.52	0.12	0.00	0.00	0.00
hy-fs	0.00	1.42	4.23	0.00	0.00	0.00
fo	0.00	0.00	0.00	0.01	0.00	3.15
fa	0.00	0.00	0.00	0.00	0.00	2.86
cs	0.00	0.00	0.00	0.00	0.00	0.00
mt	0.56	1.34	0.64	1.10	2.66	5.49
hm	0.53	0.00	0.00	0.95	10.82	0.00
il	0.23	0.08	0.04	0.04	1.46	2.03
ru	0.00	0.00	0.00	0.00	0.00	0.00
ap	0.01	0.19	0.01	0.01	0.47	1.35
ΣFEMIC	1.34	3.55	5.05	2.11	27.63	26.36
D. I.	96.64	88.09	87.09	81.97	53.31	59.70
SERIES	TH	TH	TH	TH	TH	TH

*: Total Fe as FeO

Appendix 1-6 (5) Chemical Compositions and CIPW Norms (5)

No.	25	26	27	28	29	30
SAMPLE No.	3 RS 6	3 RS 9	3 RS 14	3 RS 15	3 SN 10	3 SN 21
LOCALITY	Lugiingol	Lugiingol	Lugiingol	Lugiingol	Tsagaan-suvraga	Tsagaan-suvraga
ROCK NAME	Syenite	Nepheline syenite	Syenite	Nepheline syenite	Quartz monzonite	Greisen
SiO ₂	43.80	51.26	57.64	49.89	66.91	71.89
TiO ₂	2.55	0.32	0.42	0.40	0.29	0.23
Al ₂ O ₃	12.72	23.90	19.29	22.99	18.23	13.54
Fe ₂ O ₃	11.35	1.08	1.54	1.20	1.02	0.05
FeO	2.59	0.63	2.73	1.10	0.26	2.11
MnO	0.54	0.09	0.15	0.16	0.03	0.01
MgO	1.02	0.01	0.54	0.01	0.23	0.25
CaO	14.37	1.51	2.63	1.98	0.56	1.02
Na ₂ O	2.85	8.74	4.95	10.38	5.85	0.48
K ₂ O	4.44	9.32	7.34	7.19	4.58	6.07
P ₂ O ₅	0.22	0.01	0.17	0.01	0.03	0.01
H ₂ O ⁺	2.17	2.11	1.07	2.05	1.01	2.00
H ₂ O ⁻	0.41	0.37	0.24	0.24	0.38	0.25
BaO	0.11	0.02	0.05	0.03	0.09	0.05
Total	99.14	99.36	98.76	97.62	99.47	97.95
FeO*	12.80	1.60	4.11	2.18	1.18	2.15
FeO*/MgO	12.55	320.36	7.62	435.60	5.12	8.60
SOLIDIFY INDEX	4.83	0.03	3.19	0.03	1.94	2.79
CIPW NORM						
Q	0.00	0.00	0.00	0.00	13.82	41.70
C	0.00	0.00	0.00	0.00	2.64	4.30
or	26.24	45.02	43.38	42.49	27.07	35.87
ab	5.95	0.00	30.43	3.52	49.50	4.06
an	8.80	0.00	8.74	0.00	2.75	5.12
lc	0.00	7.89	0.00	0.00	0.00	0.00
ne	9.84	38.49	6.20	40.46	0.00	0.00
kp	0.00	0.00	0.00	0.00	0.00	0.00
ac	0.00	2.57	0.00	3.47	0.00	0.00
wo	22.64	0.00	0.00	0.00	0.00	0.00
di-wo	2.94	0.00	1.38	0.00	0.00	0.00
di-en	22.11	0.00	0.41	0.00	0.00	0.00
di-fs	0.00	0.00	1.02	0.00	0.00	0.00
hy-en	0.00	0.00	0.00	0.00	0.57	0.62
hy-fs	0.00	0.00	0.00	0.00	0.00	3.48
fo	0.00	0.01	0.65	0.01	0.00	0.00
fa	0.00	0.49	1.78	1.28	0.00	0.00
cs	0.00	0.00	0.00	0.00	0.00	0.00
mt	2.72	0.28	2.23	0.00	0.10	0.07
hm	9.48	0.00	0.00	0.00	0.96	0.00
il	4.84	0.61	0.80	0.76	0.55	0.44
ru	0.00	0.00	0.00	0.00	0.00	0.00
ap	0.52	0.01	0.40	0.01	0.07	0.01
ΣFEMIC	45.68	3.97	8.68	5.53	2.25	4.61
D. I.	42.03	91.39	80.01	86.48	90.39	81.63
SERIES	TH	TH	TH	TH	TH	TH

*: Total Fe as FeO

Appendix I-6 (6) Chemical Compositions and CIPW Norms (6)

No.	31	32	33	34	35	36
SAMPLE No.	3 SN 22	3 SS 7	3 SS 24	3 SS 34	3 TN 3	3 TS 32
LOCALITY	Tsagaan-suvraga area	Tsagaan-suvraga	Tsagaan-suvraga	Tsagaan-suvraga	Salaa	Salaa
ROCK NAME	Quartz monzonite	Keratophyre	Quartz monzonite	Keratophyre	Granite	Gabbro
SiO ₂	59.23	64.38	69.01	74.16	76.34	47.73
TiO ₂	0.64	0.74	0.28	0.19	0.14	1.69
Al ₂ O ₃	18.10	16.30	18.01	14.64	13.27	15.88
Fe ₂ O ₃	2.93	3.99	0.01	0.94	0.36	4.14
FeO	2.50	0.36	0.13	0.20	0.50	6.32
MnO	0.15	0.11	0.01	0.06	0.11	0.26
MgO	1.96	1.06	0.10	0.24	0.01	6.29
CaO	4.52	0.73	0.01	0.14	0.23	7.31
Na ₂ O	5.02	6.76	3.20	4.31	3.96	2.95
K ₂ O	3.96	2.37	9.82	4.82	4.81	1.60
P ₂ O ₅	0.33	0.20	0.02	0.05	0.01	0.16
H ₂ O ⁺	0.98	2.40	0.55	1.03	0.48	3.03
H ₂ O ⁻	0.27	1.06	0.31	0.61	0.23	0.81
BaO	0.05	0.08	0.11	0.14	0.06	0.04
Total	100.64	100.54	101.57	101.53	100.50	98.21
FeO*	5.14	3.95	0.14	1.04	0.83	10.04
FeO*/MgO	2.62	3.73	1.39	4.35	165.51	1.60
SOLIDIFY INDEX	12.19	7.50	0.75	2.30	0.05	30.12
CIPW NORM						
Q	3.64	13.50	12.64	30.02	34.10	0.00
C	0.00	1.98	2.12	2.10	1.10	0.00
or	23.40	14.01	58.03	28.48	28.43	9.46
ab	42.48	57.20	27.08	36.47	33.51	24.96
an	15.16	1.72	0.00	0.63	1.22	25.36
lc	0.00	0.00	0.00	0.00	0.00	0.00
ne	0.00	0.00	0.00	0.00	0.00	0.00
kp	0.00	0.00	0.00	0.00	0.00	0.00
ac	0.00	0.00	0.00	0.00	0.00	0.00
wo	0.00	0.00	0.00	0.00	0.00	0.00
di-wo	2.18	0.00	0.00	0.00	0.00	4.15
di-en	1.55	0.00	0.00	0.00	0.00	2.79
di-fs	0.44	0.00	0.00	0.00	0.00	1.05
hy-en	3.33	2.64	0.25	0.60	0.01	11.03
hy-fs	0.95	0.00	0.00	0.00	0.59	4.14
fo	0.00	0.00	0.00	0.00	0.00	1.29
fa	0.00	0.00	0.00	0.00	0.00	0.53
cs	0.00	0.00	0.00	0.00	0.00	0.00
mt	4.25	0.00	0.00	0.29	0.53	6.00
hm	0.00	3.99	0.01	0.74	0.00	0.00
il	1.22	1.00	0.30	0.36	0.27	3.21
ru	0.00	0.00	0.10	0.00	0.00	0.00
ap	0.78	0.47	0.05	0.12	0.01	0.38
Σ FEMIC	14.70	8.10	0.70	2.10	1.41	34.57
D. I.	69.52	84.71	97.75	94.97	96.03	34.42
SERIES	TH	TH	CA	CA	TH	TH

*: Total Fe as FeO

Appendix 1-6 (7) Chemical Compositions and CIPW Norms (7)

No.	37	38	39	40	41	42
SAMPLE No.	3 TS 42	3 TY 1	3 TY 4	3 UN 1	3 UN 2	3 UN 3
LOCALITY	Salhiit core strage	Tumurtiin- Ovoo area	Tumurtiin- Ovoo area	Olon-Ovoot area	Olon-Ovoot area	Mushgia- Hudak
ROCK NAME	Granite	Granite, aplitic	Granite	Graphic granite	Gabbro	Granite
SiO ₂	72.55	78.94	76.43	77.70	46.15	73.04
TiO ₂	0.39	0.13	0.19	0.17	1.20	0.50
Al ₂ O ₃	14.27	12.53	12.97	12.36	14.76	13.79
Fe ₂ O ₃	1.16	0.14	0.61	1.49	5.39	1.85
FeO	0.88	0.23	0.29	0.41	7.00	0.29
MnO	0.13	0.01	0.05	0.03	0.20	0.04
MgO	0.39	0.01	0.07	0.27	5.82	0.23
CaO	1.12	0.15	0.18	0.01	9.15	0.55
Na ₂ O	4.58	3.34	3.74	6.87	2.80	3.28
K ₂ O	4.15	5.14	5.30	0.14	0.79	5.22
P ₂ O ₅	0.06	0.01	0.01	0.01	0.41	0.11
H ₂ O+	0.86	0.49	0.58	0.74	3.67	0.49
H ₂ O-	0.30	0.26	0.32	0.27	0.41	0.19
BaO	0.07	0.03	0.03	0.01	0.02	0.01
Total	100.91	101.40	100.76	100.47	99.77	99.58
FeO*	1.93	0.36	0.84	1.75	11.85	1.95
FeO*/MgO	4.94	71.91	11.96	6.50	2.04	8.49
SOLIDIFY	3.53	0.06	0.70	2.99	27.37	2.15
INDEX						
CIPW NORM						
Q	27.04	39.45	33.89	36.80	2.35	32.87
C	0.30	1.19	0.75	0.91	0.00	2.17
or	24.52	30.38	31.32	0.83	4.67	30.85
ab	38.75	28.26	31.65	58.13	23.69	27.75
an	5.30	0.77	0.92	0.00	25.37	1.56
lc	0.00	0.00	0.00	0.00	0.00	0.00
ne	0.00	0.00	0.00	0.00	0.00	0.00
kp	0.00	0.00	0.00	0.00	0.00	0.00
ac	0.00	0.00	0.00	0.00	0.00	0.00
wo	0.00	0.00	0.00	0.00	0.00	0.00
di-wo	0.00	0.00	0.00	0.00	7.27	0.00
di-en	0.00	0.00	0.00	0.00	4.63	0.00
di-fs	0.00	0.00	0.00	0.00	2.17	0.00
hy-en	0.97	0.01	0.17	0.67	9.87	0.57
hy-fs	0.25	0.11	0.00	0.00	4.62	0.00
fo	0.30	0.00	0.00	0.00	0.00	0.00
fa	0.00	0.00	0.00	0.00	0.00	0.00
cs	0.00	0.00	0.00	0.00	0.00	0.00
mt	1.68	0.21	0.55	0.93	7.82	0.00
hm	0.00	0.00	0.23	0.86	0.00	1.85
il	0.74	0.25	0.36	0.32	2.28	0.70
ru	0.00	0.00	0.00	0.00	0.00	0.00
ap	0.14	0.01	0.01	0.01	0.97	0.26
ΣFEMIC	3.79	0.59	1.32	2.79	39.62	3.38
D. I.	90.32	98.09	96.86	95.76	30.71	91.47
SERIES	TH	TH	TH	TH	TH	TH

*: Total Fe as FeO

Appendix 1-6 (8) Chemical Compositions and CIPW Norms (8)

No.	43	44	45	46	47	48
SAMPLE No.	3 UN 4	3 UN 7	3 UN 18	3 US 19	3 US 22	3 US 24
LOCALITY	Olon-Ovoot area	Hanbogd	Mushgia-Hudak	Mushgia-Hudak	Mushgia-Hudak	Mushgia-Hudak
ROCK NAME	Grano-diorite	Alkali granite	Carbonatite	Syenite	Gabbro	Phonolite
SiO ₂	68.77	74.75	1.72	58.12	47.94	51.27
TiO ₂	0.63	0.16	0.01	0.95	2.03	1.06
Al ₂ O ₃	15.11	10.02	0.18	17.54	17.34	17.11
Fe ₂ O ₃	0.38	3.47	1.23	2.54	5.67	4.22
FeO	2.70	0.27	0.10	0.85	3.26	2.33
MnO	0.06	0.27	0.09	0.05	0.16	0.10
MgO	0.41	0.01	0.22	1.21	6.25	3.07
CaO	1.53	0.01	64.39	2.67	7.66	5.70
Na ₂ O	3.99	4.79	0.37	5.13	4.58	3.65
K ₂ O	3.69	4.46	0.02	7.67	0.92	6.27
P ₂ O ₅	0.01	0.01	1.38	0.21	0.44	1.28
H ₂ O ⁺	0.50	0.23	0.54	0.67	1.67	1.86
H ₂ O ⁻	0.20	0.21	0.27	0.49	0.58	0.39
BaO	0.04	0.01	3.85	0.32	0.10	0.79
Total	98.01	98.66	74.36	98.42	98.60	99.10
FeO*	3.04	3.39	1.21	3.13	8.36	6.13
FeO*/MgO	7.42	678.47	5.48	2.59	1.34	2.00
SOLIDIFY INDEX	3.68	0.04	12.12	7.06	31.08	16.06
CIPW NORM						
Q	25.84	33.48	0.00	0.00	0.00	0.00
C	1.76	0.00	0.00	0.00	0.00	0.00
or	21.81	26.36	0.12	45.33	5.44	37.05
ab	33.76	26.71	0.50	30.23	36.74	21.15
an	7.63	0.00	0.00	2.18	24.04	11.78
lc	0.00	0.00	0.00	0.00	0.00	0.00
ne	0.00	0.00	0.17	7.14	1.09	5.27
kp	0.00	0.00	0.00	0.00	0.00	0.00
ac	0.00	10.04	2.04	0.00	0.00	0.00
wo	0.00	0.00	0.00	0.81	0.00	0.00
di-wo	0.00	0.00	0.00	3.49	4.72	4.03
di-en	0.00	0.00	0.00	3.71	4.08	3.48
di-fs	0.00	0.00	0.00	0.00	0.00	0.00
hy-en	1.02	0.01	0.00	0.00	0.00	0.00
hy-fs	3.72	0.73	0.00	0.00	0.00	0.00
fo	0.00	0.00	0.38	0.00	8.05	2.92
fa	0.00	0.00	0.00	0.00	0.00	0.00
cs	0.00	0.00	0.00	0.00	0.00	0.00
mt	0.55	0.00	0.60	6.15	5.14	4.76
hm	0.00	0.00	0.11	2.43	2.12	0.94
il	1.20	0.30	0.01	1.80	3.86	2.01
ru	0.00	0.00	0.00	0.00	0.00	0.00
ap	0.01	0.01	3.27	0.50	1.04	3.03
ΣFEMIC	6.50	11.10	6.41	12.19	29.01	21.17
D. I.	81.41	86.54	0.79	82.69	43.27	63.48
SERIES	TH	TH	TH	TH	TH	TH

*: Total Fe as FeO

Appendix 1-6 (9) Chemical Compositions and CIPW Norms (9)

No.	49	50	51
SAMPLE No.	3 US101	3 US104	3 UY 5
LOCALITY	Bayan-Hoshoo	Bayan-Hoshoo	Tsogt-Ovoo
ROCK NAME	Monzonite	Monzonite	Granite
SiO2	55.83	55.82	66.63
TiO2	1.29	1.53	0.88
Al2O3	16.24	16.46	15.62
Fe2O3	3.91	3.80	2.02
FeO	1.30	2.26	1.22
MnO	0.11	0.11	0.07
MgO	3.07	3.04	1.27
CaO	4.56	4.35	1.31
Na2O	5.12	4.63	3.74
K2O	5.01	4.05	4.51
P2O5	0.88	0.77	0.01
H2O+	0.54	0.48	1.57
H2O-	0.43	0.40	0.42
BaO	0.36	0.29	0.08
Total	98.65	97.99	99.35
FeO*	4.81	5.68	3.04
FeO*/MgO	1.57	1.87	2.39
SOLIDIFY INDEX	17.04	17.47	10.11
CIPW NORM			
Q	0.00	2.53	22.87
C	0.00	0.00	2.16
or	29.61	23.93	26.65
ab	39.36	39.18	31.65
an	6.53	12.17	6.61
lc	0.00	0.00	0.00
ne	2.15	0.00	0.00
kp	0.00	0.00	0.00
ac	0.00	0.00	0.00
wo	0.00	0.00	0.00
di-wo	4.61	2.07	0.00
di-en	3.99	1.79	0.00
di-fs	0.00	0.00	0.00
hy-en	0.00	5.78	3.16
hy-fs	0.00	0.00	0.00
fo	2.56	0.00	0.00
fa	0.00	0.00	0.00
cs	0.00	0.00	0.00
mt	0.81	3.21	1.61
hm	3.35	1.59	0.91
il	2.45	2.91	1.67
ru	0.00	0.00	0.00
ap	2.08	1.82	0.01
ΣFEMIC	19.86	19.17	7.37
D. I.	71.12	65.64	81.17
SERIES	CA	CA	CA

*: Total Fe as FeO

Appendix 1-7 (1) Assay Results (Polymetallic Vein, Skarn) (1)

SAMPLE No.	LOCALITY	ROCK NAME	Cu %	Pb %	Zn %	Ag g/t	Au g/t	Mo %	W ppm	WTPD: ORE XF FPGPCS ASTLIMVGBRDI	REMARKS
4	3 DN 4 Tsav	Pb-Zn ore	0.050	1.190	1.300	27.5	0.190	0.001	15	X	No. 14shaft pile
5	3 DN 5 Tsav	Pb-Zn ore	0.070	0.930	1.500	20.5	0.295	0.001	50	X	No. 14shaft pile
6	3 DN 6 Tsav	Pb-Zn ore	0.310	1.980	2.010	41.8	0.315	0.003	20	X	No. 14shaft pile
7	3 DN 7 Tsav	Pb-Zn ore	0.070	1.260	0.980	66.0	0.320	<0.001	7	X	No. 14shaft pile
8	3 DN 8 Tsav	Pb-Zn ore	0.080	1.250	2.600	27.9	0.510	0.001	7	X	No. 14shaft pile
10	3 DN 10 Tsav	qz, ccp, gn	8.310	3.880	0.120	473.0	0.800	<0.001	2	X	No. 14shaft pile
11	3 DN 11 Tsav	qz, Mn-cbt, py, gn	0.340	0.590	0.290	28.3	3.420	0.002	4	X	No. 14shaft pile
13	3 DN 13 Tsav	Pb-Zn ore, Mn-cbnt	0.180	9.600	15.100	2,850.0	0.150	0.001	4	X	No. 15shaft pile
14	3 DN 14 Tsav	Pb-Zn ore, Mn-cbnt	0.070	2.180	10.400	848.0	0.215	<0.001	<2	X	No. 15shaft pile
15	3 DN 15 Tsav	Pb-Zn ore, Mn-cbnt, Ag	0.070	9.010	8.670	1,400.0	0.065	0.001	85	X	No. 15shaft pile
16	3 DN 16 Tsav	Pb-Zn ore, calamine	0.130	11.300	12.700	3,210.0	0.095	0.002	9	X	No. 15shaft pile
26	3 DN 26 Deiger-Munh	15cm, qzv	0.028	0.193	0.432	1.5	<0.016	0.001	15	X	
27	3 DN 27 Deiger-Munh	1.2m, Pb ore, qzv-ntwk	0.023	2.760	0.463	123.5	0.233	<0.001	5	X	waste pile
39	3 DN 39 Ulaan	rhyolite, carb-fl	0.140	7.260	16.400	133.0	2.840	0.003	8	XGX	waste pile
40	3 DN 40 Ulaan	skarn, ep, sp	0.240	1.700	8.320	130.0	0.205	0.001	60	X	No. 4trench
44	3 DS 1 Tsav	galena rich ore	0.120	76.700	0.060	1,030.0	1.300	<0.001	<2	G	No. 4trench
45	3 DS 2 Tsav	oxd, gn, mal, cerussite	0.780	59.000	0.240	858.0	13.100	0.001	<2	X	No. 4trench
46	3 DS 3 Tsav	oxd, gn, sp, qz	0.240	3.520	0.520	51.3	0.605	<0.001	<2	X	No. 4trench
47	3 DS 4 Tsav	qz, gn, ccp, py, grnCu	0.620	7.280	0.050	201.0	49.400	<0.001	<2	X	No. 4trench
48	3 DS 5 Tsav	galena rich ore, ccp	6.600	48.500	2.510	1,330.0	1.440	0.008	<2	GK	No. 14shaft pile
49	3 DS 6 Tsav	1m v, oxd, MnO2, Ag	0.013	1.270	1.260	706.0	0.120	0.020	20	X	No. 8trench
51	3 DS 8 Tsav	oxd, Pb, Zn ore	0.010	0.180	0.140	3.0	0.060	<0.001	6	X	No. 8trench
52	3 DS 9 Tsav	qzv10cm, oxd, Pb, Zn	0.050	0.870	0.180	52.8	0.070	0.003	8	X	No. 11trench
53	3 DS 10 Tsav	carbonate-opaq-qz v	0.100	7.850	26.800	2,100.0	0.105	0.001	2	X	No. 15shaft tunnel
54	3 DS 11 Saihit	qz, csg	0.011	0.590	0.039	20.0	0.047	<0.001	3	X	
56	3 DS 13 Deiger-Munh	ntwk10cm, wht carb	0.004	0.176	0.014	2.5	0.047	<0.001	<2	X	
57	3 DS 14 Deiger-Munh	sil bre-zone 30cm	0.004	0.956	0.181	20.0	0.175	<0.001	2	X	
58	3 DS 15 Ulaan	bre, sp, py, fl, qz	0.100	1.520	10.100	53.0	0.695	0.006	5	X	
60	3 DS 17 Ulaan	skarn, gar-act-bt-ep	<0.010	1.430	0.500	37.8	0.200	<0.001	25	X	
63	3 DS 20 Ulaan	galena, act, py, sp	0.008	0.553	0.724	14.0	0.185	0.001	85	X	proptic
64	3 DS 21 Ulaan	galena, act, py, sp	0.009	0.812	0.787	58.0	0.115	0.001	80	X	stock pile
65	3 DS 22 Ulaan	py, qz, sp	0.031	1.130	2.340	20.0	0.190	0.001	17	X	stock pile
66	3 DS 23 Ulaan	py, qz, sp	0.024	1.470	2.260	28.0	0.325	0.004	200	X	stock pile
67	3 DS 24 Ulaan	galena, act, py, sp, qz	0.007	0.691	0.858	12.0	0.025	<0.001	12	X	qz, stock pile
68	3 DS 25 Ulaan	skarn, ep-act	0.005	0.584	1.035	14.0	0.035	<0.001	10	X	stock pile
69	3 DS 26 Ulaan	skarn ep-act, py	0.009	0.708	0.509	32.0	0.685	0.004	18	X	stock pile
70	3 DS 27 Ulaan	galena, act, py, sp, qz	0.010	0.716	0.931	16.0	0.195	<0.001	15	X	qz, stock pile
71	3 DS 28 Ulaan	galena, act, py, sp, qz	0.009	0.595	0.821	14.0	0.125	0.001	40	X	qz, stock pile
72	3 DS 29 Ulaan	skarn ep-act, py	0.007	0.946	0.808	22.0	0.245	<0.001	3	X	stock pile
73	3 DS 30 Ulaan	qz, epidote	0.007	0.326	0.094	100.0	0.285	<0.001	5	X	stock pile
74	3 DS 31 Ulaan	rhyolite, sp, py	0.008	0.462	0.450	14.0	0.060	<0.001	6	X	stock pile
75	3 DS 32 Ulaan	rhyolite, sil, sp, py	0.047	2.580	4.720	88.0	1.410	<0.001	3	X	qz, stock pile
76	3 DS 33 Ulaan	rhyolite, sil, sp, py	0.052	0.377	12.700	18.0	0.235	<0.001	320	X	qz, stock pile
77	3 DS 34 Ulaan	rh, bre, sp, py, act	0.002	0.366	0.502	4.0	0.050	<0.001	65	X	stock pile
78	3 DS 35 Ulaan	strong oxd ore	0.006	0.653	0.414	20.0	0.085	0.001	12	X	stock pile

Appendix 1-7 (2) Assay Results (Polymetallic Vein, Skarn) (2)

SAMPLE No.	LOCALITY	ROCK NAME	Cu %	Pb %	Zn %	Ag g/t	Au g/t	Mo %	W ppm	WTDPL ORE XF		REMARKS
										FP	GCFS	
										ASTL	MVGBRDI	
79	Ulaan	oxd, act, ep, py, qz	0.007	0.389	0.357	6.0	0.065	0.002	16	X	X	
80	Ulaan	hematite rich ore	0.001	0.025	0.403	<2.0	<0.005	<0.001	2	X	X	
81	Ulaan	oxd, bre, Mn	0.001	0.018	0.434	<2.0	<0.005	<0.001	2	X	X	
82	Ulaan	oxd, hem	0.005	0.217	0.101	2.0	<0.005	<0.001	<2	X	X	
84	Ulaan	galena rich ore	0.030	77.400	0.300	1.970.0	0.195	<0.001	<2	X	X	
85	Ulaan	qz, drusy	0.028	0.867	0.122	22.0	0.050	0.002	<2	X	X	
102	Tsav	Pb-Zn ore	0.900	62.400	0.060	958.0	0.460	0.009	<2	X	X	No. 4trench
103	Tsav	Pb-Zn ore	0.530	6.830	27.800	231.0	1.200	0.013	2	X	X	No. 14shaft pile
104	Tsav	Pb-Zn ore	0.970	46.600	5.390	537.0	2.780	0.002	140	GX	X	No. 14shaft pile
106	Sahtit	qzv	0.049	0.707	0.053	41.5	0.078	<0.001	2	X	X	
107	Sahtit	qzv, oxd	0.028	0.345	0.054	41.5	0.062	0.001	300	X	X	
108	Bayan-Uul	qzv, oxd	0.014	0.158	0.042	37.0	3.188	0.004	5	X	X	
109	Bayan-Uul	qzv, oxd	0.011	0.054	0.013	78.0	0.016	0.007	200	X	X	
110	Bayan-Uul	qzv, oxd	0.014	0.199	0.018	49.0	0.482	0.001	15	X	X	
111	Bayan-Uul	qzv, oxd	0.009	0.075	0.012	24.0	0.047	0.002	7	X	X	
112	Bayan-Uul	qzv, oxd	0.008	0.024	0.009	12.5	0.109	0.002	8	X	X	
113	Bayan-Uul	qzv, oxd	0.007	0.034	0.008	12.0	0.109	0.003	6	X	X	
175	Yuguzer	greisen, fl	0.005	0.006	0.086	0.5	<0.016	0.041	1,110	X	X	
176	Yuguzer	greisen, mica, mo	0.004	0.001	0.004	<0.5	<0.016	0.001	2	X	X	
177	Yuguzer	greisen	0.002	0.056	0.042	3.0	<0.016	1.060	3,170	XX	X	
178	Yuguzer	greisen	0.001	<0.001	0.004	2.0	0.031	1.870	30	X	X	
180	Yuguzer	oxide ore	0.218	0.126	0.312	26.0	0.015	0.027	850	X	X	
181	Yuguzer	qzv, ccp, py, gn, mo	0.435	0.561	0.030	60.0	0.030	0.015	1,000	X	X	
182	Yuguzer	qzv, wf, mo	0.004	0.087	0.008	44.5	0.016	0.704	16,180	X	X	
183	Yuguzer	qzv, mo, weathered	0.013	0.267	0.165	14.5	<0.016	5.300	300	X	X	
184	Tsentr	qz, wf	0.002	0.004	0.013	3.0	0.031	0.025	38,860	X	X	
188	Nuhutiin-Tsagaantoig	qz, wf	0.012	0.202	0.003	30.5	<0.016	0.01	1,740	X	X	
311	Tumurtiin-Ovoo	skarn, gar, mgt, sp	<0.010	0.420	0.270	15.0	0.010	0.018	2,140	X	X	
314	Sahtit core strage	skarn, gar	0.001	0.100	0.143	4.0	<0.005	0.015	350	X	X	
315	Sahtit core strage	skarn, gar, sp	0.020	0.570	12.500	33.5	0.095	0.379	30	X	X	DDH
316	Sahtit core strage	skarn, gar, mgt	<0.010	0.510	10.600	14.6	0.005	0.001	50	X	X	
317	Sahtit core strage	cortlandite	<0.010	0.090	0.230	1.7	0.010	0.008	20	X	X	
332	Tumurtiin-Ovoo	skarn, gar, sp, mgt	0.010	0.080	16.700	2.2	<0.005	0.014	280	X	X	
333	Tumurtiin-Ovoo	skarn, gar, sp, mgt	0.040	0.960	24.300	18.9	0.150	0.002	12	X	X	
334	Tumurtiin-Ovoo	skarn, gar, sp, mgt	<0.010	0.060	0.500	3.3	<0.005	0.002	130	X	X	
335	Tumurtiin-Ovoo	skarn, hem, mgt, sp	0.001	0.020	0.549	4.0	<0.005	0.021	130	X	X	
336	Tumurtiin-Ovoo	skarn, oxd, scnd carb	0.014	0.585	0.350	6.0	<0.015	0.200	1,000	X	X	
337	Tumurtiin-Ovoo	skarn, oxd, mgt, fl	0.147	0.010	0.339	6.0	<0.005	0.605	22	X	X	
338	Tumurtiin-Ovoo	skarn, oxd	0.217	0.211	1.895	10.0	<0.005	0.030	65	X	X	
339	Tumurtiin-Ovoo	skarn, mgt, gar, im	0.218	0.210	0.210	6.0	<0.005	0.012	20	X	X	
340	Tumurtiin-Ovoo	skarn, mgt, im, grn-Cu	1.650	0.107	0.236	18.0	<0.005	0.079	15	X	X	
341	Tumurtiin-Ovoo	skarn, mgt, im	0.009	0.001	0.377	6.0	<0.005	0.008	300	X	X	
342	Tumurtiin-Ovoo	skarn	0.151	0.092	21.400	38.0	<0.005	0.034	90	X	X	
343	Tumurtiin-Ovoo	skarn, gar, Mn-oxd	0.005	0.028	0.159	<2.0	<0.005	0.003	18	X	X	
344	Tumurtiin-Ovoo	skarn, gar, Mn-oxd	0.074	1.040	1.455	120.0	<0.005	0.212	200	X	X	

Appendix 1-7 (3) Assay Results (Polymetallic Vein, Skarn) (3)

SAMPLE No.	LOCALITY	ROCK NAME	Cu %	Pb %	Zn %	Ag g/t	Au g/t	Mo %	W ppm	#TDP: ORE XF			REMARKS
										ZPGPCS	ASTLI	MVCBFDI	
345	3 TS 27	Tumurtiin-Ovoo	0.015	0.156	0.470	<2.0	<0.005	0.007	25	X	X	X	
346	3 TS 28	Tumurtiin-Ovoo	0.015	0.042	0.404	4.0	<0.005	0.003	120	X	X	X	
347	3 TS 29	Tumurtiin-Ovoo	0.002	0.021	0.072	<2.0	<0.005	0.001	5	X	X	X	
348	3 TS 30	Tumurtiin-Ovoo	0.006	0.010	15.100	<2.0	<0.005	0.050	200	X	X	X	stock pile
351	3 TS 33	Sala	0.005	0.155	0.028	2.5	<0.016	0.338	100	X	X	X	
352	3 TS 34	Sala	0.004	0.008	0.025	13.0	<0.016	0.01	305,300	X	X	X	
353	3 TS 35	Sala	0.001	0.002	0.003	1.0	<0.016	0.056	80,880	X	X	X	
354	3 TS 36	Sala	0.003	0.029	0.017	9.5	<0.016	0.037	2,540	X	X	X	
356	3 TS 38	Salhiit core strage	<0.010	0.050	0.770	1.0	<0.005	0.033	1,820	X	X	X	DDH
357	3 TS 39	Salhiit core strage	0.001	0.007	0.010	0.5	<0.016	0.334	200	X	X	X	DDH
361	3 TS 43	Salhiit core strage	0.008	0.359	0.628	37.5	<0.016	0.001	260	X	X	X	DDH
362	3 TS 44	Salhiit	0.028	0.008	0.454	4.0	<0.005	0.008	13	X	X	X	
363	3 TS 45	Salhiit	0.004	0.029	0.224	4.0	<0.005	0.009	40	X	X	X	
365	3 TY 2	Tumurtiin-Ovoo area	0.002	0.013	0.095	0.5	<0.016	0.002	22	X	X	X	

Appendix 1-8 (1) Assay Results (Porphyry Copper) (1)

SAMPLE No.	LOCALITY	ROCK NAME	Cu %	Mo %	Ag g/t	Au g/t	WTD: ORE % FPGPCS: ASTLIMCBBDI	REMARKS
206	3 SN 2 Tsagaansuvraga	meta-dacite	0.011	0.070	46.5	<0.016	X	survey line 12
207	3 SN 3 Tsagaansuvraga	qz monzonite, grn-Cu	0.315	0.092	2.0	<0.005	X X	survey line 12
208	3 SN 4 Tsagaansuvraga	qz monzonite, grn-Cu	0.247	<0.001	<2.0	<0.005	X X	survey line 12
209	3 SN 5 Tsagaansuvraga	qz monzonite, grn-Cu	0.400	0.005	<2.0	0.005	X X	survey line 12
210	3 SN 6 Tsagaansuvraga	qz monzonite, grn-Cu	0.819	0.003	<2.0	0.015	X	survey line 12
211	3 SN 7 Tsagaansuvraga	syenite, dike	0.602	0.002	<0.5	<0.016	X	survey line 12
212	3 SN 8 Tsagaansuvraga	qz monzonite, grn-Cu	1.145	0.006	<2.0	0.020	X	survey line 12
213	3 SN 9 Tsagaansuvraga	qz monzonite, grn-Cu	0.377	0.002	<2.0	0.002	X X	survey line 12
214	3 SN 10 Tsagaansuvraga	quartz monzonite	0.324	0.002	<2.0	<0.005	XX	survey line 12
215	3 SN 11 Tsagaansuvraga	qz monzonite, grn-Cu	0.839	0.002	4.0	0.035	X	survey line 12
216	3 SN 12 Tsagaansuvraga	qz monzonite, grn-Cu	0.574	0.001	2.0	0.050	X	survey line 12
217	3 SN 13 Tsagaansuvraga	qz monzonite, grn-Cu	0.381	0.001	<2.0	0.005	X	survey line 12
218	3 SN 14 Tsagaansuvraga	qz monzonite, grn-Cu	0.067	0.002	<2.0	<0.005	X	survey line 12
219	3 SN 15 Tsagaansuvraga	qz monzonite, grn-Cu	0.129	<0.001	<2.0	<0.005	X	survey line 12
220	3 SN 16 Tsagaansuvraga	qz monzonite, grn-Cu	0.047	<0.001	<2.0	<0.005	X X	survey line 12
221	3 SN 17 Tsagaansuvraga	qz monzonite, grn-Cu	0.075	<0.001	<2.0	<0.005	X	survey line 12
222	3 SN 18 Tsagaansuvraga	qz monzonite, grn-Cu	0.055	<0.001	<2.0	<0.005	X	survey line 12
223	3 SN 19 Tsagaansuvraga	qz monzonite, grn-Cu	0.043	<0.001	<2.0	<0.005	X X	survey line 12
224	3 SN 20 Tsagaansuvraga	qz monzonite, grn-Cu	0.009	<0.001	<2.0	<0.005	X X	survey line 12
225	3 SN 21 Tsagaansuvraga	greisen	1.855	0.242	4.0	<0.005	XXK	survey line 12
226	3 SS 7 Tsagaansuvraga	keratophyre	0.016	0.008	<0.5	<0.016	XX	survey line 20
234	3 SS 8 Tsagaansuvraga	acid-effvs or wdtd	0.002	0.001	<0.5	<0.016	X	survey line 20
236	3 SS 10 Tsagaansuvraga	calc-siltst, fossil	0.013	0.000	<0.5	<0.016	X X	survey line 20
237	3 SS 11 Tsagaansuvraga	tuff breccia	0.032	0.000	0.5	<0.016	X X	survey line 20
238	3 SS 12 Tsagaansuvraga	qz monzonite, grn-Cu	0.740	<0.001	2.0	<0.005	X X	survey line 20
239	3 SS 13 Tsagaansuvraga	qz monzonite, grn-Cu	0.350	<0.001	<2.0	<0.005	X	survey line 20
240	3 SS 14 Tsagaansuvraga	qz monzonite, grn-Cu	0.380	0.007	<2.0	<0.005	X	survey line 20
241	3 SS 15 Tsagaansuvraga	qz monzonite, grn-Cu	1.285	0.015	<2.0	<0.005	X X	survey line 20
242	3 SS 16 Tsagaansuvraga	qz monzonite, grn-Cu	0.450	<0.001	<2.0	0.010	X X	survey line 20
243	3 SS 17 Tsagaansuvraga	qz monzonite, grn-Cu	0.732	0.008	<2.0	0.015	X	survey line 20
244	3 SS 18 Tsagaansuvraga	qz monzonite, grn-Cu	0.132	0.001	<2.0	<0.005	X X	survey line 20
245	3 SS 19 Tsagaansuvraga	qz monzonite, grn-Cu	0.012	0.001	<2.0	<0.005	X	survey line 20
246	3 SS 20 Tsagaansuvraga	qz monzonite, grn-Cu	0.426	0.001	<2.0	<0.005	X X	survey line 20
247	3 SS 21 Tsagaansuvraga	qz monzonite, grn-Cu	0.473	0.008	<2.0	<0.005	X X	survey line 20
248	3 SS 22 Tsagaansuvraga	qz monzonite, grn-Cu	0.227	0.009	<2.0	<0.005	X X	survey line 20
249	3 SS 23 Tsagaansuvraga	leuco granite, grn-Cu	0.091	<0.001	<2.0	<0.005	X	survey line 20
250	3 SS 24 Tsagaansuvraga	quartz monzonite, Cu	0.147	<0.001	<2.0	<0.005	XXK	survey line 20
251	3 SS 25 Tsagaansuvraga	leuco granite, grn-Cu	0.135	0.001	<2.0	<0.005	X X	survey line 20
252	3 SS 26 Tsagaansuvraga	qz monzonite, grn-Cu	0.008	0.001	<2.0	<0.005	X X	survey line 20
253	3 SS 27 Tsagaansuvraga	qz monzonite, grn-Cu	0.302	0.002	<2.0	<0.005	X	survey line 20
254	3 SS 28 Tsagaansuvraga	qz monzonite, grn-Cu	0.618	0.010	<2.0	<0.005	X	survey line 20
255	3 SS 29 Tsagaansuvraga	qz monzonite, grn-Cu	0.553	0.003	<2.0	0.010	X	survey line 20
256	3 SS 30 Tsagaansuvraga	qz monzonite, grn-Cu	0.353	0.002	<2.0	<0.005	X X	survey line 20
257	3 SS 31 Tsagaansuvraga	qz monzonite, grn-Cu	0.160	0.001	<2.0	<0.005	X X	survey line 20
258	3 SS 32 Tsagaansuvraga	qz monzonite, grn-Cu	0.143	0.001	<2.0	<0.005	X X	survey line 20

Appendix 1-8 (2) Assay Results (Porphyry Copper) (2)

SAMPLE No.	LOCALITY	ROCK NAME	Cu %	Mo %	Ag g/t	Au g/t	WTD, ORE, SP PPGPCS ASTL, MVB, BDI	REMARKS
259	3 SS 33	Tsagaansuvraga	0.444	0.002	<2.0	<0.005	X	survey line 20
260	3 SS 34	keratophyre	0.030	<0.001	<2.0	<0.005	XX	survey line 20
261	3 SS 35	granodiorite	0.034	0.000	<0.5	<0.016	X	survey line 20
262	3 SS 36	qz monzonite, grn-Cu	0.009	<0.001	<2.0	<0.005	X	survey line 32
263	3 SS 37	granodiorite, grn-Cu	0.166	<0.001	<2.0	<0.005	X	survey line 32
264	3 SS 38	qz monzonite, grn-Cu	0.800	0.001	2.0	<0.005	X	survey line 32
265	3 SS 39	qz monzonite, grn-Cu	5.610	0.016	<2.0	<0.005	X	survey line 32
266	3 SS 40	qz monzonite, grn-Cu	0.392	0.004	<2.0	<0.005	X	survey line 32
267	3 SS 41	qz monzonite, grn-Cu	1.260	0.001	<2.0	<0.005	X	survey line 32
268	3 SS 42	qz monzonite, grn-Cu	0.306	0.013	<2.0	<0.005	X	survey line 32
269	3 SS 43	qz monzonite, grn-Cu	0.259	0.004	<2.0	<0.005	X	survey line 32
270	3 SS 44	qz monzonite, grn-Cu	1.185	0.015	<2.0	<0.005	X	survey line 32
271	3 SS 45	qz monzonite, grn-Cu	0.433	0.009	<2.0	<0.005	X	survey line 32
272	3 SS 46	qz monzonite, grn-Cu	0.299	0.003	<2.0	<0.005	X	survey line 32
273	3 SS 47	qz monzonite, grn-Cu	0.373	0.002	<2.0	<0.005	X	survey line 32
274	3 SS 48	qz monzonite, grn-Cu	0.142	0.002	<2.0	<0.005	X	survey line 32
275	3 SS 49	qz monzonite, grn-Cu	0.101	0.001	<2.0	<0.005	X	survey line 32
276	3 SS 50	qz monzonite, grn-Cu	0.056	0.001	<2.0	<0.005	X	survey line 32
277	3 SY 1	qzv, mal, cc, ccp	3.210	0.079	16.0	0.040	X	survey line 32
279	3 SY 3	ccp, bn, mo	0.323	0.001	<2.0	0.020	X	stock pile, C
280	3 SY 4	py, ccp, bn, mal, mo	0.630	0.020	16.0	0.130	X	stock pile, C
281	3 SY 5	py, ccp, bn, mal	0.383	0.005	2.0	0.025	X	stock pile, C
282	3 SY 6	po, py, ccp, bn, mal	0.275	0.003	2.0	0.035	X	stock pile, C
283	3 SY 7	py, ccp, mo, mal	0.475	0.006	2.0	0.035	X	stock pile, C
284	3 SY 8	qzv, ccp, mo, bn, py	0.632	0.016	8.0	0.055	X	stock pile, C
288	3 SY 12	qz-ser v, ccp	0.980	0.009	4.0	0.075	X	stock pile, C
289	3 SY 13	mal, ccp, bn, mo	0.374	0.068	2.0	0.025	X	stock pile, C
290	3 SY 14	qz-ser v, ccp, bn, mal	3.250	0.040	12.0	0.185	X	stock pile, C
291	3 SY 15	qzv, ccp, bn, mal	1.005	0.005	4.0	0.040	X	stock pile, C
292	3 SY 16	mal, ccp, bn, cv, mo	0.457	0.023	2.0	0.025	X	stock pile, C
293	3 SY 17	mal, ccp	0.375	0.017	<2.0	0.040	X	stock pile, C
296	3 SY 20	ccp, bn, mal, mo	0.350	0.023	<2.0	0.030	X	stock pile, C
297	3 SY 21	ccp, bn, mo, fl	1.090	0.006	2.0	0.045	X	stock pile, C
298	3 SY 22	ccp, bn, mo, fl	1.125	0.003	2.0	0.070	X	stock pile, C
300	3 SY 24	qzv, ccp, mal, bn	5.040	0.042	22.0	0.230	X	stock pile, C
301	3 SY 25	ccp, mal, bn	0.400	0.006	2.0	0.020	X	stock pile, C
302	3 SY 26	mal, ccp, bn, mo	0.483	0.015	2.0	0.030	X	stock pile, C
303	3 SY 27	ccp, cv, mal	0.376	0.024	<2.0	0.025	X	stock pile, C
304	3 SY 28	ccp, cv, bn	0.718	0.020	2.0	0.050	X	stock pile, C
305	3 SY 29	ccp, bn, mo	0.562	0.014	<2.0	0.020	X	stock pile, C
306	3 SY 30	ccp, bn, mal, mo	0.570	0.012	<2.0	0.055	X	stock pile, C
307	3 SY 31	ccp, mo, mal	0.480	0.031	<2.0	0.030	X	stock pile, C
308	3 SY 32	ccp, cv, mal, mo	0.515	0.028	<2.0	0.020	X	stock pile, C
309	3 SY 33	ccp, bn, mal	0.308	0.047	<2.0	0.015	X	stock pile, C
310	3 SY 34	ccp, mal	0.475	0.004	<2.0	0.025	X	stock pile, C

Appendix 1-9 (1) Assay Results (Auriferous Quartz Vein) (1)

SAMPLE No.	LOCALITY	ROCK NAME	Au g/t	Ag g/t	WTDPT.ORE.FE		REMARKS
					PPGPCS	ASTLLMVCBDDI	
86	3 DS 43	Tsagaan-Chuluut Hud.	26.30	44.0	X	X	
87	3 DS 44	Tsagaan-Chuluut Hud.	377.0	377.0	X	X	
88	3 DS 45	Tsagaan-Chuluut Hud.	91.80	155.0	X	X	
89	3 DS 46	Tsagaan-Chuluut Hud.	0.27	4.6	X	X	
90	3 DS 47	Tsagaan-Chuluut Hud.	2.60	16.0	X	X	
91	3 DS 48	Tsagaan-Chuluut Hud.	3.77	2.7	X	X	
92	3 DS 49	Tsagaan-Chuluut Hud.	0.27	6.2	X	X	
93	3 DS 50	Tsagaan-Chuluut Hud.	3.29	1.5	X	X	
94	3 DS 51	Tsagaan-Chuluut Hud.	<0.07	<0.5	X	X	
95	3 DS 52	Tsagaan-Chuluut Hud.	<0.07	0.5	X	X	
96	3 DS 53	Tsagaan-Chuluut Hud.	<0.07	<0.5	X	X	
97	3 DS 54	Tsagaan-Chuluut Hud.	<0.07	0.5	X	X	
98	3 DS 55	Tsagaan-Chuluut Hud.	<0.07	<0.5	X	X	
99	3 DS 56	Tsagaan-Chuluut Hud.	<0.07	<0.5	X	X	
100	3 DS 57	Tsagaan-Chuluut Hud.	<0.07	0.7	X	X	
101	3 DS 58	Tsagaan-Chuluut Hud.	0.07	42.7	X	X	
116	3 DY 15	Tsagaan-Chuluut Hud.	<0.07	<0.5	XX		
121	3 UN 20	Tsagaan-Chuluut Hud.	<0.07	3.3	X	X	
379	3 UN 8	01on-0voot	1.92	<0.5	X	X	
380	3 UN 9	01on-0voot	<0.07	<0.5	X	X	
381	3 UN 10	01on-0voot	1.64	<0.5	X	X	No. 68trench
382	3 UN 11	01on-0voot	0.14	<0.5	X	X	No. 68trench
383	3 UN 12	01on-0voot	1.78	<0.5	X	X	No. 68trench
384	3 UN 13	01on-0voot	0.48	<0.5	X	X	No. 68trench
385	3 UN 14	01on-0voot	<0.07	<0.5	X	X	No. 68trench
386	3 UN 15	01on-0voot	<0.07	<0.5	X	X	No. 68trench
387	3 UN 16	01on-0voot	<0.07	<0.5	X	X	No. 68trench
388	3 UN 17	01on-0voot	0.27	<0.5	X	X	No. 68trench
419	3 US 28	01on-0voot	<0.07	<0.5	X	X	No. 59trench
420	3 US 29	01on-0voot	<0.07	<0.5	X	X	No. 59trench
421	3 US 30	01on-0voot	0.27	<0.5	X	X	No. 59trench
422	3 US 31	01on-0voot	0.82	<0.5	X	X	No. 59trench
423	3 US 32	01on-0voot	1.10	<0.5	X	X	No. 59trench
424	3 US 33	01on-0voot	5.00	<0.5	X	X	No. 59trench
425	3 US 34	01on-0voot	6.71	<0.5	X	X	No. 59trench
426	3 US 35	01on-0voot	2.12	<0.5	X	X	No. 59trench
427	3 US 36	01on-0voot	0.34	<0.5	X	X	No. 59trench
428	3 US 37	01on-0voot	0.55	<0.5	X	X	No. 59trench
429	3 US 38	01on-0voot	0.27	<0.5	X	X	No. 59trench
430	3 US 39	01on-0voot	0.07	<0.5	X	X	No. 59trench
431	3 US 40	01on-0voot	32.80	<0.5	X	X	No. 59trench
432	3 US 41	01on-0voot	16.40	<0.5	X	X	No. 59trench
433	3 US 42	01on-0voot	0.41	<0.5	X	X	No. 59trench
434	3 US 43	01on-0voot	5.21	<0.5	X	X	No. 59trench
435	3 US 44	01on-0voot	0.14	<0.5	X	X	No. 59trench
436	3 US 45	01on-0voot	8.77	<0.5	X	X	No. 59trench
437	3 US 46	01on-0voot	4.32	<0.5	X	XX	No. 59trench
438	3 US 47	01on-0voot	1.58	<0.5	X	X	No. 59trench
439	3 US 48	01on-0voot	<0.07	<0.5	X	X	No. 59trench
440	3 US 49	01on-0voot	<0.07	<0.5	X	X	No. 59trench

Appendix 1-9 (2) Assay Results (Auriferous Quartz Vein) (2)

	SAMPLE No.	LOCALITY	ROCK NAME	Au g/t	Ag g/t	WIDP, ORE, XF		REMARKS
						ASTL	WCB	
441	3 US 50	Ol-on-Ovoot	diorite	<0.07	<0.5	X	X	No. 55trench
442	3 US 51	Ol-on-Ovoot	diorite	<0.07	<0.5	X	X	No. 59trench
443	3 US 52	Ol-on-Ovoot	meta-dolerite	<0.07	<0.5	X		No. 59trench
444	3 US 53	Ol-on-Ovoot	diorite	<0.07	<0.5	X	X	No. 59trench
446	3 US 55	Ol-on-Ovoot	grano-dio. qzvit. py.	0.27	<0.5	X	X	DDH24, 72m
447	3 US 56	Ol-on-Ovoot	diorite, arg, py	9.18	<0.5	X	X	DDH24, 80m
448	3 US 57	Ol-on-Ovoot	qz, massive	0.48	<0.5	X	X	No. 60trench
449	3 US 58	Ol-on-Ovoot	diorite, oxd arg	107.00	<0.5	X	X	No. 60trench
450	3 US 59	Ol-on-Ovoot	diorite, oxd arg	12.90	<0.5	X	X	No. 60trench
451	3 US 60	Ol-on-Ovoot	qzv	13.00	<0.5	X	X	No. 60trench
452	3 US 61	Ol-on-Ovoot	qzv	0.21	<0.5	X	X	No. 60trench
453	3 US 62	Ol-on-Ovoot	qzv	1.44	<0.5	X	X	No. 61trench
454	3 US 63	Ol-on-Ovoot	qzv	0.14	<0.5	X	X	No. 61trench
455	3 US 64	Ol-on-Ovoot	qzv in siltstone	<0.07	<0.5	X	X	No. 62trench
456	3 US 65	Ol-on-Ovoot	qzv in siltstone	<0.07	<0.5	X	X	No. 62trench
457	3 US 66	Ol-on-Ovoot	qzv	0.14	<0.5	X	X	No. 62trench
458	3 US 67	Ol-on-Ovoot	siltstone with qzv	<0.07	<0.5	X	X	No. 67trench
459	3 US 68	Ol-on-Ovoot	diorite	<0.07	<0.5	X	X	No. 67trench
460	3 US 69	Ol-on-Ovoot	diorite	0.21	<0.5	X	X	No. 67trench
461	3 US 70	Ol-on-Ovoot	diorite	0.75	<0.5	X	X	No. 67trench
462	3 US 71	Ol-on-Ovoot	qzv	0.21	<0.5	X	X	No. 67trench
463	3 US 72	Ol-on-Ovoot	diorite, py, oxd	2.60	<0.5	X	X	No. 67trench
464	3 US 73	Ol-on-Ovoot	qzv	5.21	<0.5	X	X	No. 67trench
465	3 US 74	Ol-on-Ovoot	diorite, py	1.44	<0.5	X	X	No. 67trench
466	3 US 75	Ol-on-Ovoot	diorite with qz-vit	0.68	<0.5	X	X	No. 67trench
467	3 US 76	Ol-on-Ovoot	diorite with qz-vit	0.14	<0.5	X	X	No. 67trench
468	3 US 77	Ol-on-Ovoot	qzv	<0.07	<0.5	X	X	No. 67trench
469	3 US 78	Ol-on-Ovoot	siltstone with qzvit	4.11	<0.5	X	X	No. 67trench
470	3 US 79	Ol-on-Ovoot	diorite+siltstone	0.21	<0.5	X	X	No. 67trench
471	3 US 80	Ol-on-Ovoot	qzv, py, visible Au	19.30	<0.5	X	X	No. 67trench
496	3 US105	Ol-on-Ovoot	qzv, 65cm	<0.07	<0.5	X	X	No. 64trench
497	3 US106	Ol-on-Ovoot	diorite, qzvit, py, Au	2.53	<0.5	X	X	No. 64trench
498	3 US107	Ol-on-Ovoot	qzv, 150cm	0.14	<0.5	X	X	No. 64trench
499	3 US108	Ol-on-Ovoot	qzv, 80cm	<0.07	<0.5	X	X	No. 64trench
500	3 US109	Ol-on-Ovoot	qzv, 20cm	1.30	<0.5	X	X	No. 65trench
501	3 US110	Ol-on-Ovoot	qzv, 40cm	0.21	<0.5	X	X	No. 65trench
502	3 UY 1	Onh	qzv	<0.07	<0.5	X	X	
503	3 UY 2	Onh	qzv	<0.07	<0.5	X	X	
504	3 UY 3	Onh	qzv	<0.07	<0.5	X	X	
505	3 UY 4	Onh	qzv	<0.07	<0.5	X	X	
507	3 UY 6	Dugshih	qzv	<0.07	<0.5	X	X	
508	3 UY 7	Dugshih	qzv	<0.07	<0.5	X	X	

Appendix 1-10 (1) Assay Results (Carbonatite, Apatite Rock) (1)

SAMPLE No.	LOCALITY	ROCK NAME	Ce PPM	Eu PPM	La PPM	Lu PPM	Nd PPM	Sm PPM	Tb PPM	Th PPM	U PPM	Yb PPM	WTDP, ORE XF FPGPCS ASTLMLVCRBRI	REMARKS
190	Lugilingol	carbonatite, synchi	>10000	>100.00	>10000	0.9	>1000	477.2	13.6	907	22	<0.10	X X	
191	Lugilingol	hornfels, corundum	2406	4.50	1416	1.1	555	45.8	1.3	233	10	7.0	XX	
192	Lugilingol	carbonatite	>10000	>100.00	>10000	2.5	>1000	>500.0	22.4	1928	83	4.7	XX	
197	Lugilingol	cbt, synchi, pari	>10000	68.00	>10000	2.5	>1000	401.5	7.6	336	29	11.2	X X X	
199	Lugilingol	cbt, synchi, pari, gn.	6986	29.00	3587	1.9	>1000	127.4	6.8	178	18	11.7	X X X	width 8cm
200	Lugilingol	carbonatite, pseu py	>10000	>100.00	>10000	4.2	>1000	>500.0	9.3	331	67	13.8	X X X	
202	Lugilingol	synchi, fl	>10000	>100.00	>10000	3.7	>1000	>500.0	5.5	2206	76	7.6	X XX	
376	Olon-Ovoot area	alkali rh, topaz-bg	216	<0.50	69	1.3	50	6.7	0.1	33	2	7.4	X	ongonite
389	Mushgia-Hudak	carbonatite, fl	9018	40.50	6665	1.2	>1000	92.5	2.8	88	28	4.6	XX	fresh
390	Mushgia-Hudak	trachy-andesite, apt.	380	4.50	164	0.4	125	18.3	0.9	46	8	2.2	X	
391	Mushgia-Hudak	meta-andesite, ep act	20	0.50	8	0.4	5	2.1	0.4	1	<1.0	1.7	X	
393	Mushgia-Hudak	carbonatite, bre, fl	200	1.00	105	0.4	65	8.9	0.3	35	11	2.6	X X	
396	Mushgia-Hudak	carbonatite, bre	286	2.00	183	0.5	70	8.7	0.4	4	19	2.7	X X	
397	Mushgia-Hudak	carbonatite, bre, fl	6590	26.00	4244	0.9	950	90.8	3.4	13	62	8.2	X X	
399	Mushgia-Hudak	carbonatite, bre	3182	28.50	4894	1.5	1225	131.1	3.6	36	47	6.2	X X	
400	Mushgia-Hudak	cbt, fl, apt, martite	>10000	>100.00	7922	3.2	4460	517.2	13.5	306	157	24.4	X X	
402	Mushgia-Hudak	carbonatite, fl	1450	7.50	849	1.2	325	34.1	1.7	32	31	7.5	X X	
403	Mushgia-Hudak	carbonatite, qz-netwk	>10000	61.00	4673	2.2	2670	306.3	11.1	146	80	19.2	X X	
404	Mushgia-Hudak	carbonatite, bre, fl	816	3.50	477	0.5	205	20.7	0.6	15	23	3.4	X X	
406	Mushgia-Hudak	apatite, syp, prs	>10000	104.50	>10000	3.1	>1000	>500.0	16.7	83	97	25.8	X X	apatite hill
408	Mushgia-Hudak	apatite, syp, prs	>10000	229.00	>10000	5.8	>1000	>500.0	31.9	84	162	42.1	X X	apatite hill
409	Mushgia-Hudak	mgf rock, phlog	288	2.00	151	0.2	75	9.6	<0.10	4	4	0.8	X X	apatite hill
410	Mushgia-Hudak	syenite	386	5.00	154	0.3	145	19.5	1.2	21	9	2.2	XXX	
411	Mushgia-Hudak	magnetite rock	436	2.50	187	0.3	125	13.3	0.8	13	24	1.1	X X	
412	Mushgia-Hudak	mgf, apt, syp	1572	11.00	662	0.7	595	70.5	3.7	103	19	4.4	X X	
413	Mushgia-Hudak	sabbro	182	2.50	91	0.5	45	7.9	2.4	2	2	3.5	XX	
414	Mushgia-Hudak	qz, fl	9374	37.00	5557	1.1	1675	134.8	5.5	6	19	7.4	X X	
415	Mushgia-Hudak	phonolite	352	5.00	157	0.2	135	20.0	1.3	12	3	1.9	XX	
417	Mushgia-Hudak	cbt, fl purp	3800	25.50	1709	1.7	1215	144.6	7.9	56	16	11.7	X X	
418	Mushgia-Hudak	dolomite-carbonatite	580	6.00	255	1.0	160	18.0	2.0	52	16	5.5	X X	
475	Bayan-Hoshoo	carbonatite, bre	1128	9.50	757	0.2	280	23.0	0.7	2	23	<0.10	X	
493	Bayan-Hoshoo	carbonatite, cel, ba	>10000	>100.00	>10000	2.3	>1000	299.5	7.0	14	11	<0.10	XXX	trench
494	Bayan-Hoshoo	cbt, ba, qz, fl, py	1462	5.00	1161	<0.10	250	16.8	0.7	4	11	0.3	X X	trench

Appendix I-10 (2) Assay Results (Carbonatite, Apatite Rock) (2)

SAMPLE No.	LOCALITY	ROCK NAME	Sr ppm	Ba ppm	P ppm	Y ppm	WTDP ORE XF		REMARKS
							ASTL	MVCBRDI	
190	3 RS 1	Luglingol							
191	3 RS 2	Luglingol	3,510	90	260	95	X X		
192	3 RS 3	Luglingol	412	130	190	30 XX	X X		
197	3 RS 8	Luglingol	916	110	390	300 XX	X X		
199	3 RS 10	Luglingol	34,700	180	730	120	X X		
200	3 RS 11	Luglingol	8,920	660	650	80	X X		width 8cm
202	3 RS 13	Luglingol	1,925	120	670	130	X X		
376	3 UN 5	Olon-Ovoot area	1,415	90	270	320	X X		
389	3 UN 8	Mushgia-Hudak	40	20	40	30 X	X X		ongonite
390	3 UN 19	Mushgia-Hudak	1,910	1,380	4,830	160 XX	X X		fresh
391	3 UN 20	Mushgia-Hudak	6,800	2,480	2,960	20 X	X X		
393	3 US 2	Mushgia-Hudak	679	100	530	10 X	X X		
396	3 US 5	Mushgia-Hudak	287	1,510	280	20	X X		
397	3 US 6	Mushgia-Hudak	515	3,190	260	20	X X		
398	3 US 8	Mushgia-Hudak	1,235	1,870	310	240	X X		
400	3 US 9	Mushgia-Hudak	1,465	2,670	830	220	X X		
402	3 US 11	Mushgia-Hudak	124,000	20	46,480	460 X X	X X		
403	3 US 12	Mushgia-Hudak	4,540	3,340	2,870	70	X X		
404	3 US 13	Mushgia-Hudak	923	4,380	4,360	340	X X		
406	3 US 17	Mushgia-Hudak	634	3,600	670	30	X X		
408	3 US 18	Mushgia-Hudak	5,360	150	47,130	590	X X		apatite hill
409	3 US 19	Mushgia-Hudak	10,100	560	112,600	1220	X X		apatite hill
410	3 US 20	Mushgia-Hudak	3,080	490	720	25	X X		apatite hill
411	3 US 21	Mushgia-Hudak	3,330	2,870	1,370	30 XXK	X X		
412	3 US 22	Mushgia-Hudak	191	70	6,850	65	X X		
413	3 US 23	Mushgia-Hudak	464	70	980	35 XX	X X		
414	3 US 24	Mushgia-Hudak	759	980	1,800	310	X X		
415	3 US 25	Mushgia-Hudak	5,160	3,780	2,490	25 XX	X X		
417	3 US 26	Mushgia-Hudak	9,700	6,590	4,540	220	X X		
418	3 US 27	Mushgia-Hudak	40,200	320	18,290	80	X X		
475	3 US 84	Bayan-Hoshoo	1,610	1,860	1,800	20	X X		
493	3 US102	Bayan-Hoshoo	3,220	2,390	740	320	XXX		trench
494	3 US103	Bayan-Hoshoo	5,230	1,330	800	20	X X		
			336,000	20	720	20	X X		

Appendix 1-11 Assay Results (Fluorite)

SAMPLE No.	LOCALITY	ROCK NAME	CaO %	F %	SiO2 %	CO2 %	TOTAL-Fe %	WTD ¹ ORE %			REMARKS	
								FP	PGPCS	XF		
								AST	LLM	VB	BDI	
136	3 HN 13	Bor-Undur No. 3	5.2	3.02	80.00	< 0.2	1.21	X	X	X		waste pile
138	3 HN 15	Bor-Undur No. 2	62.8	42.60	9.90	< 0.2	0.08	X	X	X		
140	3 HN 17	Bor-Undur No. 11	61.9	42.60	10.90	< 0.2	0.19	X	X	X		
145	3 HN 22	Bor-Undur No. 5	68.7	45.70	6.16	< 0.2	0.08	X	X	XX		tunnel
147	3 HN 24	Bor-Undur No. 5	31.2	16.50	48.60	< 0.2	1.16	X	X	X		tunnel
148	3 HN 25	Bor-Undur No. 5	25.5	13.10	54.90	< 0.2	0.56	X	X	X		tunnel
149	3 HN 26	Bor-Undur dress plt	20.3	9.72	57.60	0.3	0.86	X	X	X		16-20mm
150	3 HN 27	Bor-Undur dress plt	69.9	47.70	2.09	< 0.2	0.05	X	X	X		final product
152	3 HS 2	Bor-Undur No. 3	63.9	41.70	10.00	< 0.2	0.11	X	X	X		
153	3 HS 3	Bor-Undur No. 2	55.9	36.60	19.70	< 0.2	0.09	X	X	X		
154	3 HS 4	Bor-Undur No. 13	67.6	42.60	6.28	< 0.2	0.06	X	X	X		
155	3 HS 5	Bor-Undur No. 13	69.6	42.60	5.29	< 0.2	0.08	X	X	X		
156	3 HS 6	Adag No. 3	50.9	31.50	25.80	< 0.2	0.17	X	X	X		
157	3 HS 7	Adag No. 3	29.3	15.80	48.90	< 0.2	0.41	X	X	X		
158	3 HS 8	Bor-Undur No. 5	35.9	17.10	36.30	< 0.2	1.21	X	X	X		tunnel
159	3 HS 9	Bor-Undur No. 5	50.8	32.40	26.80	< 0.2	0.52	X	X	X		tunnel
160	3 HS 10	Bor-Undur No. 5	32.7	17.10	45.40	< 0.2	0.92	X	X	X		tunnel
161	3 HS 11	Bor-Undur No. 5	51.9	32.50	26.30	< 0.2	0.29	X	X	X		tunnel
162	3 HS 12	Bor-Undur No. 5	55.9	35.60	22.80	< 0.2	0.24	X	X	X		tunnel
163	3 HY 1	Tsagaan-tahilch	41.4	25.70	39.60	< 0.2	0.32	X	X	X		
164	3 HY 2	Maihanta 2	34.8	22.30	50.40	< 0.2	0.17	X	X	X		
165	3 HY 3	Bor-Undur No. 13	50.9	33.00	26.60	< 0.2	0.12	X	X	X		
166	3 HY 4	Adag	11.6	6.17	71.40	< 0.2	0.31	X	X	X		tunnel
167	3 HY 5	Bor-Undur No. 5	52.7	25.70	26.40	< 0.2	0.28	X	X	X		
169	3 HY 7	Choi-Tsagaan-Del	63.9	38.70	16.00	< 0.2	0.19	X	X	X		
170	3 HY 8	Choi-Tsagaan-Del	57.9	36.60	19.60	< 0.2	0.23	X	X	X		
171	3 HY 9	Choi-Tsagaan-Del	52.0	33.10	26.40	< 0.2	0.18	X	X	X		
172	3 HY 10	Choi-Tsagaan-Del	41.9	24.40	28.90	< 0.2	1.21	X	X	X		
173	3 HY 11	Choi-Tsagaan-Del	40.9	17.30	30.90	< 0.2	1.79	X	X	X		tailing
179	3 NS 5	Yuguzer	14.7	7.34	72.60	< 0.2	0.45	X	X	X		
189	3 NS 15	Nuhutin-Tsagaan-toig	20.3	10.30	60.60	< 0.2	0.62	X	X	X		

Appendix I-12 Assay Results (Strontium)

SAMPLE No.	LOCALITY	ROCK NAME	Sr %	Ba %	CaO %	TOTAL-Fe %	S04 %	total S %	#TDP, ORE, XF FPGPCS, ASTLMVBRDI	REMARKS
29										
3 DN 29	Mardai	welded tuff	0.02	0.06	0.67	0.95	0.02	0.36	X	XX
30										
3 DN 30	Mardai	lapilli tuff, alt, chl	0.04	0.02	1.28	1.50	0.02	0.02		XX
472										
3 US 81	Bayan-Hoshoo	rhyolitic tuff	0.09	0.10	0.37	2.22	0.10	0.03	X	XX
473										
3 US 82	Bayan-Hoshoo	rhyolitic tuff	0.07	0.14	1.12	1.84	0.18	0.05	X	XX
474										
3 US 83	Bayan-Hoshoo	apatite-st rock, fl	5.34	0.04	3.86	4.30	5.20	2.07	X	XX
476										
3 US 85	Bayan-Hoshoo	rhyolitic tf, cel, qz	12.70	0.67	1.47	2.68	13.24	4.41	X	trench
477										
3 US 86	Bayan-Hoshoo	rhyolitic tf, cel, qz	19.10	0.92	1.56	4.80	13.59	5.55	X	trench
478										
3 US 87	Bayan-Hoshoo	rhyolitic tf, cel, qz	23.40	0.89	1.17	4.87	12.14	4.89	X	trench
479										
3 US 88	Bayan-Hoshoo	rhyolitic tf, cel, qz	10.80	0.42	2.67	3.63	10.60	4.14	XX	trench
480										
3 US 89	Bayan-Hoshoo	rhyolitic tf, cel, qz	5.56	0.55	1.87	2.14	7.17	2.42	X	trench
481										
3 US 90	Bayan-Hoshoo	rhyolitic tf, cel, qz	3.98	0.46	2.65	1.65	6.14	2.60	XX	trench
482										
3 US 91	Bayan-Hoshoo	rhyolitic tf, cel, qz	5.79	0.61	1.28	4.49	6.70	2.40	X	trench
483										
3 US 92	Bayan-Hoshoo	rhyolitic tf, cel, qz	4.39	0.36	0.86	2.72	5.47	1.83	X	trench
484										
3 US 93	Bayan-Hoshoo	rhyolitic tf, cel, qz	9.27	0.44	0.86	4.31	8.26	3.43	X	trench
485										
3 US 94	Bayan-Hoshoo	rhyolitic tf, cel, qz	1.46	0.84	2.43	5.21	2.41	0.86	X	trench
486										
3 US 95	Bayan-Hoshoo	rhyolitic tf, cel, qz	8.63	1.03	1.72	6.03	8.58	3.32	X	trench
487										
3 US 96	Bayan-Hoshoo	rhyolitic tf, cel, qz	14.50	0.53	1.14	3.74	9.74	4.90	X	trench
488										
3 US 97	Bayan-Hoshoo	rhyolitic tf, cel, qz	9.90	0.45	0.74	3.93	8.48	3.52	X	trench
489										
3 US 98	Bayan-Hoshoo	rhyolitic tf, cel, qz	8.83	0.40	1.13	3.29	8.91	3.31	X	trench
490										
3 US 99	Bayan-Hoshoo	rhyolitic tf, cel, qz	10.80	0.54	2.04	3.35	10.31	3.67	X	trench
491										
3 US100	Bayan-Hoshoo	qzv?, fl	3.95	0.02	35.00	0.31	4.02	1.80	X	trench
493										
3 US102	Bayan-Hoshoo	carbonatite, cel, ba	0.52	0.13	10.35	3.50	0.74	3.64	XXX	trench

Appendix 1-13 X-ray Diffraction Analyses (Pb-Zn, W Deposits)

No.	SAMPLE No.	LOCALITY	ROCK NAME	Quartz	Plagioclase	K-feldspar	Calcite	Rhodochrosite	Siderite	Cerussite	Smeelite	Sericite/Smectite	Sericite	Chlorite	Kaolinite	Biotite	Amphibole	Epidote	Andradite	Hollandite	Anatase	Tarosite	Anglesite	Melanterite	Lamarkite	Galena	Sphalerite	Pyrite	Beaverite	Scorodite	Magnetite	Hematite	Goethite	Chalcophanite	Hydrothaerolite	Hollandite			
1	3 DN 2	Tsav	Granodiorite, fng	⊙	⊙	⊙							•	○	△																								
2	3 DN 3	Tsav	Clay, gzy-wht, alt	⊙	•	△					△																												
3	3 DN 11	Tsav	Qz, Mn-cbt, py, gn	⊙			△	⊙					•														△	△											
4	3 DN 13	Tsav	Pb-Zn, Mn-cbt	△				⊙																			⊙	⊙											
5	3 DN 16	Tsav	Pb-Zn, calamine	⊙				⊙																			⊙												
6	3 DN 27	Delger-Munh	1.2m, gzyntwk	○				•																			⊙												
7	3 DN 29	Mardai	Welded tuff	⊙	△	△																																	
8	3 DN 30	Mardai	Lapilli tuff, alt, chl	⊙	△	△																																	
9	3 DN 31	Mardai	Welded tuff	⊙	⊙	△																																	
10	3 DS 2	Tsav	Oxide ore, gn, mal, cer	○																																			
11	3 DS 6	Tsav	Limchite v.oxd, MnO2, Ag	⊙				•																															
12	3 DS 7	Tsav	Andesite, wht alt	⊙	○																																		
13	3 DS 10	Tsav	Carbonate ore, Pb Zn	○				⊙																															
14	3 DS 13	Delger-Munh	Nw-10cm, wht carbonate	⊙			⊙																																
15	3 DS 29	Ulaan	Skarn, ep-act, py	⊙																																			
16	3 DS 33	Ulaan	Rhyolite, sil, sp, py	⊙																																			
17	3 DS 36	Ulaan	Oxide ore, act, ep, py, qz	⊙																																			
18	3 DY 1	Tsav	Pb-Zn ore	○																																			
19	3 DY 5	Salhit (Dornod)	Qzv	⊙																																			
20	3 DY 7	Bayan-Uul	Qzv, oxd	⊙																																			
21	3 DY 8	Bayan-Uul	Qzv, oxd	⊙																																			
22	3 DY 9	Bayan-Uul	Qzv, oxd	⊙																																			
23	3 TN 1	Tumurtiin-Ovoo	Skarn, gar, mgt, sp	△																																			
24	3 TN 4	Salhit (T.O.)	Skarn, gar	△																																			
25	3 TN 7	Salhit (T.O.)	Corlandite	△																																			
26	3 TS 18	Tumurtiin-Ovoo	Skarn, oxd	•																																			
27	3 TS 24	Tumurtiin-Ovoo	Skarn, egecul?	•																																			
28	3 TS 27	Tumurtiin-Ovoo	Limestone, gar, Mn-Cu oxd	△																																			
29	3 TS 30	Tumurtiin-Ovoo	Skarn, gar, sp	△																																			
30	3 TS 38	Salhit (T.O.), DDH	Skarn, gar, sp	○																																			
31	3 TY 2	Tumurtiin-Ovoo	Skarnized silstone	⊙	⊙	•	△																																

⊙: Abundant ○: Common △: Poor •: Rare

Appendix 1-14 X-ray Diffraction Analyses (Cu-Mo Deposits)

No.	SAMPLE No.	LOCALITY	ROCK NAME	Quartz	Plagioclase	K-feldspar	Calcite	Smeelite	Sericite/Smeelite	Sericite	Chlorite	Hematite	Lauromontite	Bornite	Chalcopyrite	Malachite	Brochantite	Goethite	Molybdenite
32	3 SN 2	Tsagaansuvraga	Mela-dacite	⊙	⊙	⊙		△				△	○						
33	3 SN 3	Tsagaansuvraga	Qz monzonite, grn-Cu	⊙	⊙	⊙			○	○	○								
34	3 SN 7	Tsagaansuvraga	Syenite, dike	△	△	△					○		○						
35	3 SN 10	Tsagaansuvraga	Qz-monzonite, grn-Cu	⊙	⊙	⊙				•	△	•				•			
36	3 SN 16	Tsagaansuvraga	Qz-monzonite, grn-Cu	⊙	⊙	⊙	•				△	•				•			
37	3 SN 19	Tsagaansuvraga	Qz-monzonite, grn-Cu	⊙	⊙	⊙					△								
38	2 SN 21	Tsagaansuvraga	Greisen, mus, qz	⊙	⊙	⊙			⊙	⊙					△				
39	3 SS 11	Tsagaansuvraga	Tuff breccia	⊙	⊙	⊙				•	•	△							
40	3 SS 12	Tsagaansuvraga	Qz monzonite, grn-Cu	⊙	△	⊙	○			△	△			•					
41	3 SS 18	Tsagaansuvraga	Qz monzonite, grn-Cu	⊙	⊙	⊙	△				△								
42	3 SS 24	Tsagaansuvraga	Qz monzonite, grn-Cu	⊙	•	⊙				△						•			
43	3 SS 32	Tsagaansuvraga	Qz monzonite, grn-Cu	⊙	⊙	⊙					△								
44	3 SS 35	Tsagaansuvraga	Granodiorite	⊙	⊙	⊙					•								
45	3 SS 36	Tsagaansuvraga	Qz monzonite, grn-Cu	⊙	⊙	⊙	△		•	△						•			
46	3 SS 40	Tsagaansuvraga	Qz monzonite, grn-Cu	⊙	⊙	⊙				△	△								
47	3 SS 44	Tsagaansuvraga	Qz monzonite, grn-Cu	⊙	⊙	⊙				△	•	•				△			
48	3 SS 48	Tsagaansuvraga	Qz monzonite, grn-Cu	⊙	⊙	⊙					△	•				•			
49	3 SY 1	Tsagaansuvraga	Qzv, mal, cc, cop	⊙															
50	3 SY 15	Tsagaansuvraga	Qzv, cop, bn, mal	⊙	△				⊙						•	△	△		
51	3 TS 1	Arin-Nuur	Oxide ore, grn-Cu, mus	⊙	⊙	⊙				△				•				△	
52	3 TS 7	Arin-Nuur	Granite, bt, mus	⊙	△	⊙				○									△

⊙: Abundant ○: Common △: Poor •: Rare

Appendix 1-15 X-ray Diffraction Analyses (Au, Fluorite Deposits)

No.	SAMPLE No.	LOCALITY	ROCK NAME	Quartz	Plagioclase	K-feldspar	Calcite	Ankerite	Amphibole	Clinopyroxene	Smectite	Sericite/Smectite	Sericite	Chlorite	Kaolinite	Halloysite	Gibbsite	Gypsum	Fluorite	Nematite	Goethite	Tamoullite	
53	3 DS 46	Tsagaan-Chuluut	Qz, ser, py	⊙									⊙										
54	3 DS 47	Tsagaan-Chuluut	Qz, bre, mica	⊙									⊙									△	••?
55	3 DS 58	Tsagaan-Chuluut	Qzv 2.5m, py, mal, az	⊙			△	•					⊙									•	••?
56	3 HA 1	Bor-Undur No.5	Qp, stg sil	⊙		⊙							⊙		△								
57	3 HN 13	Bor-Undur No.3	Qp, stg sil, fl vit	⊙									⊙		△							△	
58	3 HN 18	Bor-Undur No.11	Clay in 3HN17	⊙		△							⊙		•								
59	3 HN 20	Adag No.1	White altered, in 3HN19	⊙		⊙									⊙								
60	3 HN 22	Bor-Undur No.5	Qzv, fl	△																			
61	3 HS 6	Adag No.3	Greisen, fl	⊙		△																	
62	3 HS 8	Bor-Undur No.5	Clay, fl	⊙		•																	
63	3 HY 5	Bor-Undur No.5	Qzv, fl	△																			
64	3 HY 6	Chol-Tsagaan-Del	Clay, white	⊙											△								
65	3 UN 16	Olon-Ovoot	Qzv, alt zone	⊙		• △?							⊙		⊙				○				
66	3 US 28	Olon-Ovoot	Siltstone	⊙		⊙							⊙		⊙								
67	3 US 31	Olon-Ovoot	Siltstone	⊙		⊙							⊙		⊙								
68	3 US 35	Olon-Ovoot	Qzv in siltstone	⊙		•							⊙		⊙								
69	3 US 41	Olon-Ovoot	Qzv	⊙		△							⊙		•								
70	3 US 43	Olon-Ovoot	Qzv in siltstone	⊙																			
71	3 US 47	Olon-Ovoot	Qzv in siltstone	⊙		•?							⊙		△								
72	3 US 48	Olon-Ovoot	Diorite, sheared	⊙		•?							⊙		△								
73	3 US 51	Olon-Ovoot	Diorite, sheared	⊙		⊙							⊙		⊙								
74	3 US 57	Olon-Ovoot	Siltstone with qzv	⊙		⊙																	
75	3 US 70	Olon-Ovoot	Diorite	⊙		•?							⊙		⊙								
76	3 US 72	Olon-Ovoot	Diorite, py oxd	⊙		⊙							⊙		⊙								
77	3 US 74	Olon-Ovoot	Diorite, py	⊙		⊙							⊙		⊙								••?
78	3 US 78	Olon-Ovoot	Siltstone with qzv	⊙		••?							⊙		△								••?

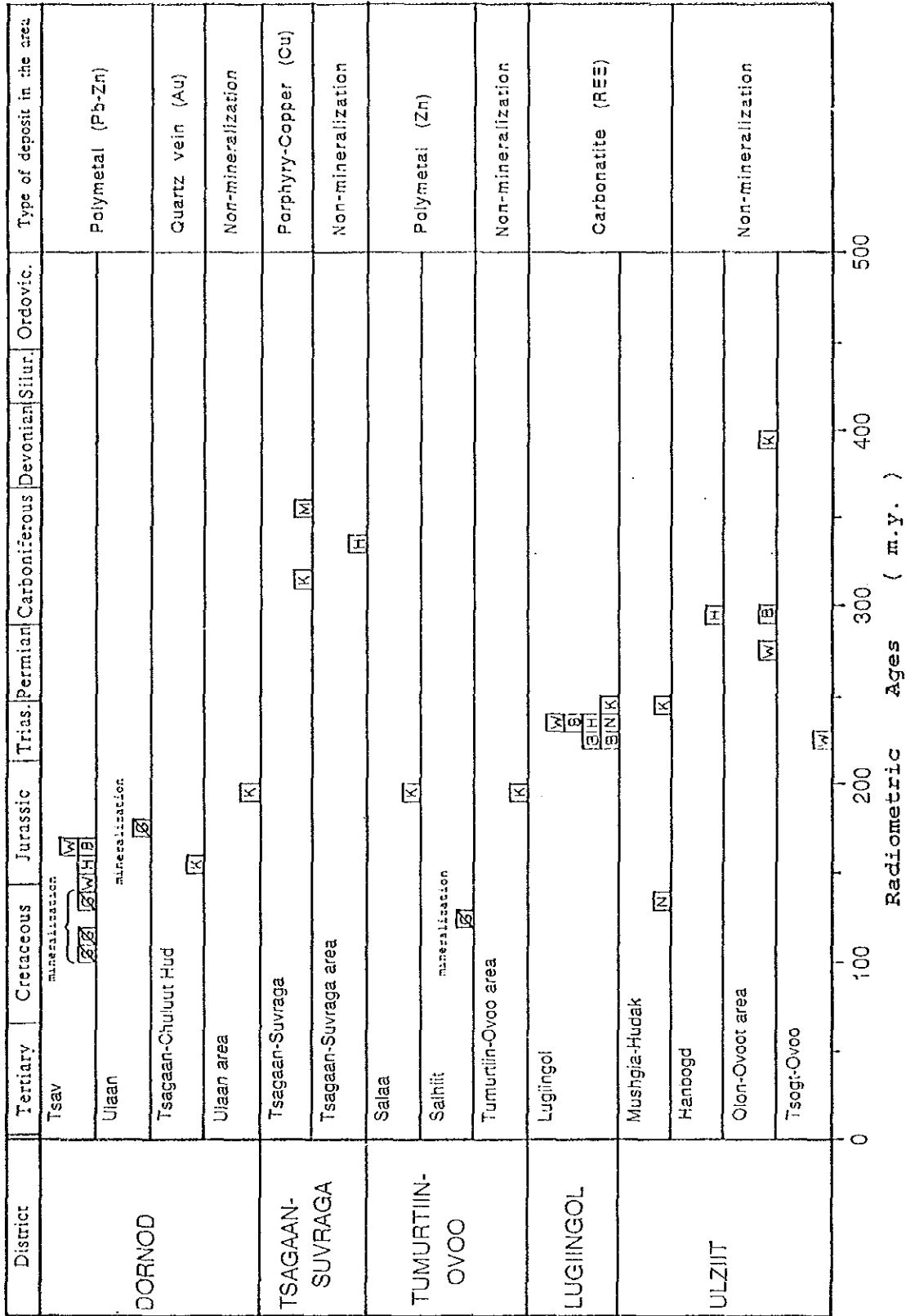
⊙: Abundant ○: Common △: Poor •: Rare ••: Unidentified *

Appendix I-16 X-ray Diffraction Analyses (Rare Earth, Rare Metal Deposits)

No.	SAMPLE No.	LOCALITY	ROCK NAME	Quartz	Plagioclase	K-feldspar	Calcite	Ankerite	Dolomite	Bafluorite	Mica	Smectite	Sericite	Kaolinite	Molybdenite	Monazite	Synchysite	Strontianite	Beryl	Topaz	Barite	Fluorite	Apatite	Anatase	Gypsum	Varosite	Pyrite	Magnetite	Hematite	Goethite	Asphalite	Phosphosiderite
79	3 NS 1	Yuguzer	Greisen, fl	⊙							⊙				△							△										
80	3 NS 6	Yuguzer	Oxide ore	⊙							⊙																					
81	3 NS 11	Tsentr	Secondary carbonate, on qf	⊙			△																									
82	3 NS 13	Nuhutlin-Tsagaan	Beryl	△																												
83	3 NS 14	Nuhutlin-Tsagaan	Qz, wf	⊙	△	△	⊙																									
84	3 RS 1	Luglingol	Carbonatite, synchi	⊙			⊙																									
85	3 RS 3	Luglingol	Carbonatite, synchi	⊙			⊙																									
86	3 RS 8	Luglingol	Carbonatite, synchi, pari	⊙			⊙	△																								
87	3 RS 10	Luglingol	Carbonatite, gm	⊙			⊙																									
88	3 RS 11	Luglingol	Carbonatite, pseu py	⊙			△																									
89	3 RS 13	Luglingol	Carbonatite, synchi, fl	⊙			△																									
90	3 RS 36	Salaa	Qz, limonite	⊙																												
91	3 UN 5	Olon-Ovoet area	Alkali rhyolite, topaz-by	⊙	⊙	⊙	⊙																									
92	3 US 2	Mushgia-Hudak	Carbonatite, bre ore, fl	⊙			⊙																									
93	3 US 6	Mushgia-Hudak	Carbonatite, bre ore, fl	⊙			⊙																									
94	3 US 9	Mushgia-Hudak	Carbonatite, fl, spt, mart	⊙			⊙																									
95	3 US 15	Mushgia-Hudak	Apatite, gypsum	△																												
96	3 US 18	Mushgia-Hudak	Magnetite rock, phlog																													
97	3 US 21	Mushgia-Hudak	Magnetite, apatite, gyp																													
98	3 US 26	Mushgia-Hudak	Carbonatite, fl, purp	⊙																												
99	3 US 88	Bayan-Hoshoo	Rhylic tuff, celestite, qz	⊙			△																									
100	3 US 90	Bayan-Hoshoo	Rhylic tuff, celestite, qz	⊙			△																									
101	3 US102	Bayan-Hoshoo	Carbonatite, celestite, ba	⊙			⊙																									
102	3 US103	Bayan-Hoshoo	Carbonatite, ba, qz, fl, py	△																												

⊙: Abundant ○: Common △: Poor •: Rare

Appendix 1-18 Histogram of Radio Metric Ages



X - Xf Pb - Pb
 B Biotite G Galena H Hornblende K K-feldspar M Muscovite N Nepheline W Whole rock

Appendix I-19 (I) Data of Dating (K-Ar) (I)

No. SAMPLE No.	LOCALITY	ROCK	MEDIA	A r *	% A r *	% K	ISOTOPIC AGE (Ma)
				($\text{scc}/\text{gm} \times 10^{-5}$)			
1 3 DY 16	Tsagaan-Chuluut Hud.	Granite porphyry	K-feldspar	5.25 5.23 5.40	89.4 92.7 92.8	8.53 8.45	154 ± 8
2 3 DN 17	Tsav	Monzodiorite	Hornblende	0.181 0.173	54.8 54.9	0.28 0.28	156 ± 8
3 3 DN 18	Tsav	Granite porphyry	Whole rock	2.32 2.36 2.23 2.29	93.4 94.4 92.7 93.2	4.08 4.04	140 ± 7
4 3 DN 19	Tsav	Schistose granite	Biotite	0.651 0.662 0.655	77.7 82.0 86.2	1.00 1.01	161 ± 8
5 3 DN 19	Tsav	Schistose granite	Whole rock	2.60 2.68 2.65	95.0 95.7 96.0	4.00 3.99	163 ± 8
6 3 DN 38	Ulaan area	Granite	K-feldspar	3.63 3.64 3.55 3.57	88.1 89.2 86.2 85.4	4.61 4.56	191 ± 10
7 3 RS 09	Lugiingol	Nepheline syenite	Biotite	2.52 2.50	93.5 93.2	2.52 2.57	237 ± 12
8 3 RS 14	Lugiingol	Syenite	Biotite	4.00 4.08 4.14	96.8 96.7 95.0	4.36 4.23	229 ± 11
9 3 RS 14	Lugiingol	Syenite	Hornblende	1.76 1.78	94.8 95.1	1.81 1.83	234 ± 12
10 3 RS 14	Lugiingol	Syenite	K-feldspar	7.90 7.68	91.2 92.5	7.68 7.80	242 ± 12
11 3 RS 14	Lugiingol	Syenite	Whole rock	6.30 6.16 6.25 6.16	97.3 97.9 97.4 98.2	6.27 6.23	239 ± 12
12 3 RS 15	Lugiingol	Nepheline syenite	Nepheline	7.13 7.06 7.12 7.05	97.3 97.0 97.8 98.1	7.30 7.32	234 ± 12

Appendix I-19 (2) Data of Dating (K-Ar) (2)

No. SAMPLE No.	LOCALITY	ROCK	MEDIA	A r *	% A r *	% K	ISOTOPIIC AGE (Ma)
				($\text{cc}/\text{gm} \times 10^{-5}$)			
13 3 RS 15	Lugiingol	Nepheline syenite	Biotite	3.12 3.19	94.3 93.7	3.33 3.34	228 ± 11
14 3 SN 21	Tsagaan-Suvraga	Greisen	Muscovite	11.6 11.4	98.4 98.2	7.55 7.58	354 ± 18
15 3 SS 24	Tsagaan-Suvraga	Quartz monzonite	K-feldspar	13.2 12.9	95.5 96.8	9.71 9.77	315 ± 16
16 3 SN 22	Tsagaan-Suvraga	Quartz monzonite	Hornblende	0.611 0.629 0.629	81.7 83.4 79.2	0.43 0.43	339 ± 17
17 3 TN 03	Salaa	Granite	K-feldspar	5.90 5.64 6.00	90.1 88.1 89.3	7.40 7.50	191 ± 10
18 3 TY 04	Tumurtiin-Ovoo area	Granite	K-feldspar	7.22 7.22	91.4 92.2	9.25 9.18	191 ± 10
19 3 UN 07	Hanbogd	Alkali granite	Hornblende	0.603 0.614 0.617 0.639	93.2 92.2 90.5 91.1	0.51 0.50	290 ± 15
20 3 US 19	Mushgia-Hudak	Syenite	Nepheline	3.41 3.34	94.2 95.8	6.30 6.36	132 ± 7
21 3 UN 01	Olon-Ovoot area	Graphic granite	Albite	0.128 0.127	13.7 18.3	0.07 0.08	392 ± 75
22 3 UN 02	Olon-Ovoot area	Gabbro	Whole rock	0.763 0.812	83.3 87.5	0.67 0.68	278 ± 14
23 3 UN 03	Mushgia-Hudak	Granite	K-feldspar	9.44 9.22	95.8 95.5	9.18 9.01	246 ± 12
24 3 UN 04	Olon-Ovoot area	Granodiorite	Biotite	4.94 4.94	94.5 95.6	4.03 3.98	292 ± 15
25 3 UY 05	Tsogt-Ovoo	Granite	Whole rock	3.90 3.90	96.3 96.8	4.15 4.17	226 ± 11

I. Analyst : TELEDYNE ISOTOPE (U.S.A.)

2. Constants : $\lambda \beta = 4.962 \times 10^{-10} \text{ yr}^{-1}$ $\lambda \epsilon = 0.581 \times 10^{-10} \text{ yr}^{-1}$
 $^{40}\text{K}/\text{K} = 1.167 \times 10^{-4} \text{ atm\%}$ $^{40}\text{Ar}/\text{Ar atmosphere} = 295.5$ (Steiger and Jager, 1977)

3. $^{40}\text{Ar}^*$: Radioactive Argon

Appendix 1-20 Data of Dating (Pb-Pb)

No.	SAMPLE No.	LOCALITY	ORE TYPE	MEDIA	204 P b	206 P b	207 P b	208 P b	Isotopic Age (Ma)
1	3 DS 01	Tsav	Polymetal vein ore	Galena	1.369	25.111	21.268	52.252	131.0
2	3 DS 05	Tsav	Polymetal vein ore	Galena	1.371	25.140	21.279	52.210	116.1
3	3 DY 03	Tsav	Polymetal vein ore	Galena	1.372	25.142	21.278	52.208	109.3
4	3 DN 39	Ulaan	Polymetal breccia pipe ore	Galena	1.368	25.071	21.282	52.279	170.1
5	3 TN 08	Salhiit	Garnet-magnetite skarn ore	Galena	1.372	25.165	21.309	52.154	125.3

1. Analyst: TELEDYNE ISOTOPES (U.S.A.)

2.

$$Ma = \left[\frac{{}^{207}\text{Pb} / {}^{204}\text{Pb} - 10.294}{{}^{206}\text{Pb} / {}^{204}\text{Pb} - 9.307} \right]$$

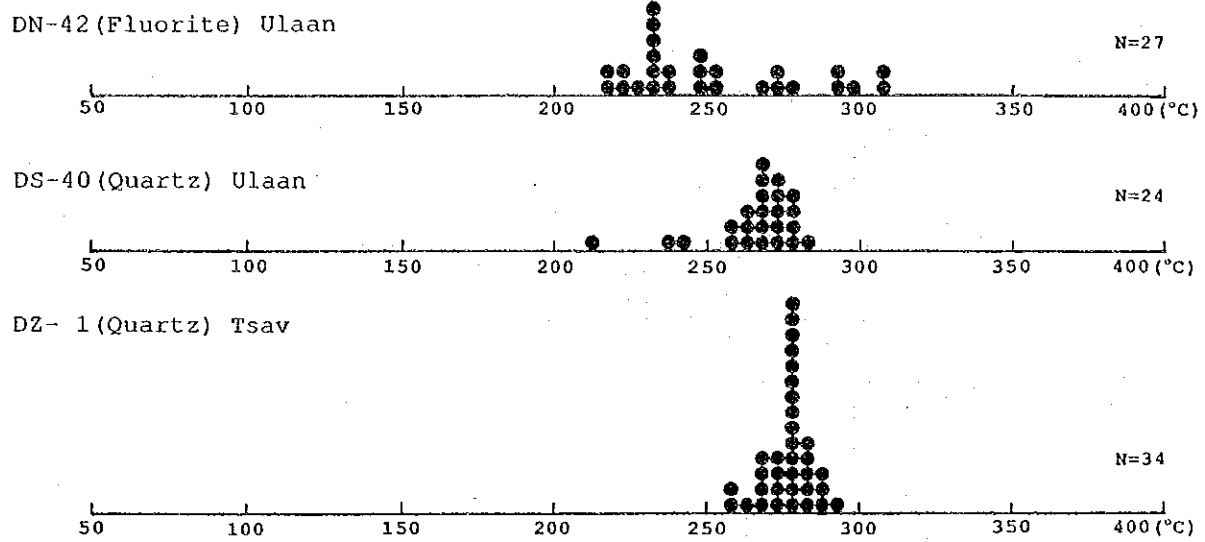
(after Doe and Stacey, 1974; Faure, 1977)

Appendix 1-21 Homogenization Temperature of Fluid Inclusions

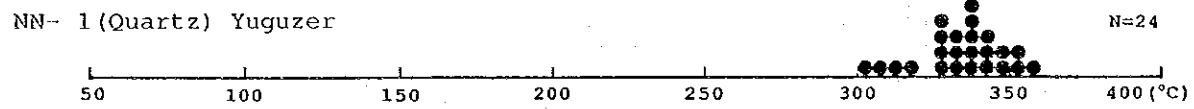
No.	Type of deposit (element)	Deposits	Sample No.	Mineral	Number of measurements	Homogenization temperature (°C)		
						Range	Mean of sample	Mean of deposit
1		Ulaan	3DN42	Fluorite	27	215 - 307	252	258
2	Polymetal (Pb, Zn)		3DS40	Quartz	24	213 - 280	264	
3		Tsav	3DZ 1	Quartz	34	255 - 291	276	276
4	Greisen(W)	Yuguzer	3NN 1	Quartz	24	301 - 357	334	334
5	Fluorite vein(F)	Bor-Undur No.5 vein	3HN22	Fluorite	9	92 - 260	156	156
6		Maihantaz	3HY 2	Fluorite	15	147 - 171	160	160
7	Carbonatite(REE)	Lugilingol	3RS13	Fluorite	24	160 - 285	213	213
8		Olon-Ovoot	3US36	Quartz	19	219 - 283	246	
9			3US40	Quartz	18	185 - 341	270	246
10			3US47	Quartz	16	169 - 339	251	
11	Quartz vein(Au)		3US54	Quartz	18	181 - 251	218	
12		Onh	3UY 1	Quartz	13	191 - 339	301	301
13		Dugshin	3UY 6	Quartz	24	207 - 331	280	281
14			3UY 7	Quartz	14	253 - 328	283	

Appendix 1-22 (1) Histogram of Homogenization Temperature of Fluid Inclusions (1)

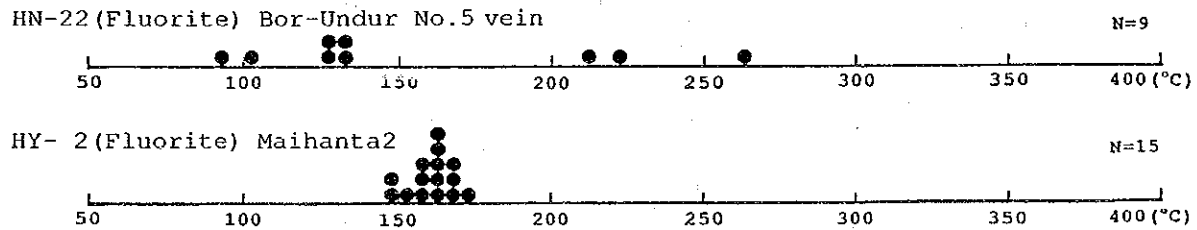
Polymetal (Pb, Zn)



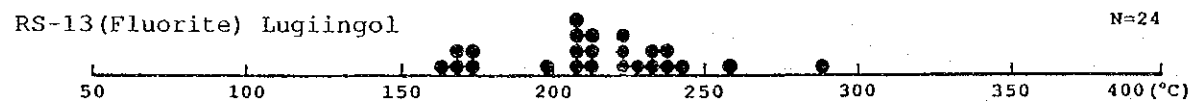
Greisen (W)



Fluorite vein (F)

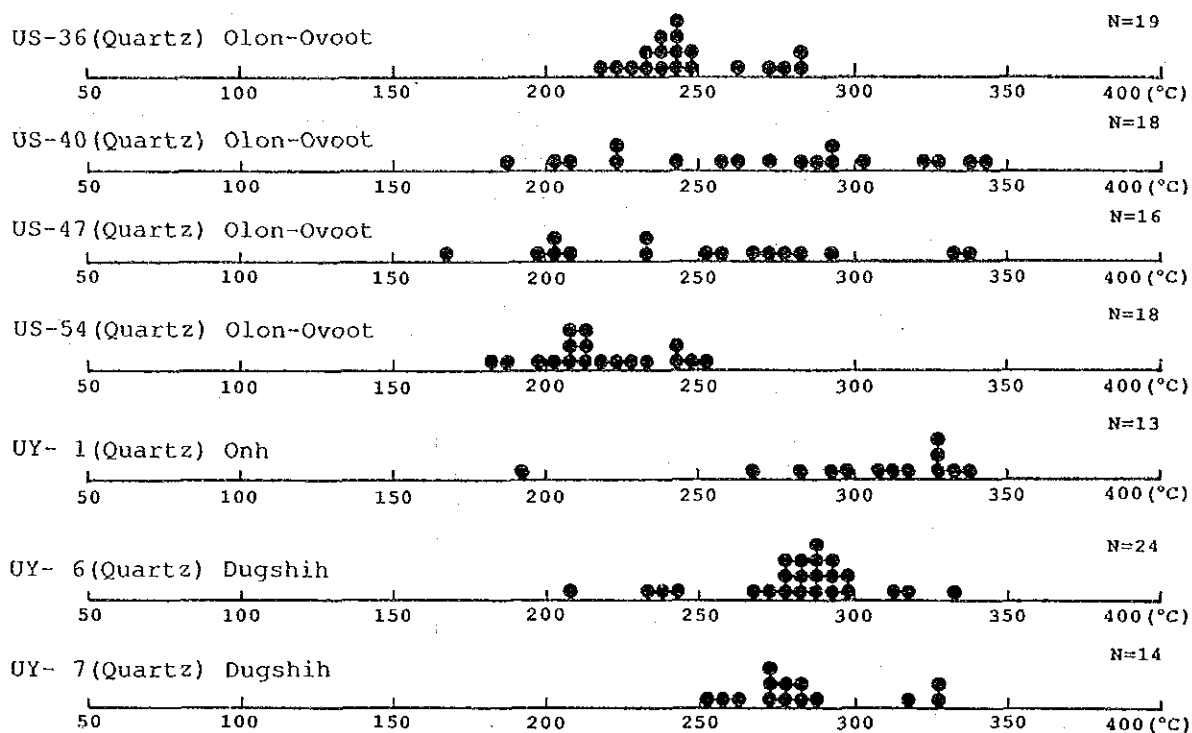


Carbonatite (REE)



Appendix 1-22 (2) Histogram of Homogenization Temperature of Fluid Inclusions (2)

Quartz vein (Au)



Appendix 1-23 Fossil Identifications

Sample : Fossiliferous calcareous siltstone (Sample No. 3SS10)

Locality : Tsagaansuvraga area, Central Gobi, MPR (43° 51' N, 108° 21' E)

(Phylum)	Name	Age	Distribution	Note	Determined by
(Brachyopoda)	Athyris sp.	Lower Devonian~Triassic	World wide		Junichi TAZAWA
(Brachyopoda)	Productella sp.	Middle Devonian~Upper Devonian	Europe, Asia, N. America		Junichi TAZAWA
(Brachyopoda)	Spiriferide			gen. et sp. indet.	Junichi TAZAWA
(Brachyopoda)	Rhynchonellide			gen. et sp. indet.	Junichi TAZAWA
(Bryozoa)	Fenestera spp.	Ordovician~Permian		sp. indet.	Sumio SAKAGAMI
(Bryozoa)	Penniretepora spp.	Ordovician~Permian		sp. indet.	Sumio SAKAGAMI

(ABBREVIATIONS) gen. : genus
 et : and
 sp. : species
 indet. : indeterminate

A p p e n d i x 2

Mines and Ore-showings of the Uudam-Tal Area

- Appendix 2-1 Mines and Ore-showings of the Uudam-Tal Area
- Appendix 2-2 Gold deposit and Ore-showings in the Ulziit Area

Appendix 2-1 Mines and Ore-showings of the Udum-Tal Area (1)

AREA No. Name of deposit DORNOV AREA	LONGITUDE		LATITUDE		MINERAL DEPOSIT	TYPE OF DEPOSIT	TYPE OF ORE	RESERVE (T. t)	ORE GRADE (Au, Ag, g/t, Others: %)		HOST ROCK	DISCOVERY YEAR	EXPLORATION CONDITION	NOTE
	115° 20' 16"	48° 55' 27"	770 m	Ag, Pb, Zn					Polymetal	7.680				
1. Tsav	115° 20' 16"	48° 55' 27"	770 m	Ag, Pb, Zn	Polymetal	7.680	Ag 222.4, Pb 6.4, Zn 4.6	Gns, Schist, Dior, Gr. An Bas.	1975 USSR	Intensively explored	Under exploration by MPR, Cretaceous Mineralization.			
2. Ulaan	114° 05' 47"	48° 05' 12"	1.159 m	Ag, Pb, Zn	Stockwork & Skarn	68,100 + P 25,000	Ag 49, Pb 0.95, Zn 1.90	Rhyolite (Jurassic)	1973 USSR	Intensively explored	All the exploration was done by USSR. Now stopped			
3. Mubar	1.2 km southeast from Ulaan dep.			Ag, Pb, Zn	Stockwork	25.500	Ag 113, Pb 0.63, Zn 3.4	Rhyolite (Jurassic)	1973? USSR	Insufficient	All the exploration was done by USSR. Now stopped			
4. Bayan-Uul	115° 41' 16"	48° 54' 11"	920 m	Ag, Pb, Zn	Quartz vein and stockwork	61.110	Ag 80g/t, Pb+Zn 1~2% Gr(Pz), Au 0.3g/t, Cu 0.10-0.13	Dior. (Mz)	1975 USSR	Insufficient	Being studied by MPR			
5. Salhiit	115° 41' 01"	48° 57' 37"	732 m	Ag, Pb, Zn	Quartz vein	-	Ag 15g/t at outcrop	Schist, Gr. Grd. An	1988	? 20 drillings	Abandoned			
6. Delger-Munh	114° 48' 21"	48° 46' 38"	917 m	Ag, Pb, Zn?	Quartz vein	-	not clarified	An, Shale, Ss, Cgl	1982 USSR	IP, Boring.	Under exploration			
7. Tsagaan-Chuluut Huduk	113° 25' 00"	49° 28' 00"	860 m	Au	Placer	Au 4 t?	not clarified	Alluvium	1973	Intensive	Under exploration Production from 1992.			
8. Mardai	114° 21' 30"	49° 06' 20"	900 m	U	Stockwork & vein	?	?	Rhy. An. Bas. of Jurassic	1972	?	Under exploitation by USSR			
TUMURTIIN-OVOO AREA														
1. Tumurtiin-Ovoo	113° 39' 29"	46° 47' 44"	1.135 m	Zn	Massive	7.580	Zn 11.5%	Limestone Siluro-Devon	1974 GBR/MPR	Intensive 113 drillings	Under stripping for exploitation.			
2. Salhiit	113° 30' 05"	46° 48' 02"	1.074 m	Zn	Massive	920	Zn 6.4%	Limestone Siluro-Devon	1966 UPR	Intensive	Many drillings were done.			
3. Salaa	113° 26' 06"	46° 48' 49"	1.070 m	W	Quartz vein	170	W ₀₃ 1.35%	Granite of Jurassic	1966 UPR/MPR	Intensive	Mined out by open pit & underground			
4. Arin-Nuur	113° 57' 31"	47° 13' 44"	1.006 m	Cu, Mo	Greizen	24.100	Mo 0.107%, Cu 0.06%	Gr. Grd. Jurassic~	1967 UPR	Intensive	Mined out by open pit & underground			
NUHUT-DAVAA														
1. Yuguzer	115° 24' 02"	45° 54' 27"	1.181 m	W, Mo, Be, Bi	Greizen qz vein	21.580	W ₀₃ 0.197%, Mo 0.056%, Bi 5.140 t(Av 0.132%), Be 41.000 t(Av 0.08%)	Granite Triassic~ Jurassic	1989 USSR	Very intensive	Mined by underground method. Difficulty in ore dressing.			
2. Tsentr	115° 35' 18"	45° 56' 08"	1.167 m	Sn, W, Be, Mo	Greizen	9.000	Sn 0.078%, W ₀₃ 0.137%, BeO 0.120%	Granite Trias ~Jura	1977	Very intensive	Abandoned after exploration			

Appendix 2-1 Mines and Ore-showings of the Uudam-Tal Area (2)

AREA No. Name of deposit	LOCATION		MINERAL	TYPE OF DEPOSIT	TYPE OF ORE	RESERVE (T.t)	ORE GRADE (Au, Ag, t, Others: %)	HOST ROCK	DISCOVERY YEAR	EXPLORATION CONDITION	NOTE
	Longitude	Latitude									
3. Nuhitiin-Tsagaan-tolgol	109° 48' 24"	46° 03' 17"	Be	pegmatite	Beryl	?	?	Granite	?	?	lenticular body, 10 ~ 20 m long
HAR-AIRAG AREA											
1. Bor-Uundur	109° 25' 18" 109° 26' 16"	46° 15' 21" 46° 16' 19"	CaF ₂	Vein	Quartz-Fluorite	20,985	CaF ₂ 39.10 %	Basalt, Qp. Gr. Cretaceous	1966	Intensive Working	production 210,000 t/y CaF ₂ 32 %
2. Adag	109° 19' 32"	46° 17' 44"	CaF ₂	Vein	Quartz-Fluorite	4,000	CaF ₂ 40 %	Granite, Qp.	?	Intensive Working	production 60,000 t/y CaF ₂ 27 % ~ 29 %
3. Chol-Tsagaan-Del	107° 14' 21"	46° 55' 48"	CaF ₂	Vein	Quartz-Fluorite	1,400	CaF ₂ 40 % ~ 53 %	Phyl. Sch. Dol. Ls	1978	Intensive Working	production 60,000 t ~ 70,000 t/y CaF ₂ 40 % ~ 53 %
4. Hongor	109° 44' 51"	45° 48' 17"	CaF ₂	Vein	Quartz-Fluorite	1,376	CaF ₂ 29 % ~ 34 %	Sch. Ls. Rhy. Protero. Carb	1964	Intensive Exploited by open pit	Closed 1977-1979 produc. 239,729t crude o.
5. Maihanta I II	108° 38' 20" 108° 39' 54" 45° 51' 22"	45° 49' 50" 45° 51' 22"	CaF ₂	Vein	Quartz-Fluorite Cal-Fl	2,887 197	CaF ₂ 36.5 % CaF ₂ 33.1 %	Gas, Gr. Ls Protero-Pz.	1971	Intensive Exploited by Open pit	Abandoned Difficulty in ore dressing.
6. Tsagantakhilch	108° 37' 36"	45° 47' 46"	CaF ₂	Vein	Quartz-Fluorite	1,824	CaF ₂ 40.5 %	Gas, Gr. Ls	1971	Intensive 55 bore holes	abandoned.
7. Hamar-Uс	110° 10' 28"	46° 25' 13"	CaF ₂	Vein	CaF ₂	1,053	CaF ₂ 47.1 %			Intensive	Working
8. Dzuun-Tsagaan-Del	110° 02' 18"	46° 22' 12"	CaF ₂	Vein	CaF ₂	6,952	CaF ₂ 32.1 %			Intensive	Working
9. Tsagaan-Elegeni	30km southeast from Dzuun-Tsagaan-Del		CaF ₂	Vein	CaF ₂	1,100	CaF ₂ 46.0 %			Intensive	
10. Haiyuu-Ulaan	109° 52' 05"	46° 19' 24"	CaF ₂	Vein	CaF ₂	582	CaF ₂ 39.0 %			Intensive	
LUGINGOL AREA											
1. Luginol	108° 35' 04"	42° 58' 38"	RE	Vein	Carbonatite	436	TR50 2.86 %	Alkaline rock complex Triassic	197?	Intensive	Left
TSAGAANSUVRAGA											
1. Tsagaansuvraga	108° 20' 47"	43° 51' 56"	Cu, Mo	Porphyry	disseminated	240,044 (Serven-Suhait ore body or No. 1 ore body only)	Cu 0.58 %, Mo 0.018 %	Quartz-monzonite	1964 MPR	Very intensive	Left. Not pay for initial cost.
2. Duchi-Hural	106° 18' 00" 106° 20' 25"	44° 04' 30" 44° 05' 50"	Cu	Porphyry	dissem. stockw.	2,600	Cu 0.31 %	An. Gd-Por. Carb-Pert	1971 MPR	12 drillings	Abandoned

Appendix 2-1 Mines and Ore-showings of the Udam-Tal Area (3)

AREA No. Name of deposit	LONGITUDE		MINERAL	TYPE OF DEPOSIT	TYPE OF ORE	RESERVE (t)	ORE GRADE (Au, Ag: g/t, Others: %)		HOST ROCK	DISCOVERY YEAR	EXPLORATION CONDITION	NOTE
	Longitude	Latitude					Cu	Others				
3. Harnagtai	106° 08' 40"	44° 01' 30"	Cu	Porphyry	dissem. & stockw.	139,600	Cu 0.25 %		An. Gd-Por. Carb-Perm	1971 MPR	3 drillings	Abandoned
4. Ih-Shanhai	106° 00' 00"	43° 40' 20"	Cu	Porphyry	dissem. Qz stockw.	-	Cu 0.01 ~ 2.5 %, Au 0.03 ~ 3g/t		An. tuff. Gr. Grd. Carbon	1971	IP, Magne	Abandoned
5. Narinhuduk	107° 11' 00"	44° 14' 10"	Cu	Porphyry	dissem. 6 ore bodies	8,600	Cu 0.58 %		Grd. Dior. Permian	1971	1/50,000 Geol. surv., IP	Abandoned
5. Ovootu-Hira	105° 02' 10"	44° 01' 05"	Cu	Porphyry	Qz stock-work	-	Cu 0.05 % ~ 0.3 %, Ag 0.2 ~ 0.6g/t, Au ≤ 5g/t		Ord-por.	1971	14 drillings IP, Geochem. Magne, Trench	Abandoned
6. Shuten	107° 21' 15"	43° 36' 25"	Cu	Porphyry	dissem.	-	Cu 0.31 %		Grd. Gr. Por. Ap. Dior.	1971	Geological mapping	Abandoned
7. Uhaa-Hudak	106° 12' 30"	44° 01' 45"	Cu	Porphyry	Stockw.	-	Cu 0.05 % ~ 3 %, Ag 0.1 ~ 12.3 g/t		Ord Carbon-Perm.	1971	9 drillings 9 trenchings	Abandoned
ULZIT AREA												
1. Mushingia-Huduk	104° 00' 16"	44° 23' 41"	RE	Vein, lens	Carbonatite	398,000	TREO 1.53		Syenite Jurassic	1974-77 USSR/MPR	Intensive 100 < drilling holes	Ore reserve drastically decreased by 1989-90 survey
2. Bayan-Hosho	104° 21' 19"	44° 20' 17"	Sr	Massive	Stockw. of celestite	about 700	SrO 40~50 %		Rhy. Tuff. Syenite of Jurassic	1976	Intensive With many drillings	Vein ratio at surface is 2 ~ 3 % Abandoned
3. Olon-Ovoot	104° 09' 44"	44° 22' 28"	Au	Vein Network	Auriferous quartz v.	?	Au up to 32.8g/t in 68 samples, max 340g/t in spot samples.		Ss, Shale of Silurian	1979-82 USSR	Insufficient	Under exploration possibly workable
4. Dugshih	104° 55' 48"	44° 24' 29"	Au	Vein swarm	Auriferous quartz v.	?	Au up to 50 g/t in 18 samples.		Diabase, Gab. Devonian	1979-82 USSR	Insufficient	Left.
5. Onh	105° 22' 29"	44° 36' 12"	Au	Vein	Auriferous quartz v.	?	Au 0.1 ~ 0.4 g/t, Ag 0.2 ~ 0.8 g/t		Sch. Rhy, Gab Siluro-Devon	1979-82 USSR	Insufficient	Left.
6. Bayan-Bor-Nuruu	104° 53' 06"	44° 24' 25"	Au	Vein	Auriferous quartz v	?	Au 1 ~ 6 g/t in 182 samples		alt. Ss. sh Silurian	1979-82 USSR	Insufficient	Left.

Appendix 2-2 Gold Deposits and Ore-showings in the Ulziit Area (1)

Name or Number of Occurrence	Mineral	Ore-type	C o o r d i n a t e		Characteristics and Scale	Host Rock	Quantity of Samples	Assay Au(g/t) Ag(g/t)	N o t e
			Longitude	Latitude					
Olon-Ovoot	Au	Quartz vein	104° 08' 44"	44° 22' 28"	Vein swarm of auriferous quartz veins, partly network type. Quartz vein zone: L. 50m~100m x W: 20~50m x D: 30~50m?	sandstone siltstone shale (Silurian)	55 pcs	~32.8	pyritization is widely seen. mesothermal type. Under exploration by MPR
Dugshih	Au	Quartz vein	104° 55' 48"	44° 24' 29"	Vein swarm of auriferous quartz veins. L. 30~80m. Quartz vein zone: L. 150m x 50m	diabase, gabbro, schist (Siluro-Devon)	18 pcs	up to 20-60	sericitization, pyritization, silicification
Onh	Au	Quartz vein	105° 22' 29"	44° 36' 12"	Vein swarm of auriferous quartz veins. L. 50~150m x W max. 1m zone: L. 2.500m x W. 600m	diabase, gabbro, schist (Siluro-Devon)	2 pcs	0.07 >	sericitization, pyritization
1	Ag	Quartz vein	106° 50' 15"	45° 10'	zone: 600 m x 50 m vein: up to 50 m x 2.5 m containing green copper, pyrite	limestone R ₂ or ₂	1 pc	30	4 km north from Haldzan-ula Pb 0.2 %, Cu 0.05 %, Bi 0.015 %
2	Ag	Quartz vein	106° 40' 25"	45° 15'	vein: 50 m x 1.5 m	acidic tuff (Devonian)	1 pc	50	2.5 km NE from Hutul Usu-khuduk Pb 0.3 %, Cu, Zn 0.02 %
3	Au	Quartz vein	104° 52' 15"	44° 22' 30"	vein: 10 m x 0.4 m	sandstone (Devonian)	1 pc	3.0	5 km SE from Saltain Vosaga-khuduk
4	Au	Quartz vein	104° 31' 15"	44° 12' 15"	zone: 1,000 m (N-S) x 50 m vein: up to 100 m x 0.3 ~0.5 m	γ ₂ P ₁	1 pc	0.5	Tsagan Tolgoi-khuduk
5	Ag	Stockwork of quartz	104° 26'	43° 51' 40"	area: 200 m x 100 m vein: up to 1 ~3 cm	silicious S ₂ D ₁ gs	2 pcs	10.50	1 km west from Takniga-Ula
6	Au	Quartz vein	104° 22' 35"	44° 25' 45"	area: 700 m x 100 m vein: up to 100 m x 1 m	claystone, sandstone (D ₁ ms)	1 pc	0.3	2 km NW from Mu Suhai-khuduk
7	Au	Quartz vein	104° 25'	44° 26' 30"	zone: 500 m x 50 m vein: up to 50 m x 1 m (parallel veins)	claystone, sandstone (D ₁ ms)	1 pc	0.3	2.5 km N ~NE from Mu Suhai-khuduk
8	Ag	Silicified rock	106° 45' 10"	45° 10' 40"	zone: 500 m x 50 m silicification, brecciation, hematization	limestone (R ₂ or ₂)	1 pc	8	3.5 km SW from Sologoi-khuduk As 0.04 % Sb 0.01 %
9	Ag	Quartz vein	106° 01'	45° 10' 25"	vein: 100 m x 0.3 ~2.5 m (brecciated quartz vein)	limestone R ₂ or ₂ , γD ₂	1 pc	6	3 mk N ~NW from Tsaiangatai-khuduk Pb, Zn 0.1 %, Cu 0.07 %, Bi 0.03 %
10	Au	?	104° 37' 45"	44° 09'	zone: 200 m x 50 m	tuff breccia	1 pc	0.2	2.8 km S ~SE from Tsagan Tolgoi-khuduk. Pb 0.05 %, Zn 0.02 %, Mo 0.002
11	Au	Stockwork of quartz	104° 50' 20"	44° 20' 25"	area: 300 m x 100 m vein: up to 3 cm wide	sandstone S ₁₋₂ m n	1 pc	0.3	7 km S-SE from Saltain Vosaga-khuduk
12	Ag	milky quartz	105° 51' 40"	45° 52' 20"	zone: 900 m x 50 m (quartz vein with brecciated texture)	acidic tuff	20 pcs	0.003 ~0.1	1 km S from Polo Knabtsagai-khuduk. Pb, Cu, Zn up to 0.05%. Mo up to 0.01%

Appendix 2-2 Gold Deposits and Ore-showings in the Ulziit Area (2)

Name or Number of Occurrence	Mineral	Ore-type	C o o r d i n a t e		Characteristics and Scale	Host Rock	Quantity of samples	Assay		N o t e
			Longitude	Latitude				Au (g/t)	Ag (g/t)	
13	Ag	Quartz vein	105° 42' 30"	45° 35'	vein swarm of quartz veins area: 300 m × 50 m vein: up to 50 m × 0.5 m	volcanic rocks P ₁ sh ₁	20 pcs	up to 0.05 0.3 0.50	Cu, Zn, W ≤ 0.015 % Pb ≤ 0.05 % Mo ≤ 0.005 %	
14	Au, Ag	Quartz vein	105° 52' 50"	45° 50' 05"	parallel quartz veins area: 500 m × 100 m vein: up to 150 m × 5 m	γ δ P ₁	12 pcs	0.03 ~0.1	Zn ≤ 0.15 % Mo ≤ 0.008 % W ≤ 1.0 %	
15	Ag	silicified rock	106° 14' 35"	45° 58' 35"	silicified rock, pyrite dissem. area: 200 m × 200 m	acidic volcanics P ₁ sh ₁	3 pcs	0.8	Cu ≤ 0.1 %, Zn 0.01 ~ 0.03 W ≤ 0.01 %	
16	Ag	Quartz net-work	104° 42' 05"	45° 55' 40"	zone: 500 m × 20 m vein: ≤ 15 m × 0.8 m	sedimentary rocks P ₂ sh ₂	6 pcs	0.003 ~0.1	Pb 0.01 ~ 0.3 %, Bi ≤ 0.004 % Zn, Cu 0.015 ~ 0.15 %	
17	Ag	Parallel quartz vein	104° 52' 05"	44° 54' 15"	area: 300 m × 100 m vein: 10 ~ 30 m × 0.1 ~ 0.5 m	γ D ₂	4 pcs	0.5 0.50	1.4 km S from Tsagan-Ura Pb ≤ 0.08 %, As, Cu ≤ 0.04 %	
18	Ag	Quartz vein swarm	104° 54'	44° 51' 10"	vein: 10 ~ 100 m × 0.2 ~ 2 m containing galena and malachite	shale R ₁₋₂ SV	5 PCS	0.1 0.1	5 km W Unaga-Ura As, Zn 0.02 %, Mo ≤ 0.003 %	
19	Au, Ag	Quartz vein	105° 18' 15"	44° 40' 30"	area: 800 m vein: ≤ 0.5 m wide	σ P ₂₋₂	13 pcs	0.1 ~ 0.4	2.5 km SW from Onchiin Tsuzo-Ula Cr 0.1 ~ 0.7 %, Ni 0.1 ~ 0.3 % Co 0.01 ~ 0.3 %	
20	Ag	Quartz vein	105° 46' 55"	45° 55' 30"	zone: 1,000 m × 15 m vein: ≤ 50 m × 0.5 m brecciated chaledonic quartz veins, many vugs after pyrite	sandstone T ₂₋₃ mu	4 pcs	0.1 0.10	1.4 km N from Soirig Khairkhan-Ula W, Mo ≤ 0.03 %, As ≤ 1.0 %, Ge 0.1 % Be, Sb ≤ 0.05 %	
21	Au, Ag	silicified rock	105° 20'	45° 59' 30"	mono-quartz silicified rock, quartz-kaolinite, hematite-sericite-quartz facies	dacite P ₁ sh ₁	33 pcs	≤ 0.1	Tsagan Kharatu Cu ≤ 0.1 %, Ge > 0.1 %, Mo 0.001 ~ 0.03 %, W 0.001 % ~ 0.015 %	
22	Au, Ag	Qz-Tour breccia	104° 53'	44° 23' 30"	quartz-tourmaline breccia vein: ≤ 25 m × 0.6 m	sandstone S ₁₋₂ mn, μ β D ₂	3 pcs	0.02 ~2	4.8 km E-SE from Saltain Vosaga-khuduk As ≤ 0.005 %	
23	Ag	Quartz	106° 50' 15"	44° 55' 40"	quartz containing green copper	amphibolite pyroxenite D ₂ bt	1 pc	50	4 km SE from Undur-Uda Cu 0.5 %	
24	Au	Qz-Tour vein	104° 52' 15"	44° 24' 15"	quartz, quartz-tourmaline vein zone: 150 m × 20 m vein: ≤ 50 m × 0.3 m	siltstone D ₁ ir ₁	2 pcs	0.3, 5.0	4 km E-NE from Saltain Bosaga-Khuduk	
25	Au, Ag	Quartz vein	106° 54' 05"	45° 30' 25"	quartz veins, silicification, argillization, propylitization zone: 300 m × 10 m vein: ≤ 15 m × 2 m	rhyolite P ₁ sh ₁	5 pcs	≤ 0.1	1 km west from Chili-Khuduku	
26	Au, Ag	Quartz vein	104° 49' 20"	45° 53' 45"	quartz veinlets zone: 100 m × 70 m vein: ≤ 5 cm wide	sedimentary rocks, dike P ₂ sh ₂ , P ₂	1 pc	0.7	1.3 km N from Tsordoi-Khuduk quartz veinlet zone zone: 100 m × 70 m, vein: ≤ 5 cm	

A p p e n d i x 3

Mining History of the Udam-Tal Area

Mining History of the Uudam-Tal Area

1983	Russia started a geological survey around the Yuguzer.
1939	Kabariam, a Russian discovered a tungsten vein in a part of Yuguzer deposit during his survey for water resources.
1942~1943	A geological survey (1/10,000) began around the Yuguzer deposit, and 45 tungsten-bearing veins were discovered (the USSR).
1943	Mining of the Yuguzer deposit began (the USSR).
1954	A geological survey (1/200,000) began in Har-Airag (the USSR).
1954	Mineral showings of Mo, W and Be, such as Saihan-Ula, Tsagan-Ula, etc. were discovered during a geological survey (1/200,000) (the USSR).
1956	The Bor-Undur deposit was discovered (the USSR). The Yuguzer Mine was closed.
1957~1958	Evaluation work was conducted in the Bor-Undur deposit (the USSR).
1964	The Tsagaansuvraga deposit was discovered by local resident.
1964	Exploration of copper deposits around the Erdenet deposit began (the USSR)*.
1965	A survey over a wide area began around the Tsagaansuvraga deposit (the USSR).
1966	Salaa, Salhiit, etc. deposits were discovered in the Nuhut-Dawaa district by the cooperative survey of Hungary and Mongolia.
1967	The Arin-Nuur copper and molybdenum deposit was discovered by the cooperative survey team of Hungary and Mongolia.
1969	Bayan-Hairast deposit was discovered by the cooperative survey team of Mongolia and the USSR.
1971	Mainhanta and Tsagantakhilch fluorite deposits were discovered (the USSR).
1971~72	20 copper ore showings were discovered by the geological survey around the Tsagaansuvraga deposit (the USSR).
1972	Mardai-uranium deposit and Lugiingol deposit were discovered (the USSR).
1973	Air-borne magnetic survey was conducted in the Tumurtiin-Ovoo district by the cooperative survey team of East Germany and Mongolia.
1973	Tsagaan-Chuliut-Huduk placer gold was discovered during a geological survey (1/200,000) (the USSR).
1974	The Tumurtiin-Ovoo deposit was discovered by the cooperative survey team of East Germany and Mongolia.
1974	Development of Hongor fluorite deposit began (Mongolia).
1974~1977	Mushgia-Hudak deposit was discovered by the cooperative survey of Mongolia and the USSR.
1975	The Tsav and Bayan-Uul deposits were discovered during a geological survey (1/200,000) (the USSR).
1975	Tsagaansuvraga geological survey team was organized for the survey of southern Gobi copper deposit zone (the USSR).
1975~1977	Tsentr and Aronsar deposits were discovered.
1976	Bayan-Hoshoo deposit was discovered during a geological survey (1/200,000) (the USSR).
1978	Chol-Tsagaan-Del fluorite deposit was discovered (the USSR).
1978	Production of Erdenet* copper mine began by the cooperation of Mongolia and the USSR.
1979	Exploration of Chol-Tsagaan-Del fluorite deposit began (Czechoslovakia).

1979~1981 A detailed survey of Bor-Undur fluorite deposit was conducted (the USSR).

1979~1982 A detailed survey of Tsagaansuvraga deposit was conducted (the USSR).

1979~1982 A large number of gold ore showings were discovered in the Ulziit district such as Olon-Ovoot, Onh, etc. during a geological survey (1/200,000) (the USSR).

1980 Production began in the Mardai-uranium deposit (the USSR).

1980 Production begun in the Chol-Tsagaan-Del deposit by the cooperation of Mongolia and Czechoslovakia.

1981 A detailed geological survey of Tsav deposit began (the USSR).

1982 A boring survey of Tsav deposit began (the USSR).

1982 Ore reserves of the Bor-Undur fluorite deposit was calculated to be 11,886,270t (the USSR).

1983 A survey of the Tsav deposit began by the Dornod Exploration Party (By the cooperation of Mongolia and the USSR).

1984~1986 Boring and trenching surveys of Bayan-Uul were conducted (Mongolia).

1985 Geological survey (1/10,000) and geochemical exploration of the Tsav deposit were conducted (By the cooperation of Mongolia and the USSR).

1986~1989 A detailed survey of Tsav was conducted (By the cooperation of Mongolia and the USSR).

1988 The Salhiit deposit was discovered during a survey (1/50,000).

1988 No.14 Shaft was sunk for the Tsav deposit (Mongolia).

1988~1991 Geochemical exploration and geophysical exploration of Bayan-Uul were conducted (By the cooperation of Mongolia and the USSR).

1989 The final F/S of the Tumurtiin-Ovoo deposit was conducted by Mongolia.

1989~1990 Geology Company confirmed high grade gold at a part of the Olon-Ovoot gold ore showings in the Ulziit district during their geological survey (1:50,000).

1990 No. 15 shaft was sunk for the Tsav deposit (Mongolia).

1990 Mongolian Mining Corporation was permitted to develop the Tumurtiin-Ovoo deposit.

1991 Geology Company carried out five diamond drillings and one trenching for Olon-Ovoot gold showings in Ulziit district (Mongolia).

1991 In July, Erdenet Company started the development and stripping of the Tumurtiin-Ovoo deposit.

1991 In July, a set of data related to the exploration of the Ulaan deposit were transferred to the Mongolian government.

1991 In July, the Tsagaan-Chuluut Huduk alluvial gold area is being explored by 270 people. The production is planned to begin in 1992.

Notice * indicates that it is outside of the Uudam-Tal area.

A p p e n d i x 4

Statistical Data

- Appendix 4-1 Production of Non-ferrous Metallic Minerals and Fluorite of MPR (1986~1990)
- Appendix 4-2 Trade of Non-ferrous Metallic Minerals (1986~1990)
- Appendix 4-3 Coal Production of MPR (1986~1990)
- Appendix 4-4 Exportation of Coal (1986~1990)

Name of the Mines	Mineral	Products	Unit	1986	1987	1988	1989	1990	Note
1. Erdenet	Cu, Mo	Crude ore	M. t	17.0	16.6	17.3	17.9	17.9	Porphyry type
		Cu-conc. (35% Cu)	T. t	344.4	345.4	347.7	352.9	354.1	All exported
		Mo-conc. (47% Mo)	t	3.232	3.240	3.268	3.361	4.208	to USSR & JPN
1. Modot	Sn, W	Sn-conc. (50% Sn)	t	175.4	178.1	181.7	273.0	317.4	Placer type
		W-conc. (20% W ₃)	t	81.4	50.4	103.9	0	0	Exptd to CSR
1. Ulaan-uul (USSR)	W	W-conc. (60% W ₃)	t	15.0	20.0	30.3	50.0	45.0	Quartz vein
2. Tsagaandawaa (HPR)									All exported
1. Bor-undur 2. Har-airag 3. Berh 4. Chuluut-tsagaandel	CaF ₂	Crude ore	T. t	730.2	754.2	890.9	974.0	895.3	Vein type
		CaF ₂ conc. (95~96% CaF ₂)	T. t	41.0	72.7	115.1	115.4	118.9	All exported, 1.~3. to USSR, 4. to CSR

Abbreviations: USSR; Union of Soviet Socialist Republics, JPN; Japan, HPR; Hungarian People's Republic

CSR; Czechoslovak Socialist Republic, conc.; concentrate, exptd; exported, Tt; thousand tons, t; ton

Stat. 1. Productions of Non-ferrous metal minerals and Fluorite of the Mongolian People's Republic (1986~1990).

Name of the Mines	Mineral	Products	Unit	1986	1987	1988	1989	1990	Note
1. Erdenet	Cu, Mo	Crude ore	M. t	17.0	16.6	17.3	17.9	17.9	Porphyry type
		Cu-conc. (35% Cu)	T. t	344.4	345.4	347.7	352.9	354.1	All exported
		Mo-conc. (47% Mo)	t	3,282	3,240	3,268	3,361	4,208	to USSR & JPN
1. Modot	Sn, W	Sn-conc. (50% Sn)	t	175.4	178.1	181.7	273.0	317.4	Placer type
		W- conc. (20% WO ₃)	t	81.4	50.4	103.9	0	0	Exptd to CSR
1. Ulaan-uul (USSR)	W	W- conc. (60% WO ₃)	t	15.0	20.0	30.3	50.0	45.0	Quartz vein
2. Tsagaandawaa (HPR)									All exptd
1. Bor-undur	CaF ₂	Crude ore	T. t	730.2	754.2	890.9	974.0	895.3	Vein type
		CaF ₂ conc. (95~96% CaF ₂)	T. t	41.0	72.7	115.1	115.4	118.9	All exported, 1. ~3. to USSR, 4. to CSR
2. Har-airag									
3. Berh									
4. Chuluut-tsaagaandel									

Abbreviations: USSR; Union of Soviet Socialist Republics, JPN; Japan, HPR; Hungarian People's Republic
 CSR; Czechoslovak Socialist Republic, conc.; concentrate, exptd; exported, Tt; thousand tons, t; ton

Appendix4-1 Productions of Non-ferrous Metallic Minerals and Fluorite of MPR (1986~1990)

(unit in thousand tons)

No.	Name of mine	Spec.	1986	1987	1988	1989	1990	Note	
								Age	Cr ₁
1	Baganuur (Багауур)	Ant-c	-	-	-	-	-	Age	Cr ₁
		Cok-c	-	-	-	-	-	Rsv	487.9 Mt
		Bts-c	-	-	-	-	-	F/R	
		Brn-c	2,881.8	3,339.4	4,053.0	3,785.8	3,700.6		3,000 kcal/kg
2	Shariin gol (Шарийгол)	Ant-c	-	-	-	-	-	Age	J ₂ ~ J ₃
		Cok-c	-	-	-	-	-	Rsv	34.8 Mt
		Bts-c	-	-	-	-	-	F/R	
		Brn-c	2,025.8	1,984.4	2,053.0	1,900.2	1,474.8		4,000 kcal/kg
3	Aduunchuluun (Адуунчулуун)	Ant-c	-	-	-	-	-	Age	Cr ₁
		Cok-c	-	-	-	-	-	Rsv	23.7 Mt
		Bts-c	-	-	-	-	-	F/R	
		Brn-c	388.4	469.3	612.9	536.1	512.2		2,800 kcal/kg
4	Naraih (Нарайх)	Ant-c	-	-	-	-	-	Age	Cr ₁
		Cok-c	-	-	-	-	-	Rsv	15 Mt
		Bts-c	-	-	-	-	-	F/R	
		Brn-c	629.8	712.7	538.0	434.5	234.9		3,500 kcal/kg
5	Bayanteeg (Байантэег)	Ant-c	-	-	-	-	-	Age	J ₂ ~ J ₃
		Cok-c	-	-	-	-	-	Rsv	26.9 Mt
		Bts-c	220.6	221.6	230.1	240.3	226.1	F/R	
		Brn-c	-	-	-	-	-		4,600 kcal/kg

Ant-c; Anthracite, Cok-c; Coking coal, Bts-c; Bituminous coal, Brn-c; Brown coal, Rsv; Reserve, F/R; Fuel ratio

Appendix 4-3 Coal Production in MPR (1986 ~ 1990) (1)

(unit in thousand tons)

No.	Name of mine	Spec.	1986	1987	1988	1989	1990	Note			
								Age	C ₂ ~ C ₃		
6	Hartavagatai (Хартавагатай)	Ant-c	-	-	-	-	-	-	-	Open pit mining	
		Cok-c	-	-	-	-	-	Rsv	17.7 Mt		
		Bts-c	110.5	172.5	192.0	219.7	213.0	F/R			
		Brn-c	-	-	-	-	-		3,800 kcal/kg		
7	Nuursthotogol (Нуурстхотогол)	Ant-c	-	-	-	-	-	-	-	Open pit mining	
		Cok-c	-	-	-	-	-	Rsv	9.6 Mt		
		Bts-c	138.6	146.3	180.5	192.0	198.4	F/R			
		Brn-c	-	-	-	-	-		4,000 Kcal/kg		
8	Tavantolgoi (Тавантолгой)	Ant-c	-	-	-	-	-	-	-	Open pit mining	
		Cok-c	-	-	-	-	-	Rsv	5,000 Mt		
		Bts-c	129.2	133.0	136.3	137.3	115.0	F/R			
		Brn-c	-	-	-	-	-		5,500 Kcal/kg		
9	Mogingol (Могоингол)	Ant-c	-	-	-	-	-	-	-	Open pit mining & Underground	
		Cok-c	-	-	-	-	-	Rsv	14.2 Mt		
		Bts-c	107.5	122.6	124.8	127.9	103.5	F/R			
		Brn-c	-	-	-	-	-		5,000 Kcal/kg		
10	Chandganatal (Чандганатай)	Ant-c	-	-	-	-	-	-	-	Open pit mining	
		Cok-c	-	-	-	-	-	Rsv	121.3 Mt		
		Bts-c	-	-	-	-	-	F/R			
		Brn-c	85.7	100.8	113.0	120.5	95.7		3,000 Kcal/kg		

Ant-c; Anthracite, Cok-c; Coking coal, Bts-c; Bituminous coal, Brn-c; Brown coal, Rsv; Reserve, F/R; Fuel ratio

Appendix 4-3 Coal Production in NPR (1986 ~ 1990) (2)

(unit in thousand tons)

No.	Name of mine	Spec.	1986	1987	1988	1989	1990	Note	
11	Talbulag (Танбулаг)	Ant-c	-	-	-	-	-	Age	Open pit mining
		Cok-c	-	-	-	-	Rsv	47.6 Mt	
		Bts-c	-	-	-	-	F/R		
		Brn-c	95.7	105.9	111.2	110.1	95.5	3,000 kcal/kg	
12	Zeegt (Зегет)	Ant-c	-	-	-	-	-	Age	Open pit mining
		Cok-c	-	-	-	-	Rsv	4.0 Mt	
		Bts-c	-	-	-	-	F/R		
		Brn-c	72.6	78.7	86.7	91.2	72.2	4,000 Kcal/kg	
13	Hoshoot (Хошот)	Ant-c	-	-	-	-	-	Age	Open pit mining
		Cok-c	-	-	-	-	Rsv	14.4 Mt	
		Bts-c	85.6	76.0	60.7	65.4	61.5	F/R	
		Brn-c	-	-	-	-	-	4,700 Kcal/kg	
14	Tevshingovi (Тевшингов)	Ant-c	-	-	-	-	-	Age	Open pit mining
		Cok-c	-	-	-	-	Rsv	769.0 Mt	
		Bts-c	-	-	-	-	F/R		
		Brn-c	62.0	70.1	72.3	57.5	37.8	3,000 Kcal/kg	
15	Saihanovoo (Сайхановоо)	Ant-c	-	-	-	-	-	Age	Underground
		Cok-c	-	-	-	-	Rsv	20.0 Mt	
		Bts-c	27.0	28.1	29.0	26.0	9.2	F/R	
		Brn-c	-	-	-	-	-	5,000 Kcal/kg	

Ant-c; Anthracite, Cok-c; Coking coal, Bts-c; Bituminous coal, Brn-c; Brown coal, Rsv; Reserve, F/R; Fuel ratio

Appendix 4-3 Coal Production in MPR (1986 ~ 1990) (3)

No.	Name of mine	Spec.	1986	1987	1988	1989	1990	Note			
								Age	Cr:	Open pit mining	
16	Jinst (Жинст)	Ant-c	-	-	-	-	-	Rsv	2.4 Mt		
		Cok-c	-	-	-	-	-	F/R			
		Bts-c	-	-	-	-	5.7				
		Brn-c	-	-	-	-	-		4,000 kcal/kg		
17	Zeegt (Зегт)	Ant-c	-	-	-	-	-	Age	Cr:	Open pit mining	
		Cok-c	-	-	-	-	-	Rsv	1,000.0 Mt	Under stripping	
		Bts-c	-	-	-	-	-	F/R		beginning of pro-	
		Brn-c	72.6	78.7	86.7	91.2	72.2		3,000 Kcal/kg	duction 1992.	
Total	Ant-c	-	-	-	-	-	Rsv	-		Coal production MPR	
	Cok-c	-	-	-	-	-	Rsv	-		1960: 600 Tt	
	Bts-c	819.0	900.1	953.4	1,008.6	926.7	Rsv	5,102.8 Mt		1970: 2,000	
	Brn-c	6,241.8	6,861.3	7,640.1	7,035.9	6,229.4	Rsv	2,505.7 Mt		1980: 4,400	
		7,060.8	7,761.4	8,593.5	8,044.5	7,156.1		7,608.5 Mt		1985: 6,500	

Ant-c; Anthracite, Cok-c; Coking coal, Bts-c; Bituminous coal, Brn-c; Brown coal, Rsv; Reserve, F/R; Fuel ratio
Annual production; in thousand tons, Reserve; in million tons.

Appendix4-3 Coal Production in MPR (1986 ~1990) (4)

No.	Name of mine	1986	1987	1988	1989	1990	Note
1	Baganuur	(200)	(500)	(940)	676.0	417.6	Exported to USSR
2	Aduunchuluun	(100)	(100)	(100)	100.0	94.8	Exported to USSR
Total		300	600	1,040	776.0	515.4	

Unit; thousand tons. Numbers with (); estimation.

Appendix4-4 Exportation of Coal (1986~1990)

A p p e n d i x 5

Correlation Table of Terminology

Appendix-5. Correlation Table of Terminology (1)

MONGOLIAN	RUSSIAN	ENGLISH	JAPANESE
БУГД НАЙРАМДАХ МОНГОЛ АРД УЛС (БНМАУ)	МОНГОЛЬСКОЙ НАРОДНОЙ РЕСПУБЛИКИ (МНР)	MONGOLIAN PEOPLE'S REPUBLIC (MPR)	モンゴル人民共和国 (モンゴル, (モ))
ЯЦОН	ЯПОНИИЯ	JAPAN (JPN)	日本
ЗСБНХОУ	СОЮЗ СОВЕТСКИХ СОЦИАЛИСТИЧЕСКИХ РЕСПУБЛИК (СССР)	UNION OF SOVIET SOCIALIST REPUBLICS (USSR)	ソビエト社会主義共和国連邦 (ソ連, (ソ))
ЧЕХОСЛОВАК	ЧЕХОСЛОВАКИЯ	CZECHOSLOVAK SOCIALIST REPUBLIC	チェコスロバキア (チェコ)
АРЦЕСАН ГЕРМАН	ГЕРМАНСКАЯ ДЕМОКРАТИЧЕСКАЯ РЕСПУБЛИКА (ГДР)	GERMAN DEMOCRATIC REPUBLIC	ドイツ民主共和国 (東独)
ПОЛЬША	ПОЛЬША	POLISH PEOPLE'S REPUBLIC	ポーランド人民共和国
УНГЕР	БЕНГРИЯ	HUNGARIAN PEOPLE'S REPUBLIC	ハンガリー人民共和国
ХЯТАД	КИТАИ	PEOPLE'S REPUBLIC OF CHINA	中華人民共和国
Уудам Тал Бус	Уудам Тал ЯПОНСКИЙ МЕЖДУНАРОДНЫЙ ОРГАН КООПЕРАЦИИ	Uдaм-Taл Aгeа JAPAN INTERNATIONAL COOPER- ATION AGENCY (JICA)	オードラムタル地域 国際協力事業団 (JICA)
БНМАУ-НИ УЛСЫН ГЕОЛОГИЙН ТОВ	ЯПОНСКОЕ АГЕНСТВО ГОРНОГО ДЕЛА ПО МЕТАЛЛАМ	METAL MINING AGENCY OF JAPAN (MMAJ)	金属鉱業事業団 (MMAJ)
УЛААНБААТАР	УЛААНБАТОР	STATE GEOLOGICAL CENTER OF THE MONGOLIAN PEOPLE'S REPUB- LIC	モンゴル人民共和国 国家地質 センター
ДОРНОД	ДОРНОД	ULANBAATAR	ウランバートル
ХУХНАГАТ	ХУХНАГОРЬ	DORNOD	ドルノド
ДОРНОГОВЬ	ДОРНОГОВЬ	SUHBAAATAR	スフバートル
ӨМНӨГОВЬ	ӨМНӨГОВЬ	DORNOGovi	ドルノゴビ (東ゴビ県)
Чойбалсан	Чойбалсан	DUMNGOVI	ドゥムンゴビ (中央ゴビ県)
Баян-Уул	Баян-Уул	Umnugovisan	ウムンゴビ (南ゴビ県)
Даланзадгад	Даланзадгад	Choibalsan	チョイバルサン
Хөвсгөл	Хөвсгөл	Bayan-Uul	バヤンウール
Гурван Сайхан нууц	Гурван Сайхан	Dalanzadgad	ダランザダグ
Монголын Дорнод Тал	Монголын Дорнод Равнина	L. khuh Gurvan Saihan Mountains Mongol Dornod Plane	フツフ湖 ゴルバン Сайхан 山地 (モンゴル) ドルノド平原

Appendix-5. Correlation Table of Terminology (2)

MONGOLIAN	RUSSIAN	ENGLISH	JAPANESE
Хэнтэй	Хэнтэй	Hentei Mts.	ヘンテイ (山地)
Хангай	Хангай	Hanngai Mts.	ハンガイ (山地)
Говь-Алтай нуруу	Говь-Алтай	Govi Altai Mts.	ゴビアルタイ山地
Их Шанхай нуруу	Их Шанхай	Ih Shanhai Mts.	イヒシヤンхай山地
Улзын гол	Улзын	Ulzin river	ウルズ川
Хэлэн гол	Хэлэн	Ghelin river	ケルレン川
Хаймаг	Хаймаг	Haimag	ハルヒン川
Аймаг	Аймаг	Aimag	(アイマク)
Сулаанбаатар	Сулаан-Батор	Sulaanbaatar	県村 (ソム)
Удодолсагар	Удодол-Полсагар	Udoodolsagar	ウラノト (県)
Дорнод-Полсагар	Дорнод-Полсагар	Doronodolsagar	ドルノト平原 (県)
Чойрбаанзбар	Чойрбаанзбар	Choirbanzabar	チヨイバンガザル (村)
Гуушанзбар	Гуушанзбар	Gushanbazar	グバルバンガザル (村)
Баяндулэн	Баяндулэн	Bayandulen	ダシユンバル (村)
Сэрч	Сэрч	Serch river	セルゲレン (村)
Далхын Гол	Далхын Гол	Dalhin Gol	ドガリン川
Хөхнуулсан	Хөхнуулсан	Khukhnuulsan	フツイバールサン
Чийн-Нулсан	Чийн-Нулсан	Chingis Khaan	チンギス・ハーン
Цавгаан	Цавгаан	Tsavaan	ツァヴァン
Улаан-Уур	Улаан-Уур	Ulaan-Uul	オムラール
Баянхир-Мунх	Баянхир-Мунх	Baihan-Uul	バヤン・ウール
Сэлгээр-Мунх	Сэлгээр-Мунх	Selgeer-Munh	サルヒート
Цагаан Чулуут Хуук	Цагаан Чулуут Хуук	Tsagaan-Chuluut Huduk	テラゲルムンフ
Мардайт	Мардайт	Margdai	ツァガタン・チヨルト
Хөх толгой	Хөх толгой	Khukh hill	フツァイ 丘

Appendix-5. Correlation Table of Terminology (3)

MONGOLIAN	RUSSIAN	ENGLISH	JAPANESE
Хавирга Хөгөнө ууур Хөгөнө Толгой Эрт Овоот Төмөртнийн Овоо Суухбаат-урт Баруун-урт Дарьганга Салхит Сарын-Нуур Салаа Дун Уртын Хууч Баян Голын Хууч Борет-Уур Нухет-Даваа Хүснэ гол Жаран гол Сам Усен уул, Ширээ гол Могоэр (Эрдэнэлаган) Төб Нухотин-Цагаантолгой Ар-Баян Алтан-Хай-Группа Баян-Хул-Чулут Цагаан-Тулут Мөнхөт-Индлай Нухет-Хай-Уулай Саруур-Хай-Уулай Тувур-Хай-Уулай Дэвсгэр-Хай-Уулай	Хавирга Хөгөнө ууур Хөгөнө Толгой Эрт Овоот Төмөртнийн Овоо Суухбаат-урт Баруун-урт Дарьганга Салхит Сарын-Нуур Салаа Дун Уртын Хууч Баян Голын Хууч Борет-Уур Нухет-Даваа Хүснэ гол Жаран гол Сам Усен уул, Ширээ гол Могоэр (Эрдэнэлаган) Центр Нухотин-Цагаантолгой Ар-Баян Алтан-Хай-Группа Баян-Хул-Чулут Цагаан-Тулут Мөнхөт-Индлай Нухет-Хай-Уулай Саруур-Хай-Уулай Тувур-Хай-Уулай Дэвсгэр-Хай-Уулай	Навирга Mt. Khaman Mt. Hanan Mt. Dzurhut Ovoo Tumurtiin-Ovoo Suhbaatar Baruun-Urt Deriganga Highland Salhit Arin-Nuur Sala Urt Dundun Göl Bayan Gol Mt. Bor Nuhut-Dawaa Khuishin, Jyaran Sain Os hill, Shiree river Yuguzer (Erdenetsagan) Tsentri Nuhuttin-Tsagaantolgoi Ar-Bayan Altan group Bayan-Hairast Bayan-Ul-Chulut Monghotiin Nuhet group Ustaihan-Utai Tuvurhaya Dzuvurhaya	ハビルガ クダヌ山 ハナ山 ツルフト・オボート山 トウムルテイ山 スアバート バルン・ウルト ダリガンガ高地 サルヒート アリンヌール サラド・ウルト ドンドンゴル ボル山 ヌフツイン川、ジャラン川 クイン・オス丘、シレー川 ユグゼル(エドネツガン) ツェントル ヌフツイン・ツァン・トルゴイ アルバヤン アルタン グループ バトガイ グループ バヤンハイルアスト バヤン・オール ツァンガート・チョルト ムンクテイイン ヌフツイン グループ オウルハン・ウライ タルヴァガタイ ウウルバヤン ズルフオボ

Appendix-5. Correlation Table of Terminology (4)

MONGOLIAN	RUSSIAN	ENGLISH	JAPANESE
Хар-Айраг	Хар-Айраг	H a r - A i i r a g	ハル・アイラグ
Хэнтийговь	Хэнтийговь	H e n t i g o v i	ヘンテイゴ
Дундөрговь	Дундөрговь	D u n d u r g o v i	ドンドウゴ
Өндөршандаргалан	Өндөршандаргалан	O n d o r s h a n d a r g a l a n	オンドウシヤンダ
Сайландаргалан	Сайландаргалан	S a i l a n d a r g a l a n	サイランド
Дайрхангаан	Дайрхангаан	D a i r h a n g a a n	ダイラン
Баянцагнал	Баянцагнал	B a y a n c a g n a l	バヤンツァン
Хэндэлговь	Хэндэлговь	H e n d e l g o v i	ケンデルゴ
Мамбэрговь	Мамбэрговь	M a m b e r g o v i	マンデルゴ
Сумбэрговь	Сумбэрговь	S u m b e r g o v i	スンベルゴ
Их Бор Ундур	Их Бор Ундур	M t. I h B o r U n d u r	イヒ・ボル・ウンドウル
Өлгий уул	Өлгий уул	M t. O l g i y u u l	ウエルギウ
Их Хөнгөр толгой	Их Хөнгөр толгой	M t. I h H o n g o r t o l g o y	イヒホントウ
Хороот Ухаа	Хороот Ухаа	K h o r o o t U h a a	ホロトウ
Халзангийн арван	Халзангийн арван	K h a l z a n g i y i n a r w a n	ハルツンギン
Бор-Өндөр	Бор-Өндөр	B o r - O n d o r	ボル・ウンドウル
Адаггор	Адаггор	A d a g g o r	アダグ
Хонгор	Хонгор	H o n g o r	ホンゴ
Майхан талил	Майхан талил	M a i h a n t a l i l	マイハント
Цажуу-Улаан	Цажуу-Улаан	C a j u u - U l a a n	ツァジュウ
Барун-Цаган-Дэль	Барун-Цаган-Дэль	B a r u n - C a g a n - D e l	バルンツァガン
Булжигер	Булжигер	B u l j i g e r	ブジゲル
Өлгэн	Өлгэн	O l g e n	ウルゲン
Цул-Цагаан-Дэль	Цул-Цагаан-Дэль	C h o l - C a g a a n - D e l	チヨルツァガン
Хамарта	Хамарта	H a m a r t a	ハマルタ
Хамар-Ус	Хамар-Ус	H a m a r - U s	ハマルオス
Цагаан-Элеген	Цагаан-Элеген	C a g a a n - E l e g e n	ツァガンエリゲ
Дзуун-Цагаан-Дэль	Дзуун-Цагаан-Дэль	D z u u n - C a g a a n - D e l	ツァンツァガン
Чойр	Чойр	C h o i r	チヨイル

Appendix-5. Correlation Table of Terminology (5)

MONGOLIAN	RUSSIAN	ENGLISH	JAPANESE
<p>Лу Дорйношанбуу Саатаансугувь Хатаансугувь Ганц Моден Хяр Цагаансугувь Дорноговь Дуланшан Саяндай Мангтэцэ Хаян-Ово Өнарма Хайду Сэарган Хуангу Эрдэнэгийн уурхай Шуутаан-Хуудаг</p>	<p>Лу Дорйношанбуу Саатаансугувь Хатаансугувь Ганц Моден Хяр Цагаансугувь Дорноговь Дуланшан Саяндай Мангтэцэ Хаян-Ово Өнарма Хайду Сэарган Хуангу Эрдэнэгийн уурхай Шуутаан-Хуудаг</p>	<p>Lugoin Dorin Saitan Hatan Gants Modn Khayar Tsagaan Dornogovi Dulanshan Saiandai Mangtsetschi Tsogbon Hayan Bairman Haidu Seargan Huang Erdene- Shuutaan-Hudak</p>	<p>ルギーン ドリン サイタン ハタン ガンツ・モデン・ハヤル ツァガアン ドロンゴビ ドランシャ サインダイ マンダイツェチ ツォボン ハヤン バインマン ハイド セアガン ツァン エレンエツ シュウター ホダク</p>

Appendix-5. Correlation Table of Terminology (6)

MONGOLIAN	RUSSIAN	ENGLISH	JAPANESE
<p>Өзгийт район Өмнөговь Дундговьдгад Говь Алтай Нуруу Мандал-Овоо Цогт-Эл Харна Чойр Улгий Нуруунд Хумд Мушгийн-Хундаг Баян-Хушут Баян-Овоот Олон-Овоот Олонших Онх Баян-Боро-Нуруу</p>	<p>Узгийт оввь Дундговьдгад Говь Алтай Мандал-Овоо Цогт-Эл Харна Чойр Улгий Нуруунд Хумд Мушгийн-Хушут Баян-Овоот Олон-Овоот Олонших Онх Баян-Боро-Нуруу</p>	<p>Uziit area Umnugovi Darganzadgad Govi Altai Mountains Mandal-Ovoo Tsoigt-El Harna Choir Ulgii Valley Lakshigianhshoot Bayan-Ovoot Olonshih Onh Bayan-Bor-Nuruu</p>	<p>ウルス ウモンゴビ地区 ウラゴビ(南ゴビ県) ドランザド(中央ゴビ県) ゴビ・アルタイ山脈 マングトオボ ツオルテル フアル チヨル ウエル 「湖沼谷」 ムシギン・ホダク バヤン・ホシヨト バヤン・オボ オロン・オボ ドグンシヒ オンホ バヤン・ボルノロー</p>

A p p e n d i x 6

Microscopic Observations and Photomicrographs (Thin Section)

ABBREVIATION

Aa : Aegirine-augite	Act: Actinolite	Ag : Aegirine
An : Anorthoclase	Au : Augite	Av : Arfvedsonite
Bt : Biotite	Cal: Calcite	Can: Cancrinite
Cb : Carbonate	Ccp: Chalcopyrite	Ce : Cerussite
Cel: Celestite	Cr : Corundum	Cv : Cavity
Ep : Epidote	Fl : Fluorite	Ga : Garnet
Gl : Galena	Go : Goethite	Hb : Hornblende
Fl : Fluorite	Ga : Garnet	Gl : Galena
Hm : Hematite	Hy : Hypersthene	Il : Ilmenite
Kf : K-feldspar	Mf : Mafic mineral	Mo : Molybdenite
Ms : Muscovite	Mt : Magnetite	Ne : Nepheline
Ph : Phlogopite	Pl : Plagioclase	Px : Pyroxene
Qz : Quartz	Rc : Rhodochrosite	Sp : Sphalerite
Sph: Sphene	Sy : Synchysite	Tp : Topaz
Tr : Tremolite		

Nomenclature of the igneous rocks is based upon the following literature:

R.W. Le Maitre ed. (1989) : A classification of igneous rocks and glossary of terms. Blackwell Scientific Publ., Oxford, 193p.

(1)

Sample No. : 3DN2
Locality : Tsav
Rock name : Granodiorite
Observation note :

This specimen is pinkish gray, fine-grained, porphyritic granodiorite. It consists principally of plagioclase(oligoclase), quartz, K-feldspar(orthoclase), biotite and hornblende in a decreasing order. Plagioclase is euhedral, up to 5mm in length, partly replaced by chlorite and epidote. Quartz and K-feldspar occur interstitially between plagioclase crystals. Biotite is mostly altered to chlorite and leucoxene. Hornblende is mostly altered to chlorite, epidote and actinolite.

(2)

Sample No. : 3DN17
Locality : Tsav
Rock name : Monzodiorite
Observation note :

This specimen is dark gray, medium-grained monzodiorite showing an intergranular texture. It consists of plagioclase(andesine), augite, hypersthene, K-feldspar(orthoclase), olivine (pseudomorph), biotite, opaque oxide and apatite in a decreasing order. Plagioclase is long prismatic, up to 5mm. K-feldspar occurs interstitially between plagioclase crystals in a small amount. Olivine is wholly altered to opaque oxide and carbonate. Biotite has a symplektitic rim along the contact with K-feldspar. Small amount of actinolite, chlorite and carbonate occur as alteration products after mafic minerals.

(3)

Sample No. : 3DN18
Locality : Tsav
Rock name : Granite porphyry
Observation note :

This specimen is pale pink granite porphyry with phenocrysts of K-feldspar(orthoclase-micropertthite), plagioclase(andesine-oligoclase), quartz and mafic minerals, mostly 1-5mm across. K-feldspar phenocrysts are clouded by dusty materials. Mafic phenocrysts are biotite, augite, brown hornblende and opaque oxide. Groundmass consists of K-feldspar, quartz and a lesser amount of plagioclase, and shows a microgranitic texture.

(4)

Sample No. : 3DN19
Locality : Tsav
Rock name : Schistose granite
Observation note :

This specimen is pinkish gray, schistose granite which has undergone metamorphic recrystallization. It consists principally of quartz, plagioclase (oligoclase), K-feldspar(orthoclase) and biotite. Plagioclase is subhedral, partly replaced by sericite and carbonate minerals. K-feldspar is subhedral to anhedral, and often includes poikilitically plagioclase crystals. Quartz is anhedral, interstitial between plagioclase crystals, and is recrystallized into a mosaic aggregate of quartz subgrain. Biotite is highly deformed and altered to aggregate of minute opaque oxide and chlorite.