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LAND SELECTION UNIT 18 (MELOZITNA, RUBY, NULATO, AND KATEEL RIVER QUADRANGLES): REFERENCES, DGGS SAMPLE LOCATIONS, GEOCHEMICAL AND MAJOR OXIDE DATA

by

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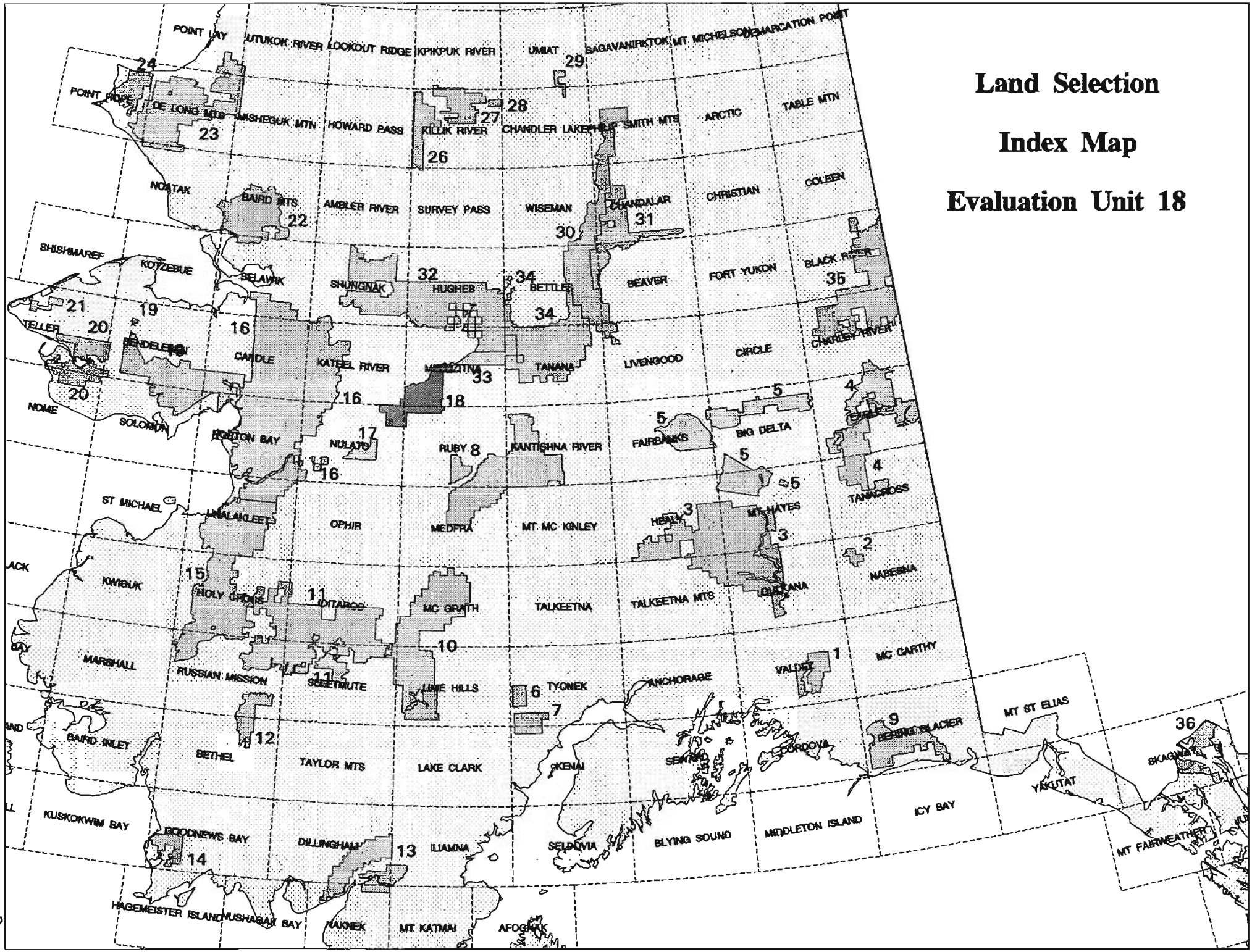
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LAND SELECTION UNIT 18 (MELOZITNA, RUBY, NULATO, AND KATEEL RIVER QUADRANGLES): REFERENCES, DGGS SAMPLE LOCATIONS, GEOCHEMICAL & MAJOR OXIDE DATA

Introduction:
The Dulbi River land selection unit (Unit 18) encompasses 911,000 acres in the Melozitna, Ruby, Kateel River and Nulato quadrangles. The authors spent several days of helicopter-supported field work in Unit 18 in 1992, in support of DGGS mineral resource evaluation of lands available for selection as State land. The analytical results from samples collected by DGGS are presented in this Public-data File, and the references used in the evaluation process are listed. The analytical data are also available on disk, by quadrangle, as part of the DGGS Public-Data File 93-37 series. NURE data were also used in the evaluative process, and maps of DGGS' statistical treatment of the NURE data will be available by quadrangle as part of the Public-Data File 93-38 series.

Samples collected by DGGS are briefly described in the first table. In the following tables of trace element geochemical data, asterisks indicate the analytical procedure that we consider to be more reliable for those elements that were analyzed by more than one method. Negative numbers denote values below the analytical detection limit. On the table with major oxide data, CIPW norms were calculated using the UAF/PETCAL program, with oxide values normalized on an anhydrous basis.

Geologic Summary:
The area is underlain predominantly by Cretaceous sedimentary rocks, many of which were derived at least in part from volcanic rocks. Structurally placed in the package of sedimentary rocks are three northeast-southwest-trending belts of Jurassic basalt and greenstone, which include small areas of ultramafic intrusive rocks. In the southeast corner of Unit 18, an area of older pelitic schist crops out in structural contact with one of the Jurassic basalt belts. In the northern part of the evaluation unit, Cretaceous volcanic rocks crop out. These are comprised of andesite and basalt flows, andesitic tuffs, and interlayered chert and limestone. All of the above bedrock types have been intruded by Tertiary or Cretaceous intrusive rocks which are generally intermediate to felsic in composition. A Tertiary-Cretaceous volcanic center crops out on the Dulbi River.

In the area of Shovel Creek, near the contact between pelitic schist and Jurassic basalt, several gossanous alteration zones and elevated concentrations of such elements as Au, Ag, Bi, W, Mo, As and Sb in rock, stream sediment and pan concentrate samples suggest moderate favorability for possible structurally controlled metamorphic gold veins. Near VABM Bald, the intrusive rocks are compositionally favorable for association with gold, and sulfide-rich rock grab samples collected by DGGS yielded up to 51 ppb Au. At a sharp bend in the Dulbi River, a gossanous outcrop yielded anomalous As and Sb concentrations. The Jurassic basalt belts contain ultramafic bodies which have yielded anomalous values of Cr, Ni, Co, Pt and Pd in rock and pan concentrate samples. The volcanic center transected by the Dulbi River in the central part of Unit 18 is a geologic feature favorable for a volcanic-hosted epithermal deposit, however, no anomalous concentrations of metals were found during DGGS field work.

Dulbi Hot Springs, on the north side of the Dulbi River, did not yield anomalous metal values in pan concentrate samples. The site is a possible geothermal resource for local heating, agriculture and recreation use.

LAND SELECTION UNIT 18 SAMPLES

QUAD	STATION	GC No.	PC No.	MO No.	DESCRIPTION	LAT.	LONG.
MEL A-4	92BT309				Epidotized greenstone, meta-andesite	65.061	154.919
MEL A-4	92BT310				Meta-andesite/basalt	65.064	154.915
MEL A-4	92BT311	4031			Mafic layers w/possible chromite	65.068	154.91
MEL A-4	92BT312				Pillowed meta-andesite	65.074	154.909
MEL A-4	92DNS146				Basalt	65.061	154.932
MEL A-4	92DNS147	4224			Basalt w/ sparse cpy, malachite	65.064	154.915
MEL A-4	92DNS148	4225			Magnetic px-plag gabbro/pyroxenite	65.069	154.922
MEL A-4	92DNS148	4226			Whitish veins in gabbro	65.069	154.922
MEL A-4	92DNS149				Bt hb qtz monzodiorite	65.076	154.925
MEL A-4	92DNS150			4228	Ultramafic	65.079	154.921
MEL A-4	92DNS150	4227			Ultramafic	65.079	154.921
MEL A-4	92DNS151				Basalt	65.082	154.918
MEL A-4	92NB116	4009			Stream float of greenstone w/sulfides	65.073	154.891
MEL A-4	92NB116		4008		Blk Sands Ck.-Blk sand, greenstone, gt	65.073	154.891
MEL A-4	92NB116	4010			Stream float of gabbro w/sulfides	65.073	154.891
MEL A-4	92NB117	4011			Gossanous gabbro	65.014	154.984
MEL A-5	92BT259				Felsic tuff	65.168	155.398
MEL A-5	92BT260				Lithic frags in tuff, ignimbrite(?)	65.17	155.402
MEL A-5	92BT261				Coarse pyroclastic felsic tuff	65.212	155.438
MEL A-5	92BT262	4192			Pyroclastic breccia & glassy dk brown flow	65.212	155.431
MEL A-5	92BT263				Intermediate tuff, welded shards, pumice lapilli	65.207	155.437
MEL A-5	92BT264				Ss & siltstone	65.204	155.442
MEL A-5	92BT291	4018			Fine-gr. welded tuff, ferricrete in fractures	65.242	155.462
MEL A-5	92BT292	4019			Ferricrete breccia, chalcedonic veining in tuff	65.238	155.455
MEL A-5	92BT292	4020			Ferricrete breccia in tuff	65.238	155.455
MEL A-5	92BT293	4021			Ferricrete, minor silicrete on fractures in tuff	65.228	155.46
MEL A-5	92BT294				Tuff, pyroclastic	65.221	155.464
MEL A-5	92BT295				Tuff, coarse pyroclastic breccia	65.213	155.473
MEL A-5	92BT296	4022			Chalcedonic replacement in felsite, py	65.203	155.479
MEL A-5	92BT297				Obsidian and tuff	65.198	155.483
MEL A-5	92BT298				Massive to laminated tuffs	65.193	155.492
MEL A-5	92BT306				Feldspathic ss	65.021	155.392
MEL A-5	92BT307				Lithic feldspathic ss	65.028	155.376
MEL A-5	92BT313				Foliated cpx-rich metabasalt	65.001	155.022
MEL A-5	92BT314	4032			Silica-flooded mudstone w/limonite	65.004	155.032
MEL A-5	92BT315			4034	Dunite	65.004	155.035
MEL A-5	92BT315	4033			Altered hartzburgite	65.004	155.035
MEL A-5	92BT316	4035			Limonitic silicrete-rich altered basalt/gabbro	65.008	155.039
MEL A-5	92BT317				Px-rich volcanics and gabbro	65.012	155.049
MEL A-5	92DNS100	3754			Rhyolitic ash tuff chips, variable Fe-stain	65.168	155.398
MEL A-5	92DNS101				Volcanics, artifacts	65.212	155.435
MEL A-5	92DNS102				Lithic ash tuff, brown obsidian	65.212	155.431
MEL A-5	92DNS103	3755			Limonitic staining, lithic tuff	65.212	155.429
MEL A-5	92DNS104	3756			Lithic tuff, possible tiny sulfides	65.206	155.421
MEL A-5	92DNS129	4210			Bt gabbro	65.151	155.376
MEL A-5	92DNS129	4211			Intermediate intrusive w/qtz veins	65.151	155.376
MEL A-5	92DNS130				Ss & cgl	65.152	155.384
MEL A-5	92DNS131	4212			Felsic volcanic w/thin qtz veins	65.155	155.4
MEL A-5	92DNS132	4213				65.155	155.436
MEL A-5	92DNS143				Dk gray feldspathic ss	65.072	155.275
MEL A-5	92DNS144				Ss, local white mica, calcareous, plant frags	65.069	155.285
MEL A-5	92DNS145				White micaceous ss	65.058	155.296
MEL A-5	92GRC012		4151		Few blk. sands	65.044	155.259
MEL A-5	92GRC013		4152		Blk. sands, gt, mica	65.018	155.04

LAND SELECTION UNIT 18 SAMPLES

QUAD	STATION	GC No.	PC No.	MO No.	DESCRIPTION	LAT.	LONG.
MEL A-6	92DNS133	4214			Fault breccia, limonitic, in blk. seds	65.111	155.65
MEL A-6	92DNS134	4215			Bleached zone in volcanic	65.192	155.516
MEL A-6	92NB111		4003		Some blk. sands, lots of sulfide	65.062	155.813
MEL A-6	4216		4216		Creek w/NURE Bi anomalies	65.045	155.844
MEL B-4	92BT276	3994			Highly epidotized andesite-dacite agglomerate	65.499	154.922
MEL B-4	92BT277	4199			Magnetic metavolcanic	65.491	154.914
MEL B-4	92BT278	4200			Andesite tuff and breccia	65.487	154.914
MEL B-4	92BT279				Magnetic px-rich basalt/andesite flow	65.476	154.911
MEL B-4	92BT280	4201			Andesite flow, magnetic	65.473	154.912
MEL B-4	92BT281	4202			Magnetic olivine basalt	65.469	154.904
MEL B-4	92DNS117			3765	Porphyritic plag. andesite	65.471	154.888
MEL B-4	92NB104	3994			Andesite agglomerate	65.499	154.922
MEL B-5	92BT265	4193			Porphyro-aphanitic felsite dike	65.289	155.264
MEL B-5	92BT266				Hornfels	65.292	155.279
MEL B-5	92BT267			4194	Bt hb granodiorite	65.299	155.281
MEL B-5	92BT268	4195			Ferricrete in bt hornfels	65.307	155.265
MEL B-5	92BT269	4196			Qtz carbonate veins in hornfels	65.32	155.268
MEL B-5	92DNS105	3757			Fine-gr. seds, sparse py	65.32	155.36
MEL B-5	92DNS106				Greywackes	65.312	155.375
MEL B-5	92DNS107				Lt gray ash tuff	65.288	155.376
MEL B-5	92DNS108	3758			Greywacke w/sulfide. Artifacts	65.333	155.324
MEL B-5	92DNS109				Basalt & diorite	65.339	155.344
MEL B-5	92DNS128		4209		Base of streamlet fed by seep	65.259	155.28
MEL B-5	92DNS128		4207		Dulbi Hot Spg-few blk sands, white heavies	65.259	155.28
MEL B-5	92DNS128	4208			Silicrete on pebbles at seep	65.259	155.28
MEL C-4	92BT270	4197			Andesite(?) w/trace cpy	65.531	154.869
MEL C-4	92BT271				Andesite agglomerate	65.523	154.896
MEL C-4	92BT272				Andesite	65.518	154.91
MEL C-4	92BT273			4198	Pyroxene metabasalt	65.51	154.919
MEL C-4	92BT274				Metavolcanics	65.505	154.931
MEL C-4	92BT275				Andesite, dacite agglomerate	65.501	154.947
MEL C-4	92DNS110				Aphanitic & porph. feld. dacite/andesite	65.53	154.867
MEL C-4	92DNS111				Volcanic breccia	65.526	154.867
MEL C-4	92DNS112				Dacite/andesite, minor blk. chert	65.516	154.859
MEL C-4	92DNS113			3762	Bt granodiorite	65.514	154.855
MEL C-4	92DNS113	3759			Malachite, cpy in qtz vein in bt granodiorite	65.514	154.855
MEL C-4	92DNS113	3760			Cpy, malachite, azurite in granodiorite	65.514	154.855
MEL C-4	92DNS113	3761			Qtz vein w/tourmaline, pyrite in bt granodiorite	65.514	154.855
MEL C-4	92DNS114	3763			Fine-gr. bt granodiorite, qtz veins w/py	65.512	154.861
MEL C-4	92DNS115				Dacite/andesite	65.503	154.852
MEL C-4	92DNS116	3764			Felsite plug, disseminated py	65.503	154.901
MEL C-4	92NB101	3991			Intermediate intrusive w/py	65.531	154.869
MEL C-4	92NB102	3992			Andesite agglomerate w/cpy		
MEL C-4	92NB103	3993			Diorite	65.501	154.947
NUL D-1	92BT288	4016			Dike w/minor py in hf seds	64.928	156.007
NUL D-1	92BT289			4017	Hb diorite/granodiorite	64.882	156.174
NUL D-1	92DNS123	4205			Pyritic hf sed w/ qtz veining	64.916	156.012
NUL D-1	92DNS124				Sandstone, minor pebble cgl	64.917	156.029
NUL D-1	92DNS125				Hb porph. qtz monzonite plug in ss, siltstone	64.957	156.07
NUL D-1	92DNS126				Hb porph. intrusive	64.969	156.038
NUL D-1	92DNS127			4206	Fine-gr. hb qtz monzonite	64.88	156.19
NUL D-1	92GRC009				Diorite	64.894	156.019
NUL D-1	92GRC010	4150			Mafic dike w/pyrite	64.896	156.018
NUL D-1	92GRC011				Mafic intrusive w/pyrite	64.896	156.022

LAND SELECTION UNIT 18 SAMPLES

QUAD	STATION	GC No.	PC No.	MO No.	DESCRIPTION	LAT.	LONG.
NUL D-1	92NB105		3995		Not much blk. sand	64.917	156.076
NUL D-1	92NB106	3996			Stream float-diorite w/sulfides	64.917	156.076
NUL D-1	92NB107	3997			Fe-stain on cgl	64.917	156.076
NUL D-1	92NB108		3998		Float of graywacke, tuff, granodiorite	64.9	156.014
NUL D-1	92NB109	3999			Abundant py in qtz diorite	64.895	156.019
NUL D-1	92NB110	4002			Abundant sulfide in gossanous qtz diorite	64.897	156.024
NUL D-1	92NB110	4001			Abundant sulfide in qtz diorite	64.897	156.024
NUL D-1	92NB110	4000			Abundant sulfide in qtz diorite breccia	64.897	156.024
RUB D-5	92BT299	4023			Heavy greenstone cataclasite	64.931	155.105
RUB D-5	92BT300	4024			Limonitic fractures in silicified chert	64.927	155.089
RUB D-5	92BT301	4026			Limonitic phyllite & qtzite, shear zone	64.927	155.076
RUB D-5	92BT301	4025			Sheared carbonaceous phyllite & silicified qtzite	64.927	155.076
RUB D-5	92BT301		4027		Stream sed.-below gossan zone	64.927	155.076
RUB D-5	92BT302	4028			Limonitic coarse volcaniclastic ss	64.935	155.163
RUB D-5	92BT303				Metabasalt	64.932	155.16
RUB D-5	92BT304				Lithic volcaniclastic ss	64.931	155.173
RUB D-5	92BT305		4029		Soil sample- mineral lick	64.931	155.184
RUB D-5	92DNS135				Basalt	64.941	155.096
RUB D-5	92DNS136				Andesitic tuff/agglomerate	64.943	155.092
RUB D-5	92DNS137	4219			Gossanous punky basalt	64.947	155.08
RUB D-5	92DNS138				Andesite	64.948	155.072
RUB D-5	92DNS139	4220			Sulfides in mafic rock	64.946	155.065
RUB D-5	92DNS140	4221			Malachite, cpy in limonitic gossan zone in mafic	64.945	155.06
RUB D-5	92DNS141	4222			Qtz veining in phyllite	64.944	155.063
RUB D-5	92DNS142	4223			Limonitic qtz veins in phyllite	64.936	155.069
RUB D-5	92DNS152	4229			Qtz veinlets in basalt, minor py	64.986	155.027
RUB D-5	92DNS153				Greenschist	64.985	155.048
RUB D-5	92DNS154	4230			Blue-green siliceous fracture-fill in mafic	64.989	155.053
RUB D-5	92DNS155				Gabbro, ultramafic	64.992	155.049
RUB D-5	92NB112		4004		Shovel Ck.Float of bas, granite w/ sulfide, sch.	64.877	155.082
RUB D-5	92NB113	4005			Qtz monzonite	64.931	155.006
RUB D-5	92NB114	4007			Porphyritic granite w/tourmaline	64.928	155.02
RUB D-5	92NB115			4006	Qtz monzonite	64.926	155.022
RUB D-6	92BT282				Hb bt monzonite	64.903	155.984
RUB D-6	92BT283	4203			Sulfide-bearing seds & intrusive float	64.913	155.976
RUB D-6	92BT284	4204			Py in contact phase of bt-rich hypabyssal stock	64.915	155.968
RUB D-6	92BT285				Porphyritic sulfide-bearing felsic dike	64.915	155.953
RUB D-6	92BT286				Carbonaceous sediments intruded by dikes	64.922	155.957
RUB D-6	92BT287	4015			Syenite/monzonite w/minor py	64.923	155.985
RUB D-6	92DNS118			3766	Porph. bt plag qtz diorite	64.904	155.987
RUB D-6	92DNS119	3767			Seds at contact, Fe+Mn stains, Qtz+Fe veinlets	64.909	155.987
RUB D-6	92DNS120	3768			Intrusive w/sulfide	64.913	155.99
RUB D-6	92DNS121	3769			Blk. seds w/ gossan, po	64.914	155.992
RUB D-6	92DNS122	3770			Skarnoid green rocks w/sulfide	64.915	155.994

LAND SELECTION UNIT 18 GEOCHEMICAL DATA (Analyses by Bondar–Clegg)

	METHOD	UNITS	L.LIMIT	U.LIMIT	3754	3755	3756	3757	3758	3759	3760	3761	3763	3764
AG	ICP *	PPM	0.5	50	-0.5	-0.5	-0.5	-0.5	0.8	-0.5	-0.5	-0.5	-0.5	-0.5
Ag	INAA	PPM	5	300	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5
Al	ICP	PCT	0.01	10	0.33	0.31	0.4	1.21	4.14	0.81	0.7	0.76	1.11	0.81
As	ICP	PPM	5	2000	32	-5	20	12	45	9	-5	-5	22	15
As	INAA *	PPM	1	10000	13	6	18	5	4	2	2	2	4	26
Au	INAA	PPB	5	10000	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5
Ba	ICP	PPM	5	2000	107	715	160	761	552	1348	1731	2000	1767	169
Ba	INAA *	PPM	100	20000	-100	920	210	1200	530	1800	2500	2800	2500	4000
Bi	AA	PPM	1	2000	-1	-1	-1	-1	-1	-1	-1	-1	-1	1
Bi	ICP *	PPM	5	2000	13	11	11	16	43	25	15	-5	34	8
Br	INAA	PPM	1	30000	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
CA	ICP	PCT	0.01	10	0.03	0.09	0.06	0.92	7.1	1.2	0.95	0.85	2.94	0.1
Cd	ICP *	PPM	2	2000	2.7	-2	-2	-2	-2	-2	-2	-2	-2	-2
Cd	INAA	PPM	10	2000	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10
Ce	INAA	PPM	10	30000	53	110	66	56	50	79	97	350	84	72
Co	ICP *	PPM	1	20000	3	5	-1	20	29	8	11	5	8	7
Co	INAA	PPM	10	20000	-10	-10	-10	18	30	-10	14	-10	-10	-10
CR	ICP *	PPM	2	20000	13	12	10	73	161	13	21	9	47	20
Cr	INAA **	PPM	50	30000	-50	-50	-50	80	230	-50	-50	-50	54	72
Cs	INAA	PPM	1	10000	6	3	3	5	2	6	5	5	3	2
Cu	ICP	PPM	1	20000	9	9	4	49	104	1144	1179	392	385	16
Eu	INAA	PPM	2	30000	-2	-2	-2	-2	-2	-2	-2	3	-2	3
F	SPION	PPM	20	20000	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
Fe	ICP	PCT	0.01	10	0.76	0.71	0.34	5.29	6.79	1.16	2	1.11	1.99	2.19
Fe	INAA *	PCT	0.5	10	1	0.9	0.6	5.9	7.5	1.4	2.5	1.6	3	3.2
GA	ICP	PPM	10	2000	22	17	19	24	37	20	16	19	28	17
Hf	INAA	PPM	2	30000	4	6	6	4	4	4	4	7	4	4
HG	CV AA	PPM	0.01	50	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
Ir	INAA *	PPB	100	1000	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100
K	ICP	PCT	0.01	10	1.81	1.25	1.82	0.97	1.02	1.31	1.17	1.6	0.83	1.09
LA	ICP	PPM	5	2000	6	-5	-5	-5	11	11	-5	30	9	-5
La	INAA *	PPM	5	30000	22	47	36	21	20	40	47	180	44	35
LI	ICP	PPM	2	2000	40	21	22	46	19	4	6	4	4	-2
Lu	INAA	PPM	0.5	2000	-0.5	0.6	-0.5	0.7	0.6	-0.5	-0.5	-0.5	-0.5	-0.5
MG	ICP	PCT	0.01	10	0.02	-0.01	-0.01	0.86	2.06	0.28	0.43	0.25	0.51	0.51
Mn	ICP	PPM	5	20000	203	360	191	982	1789	70	194	80	970	174
Mo	ICP *	PPM	1	20000	11	3	3	3	7	18	-1	6	11	2
Mo	INAA	PPM	2	30000	2	2	2	-2	-2	17	-2	6	4	4
NA	ICP *	PCT	0.01	10	2.62	3.27	2.14	1.79	1.84	2.6	2.83	2.44	2.46	2.74
Na	INAA *	PCT	0.05	10	2.3	3.2	2.1	1.8	1.6	2.9	3.1	2.7	2.6	2.6
Nb	ICP	PPM	5	2000	24	25	24	10	16	10	8	8	16	12
NI	ICP *	PPM	1	20000	9	10	5	55	100	8	14	5	23	14
Ni	INAA	PPM	20	30000	-20	-20	-20	53	120	-20	-20	-20	36	-20
Pb	AA *	PPM	2	10000	17	12	12	6	5	3	6	4	9	11
Pb	ICP	PPM	2	10000	37	17	26	9	8	14	8	4	20	15
PD	FADCP	PPB	1	10000							-9	-9		
PT	FADCP	PPB	5	10000							-9	-9		
Rb	INAA	PPM	10	10000	150	140	190	66	49	120	200	140	66	91
SB	ICP	PPM	5	2000	6	-5	6	-5	-5	14	-5	7	14	-5
Sb	INAA *	PPM	0.2	9999	2.1	1.5	3.2	0.7	0.6	0.3	1.7	0.4	2	3
Sc	INAA	PPM	0.5	2000	2.8	4.7	3.1	24	32	5.4	6.7	5.8	8.7	6.1
Se	INAA	PPM	10	30000	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10
Sm	INAA	PPM	0.2	2000	3.9	7.3	6	6.5	6.4	4.3	4.6	18	5.2	3.4
SN	ICP *	PPM	20	2000	-20	-20	-20	26	44	24	-20	-20	28	-20
Sn	INAA	PPM	200	30000	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200
Sn	XRF **	PPM	1	10000	-9	-9	-9	-9	-9	9	12	14	-9	-9
Sr	ICP	PPM	1	2000	14	48	20	113	268	305	360	308	713	243
Ta	ICP	PPM	5	2000	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100
Ta	INAA *	PPM	1	2000	2	2	2	-1	-1	-1	-1	2	1	2
Tb	INAA	PPM	1	30000	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
Te	AA *	PPM	0.2	100							-0.2	-0.2		
Te	ICP	PPM	25	2000	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25
Te	INAA	PPM	20	2000	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20
Th	INAA	PPM	0.5	3000	21	18	24	6.1	6	15	15	20	12	15
TI	ICP	PCT	0.01	10	0.07	0.18	0.08	0.47	0.56	0.19	0.18	0.19	0.24	0.2
U	INAA	PPM	0.5	2000	7.1	6	9.2	2.1	2.1	5	4.7	4.1	4	5.3
V	ICP	PPM	2	2000	15	18	9	237	255	53	56	52	92	52
W	ICP	PPM	20	2000	-20	-20	-20	-20	-20	-20	-20	-20	60	-20
W	INAA *	PPM	2	30000	3	2	3	-2	-2	4	5	13	85	-2
Y	ICP	PPM	5	2000	-5	-5	-5	-5	10	-5	-5	-5	-5	-5
Yb	INAA	PPM	5	2000	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5
ZN	ICP *	PPM	2	20000	29	37	25	162	123	15	29	12	54	30
Zn	INAA	PPM	200	30000	-200	-200	-200	250	250	-200	-200	-200	-200	-200
Zr	ICP	PPM	5	2000	49	65	49	-5	28	7	50	8	9	49
Zr	INAA *	PPM	500	10000	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500

Negative numbers denote below detection limit

LAND SELECTION UNIT 18 GEOCHEMICAL DATA (Analyses by Bondar – Clegg)

	3767	3768	3769	3770	3991	3992	3993	3994	3996	3997	3999	4000	4001	4002
AG	-0.5	-0.5	-0.5	1.6	1.1	-0.5	1	-0.5	-0.5	-0.5	-0.5	-0.5	0.8	1.4
Ag	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5
Al	2.59	0.83	1.65	2.73	1.1	1.81	1.06	1.06	0.96	1.8	1.05	1.33	0.93	1.07
As	81	8	37	57	32	62	35	22	16	43	15	29	48	59
As	78	4	30	10	5	91	7	3	12	27	8	9	11	16
Au	7	-5	8	51	-5	-5	-5	-5	-5	-5	14	16	45	25
Ba	508	1516	585	536	1661	1420	748	742	1209	351	234	263	103	70
Ba	890	2100	930	850	2300	1900	1000	1100	1800	570	480	370	1000	420
Bi	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	2	2	-1	2
Bi	13	26	11	60	36	8	49	12	15	18	19	34	40	46
Br	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
CA	1.73	2.03	1.14	3.19	1.78	1.41	2.52	2.43	0.54	0.13	1.01	0.7	1.51	1.05
Cd	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2
Cd	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10
Ce	61	71	66	46	64	89	89	75	79	75	30	21	61	32
Co	22	8	33	24	5	13	16	16	11	19	9	5	10	14
Co	22	-10	34	23	-10	11	-10	18	-10	11	-10	-10	12	11
CR	188	49	197	167	53	47	47	39	41	104	87	77	120	105
Cr	170	-50	230	200	72	83	56	-50	60	110	85	89	140	140
Cs	9	2	10	5	3	5	-1	2	1	4	1	1	1	1
Cu	82	25	108	132	10	301	20	17	26	35	110	29	100	71
Eu	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2
F	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
Fe	5.48	1.63	5.42	5.17	2.58	5.21	3.2	2.68	2.48	3.53	4.93	6.25	4.08	6.34
Fe	7.1	1.9	6.5	6	3.2	6.7	4.5	4.1	3	4.4	5.8	6.9	5	7.5
GA	22	31	26	43	31	20	33	20	19	22	21	29	31	31
Hf	4	3	5	4	4	3	6	3	-2	3	3	3	4	3
HG	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
Ir	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100
K	0.98	1.18	1.03	1.06	1.11	0.73	0.76	0.84	0.89	0.93	0.84	0.59	0.87	0.84
LA	11	6	-5	8	8	5	6	-5	-5	13	-5	-5	7	-5
La	26	37	27	20	40	43	41	36	36	28	13	12	28	16
LI	33	11	20	18	9	13	4	-2	18	37	4	3	4	5
Lu	-0.5	-0.5	0.5	0.6	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
MG	0.93	0.66	1.24	1.8	0.8	1.27	0.74	0.75	0.97	0.43	0.85	0.89	0.95	0.95
Mn	644	391	799	895	444	715	511	558	597	413	308	284	265	258
Mo	16	3	3	8	4	-1	3	-1	-1	12	3	5	3	5
Mo	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2
NA	1.7	3.51	1.72	1.77	2.93	2.06	2.9	2.23	2.83	0.39	1.06	1.33	1.28	1.16
Na	1.3	3.5	1.6	1.7	3.2	2.6	3.3	2.6	3.1	0.17	1	1	1.3	1.2
Nb	19	18	18	22	17	11	17	10	10	11	11	17	15	16
Ni	82	34	128	78	37	36	49	34	30	54	27	18	36	37
Ni	85	35	120	79	20	32	49	34	-20	38	-20	-20	27	50
Pb	8	8	6	4	22	6	8	4	14	14	4	8	9	9
Pb	13	15	10	24	33	7	30	13	7	23	5	28	20	18
PD														
PT														
Rb	87	83	120	66	87	49	60	73	42	75	47	36	37	55
SB	-5	-5	-5	37	38	-5	25	10	7	14	-5	7	16	32
Sb	3.1	2.8	2.1	2.7	4.1	3.1	3	0.8	1.8	5.5	4.5	2.7	2.8	3.8
Sc	25	7.5	26	23	10	10	14	11	11	14	14	11	16	15
Se	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10
Sm	9.1	4.4	8.3	6.1	4.8	8	4.9	4.2	4.8	5.7	3	3.4	7.5	5.3
SN	27	24	25	57	29	-20	52	-20	-20	-20	25	28	36	40
Sn	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200
Sn	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
Sr	116	554	83	386	475	629	498	394	526	47	123	120	159	154
Ta	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100
Ta	2	2	2	2	1	1	1	1	-1	-1	-1	1	2	1
Tb	1	-1	-1	1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
Te														
Te	-25	-25	-25	29	29	-25	26	-25	-25	-25	-25	-25	-25	36
Te	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20
Th	10	15	10	6.6	11	10	11	10	9.6	11	6.4	5	9.2	8.3
Tl	0.75	0.19	0.69	0.59	0.27	0.23	0.32	0.26	0.27	0.38	0.43	0.46	0.47	0.43
U	4.1	5.4	3.5	2.4	3.9	2.8	3.6	2.9	2	1.8	1.8	2.2	3.4	2.6
V	270	70	249	160	62	122	138	88	95	125	135	135	140	136
W	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20
W	-2	-2	-2	2	-2	-2	-2	-2	-2	-2	-2	-2	3	2
Y	9	-5	-5	5	-5	-5	-5	-5	-5	6	-5	-5	-5	-5
Yb	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5
ZN	101	33	88	67	135	68	74	72	74	63	30	27	28	27
Zn	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200
Zr	62	19	38	40	36	40	29	22	19	40	9	23	-5	8
Zr	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500

Negative numbers denote below detection limit

	4005	4007	4009	4010	4011	4015	4016	4018	4019	4020	4021	4022	4023	4024
AG	-0.5	-0.5	-0.5	-0.5	1.1	-0.5	0.6	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Ag	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5
Al	0.65	0.81	3.04	4.15	1.11	1.52	1.75	1.44	1.61	1.42	1.53	1.01	5.94	1.18
As	-5	11	61	-5	90	19	59	-5	37	-5	-5	26	34	9
As	2	-1	2	-1	-1	1	4	15	20	15	26	27	-1	7
Au	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	5	-5
Ba	918	160	371	117	28	2000	666	691	76	184	63	33	464	763
Ba	1500	320	450	130	-100	3300	980	930	-100	210	-100	-100	480	860
BI	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
BI	6	-5	64	30	97	6	33	10	7	-5	-5	6	44	6
Br	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
CA	0.6	0.27	5.02	5.76	0.53	2.22	0.79	0.06	0.07	0.08	0.12	0.09	7.67	0.03
Cd	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2
Cd	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10
Ce	110	70	99	12	-10	85	77	100	49	61	72	60	100	13
Co	3	2	33	42	168	14	15	-1	-1	3	-1	2	67	3
Co	-10	-10	40	46	190	13	10	-10	-10	-10	-10	-10	77	-10
CR	6	5	128	16	479	52	43	8	9	5	7	6	630	38
Cr	-50	-50	200	-50	710	70	56	-50	-50	-50	-50	-50	1300	63
Cs	11	45	3	-1	-1	1	2	3	3	3	8	6	-1	-1
Cu	3	16	62	252	21	35	45	5	2	2	2	2	96	12
Eu	-2	-2	3	-2	-2	-2	-2	-2	-2	-2	-2	-2	4	-2
F	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
Fe	1.3	0.49	7.66	7.38	10	2.31	2.29	0.36	0.47	0.43	0.32	0.2	10	0.95
Fe	1.9	0.8	10	10	10	3.1	2.7	-0.5	0.5	0.7	-0.5	-0.5	10	1
GA	22	23	43	22	63	19	30	16	13	11	13	13	35	-10
HI	6	-2	8	-2	-2	3	3	8	4	5	4	4	7	-2
HG	-9	-9	-9	-9	-9	-0.01	0.015	0.042	-0.01	-0.01	0.015	-0.01	-9	-9
Ir	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100
K	1.26	1.75	0.47	0.35	0.24	1.02	1.29	1.67	1.71	2.1	1.48	1.25	0.33	0.28
LA	11	7	17	-5	-5	16	9	19	10	11	12	9	36	8
La	45	28	35	-5	-5	36	34	54	20	28	27	27	37	8
LI	53	54	30	-2	-2	20	25	9	46	35	26	7	6	3
Lu	-0.5	-0.5	0.5	-0.5	-0.5	-0.5	-0.5	0.6	0.6	0.5	0.6	0.7	-0.5	-0.5
MG	0.07	0.02	2.07	1.99	10	1.04	1.18	0.08	0.04	0.04	0.05	-0.01	10	0.1
Mn	206	147	1387	939	1454	410	510	48	93	157	205	35	1205	122
Mo	1	-1	7	-1	12	13	4	3	3	2	-1	2	3	-1
Mo	-2	-2	3	-2	-2	-2	-2	2	-2	-2	2	3	-2	3
NA	1.92	1.95	2.39	1.83	0.62	2.89	2.82	2.33	1.91	2.08	1.17	1.67	1.65	0.07
Na	2.1	2.2	2.6	1.8	0.2	3.4	2.9	2.4	2.1	2.3	1.3	2.1	1.2	0.06
Nb	12	7	52	-5	13	9	14	21	16	19	18	19	46	7
NI	3	2	106	17	476	42	38	3	3	3	3	2	574	24
NI	-20	-20	110	-20	500	54	33	-20	-20	-20	-20	-20	560	24
Pb	9	9	5	4	3	6	24	18	7	10	9	7	5	4
Pb	39	54	24	3	42	24	34	29	13	19	19	27	9	7
PD														
PT														
Rb	270	450	21	12	-10	57	74	150	170	180	150	160	-10	10
SB	-5	12	27	-5	41	11	32	8	17	15	8	-5	-5	8
Sb	-0.2	0.4	0.8	-0.2	-0.2	1.4	2.5	4.3	4.6	2.5	3.5	7.1	0.3	6.8
Sc	5.6	4.7	36	51.8	11	11	10	3.7	2.1	2.1	2.3	1.7	35	2.1
Se	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10
Sm	8.8	7	12	3.3	-0.2	4.5	4.4	5.3	4.2	4.5	4.9	4.2	10	1.9
SN	-20	-20	94	32	65	24	28	-20	-20	-20	-20	-20	53	-20
Sn	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200
Sn	13	-9	-9	-9	-9	15	-5	-9	-9	-9	-9	-9	-9	12
Sr	100	50	360	681	15	672	379	28	10	19	11	9	510	89
Ta	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100
Ta	2	3	4	-1	-1	-1	-1	2	2	2	2	3	3	-1
Tb	-1	-1	1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
Te														
Te	-25	-25	43	-25	40	-25	-25	-25	-25	-25	-25	-25	-25	-25
Te	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20
Th	35	21	3.4	-0.5	-0.5	8.9	9.1	25	19	21	21	22	3.5	1
Ti	0.21	0.08	1.93	0.72	0.07	0.25	0.24	0.17	0.05	0.07	0.05	0.04	1.86	0.13
U	4.2	4.2	1.1	-0.5	-0.5	2.6	2.4	7	5.7	6.3	7	8.3	1.5	1.4
V	19	7	346	452	106	103	92	21	9	8	6	4	304	35
W	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20
W	-2	2	-2	-2	-2	-2	-2	2	-2	2	3	5	-2	-2
Y	-5	-5	10	-5	-5	-5	-5	7	12	11	16	9	15	-5
Yb	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5
ZN	47	27	133	74	119	65	66	25	28	27	26	20	125	53
Zn	-200	-200	220	-200	-200	220	-200	-200	-200	-200	-200	-200	-200	-200
Zr	33	20	-5	-5	13	25	27	99	64	75	62	46	117	28
Zr	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500

Negative numbers denote below detection limit

LAND SELECTION UNIT 18 GEOCHEMICAL DATA (Analyses by Bondar–Clegg)

	4026	4026	4028	4031	4032	4033	4035	4150	4192	4193	4196	4195	4197	4199
AG	−0.5	−0.5	−0.5	1.2	1	−0.5	−0.5	−0.5	−0.5	−0.5	−0.5	−0.6	0.6	−0.5
Ag	−5	−5	−5	−5	−5	−5	−5	−5	−5	−5	−5	−5	−5	−5
Al	4.21	6.04	2.83	8.55	5.26	3.79	3.92	5.02	2.63	4.66	9.21	6	6.9	3.69
As	44	38	−5	149	95	60	26	21	32	16	30	39	129	16
As	56	19	−1	−1	12	5	3	14	20	4	7	23	19	4
Au	28	190	−5	10	−5	−5	−5	5	−5	−5	−5	−5	−5	−5
Ba	865	1170	484	64	395	158	33	589	115	1306	647	175	543	1289
Be	1100	1300	580	−100	500	290	−100	710	130	1700	810	170	660	1600
Bi	16	52	−1	−1	−1	−1	−1	−1	−1	−1	−1	−1	−1	−1
Bi	30	67	−5	73	38	28	9	22	−5	8	36	26	47	12
Br	1	−1	−1	−1	−1	−1	−1	−1	−1	−1	−1	−1	−1	−1
CA	1.27	3.83	0.03	10	0.61	3.24	10	1.11	0.2	3.38	3.84	10	3.04	2.65
Cd	−2	−2	−2	−2	−2	−2	−2	−2	−2	−2	−2	−2	−2	−2
Cd	−10	−10	−10	−10	−10	−10	−10	−10	−10	−10	−10	−10	−10	−10
Ce	23	36	46	−10	42	−10	−10	77	63	120	46	33	63	100
Co	16	13	3	47	23	41	51	15	1	10	35	34	22	10
Co	18	14	−10	48	26	50	60	19	−10	−10	34	35	25	12
CR	50	75	24	144	23	164	472	166	11	30	266	161	158	25
Cr	79	76	−50	250	−50	420	800	220	−50	62	310	160	190	−50
Cs	8	8	4	−1	−1	6	−1	5	34	4	3	5	3	3
Cu	325	343	6	171	67	10	43	78	4	60	85	188	19	33
Eu	−2	−2	−2	−2	2	−2	−2	2	−2	−2	−2	−2	−2	−2
F	−9	−9	−9	−9	−9	−9	−9	−9	−9	−9	−9	−9	−9	−9
Fe	7.66	10	1.67	4.12	4.91	3.2	7.14	3.81	0.46	2.94	8.54	7.09	4.49	2.81
Fe	7.6	10	2.1	4.7	5.4	6.1	7.7	4.2	0.6	3.7	8	6.1	4.9	3.4
GA	20	20	14	48	42	16	15	15	14	20	27	25	42	23
Hf	4	3	4	−2	5	−2	−2	5	−2	4	4	3	4	4
HG	−9	−9	−9	−9	−9	−9	−9	−9	−9	−9	−9	−9	−9	−9
Ir	−100	−100	−100	−100	−100	−100	−100	−100	−100	−100	−100	−100	−100	−100
K	0.87	1.2	1.25	0.22	1.04	0.97	0.07	1.13	1.6	1.66	1.17	0.33	0.5	0.94
LA	10	10	20	−5	12	−5	10	22	13	22	17	11	21	19
La	14	13	19	−5	21	−5	−5	31	25	54	17	12	31	51
LI	8	30	12	−2	14	83	6	15	30	14	32	32	25	6
Lu	−0.5	−0.5	−0.5	−0.5	0.8	−0.5	−0.5	0.7	0.8	−0.5	0.6	−0.5	−0.5	−0.5
MG	0.51	1.63	0.04	4.52	1.33	5.98	1.56	1.64	0.05	1.19	4.49	3.24	1.98	0.82
Mn	391	643	74	670	2942	887	1084	580	140	465	1398	1351	389	408
Mo	7	5	−1	6	4	3	12	2	3	−1	4	5	7	−1
Mo	9	6	−2	−2	2	−2	−2	−2	3	−2	−2	−2	−2	−2
NA	0.2	0.37	0.26	1.16	3.22	0.73	0.21	1.91	1.66	2.81	2.76	1.04	2.24	3.37
Na	0.07	0.08	0.16	0.72	3.2	0.66	0.07	2	2.2	2.8	2.1	0.89	1.9	3.3
Nb	9	11	13	12	9	−5	−5	14	20	11	14	12	16	12
NI	47	34	13	76	51	278	284	55	3	18	124	121	90	26
NI	55	−20	−20	71	35	320	320	51	−20	−20	160	130	90	−20
Pb	10	19	10	3	7	4	5	6	34	5	4	7	5	6
Pb	−2	15	17	29	24	−2	12	3	32	5	13	11	33	7
PD				12		11								
PT				13		−5								
Rb	160	170	270	−10	40	24	−10	95	170	97	47	−10	27	70
SB	17	29	8	45	35	7	−5	−5	18	−5	6	−5	44	−5
Sb	8.5	29.5	0.2	−0.2	0.4	−0.2	−0.2	1.7	4.5	0.8	1.2	1.2	3.9	1
Sc	11	14	3.7	29	20	3.7	11	20	2.7	10	32	23	13	10
Se	−10	−10	−10	−10	−10	−10	−10	−10	−10	−10	−10	−10	−10	−10
Sm	3.3	3	3.3	0.4	6.9	−0.2	0.6	7.7	4.4	5.5	7.1	5.3	4.9	5.9
SN	29	37	−20	50	31	−20	−20	24	−20	21	43	21	51	−20
Sn	−200	−200	−200	−200	−200	−200	−200	−200	−200	−200	−200	−200	−200	−200
Sn	15	19	−9	−9	−9	−9	−9	−9	−9	−9	−9	−9	−9	−9
Sr	61	168	42	510	74	544	91	172	71	827	345	309	593	716
Ta	−100	−100	−100	−100	−100	−100	−100	−100	−100	−100	−100	−100	−100	−100
Ta	−1	−1	2	−1	−1	−1	−1	2	3	1	1	−1	1	−1
Tb	−1	−1	−1	−1	−1	−1	−1	−1	−1	−1	−1	−1	−1	−1
Te				−9		−9								
Te	−25	−25	−25	−25	−25	−25	−25	−25	−25	−25	−25	−25	34	−25
Te	−20	−20	−20	−20	−20	−20	−20	−20	−20	−20	−20	−20	−20	−20
Th	5.3	5.6	19	−0.5	2.7	−0.5	−0.5	12	23	8.7	4.8	2.3	10	13
Tl	0.25	0.29	0.1	0.07	0.37	−0.01	0.08	0.57	0.07	0.28	0.63	0.45	0.34	0.28
U	3.4	3.4	11	−0.5	1.2	−0.5	−0.5	3.2	10	3.3	2.2	1.1	5.2	4.3
V	213	185	41	104	142	15	90	163	11	90	284	216	90	87
W	161	−20	−20	−20	−20	−20	−20	−20	−20	−20	−20	−20	−20	−20
W	180	11	2	−2	−2	−2	−2	−2	3	−2	−2	−2	−2	−2
Y	11	12	11	−5	20	−5	−5	17	15	−5	20	13	6	−5
Yb	−5	−5	−5	−5	−5	−5	−5	−5	−5	−5	−5	−5	−5	−5
ZN	30	45	65	33	123	54	64	41	30	62	127	120	42	69
Zn	−200	−200	−200	−200	200	−200	−200	−200	−200	−200	−200	−200	−200	−200
Zr	61	74	50	15	101	7	−5	56	82	60	36	5	92	77
Zr	−500	−500	−500	−500	−500	−500	−500	−500	−500	−500	−500	−500	−500	−500

Negative numbers denote below detection limit

LAND SELECTION UNIT 18 GEOCHEMICAL DATA (Analyses by Bonder-Clegg)

	4201	4202	4203	4204	4205	4208	4210	4211	4212	4213	4214	4215	4219	4220
AG	1.5	0.7	0.9	1.3	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Ag	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5
Al	5.72	5.24	5.96	3.12	7.62	8.51	7.88	4.78	2.51	2.99	3.21	2.86	5.27	5.25
As	118	67	100	83	19	26	24	56	49	30	2000	29	-5	13
As	4	2	41	44	14	14	3	2	28	14	2760	26	5	2
Au	-5	-5	-5	20	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5
Ba	1445	1149	1102	1305	812	630	2000	2000	119	255	1116	389	703	525
Ba	1800	1300	1600	1600	890	680	3000	4400	120	330	1300	500	850	530
Bi	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
Bi	52	34	51	45	17	19	20	19	-5	-5	-5	-5	18	38
Br	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	4	-1	-1	-1
CA	3.37	3.63	1.74	0.76	1.75	1.56	1.92	0.1	0.11	0.16	0.06	0.09	0.71	8.42
Cd	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2
Cd	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10
Ce	120	76	73	87	49	58	150	38	55	74	-37	88	120	90
Co	16	13	33	22	22	21	13	3	-1	3	19	-1	46	48
Co	17	14	40	23	24	23	15	-10	-10	-10	22	-10	58	56
CR	24	41	115	74	204	268	33	7	6	17	283	4	711	480
Cr	-50	52	190	78	270	330	86	-50	-50	-50	200	-50	880	750
Cs	-1	-1	9	3	7	88	5	1	4	5	1	1	3	-1
Cu	26	37	120	49	151	67	16	3	3	12	61	2	115	82
Eu	-2	-2	-2	2	-2	-2	3	-2	-2	-2	-2	-2	3	2
F	-9	-9	-9	-9	-9	720	-9	-9	-9	-9	-9	-9	-9	-9
Fe	3.52	2.66	4.69	4.33	6.61	6.69	4.12	1.36	0.5	1.01	5.74	0.92	9.18	9.2
Fe	4.2	3.2	5.5	5.3	8.5	7.2	4.8	1.7	0.6	1.2	6.5	1	8.7	8.9
GA	43	37	42	41	28	25	30	30	19	19	20	18	32	34
Hf	6	4	5	4	3	-2	6	5	5	5	-2	4	7	7
HG	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
Ir	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100
K	1.45	1.24	1.79	1.44	1.51	1.14	2.16	2.14	2.53	1.75	0.41	2.27	1.04	1.27
LA	28	19	14	16	21	19	43	6	15	26	12	23	45	31
La	57	38	29	34	21	21	61	8	26	32	21	31	50	34
LI	4	4	26	29	29	71	17	14	20	29	43	47	38	6
Lu	-0.5	-0.5	0.6	-0.5	-0.5	0.6	0.6	-0.5	0.6	0.6	1.4	0.5	-0.5	-0.5
MG	1.16	1.2	1.9	1.48	2.41	2.66	1.66	1.33	0.05	0.1	0.15	0.02	0.49	0.29
Mn	695	586	373	499	1076	755	606	240	188	230	400	52	1524	1083
Mo	7	6	7	6	2	3	3	4	5	11	5	-1	2	-1
Mo	-2	-2	-2	2	-2	-2	-2	-2	3	2	8	-2	-2	-2
NA	3.47	3.22	2.51	2.75	1.91	2.24	2.92	1.13	2.46	2.7	0.18	1.64	0.29	1.62
Na	3.4	3	2.4	2.8	1.4	2	2.7	1	2.4	2.6	-0.05	1.5	-0.05	1.5
Nb	20	16	21	13	20	10	24	25	24	22	11	21	57	42
NI	31	34	104	53	59	92	22	9	3	12	116	2	283	235
Ni	-20	34	120	-20	59	98	-20	-20	-20	-20	130	-20	290	230
Pb	9	2	8	24	4	9	15	36	13	13	8	13	7	9
Pb	33	22	31	40	7	8	19	43	22	27	8	25	5	3
PD														
PT														
Rb	55	58	110	82	87	71	210	300	190	180	-10	190	80	35
SB	54	26	41	20	-5	-5	10	18	10	-5	29	-5	-5	-5
Sb	0.5	0.5	2.2	2.9	1.5	2.2	0.2	0.6	1.8	1.8	64.5	1.8	6.5	-0.2
Sc	14	11	25	16	26	32	17	1.3	2	3.5	16	2	35	37
Se	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10
Sm	6.4	4.3	8.5	4.9	8.3	6	12	4	4.2	5.1	5.2	4.4	12	10
SN	51	33	51	36	27	29	25	29	21	-20	-20	-20	54	40
Sn	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200
Sn	-9	-9	-9	-9	-9	11	-9	-9	-9	-9	-9	-9	-9	-9
Sr	1081	639	493	485	191	300	554	64	18	35	424	17	179	1351
Ta	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100
Ta	1	-1	1	-1	2	-1	2	3	3	3	-1	2	5	4
Tb	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	1	1
Te														
Te	-25	-25	33	26	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25
Te	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-70	-20	-20	-20
Th	11	10	10	10	3.4	6.4	25	52	24	24	4.9	20	4.8	3.7
TI	0.37	0.27	0.56	0.29	0.79	0.55	0.63	0.04	0.06	0.09	0.41	0.07	2.14	1.93
U	3.5	3.6	3.3	2.6	1.6	2.4	5.9	7.4	8	6.7	1.5	6.4	1.3	1.3
V	134	83	183	122	228	221	137	8	8	22	131	6	332	326
W	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20
W	-2	-2	2	-2	-2	4	2	-2	3	2	-2	3	-2	-2
Y	5	-5	11	-5	16	19	17	13	15	16	11	16	16	12
Yb	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	12	-5	-5	-5
ZN	83	64	49	171	60	116	96	56	29	41	88	27	127	114
Zn	-200	-200	-200	270	-200	-200	-200	-200	-200	-200	730	-200	-200	-200
Zr	74	77	79	62	57	53	217	91	85	88	67	78	80	64
Zr	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500

Negative numbers denote below detection limit

LAND SELECTION UNIT 18 GEOCHEMICAL DATA (Analyses by Bondar–Clegg)

	4221	4222	4223	4224	4225	4226	4227	4229	4230
AG	1.6	−0.5	−0.5	−0.5	0.9	−0.5	1.3	1.5	−0.5
Ag	−5	−5	−5	−5	−5	−5	−5	−5	−5
Al	2.09	0.66	2.26	2.82	4.28	4.3	1.87	2.94	1.17
As	84	−5	6	−5	62	53	119	72	17
As	2	3	−1	3	1	−1	51	2	−1
Au	−5	−5	−5	−5	−5	−5	−5	−5	−5
Ba	236	1196	204	110	46	88	96	455	33
Ba	270	1500	240	150	−100	120	−100	630	−100
Bi	−1	−1	−1	−1	−1	−1	−1	−1	−1
Bi	60	5	15	20	69	37	69	58	26
Br	−1	−1	−1	−1	−1	−1	−1	−1	−1
CA	7.88	0.05	0.07	2.85	7.71	10	4.03	3.54	0.34
Cd	−2	−2	−2	−2	−2	−2	−2	−2	−2
Cd	−10	−10	−10	−10	−10	−10	−10	−10	−10
Ce	27	−10	30	32	−10	−10	−10	13	−10
Co	59	−1	15	17	68	10	83	33	142
Co	65	−10	21	22	82	11	96	38	180
CR	1321	19	47	15	52	24	1491	42	1281
Cr	1900	−50	63	−50	60	−50	2800	52	2800
Cs	2	−1	1	−1	−1	−1	−1	−1	−1
Cu	71	14	33	930	474	63	40	137	15
Eu	−2	−2	−2	−2	−2	−2	−2	−2	−2
F	−9	−9	−9	−9	−9	−9	−9	−9	−9
Fe	5.64	0.44	4.46	6.52	10	1.03	5.87	6.29	10
Fe	6.4	0.6	5.2	8.7	10	1.7	8	9.1	10
GA	49	−10	13	26	53	34	47	42	22
Hf	2	−2	−2	4	−2	−2	−2	−2	−2
HG	−9	−9	−9	−9	−9	−9	−9	−9	−9
Ir	−100	−100	−100	−100	−100	−100	−100	−100	−100
K	0.26	0.39	0.15	0.33	0.27	0.09	0.24	0.32	0.23
LA	22	−5	8	−5	−5	−5	−5	−5	−5
La	14	−5	8	12	−5	−5	−5	6	−5
LI	18	−2	19	−2	−2	−2	−2	10	−2
Lu	−0.5	−0.5	−0.5	0.8	−0.5	−0.5	−0.5	−0.5	−0.5
MG	7.36	0.11	0.66	1.29	3.58	0.47	10	1.5	10
Mn	898	23	747	1020	1089	180	918	1016	1537
Mo	13	2	−1	3	5	6	7	8	4
Mo	−2	−2	−2	−2	−2	−2	−2	−2	−2
NA	0.44	0.04	0.11	3.44	1.15	0.89	0.76	2.16	0.6
Na	0.1	−0.05	−0.05	3.8	0.79	1.2	0.54	2.5	0.22
Nb	29	−5	7	−5	5	9	7	8	−5
Ni	713	11	40	9	106	22	573	32	753
Ni	850	−20	47	−20	130	−20	670	28	880
Pb	5	−2	4	8	4	3	3	7	4
Pb	36	−2	5	6	32	17	37	29	8
PD					13	8	20		15
PT					24	8	20		10
Rb	−10	14	−10	13	−10	−10	−10	18	−10
SB	36	16	−5	−5	44	10	61	39	−5
Sb	1	0.4	0.4	0.4	−0.2	−0.2	0.5	0.5	−0.2
Sc	17	2.8	13	41	86.3	4.2	39	47	11
Se	−10	−10	−10	−10	−10	−10	−10	−10	−10
Sm	4	1.1	3.7	6.8	0.9	−0.2	0.5	2.7	−0.2
SN	65	−20	−20	25	64	28	61	45	23
Sn	−200	−200	−200	−200	−200	−200	−200	−200	−200
Sn	12	−9	−9	−9	−9	−9	−9	−9	−9
Sr	1237	27	11	219	309	703	31	178	15
Ta	−100	−100	−100	−100	−100	−100	−100	−100	−100
Ta	2	−1	−1	−1	−1	−1	−1	−1	−1
Tb	−1	−1	−1	−1	−1	−1	−1	−1	−1
Te					−9	−9	−9		−9
Te	26	−25	−25	−25	29	−25	45	−25	−25
Te	−20	−20	−20	−20	−20	−20	−20	−20	−20
Th	1.5	1.2	0.7	1.4	−0.5	−0.5	−0.5	0.9	−0.5
Ti	0.76	0.07	0.35	0.61	0.62	0.01	0.07	0.32	0.04
U	−0.5	0.6	−0.5	0.6	−0.5	−0.5	−0.5	0.5	−0.5
V	159	21	90	313	966	25	112	298	63
W	−20	−20	−20	−20	−20	−20	−20	−20	−20
W	−2	−2	−2	−2	−2	−2	−2	−2	−2
Y	−5	−5	7	6	−5	−5	−5	−5	−5
Yb	−5	−5	−5	−5	−5	−5	−5	−5	−5
ZN	74	14	51	113	95	14	67	105	74
Zn	−200	−200	−200	250	−200	−200	−200	250	−200
Zr	38	40	17	29	−5	−5	13	−5	12
Zr	−500	−500	−500	−500	−500	−500	−500	−500	−500

Negative numbers denote below detection limit

LAND SELECTION UNIT 18 STREAM SEDIMENT & PAN CONCENTRATE ANALYSES (Analyses by Bondar–Clegg)

	METHOD	UNIT	L.LIMIT	U.LIMIT	4027s	4029s	3995p	3998p	4003p	4004p	4008p
AG	ICP	PPM	0.5	50	3.8	−9	−0.5	−0.5	−0.5	2.6	1.7
Ag	INAA	PPM	5	300	−5	−5	−5	−5	−5	−5	−5
Al	ICP	PCT	0.01	10	4.69	−9	1.71	2.27	2.73	4.09	4.34
As	ICP	PPM	5	2000	101	−9	35	24	45	89	94
As	INAA	PPM	1	10000	8	5	16	32	18	8	7
Au	INAA	PPB	5	10000	11	10	−5	14	−5	−5	7
Ba	ICP	PPM	5	2000	1718	−9	444	1057	515	782	622
Ba	INAA	PPM	100	20000	2000	740	650	1500	890	1100	880
Bl	AA	PPM	1	2000	−1	−1	−1	−1	−1	−1	−1
Bl	ICP	PPM	5	2000	193	−9	16	15	42	80	81
Br	INAA	PPM	1	30000	4	−1	−1	1	−1	−1	−1
CA	ICP	PCT	0.01	10	1.99	−9	0.2	1.54	1.22	3.77	4.49
Cd	ICP	PPM	2	2000	−2	−9	−2	−2	−2	−2	−2
Cd	INAA	PPM	10	2000	−10	−10	−10	−10	−10	−10	−10
Ce	INAA	PPM	10	30000	190	150	250	180	97	130	270
Co	ICP	PPM	1	20000	31	−9	20	37	24	30	29
Co	INAA	PPM	10	20000	33	35	23	53	36	44	42
CR	ICP	PPM	2	20000	269	−9	2088	300	497	1302	870
Cr	INAA	PPM	50	30000	420	110	2600	470	930	2600	2000
Cs	INAA	PPM	1	10000	6	4	3	3	4	3	2
Cu	ICP	PPM	1	20000	77	−9	27	254	41	34	41
Eu	INAA	PPM	2	30000	6	2	4	−2	3	3	3
Fe	ICP	PCT	0.01	10	4.59	−9	4.03	5.55	4.92	8.05	9.4
Fe	INAA	PCT	0.5	10	8	10	5	7.1	7.7	10	10
GA	ICP	PPM	10	2000	98	−9	24	20	31	59	68
Hf	INAA	PPM	2	30000	14	17	16	8	7	18	19
HG	CV AA	PPM	0.01	50	−9	−9	0.072	0.036	0.136	0.017	0.012
Ir	INAA	PPB	100	1000	−100	−100	−100	−100	−100	−100	−100
K	ICP	PCT	0.01	10	1.8	−9	0.71	0.75	0.75	0.84	1.01
LA	ICP	PPM	5	2000	83	−9	42	23	9	27	57
La	INAA	PPM	5	30000	78	54	96	100	38	49	110
LI	ICP	PPM	2	2000	3	−9	27	12	29	16	14
Lu	INAA	PPM	0.5	2000	0.6	1.2	0.7	−0.5	−0.5	0.6	1.5
MG	ICP	PCT	0.01	10	1.91	−9	0.67	0.72	1.29	2.74	2.43
Mn	ICP	PPM	5	20000	1295	−9	378	547	984	2020	6069
Mo	ICP	PPM	1	20000	51	−9	5	17	4	8	8
Mo	INAA	PPM	2	30000	−2	−2	−2	13	−2	−2	−2
NA	ICP	PCT	0.01	10	0.88	−9	0.69	2.07	1.26	1.59	1.36
Na	INAA	PCT	0.05	10	1.2	0.46	0.75	2.4	1.7	1.8	1.4
Nb	ICP	PPM	5	2000	105	−9	16	16	12	50	55
NI	ICP	PPM	1	20000	160	−9	63	55	80	155	129
NI	INAA	PPM	20	30000	150	58	53	64	110	220	160
Pb	AA	PPM	2	10000	13	25	10	29	11	10	10
Pb	ICP	PPM	2	10000	149	−9	26	31	25	44	44
PT	FADCP	PPB	5	10000	−9	−9	17	19	28	24	25
Rb	INAA	PPM	10	10000	110	120	71	49	94	81	110
SB	ICP	PPM	5	2000	67	−9	28	24	11	45	44
Sb	INAA	PPM	0.2	9999	1.8	1.7	2.5	23.3	1.9	1.2	0.7
Sc	INAA	PPM	0.5	2000	20	32	11	12	23	31	33
Se	INAA	PPM	10	30000	−10	−10	−10	−10	−10	−10	−10
Sm	INAA	PPM	0.2	2000	12	11	17	7.6	7.2	11	19
SN	ICP	PPM	20	2000	103	−9	37	−20	38	86	83
Sn	INAA	PPM	200	30000	−200	−200	−200	−200	−200	−200	−200
Sn	XRF	PPM	1	10000	−9	−9			15	11	21
Sr	ICP	PPM	1	2000	267	−9	71	391	104	205	312
Ta	ICP	PPM	5	2000	−100		−100	−100	−100	−100	−100
Ta	INAA	PPM	1	2000	10	2	1	2	2	5	6
Tb	INAA	PPM	1	30000	2	2	1	−1	1	2	3

−9 = not analyzed, all other negative numbers = below detection limit, s = stream sed. p = pan con.

LAND SELECTION UNIT 18 STREAM SEDIMENT & PAN CONCENTRATE ANALYSES (Analyses by Bondar–Clegg)

	METHOD	UNIT	L.LIMIT	U.LIMIT	4027s	4029s	3995p	3998p	4003p	4004p	4008p
Te	ICP	PPM	25	2000	72	–9	–25	–25	–25	41	44
Te	INAA	PPM	20	2000	–20	–20	–20	–20	–20	–20	–20
Th	INAA	PPM	0.5	3000	11	19	25	11	9.4	17	31
Ti	ICP	PCT	0.01	10	1.22		0.52	0.42	0.53	1.28	1.24
U	INAA	PPM	0.5	2000	3.9	6	3.4	4.5	2.9	4.5	7.3
V	ICP	PPM	2	2000	187	–9	139	168	177	270	274
W	ICP	PPM	20	2000	–20	–9	–20	–20	–20	–20	–20
W	INAA	PPM	2	30000	2	4	3	24	–2	22	3
Y	ICP	PPM	5	2000	29	–9	8	–5	6	17	35
Yb	INAA	PPM	5	2000	6	10	5	–5	–5	5	12
ZN	ICP	PPM	2	20000	138	–9	116	82	113	103	115
Zn	INAA	PPM	200	30000	350	310	–200	–200	250	350	400
Zr	ICP	PPM	5	2000	131	–9	81	35	53	86	26
Zr	INAA	PPM	500	10000	620	600	–500	–500	–500	–500	–500

–9 = not analyzed, all other negative numbers = below detection limit, s = stream sed, p = pan con.

LAND SELECTION UNIT 18 STREAM SEDIMENT & PAN CONCENTRATE ANALYSES (Analyses by Bondar–Clegg)

	4151p	4152p	4207p	4209p	4216p
AG	1	2.8	2	1.5	1.5
Ag	−5	−5	−5	−5	−5
Al	1.91	4.36	2.39	2.29	2.28
As	68	101	83	99	100
As	45	8	23	24	29
Au	−5	6	5	−5	7
Ba	467	760	428	425	585
Ba	860	1100	630	600	1000
Bi	−1	−1	−1	−1	−1
BI	45	106	54	59	54
Br	2	−1	−1	−1	2
CA	0.35	5.4	1.31	1.28	1.11
Cd	−2	−2	−2	−2	−2
Cd	−10	−10	−10	−10	−10
Ce	73	90	61	70	79
Co	25	34	31	30	34
Co	37	52	28	31	48
CR	168	575	330	223	239
Cr	340	1000	500	420	520
Cs	6	2	120	118	5
Cu	43	57	52	51	48
Eu	2	4	−2	−2	−2
Fe	5.25	7.6	5.97	5.32	5.53
Fe	9.1	10	7.6	9.2	10
GA	33	65	45	38	39
Hf	5	8	−2	−2	6
HG	0.108	−0.01	0.041	0.031	0.119
Ir	−100	−100	−100	−100	−100
K	0.82	0.7	0.48	0.7	0.76
LA	11	26	7	12	8
La	32	47	28	31	33
LI	38	13	76	71	32
Lu	−0.5	0.7	−0.5	0.8	0.7
MG	0.8	3.11	1.39	1.21	1.17
Mn	846	3426	812	763	1538
Mo	5	12	9	13	8
Mo	−2	−2	−2	−2	−2
NA	0.8	1.26	1.21	1.21	1.31
Na	1.2	1.3	1.5	1.8	2
Nb	15	38	15	13	15
NI	70	186	89	86	92
Ni	100	230	110	120	110
Pb	18	8	14	12	16
Pb	42	59	47	46	42
PT	6691	−5	13	21	20
Rb	130	30	100	100	130
SB	22	37	58	52	52
Sb	5	0.6	7.7	7.5	3
Sc	18	35	26	30	25
Se	−10	−10	−10	−10	−10
Sm	6.4	10	4.8	5.4	6.1
SN	38	101	66	58	59
Sn	−200	−200	−200	−200	−200
Sn	13	8		14	−5
Sr	61	404	163	165	115
Ta	−100	−100	−100	−100	−100
Ta	1	3	−1	1	2
Tb	−1	2	−1	−1	−1

−9 = not analyzed, all other negative numbers = below detection limit, s = stream sed. p = pan con.

LAND SELECTION UNIT 18 STREAM SEDIMENT & PAN CONCENTRATE ANALYSES (Analyses by Bondar–Clegg)

	4151p	4152p	4207p	4209p	4216p
Te	–25	46	45	–25	36
Te	–20	–20	–20	–20	–20
Th	10	5.9	6.4	6.7	8.3
Tl	0.44	1.29	0.55	0.5	0.46
U	3.5	2.4	2.4	2.5	2.9
V	147	288	217	209	187
W	–20	–20	–20	20	–20
W	3	5	42	38	–2
Y	7	17	5	7	6
Yb	–5	6	–5	–5	–5
ZN	120	125	117	109	123
Zn	320	550	270	380	340
Zr	46	14	23	31	49
Zr	–500	–500	–500	–500	–500

–9 = not analyzed, all other negative numbers = below detection limit, s = stream sed. p = pan con.

LAND SELECTION UNIT 18 MAJOR OXIDES (Analyses by Bondar–Clegg)

MAJOR OXIDE ANALYSES (wt.%)							
	3762	3765	3766	4006	4017	4034	4194
SiO2	68.22	60.83	62.71	70.34	63.17	36.9	62.5
TiO2	0.39	0.46	0.5	0.36	0.43	0.03	0.63
Al2O3	16.43	16.21	16.7	15.08	16.95	0.64	15.44
Fe2O3	2.29	3.57	3.51	2.66	3.06	17.03	3.89
FeO	1.16	1.03	2.25	0.26	0.9	1.99	1.99
MnO	0.01	0.07	0.06	0.03	0.05	0.17	0.1
MgO	1.13	1.64	2.59	0.55	1.9	33.92	2.75
Na2O	3.91	3.25	4.4	3.39	4.33	−0.01	4.12
K2O	2.17	1.46	1.71	4.37	1.25	−0.05	2.71
CaO	3.09	5.18	4.59	1.13	4.39	−0.01	4.48
P2O5	0.06	0.2	0.25	0.12	0.21	−0.03	0.34
LOI	1.58	5.65	1.4	0.84	2.37	11.29	0.69
Cr	−10	26	41	−10	27	1920	85
Ba*	1500	1200	1700	580	1400	40	1400
Nb	22	49	28	33	28	23	23
Rb	144	75	76	361	50	3	81
Sr	794	733	1416	174	1013	338	1070
Y	12	12	10	13	7	3	18
Zr	172	143	98	164	107	16	138
Sum as oxides	99.28	98.54	98.43	98.87	98.12	100.17	97.65
CIPW NORMS							
Quartz	29.45	25.19	17.04	31.63	22.54	0.00	16.26
Corundum	2.23	0.37	0.00	3.07	1.04	0.72	0.00
Orthoclase	13.14	9.30	10.44	26.35	7.72	0.00	16.55
Albite	33.91	29.65	38.47	29.27	38.31	0.00	36.04
Anorthite	15.31	26.30	21.46	4.92	21.34	0.00	16.16
Diopside	0.00	0.00	0.31	0.00	0.00	0.00	3.59
Hypersthene	3.58	4.40	9.19	1.40	4.95	43.90	6.84
Olivine	0.00	0.00	0.00	0.00	0.00	36.15	0.00
Magnetite	1.49	2.39	1.51	0.00	1.90	7.78	2.52
Hematite	0.00	0.97	0.00	2.42	0.84	11.39	0.00
Ilmenite	0.76	0.94	0.98	0.63	0.85	0.06	1.24
Rutile	0.00	0.00	0.00	0.04	0.00	0.00	0.00
Apatite	0.14	0.50	0.60	0.28	0.51	0.00	0.81
Sum	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Negative numbers denote below detection limit

LAND SELECTION UNIT 18 MAJOR OXIDES (Analyses by Bondar–Clegg)

MAJOR OXIDE ANALYSES (wt.%)			
	4198	4206	4228
SiO2	60.95	63.45	44.01
TiO2	0.58	0.44	0.13
Al2O3	16.66	17.1	5.71
Fe2O3	4.24	3.15	9.44
FeO	1.16	0.68	4.82
MnO	0.07	0.04	0.14
MgO	3.05	2.01	25.82
Na2O	3.55	4.48	0.49
K2O	1.2	1.1	−0.05
CaO	5.85	4.26	7.33
P2O5	0.12	0.17	−0.03
LOI	1.69	1.89	4.69
Cr	51	28	2190
Ba*	1000	1400	60
Nb	−5	−5	−5
Rb	56	54	3
Sr	906	953	51
Y	13	10	4
Zr	106	119	21
Sum as oxides	97.96	98.09	97.98
CIPW NORMS			
Quartz	20.24	22.41	0.00
Corundum	0.00	1.25	0.00
Orthoclase	7.38	6.76	0.00
Albite	31.24	39.43	4.48
Anorthite	27.02	20.83	14.46
Diopside	1.83	0.00	19.50
Hypersthene	7.05	5.21	27.38
Olivine	0.00	0.00	27.51
Magnetite	2.38	1.09	6.41
Hematite	1.43	1.75	0.00
Ilmenite	1.15	0.87	0.27
Rutile	0.00	0.00	0.00
Apatite	0.29	0.41	0.00
Sum	100.00	100.00	100.00

Negative numbers denote below detection limit

LAND SELECTION UNIT 18 REFERENCES

Arth,JG (1985): Neodymium and strontium isotopic compositions of Cretaceous calc-alkaline plutons of the Yukon-Koyukuk basin, Ruby geanticline, and Seward Peninsula, Alaska (abs.). eos 66(46), 1102.

Arth,JG; Criss,RE; Zmuda,CC; Foley,NK; Patton,WW,Jr; Miller,TP (1989): Remarkable isotopic and trace element trends in potassic through sodic Cretaceous plutons of the Yukon-Koyukuk basin, Alaska, and the nature of the lithosphere beneath the Koyukuk terrane. J.G.R. 94(B11), 15,957-15,968.

Arth,JG; Zmuda,CC; Foley,NK; Criss,RE; Patton,WW,Jr; Miller,TP (1989): Isotopic and trace element variations in the Ruby batholith, Alaska, and the nature of the deep crust beneath the Ruby and Angayucham terranes. J.G.R. 94(B11), 15,941-15,955.

Bickel,RS; Patton,WW,Jr (1957): Preliminary geologic map of the Nulato and Kateel Rivers area, Alaska. U.S. Geological Survey Miscellaneous Geologic Investigations Map I-249, Washington D.C. (1 sheet, 1:125,000 scale)

Box,SE; Patton,WW,Jr (1985): Collided intraoceanic volcanic arc in the Yukon-Koyukuk basin, western Alaska (abs.). eos 66(46), 1102.

Cass,JT (1959): Reconnaissance geologic map of the Melozitna quadrangle, Alaska. U.S. Geological Survey Miscellaneous Geologic Investigations Map I-290, Washington D.C. (1 sheet, 1:250,000 scale)

Cass,JT (1959): Reconnaissance geologic map of the Nulato quadrangle, Alaska. U.S. Geological Survey Miscellaneous Geologic Investigations Map I-291, Washington D.C. (1 sheet, 1:250,000 scale)

Chapman,RM; Coats,RR; Payne,TG (1963): Placer tin deposits in central Alaska. U.S. Geological Survey Open-file Report 239, 53 pages. (10 plates)

Chapman,RM; Patton,WW,Jr (1978): Reconnaissance geochemical sampling in the Melozitna quadrangle, Alaska. U.S. Geological Survey Open-file Report 78-699, 26 pages. (1 plate, 1:250,000 scale)

Cobb,EH (1972): Metallic mineral resources map of the Melozitna quadrangle, Alaska. U.S. Geological Survey Miscellaneous Field Studies Map MF-396, (1 sheet, 1:250,000)

Cobb,EH (1972): Metallic mineral resources map of the Nulato quadrangle, Alaska. U.S. Geological Survey Miscellaneous Field Studies Map MF-423, (1 sheet, 1:250,000 scale)

Cobb,EH; Miller,TP (1981): Summaries of data on and lists of references to metallic and selected nonmetallic mineral occurrences in the Hughes, Kotzebue, Melozitna, Selawik, and Shungnak quadrangles, west-central Alaska, supplement to Open-file Report 75-627: Part B-Lists of references to January 1, 1981. U.S. Geological Survey Open-file Report 81-847B, 13 pages.

Cobb,EH; Miller,TP (1981): Summaries of data on and lists of references to metallic and selected nonmetallic mineral occurrences in the Hughes, Kotzebue, Melozitna, Selawik, and Shungnak quadrangles, west-central Alaska, supplement to Open-file Report 75-627: Part A-Summaries of data to January 1, 1981. U.S. Geological Survey Open-file Report 81-847A, 14 pages.

Dillon,JT; Adams,DD; Adler,Penny (1983): Geologic map of the Melozitna A-4 quadrangle, Alaska. Alaska Division of Geological and Geophysical Surveys Report of Investigations 83-18, (1 sheet, 1:63,360 scale)

Dillon,JT; Patton,WW,Jr; Mukasa,SB; Tilton,GR; Blum,Joel; Moll,EJ (1985): New radiometric evidence for the age and thermal history of the metamorphic rocks of the Ruby and Nixon Fork terranes, west-central Alaska. In: The United States Geological Survey in Alaska: accomplishments during 1983. (Eds: Bartsch-Winkler,S; Reed,KM) U.S. Geological Survey Circular 945, 13-18.

Dusel-Bacon,Cynthia; Brosge,WP; Till,AB; Doyle,EO; Mayfield,CF; Reiser,HN; Miller,TP (1989): Distribution, facies, ages, and proposed tectonic associations of regionally

metamorphosed rocks in northern Alaska. U.S. Geological Survey Professional Paper 1497-A, Washington D.C. 44 pages. (2 sheets, 1:1,000,000 scale)

Eberlein,GD; Chapman,RM; Foster,HL; Gassaway,JS (1977): Map and table describing known metalliferous and selected nonmetalliferous mineral deposits in central Alaska. U.S. Geological Survey Open-file Report 77-168-D, 132 pages.

Eberlein,GD; Menzie,WD (1978): Maps and tables describing areas of metalliferous mineral resource potential of central Alaska. U.S. Geological Survey Open-file Report 78-1-D, 43 pages. (2 sheets, 1:1,000,000 scale)

Gemuts,I; Puchner,CC; Steffel,CI (1983): Regional geology and tectonic history of western Alaska. J.AK.Geol.Soc. 3, 67-85.

Harris,RA (1985): Paleomagnetism, geochronology and paleotemperature of the Yukon-Koukuk province, Alaska (abs.). eos 66(46), 1103.

Miller,TP (1985): Petrologic character of the plutonic rocks of the Yukon-Koyukuk basin and its borderlands (abs.). eos 66(46), 1102.

Miller,TP (1989): Contrasting plutonic rock suites of the Yukon-Koyukuk basin and the Ruby geanticline, Alaska. J.G.R. 94(B11), 15,969-15,987.

Nilsen,TH (1989): Stratigraphy and sedimentology of the mid-Cretaceous deposits of the Yukon-Koyukuk basin, west-central Alaska. J.G.R. 94(B11), 15,925-15,940.

Patton,WW,Jr (1966): Regional geology of the Kateel River quadrangle, Alaska. U.S. Geological Survey Miscellaneous Geologic Investigations Map I-437, Washington D.C. (1 sheet, 1:250,000 scale)

Patton,WW,Jr (1973): Reconnaissance geology of the northern Yukon-Koyukuk province, Alaska. U.S. Geological Survey Professional Paper 774-A, 17 pages.

Patton,WW,Jr (1984): Timing of arc collision and emplacement of oceanic crustal rocks on the margins of the Yukon-Koyukuk basin, western Alaska (abs.). GSA Abs. 16(5), 328.

Patton,WW,Jr; Bickel,RS (1956): Geologic map and structure sections along part of the lower Yukon River, Alaska. U.S. Geological Survey Miscellaneous Geologic Investigations Map I-197, Washington D.C. (1 sheet, 1:200,000 scale)

Patton,WW,Jr; Box,SE (1985): Tectonic setting and history of the Yukon-Koyukuk basin, Alaska (abs.). eos 66(46), 1101.

Patton,WW,Jr; Hoare,JM (1968): The Kaltag fault, west-central Alaska. In: U.S. Geological Survey Professional Paper 600-D, D147-D153.

Patton,WW,Jr; Miller,TP; Chapman,RM; Yeend,Warren (1978): Geologic map of the Melozitna quadrangle, Alaska. U.S. Geological Survey Miscellaneous Investigations Map I-1071, (1 sheet, 1:250,000 scale)

Patton,WW,Jr; Stern,TW; Arth,JG; Carlson,Christine (1987): New U/Pb ages from granite and granite gneiss in the Ruby geoanticline and southern Brooks Range, Alaska. J.Geol. 95, 118-126.

Roeske,SM; Bradshaw,JY; Snee,LW (1992): High P/low T metamorphism of oceanic and continental crust in the Ruby geanticline, north-central Alaska. GSA Abs. 24(5), 79.

Roeske,SM; Walter,Marianne; Aleinikoff,JN (1991): Cretaceous deformation of granitic rocks in the southwest Ruby terrane, central Alaska (abs.). GSA Abs. 23(2), 93.

Silberman,ML; Moll,EJ; Chapman,RM; Patton,WW,Jr; Connor,CL (1979): Potassium-argon age of granitic and volcanic rocks from the Ruby, Medfra, and adjacent quadrangles, west-central Alaska. In: The United States Geological Survey in Alaska: accomplishments during 1978. (Eds: Johnson,KM; Williams,JR) U.S. Geological Survey Circular 804-B, B63-B66.

Weber,FR; Pewe,TL (1970): Surficial and engineering geology of the central part of the Yukon-Koyukuk lowland, Alaska. U.S. Geological Survey Miscellaneous Geologic Investigations Map I-590, Washington D.C. (2 sheets, 1:250,000 scale)