



**BRITISH COLUMBIA
GEOCHEMICAL RECONNAISSANCE SURVEY DATA SUMMARY**

By W. M. Johnson

During the British Columbia Regional Geochemical Survey (RGS) and its predecessor, the joint Federal/Provincial Uranium Reconnaissance Program (URP), more than 18 000 stream sediment and stream water samples from seventeen 1:250 000 National Topographic System (NTS) map sheets in the province were collected and analysed. Unless the exploration company or individual prospector wishing to use this information has access to a computer this represents an overwhelming amount of data. This report gives a compilation of data grouped according to the dominant rock type in the drainage basin for each map sheet surveyed in the program to date in easily used map and table form as an aid to interpretation.

The data was grouped into six generalized rock types for treatment. These are defined in Table 1. The average concentration and standard deviation for 10 elements were compiled for each generalized rock type in each of the 17 map sheets. The 10 elements selected for compilation are zinc, copper, lead, nickel, cobalt, manganese, arsenic, molybdenum, mercury, and uranium. This treatment is similar to an earlier one done as part of a metallogeny study (Sutherland Brown, 1980).

TABLE 1

GENERALIZED ROCK TYPE	COMPONENT ROCK TYPES
Intrusive INTR	Alaskite, granodiorite, granite, quartz diorite, and quartz monzonite.
Volcanic VOLC	Agglomerate, andesite, basalt, dacite, greenstone, metavolcanic rocks, olivine basalt, pyroclastic and tuff.
Metamorphic METM	Gneiss, phyllite, schist, and slate.
Till	Till
Sedimentary (Clastic) SEDM	Chert, argillite, siltstone, sandstone, greywacke, conglomerate, quartzite, and metasedimentary rocks.
Carbonate CARB	Dolomite and limestone.

The rock type specified for each sample site represents the dominant rock type underlying the drainage basin of the stream from which the sediment sample was collected.

In the compilation process the analytical data were sorted into the six generalized rock-type groups. The mean element concentration, standard deviation, and the number of samples for each component rock type within each group were then tabulated for each map sheet. These tabulated results were used to calculate the weighted mean and weighted standard deviation of each element concentration for the six generalized rock types in each map sheet.

For example, in map sheet NTS 82K, there were 54 samples taken from sites specified as having dolomite as the predominant underlying component rock type and 23 samples taken from sites having limestone. These were tabulated into the generalized rock type 'carbonate'. The weighted mean element concentration and

weighted standard deviation were calculated to give mean and standard deviation results for the carbonate group for map sheet NTS 82K. To continue the example, the 54 samples from dolomitic terrane had a mean concentration for zinc of 61.0 ppm with a standard deviation of 31.3, while the 23 samples from limestone terrane had a mean zinc concentration of 64.2 ppm and a standard deviation of 39.6. These were grouped into the generalized rock-type category of carbonate and the weighted mean zinc concentration in samples of carbonate terrane in map sheet NTS 82K was found to be 62.0 ppm with a weighted standard deviation of 34.0. Each of these values has been tabulated (see Tables 2 to 11) and plotted on maps (see Figs. 70 to 80).

The formulae used are as follows:

$$\text{weighted mean} = \frac{\sum \bar{X}_i N_i}{\sum N_i}$$

$$\text{weighted standard deviation} = \left(\frac{\sum S_i^2 (N_i - 1)}{\sum (N_i - 1)} \right)^{1/2}$$

where \bar{X}_i = mean element concentration for component rock type 'i'

N_i = number of samples taken from component rock type 'i'

S_i = standard deviation of results for component rock type 'i'

In the example given above, the calculations involved are as follows:

$$\bar{X}_{DLMT} = 61.0 \text{ ppm Zn}, S_{DLMT} = 31.3, N_{DLMT} = 54$$

$$\bar{X}_{LMSN} = 64.2 \text{ ppm Zn}, S_{LMSN} = 39.6, N_{LMSN} = 23$$

$$\text{weighted mean} = \frac{(61.0 \times 54 + 64.2 \times 23)}{(54 + 23)} = 62.0 \text{ ppm Zn}$$

weighted standard deviation =

$$\left[\frac{(31.3 \times 31.3 \times (54 - 1) + 39.6 \times 39.6 \times (23 - 1))}{(54 - 1) + (23 - 1)} \right]^{1/2} = 34.0$$

This same type of calculation was used to determine the overall means and standard deviations for each rock-type group. For example, the average value of zinc in carbonates from all map sheets is 83.5 ppm, the standard deviation is 133, and there was a total of 584 samples. In addition, the mean for each element for all the samples and the corresponding standard deviation were calculated and plotted (see Fig. 80).

Portraying the information in this way is intended to assist those doing stream sediment sampling. The mean concentrations give an indication of the background values which might be expected from sediment samples collected from streams draining basins underlain by identified rock types. The standard deviation values give the explorationist an idea of what kind of variation has been experienced in regional sampling and assist in setting threshold values to distinguish anomalies (Levinson, 1974). Given the large variability of element concentrations within any one rock-type group, caution must be exercised in interpreting results. Given this precaution, however, the use of these tabulations and rock-type group averages should facilitate a more efficient screening of anomalous results from stream sediment surveys. For example, a value of 130 ppm zinc in a stream sediment from a predominantly metamorphic terrane in map sheet NTS 82K is not likely to be anomalous since the mean for zinc is 176 ppm. However, if the sample was

from a stream draining an area underlain by intrusive rocks where the average zinc concentration is 40 ppm, it would be anomalous.

A genuine local anomaly may not appear to be anomalous when compared to a map sheet average however, and care should be taken not to overlook this possibility. The 1:250 000 map-sheet grid is an artificial one and has no relationship to geological provinces. This must always be kept in mind when averages based on such a grid system are used.

Inevitably, any summarizing of data in this way hides interesting observations to be made in more detailed data listings. The grouping of rock types masks anomalies in specific rock types. Notable examples of this type are the following:

Element	Map Sheet	No. of Samples	Rock Type	Mean Conc. ppm	S.D.
Uranium	104N	93	Alaskite	56.6	56.4
Molybdenum	104O	45	Granite	6.80	4.56
Molybdenum	93A	104	Agglomerate	7.53	48.5
Nickel	104N	45	Basalt	320.00	229.00
Cobalt	104N	45	Basalt	30.9	12.8

Comparing these examples with the more generalized data in the appropriate tables leads to the following comments. The unusually high uranium in sediments draining terranes underlain by alaskite (intrusive) in NTS 104N is somewhat masked in this compilation (mean uranium is 37.1 ppm). The other intrusive rock type (granite) gives rise to sediments with only 6.91 ppm uranium. Thus, uranium exploration efforts might be more profitably oriented to alaskite rather than granitic terranes in this map sheet. Similarly, in the same map sheet, the nickel concentration of the basaltic sediments is 320 ppm and the cobalt 30.9, as compared to 12.0 ppm and 11.3 ppm respectively in the pyroclastic sediments. The 85 samples of basaltic sediments in NTS 93A gave only 1.09 ppm molybdenum compared to 7.53 ppm in the agglomerates. Molybdenum in sediments from quartz diorite and quartz monzonite terranes in NTS 104O was 3.61 ppm and 2.47 ppm respectively compared to 6.80 ppm found in samples from granitic areas.

The detailed information from which this compilation has been made can be found in a series of releases from the B.C. Ministry of Energy, Mines & Petroleum Resources and the Geological Survey of Canada. They can be ordered from the B.C. Ministry of Energy, Mines & Petroleum Resources in Victoria by referring to the following release numbers:

Map Sheet	RGS No.	GSC Open File No.
82E		GSC 409
82F		GSC 514
82K		GSC 515
82L		GSC 410
82M		GSC 516
92H	RGS 7	GSC 865
92I	RGS 8	GSC 866
92J	RGS 9	GSC 867
92O	RGS 3	GSC 774
92P	RGS 4	GSC 775
93A	RGS 5	GSC 776
93B	RGS 6	GSC 777
103I	RGS 1	GSC 772
103P	RGS 2	GSC 773
104N		GSC 517
104O		GSC 561
104P		GSC 562

Results are also available in EBCDIC or ASC11 format on widely compatible magnetic tape (not on cassettes or floppy disks) from the British Columbia Ministry of Energy, Mines and Petroleum Resources in Victoria. All results to date are assembled on magnetic tape.

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REFERENCES

Sutherland Brown, A. (1980): Metallogeny by Numbers, *Geoscience Canada*, Vol. 7, No. 3, pp. 95-101.
Levinson, A. A. (1974): Introduction to Exploration Geochemistry, *Applied Publishing Ltd.*, Calgary.

TABLE 2

ELEMENT Zn (ppm)

ROCK TYPE	INTR		VOLC		METAM		TILL		CARB		SEDM		MAP SHEET AVERAGE	
MAP SHEET	MEAN CONC.	MEAN S.D.	MEAN CONC.	MEAN S.D.										
	NO.	SPLS.	NO.	SPLS.										
82E	58.1	144	63.3	108	38.5	21.0	41.3	26.9			47.8	29.2	54.4	112
		729		313		250		71				23		1543
82F	91.9	119	158	148	202	560					80.5	369	112	349
		485		62		252						439		1318
82K	40.0	28.8	70.8	60.8	176	730	57.2	35.6	62.0	34.0	99.2	434	119	536
		213		30		547		116		77		193		1223
82L	53.1	25.0	61.8	32.9	64.3	47.3	48.8	26.8					62.0	43.4
		170		302		734		81						1308
82M	56.1	24.0	67.3	16.9	57.8	112	56.6	43.5			72.5	103	62.7	95.3
		83		10		453		490				115		1150
92H	53.0	47.1	85.0	76.4							80.0	48.9	69.7	63.5
		435		298								134		914
92I	58.1	43.0	63.2	21.7	84.8	49.3					80.0	39.8	66.8	40.3
		155		273		36						82		572
92J	48.3	52.3	88.0	66.5							67.3	51.1	62.4	58.6
		431		219								90		780
92O	47.7	26.9	55.0	27.3			50.2	21.1	56.9	26.6	72.3	31.5	57.8	29.6
		110		343				159		43		228		883
92P	41.4	35.1	59.4	50.2			50.8	50.6	91.7	63.2	63.7	28.8	55.5	48.2
		171		447				160		25		60		863
93A	43.8	25.4	64.9	41.3	75.4	104	59.7	38.9	71.5	70.4	69.1	136	65.7	74.9
		64		189		336		435		94		89		1220
93B			42.2	16.5			50.1	29.9	60.1	26.1	59.3	37.8	47.1	27.9
				312				255		28		39		701
103I	43.6	26.0	79.2	39.8	44.6	23.2	60.1	15.2			81.4	56.2	54.7	38.5
		1061		259		417		30				357		2124
103P	74.2	86.8	134	93.9							136	81.7	122	87.7
		409		147								1213		1778
104N	127	118	89.8	57.6			76.3	48.6	84.6	31.3	97.2	77.2	92.0	80.4
		152		84				401		32		189		883
104O	77.8	54.7	91.5	39.1	91.4	73.5	78.1	33.8	129	161	102	93.7	88.8	75.6
		418		101		93		75		26		16.1		892
104P	50.3	22.1	93.5	60.0			66.8	56.0	95.7	185	54.0	54.0	80.0	119
		59		145				248		259		64		801
WEIGHTED MEANS	60.0	79.2	72.0	60.0	91.6	350	59.9	41.6	83.5	133	100	180	76.5	178
TOTAL SPLS	5145		3534		3118		2521		584		3476		18953	

TABLE 3

ELEMENT Cu (ppm)

ROCK TYPE	INTR		VOLC		METAM		TILL		CARB		SEDM		MAP SHEET AVERAGE	
MAP SHEET	MEAN CONC.	MEAN S.D.	MEAN CONC.	MEAN S.D.										
	NO.	SPLS.	NO.	SPLS.										
82E	19.1	70.8	37.1	61.1	14.5	15.7	24.2	45.3			37.9	86.4	22.2	59.0
		729		313		250		71				23		1543
82F	14.4	20.3	54.5	32.6	25.4	22.1					23.8	21.5	22.1	23.4
		485		62		252						439		1318
82K	10.7	10.2	41.7	34.2	38.8	22.5	17.9	11.1	23.4	10.5	26.7	15.2	28.6	21.7
		213		30		547		116		77		193		1223
82L	16.4	14.5	27.4	23.9	23.4	15.4	19.9	12.8					23.3	19.0
		170		302		734		81						1308
82M	18.3	13.6	14.5	7.8	22.3	21.0	24.1	18.7			32.1	13.6	23.7	20.0
		83		10		452		489				115		1150
92H	21.5	23.7	45.6	69.5							35.4	72.2	31.9	52.3
		435		298								134		914
92I	57.5	95.7	35.2	18.6	52.2	46.3					33.3	14.6	42.0	54.2
		155		273		36						82		572
92J	25.4	18.9	52.7	46.8							33.6	16.2	34.4	31.2
		431		219								90		780
92O	50.2	122	27.8	27.5			22.5	12.6	25.5	14.7	35.0	31.7	31.4	50.2
		110		343				159		43		228		883
92P	25.0	28.4	91.6	23.9			19.2	17.1	27.6	21.1	38.9	19.8	27.5	25.3
		171		447				160		25		60		863
93A	25.2	20.3	35.7	25.3	24.3	12.8	28.8	20.6	30.6	17.8	30.9	15.3	28.7	20.2
		64		189		336		435		94		89		1220
93B			18.0	13.2			21.7	13.5	27.4	16.5	25.0	10.8	20.5	13.9
				312				255		28		39		701
103I	19.9	19.2	56.0	41.8	24.5	14.5	19.5	7.3			32.5	22.0	27.3	25.9
		1061		259		417		30				357		2124
103P	20.4	18.1	89.6	184							46.9	22.4	44.3	58.9
		409		147								1213		1776
104N	24.5	30.4	34.5	22.4			29.1	21.4	43.4	20.5	45.8	26.7	33.8	27.9
		152		84				401		32		189		883
104O	17.8	15.4	31.8	26.6	39.7	33.1	21.5	13.9	40.3	55.2	40.1	31.2	27.1	29.8
		418		101		93		75		26		161		892
104P	11.4	8.6	53.0	35.0			14.9	10.3	19.7	17.6	16.3	8.0	23.8	24.5
		59		145				248		259		64		801
WEIGHTED MEANS	21.3	40.2	46.3	52.8	26.5	19.2	23.6	18.6	25.3	20.2	37.2	27.0	28.8	36.6
TOTAL SPLS	5145		3534		3117		2520		584		3476		18953	

TABLE 4

ELEMENT Pb (ppm)

ROCK TYPE	INTR		VOLC		METAM		TILL		CARB		SEDM		MAP SHEET AVERAGE	
MAP SHEET	MEAN CONC.	MEAN S.D.	MEAN CONC.	MEAN S.D.										
	NO.	SPLS.	NO.	SPLS.										
82E	7.18	9.71	9.73	45.2	5.01	6.46	4.39	4.32			7.30	6.53	7.77	22.3
		729		313		250		71				23		1543
82F	24.9	45.3	43.9	73.8	43.5	139					21.7	115	28.0	97.2
		485		62		245						439		1313
82K	10.4	8.43	12.1	9.8	51.0	167	13.7	24.2	20.4	25.3	29.8	22.1	34.2	191
		213		30		547		116		77		193		1223
82L	4.86	5.55	3.83	3.18	5.56	6.89	3.84	3.88					5.08	6.50
		170		302		734		81						1308
82M	7.94	8.70	4.90	3.90	13.0	62.9	8.19	10.2			13.2	17.2	10.5	41.1
		83		10		451		489				115		1149
92H	4.70	8.23	7.19	31.8							6.89	7.65	5.91	19.4
		435		298								134		914
92I	4.65	29.2	2.67	2.78	3.19	4.08					3.23	2.86	3.35	15.4
		155		273		36						92		572
92J	4.29	20.6	6.35	18.2							2.98	10.4	4.70	18.6
		431		219								90		778
92O	5.65	12.4	2.78	3.98			2.23	2.27	2.05	1.40	3.24	2.80	3.13	5.41
		110		343				159		43		228		863
92P	4.35	4.95	5.25	24.2			2.90	2.58	2.16	1.49	5.08	3.98	4.53	17.6
		171		447				160		25		60		863
93A	5.20	6.24	2.90	2.90	8.66	21.0	4.90	11.4	14.5	8.03	14.6	6.86	7.05	13.9
		64		189		336		435		94		89		1220
93B			1.41	1.06			1.40	1.10	1.00	1.00	1.33	0.74	1.42	1.03
				312				255		28		39		701
103I	2.59	4.7	6.27	8.78	1.45	1.48	3.17	2.15			6.11	8.49	3.41	6.14
		1061		259		417		30				357		2124
103P	7.79	17.0	21.8	42.3							9.70	9.80	10.3	17.1
		409		147								1213		1778
104N	20.9	53.1	6.76	11.4			4.58	7.79	2.88	1.86	4.76	5.47	7.71	23.9
		152		84				401		32		189		883
104O	10.2	21.4	5.52	8.06	6.06	7.33	2.40	1.94	8.15	10.76	7.85	19.9	8.36	18.4
		418		101		93		75		26		161		892
104P	6.95	5.44	7.57	5.67			6.42	13.3	14.8	39.7	6.08	4.41	9.49	24.7
		59		145				248		259		64		801
WEIGHTED MEANS	8.0	20.8	6.49	23.4	17.4	84.1	5.25	9.94	12.4	28.4	10.8	42.2	9.72	57.6
TOTAL SPLS	5145		3534		3109		2520		584		3476		18950	

TABLE 5

ELEMENT NI (ppm)

ROCK TYPE	INTR		VOLC		METAM		TILL		CARB		SEDM		MAP SHEET AVERAGE	
MAP SHEET	MEAN CONC. NO.	MEAN S.D. SPLS.	MEAN CONC. NO.	MEAN S.D. SPLS.										
82E	9.78	12.4 729	20.8	25.4 313	9.53	6.24 250	10.9	11.6 71			11.4	10.3 23	13.0	20.0 1543
82F	13.8	18.4 485	28.4	43.5 62	29.4	35.4 252					12.0	8.48 439	17.5	24.4 1318
82K	10.1	15.6 213	27.7	25.4 30	37.1	28.6 547	13.9	8.26 116	18.2	8.84 77	16.7	10.7 193	25.1	24.7 1223
82L	15.9	14.9 170	23.2	21.6 302	22.5	17.6 734	18.8	15.6 81					21.7	18.4 1308
82M	12.6	10.4 83	35.2	19.2 10	17.9	12.8 452	20.1	14.2 489			28.4	12.1 115	19.6	14.5 1150
92H	14.0	22.5 435	24.9	25.2 298							15.0	9.60 134	19.5	33.7 914
92I	24.2	56.1 155	34.7	34.2 273	89.1	137 36					31.8	30.8 82	36.5	66.6 572
92J	19.2	71.4 431	75.5	110 219							60.0	110 90	50.2	127 780
92O	101	359 110	34.5	25.6 343			26.8	20.0 159	58.7	27.1 43	84.8	224 228	55.5	173 883
92P	27.5	42.7 171	31.4	25.7 447			22.4	17.1 160	60.4	86.1 25	28.8	34.4 60	29.6	33.0 863
93A	19.5	13.8 64	41.5	35.6 189	28.5	20.5 336	36.6	47.1 435	29	12.8 94	27.9	16.1 89	33.7	35.8 1220
93B			30.7	22.3 312			32.9	22.6 255	41.3	29.9 28	30.9	20.7 39	31.2	22.1 701
103I	7.99	8.22 1061	14.9	8.5 259	10.8	6.88 417	14.7	4.85 30			16.6	13.9 357	10.9	9.97 2124
103P	15.8	16.0 409	26.4	20.1 147							65.6	38.1 1213	50.8	39.6 1778
104N	39.9	84.5 152	177	169 84			48.8	72.3 401	54.7	66.7 32	86.4	144 189	71.6	128 883
104O	18.2	17.2 418	51.3	76.4 101	33.7	21.5 93	31.3	20.8 75	34.4	17.9 26	39.3	106 161	29.2	55.2 892
104P	12.5	7.51 59	100	193 145			31.1	70.0 248	28.6	38.7 259	21.5	20.8 64	44.9	115 801
WEIGHTED MEANS	16.4	60.9	38.3	60.6	24.1	24.9	30.1	43.2	33.2	37.0	45.0	76.6	30.5	64.6
TOTAL SPLS	5145		3534		3117		2520		584		3476		18953	

TABLE 6

ELEMENT Co (ppm)

ROCK TYPE	INTR		VOLC		METAM		TILL		CARB		SEDM		MAP SHEET AVERAGE	
MAP SHEET	MEAN CONC. NO.	MEAN S.D. SPLS.	MEAN CONC. NO.	MEAN S.D. SPLS.										
82E	5.18 729	2.66	7.54 313	4.72	5.30 250	2.21	5.42 71	3.02			6.09 23	3.26	5.90 1543	3.62
82F	6.20 485	3.43	13.8 62	6.21	10.2 252	6.48					9.45 439	6.62	8.69 1318	6.00
82K	4.45 213	3.89	12.3 30	9.81	15.4 547	7.49	7.97 116	4.67	10.6 77	5.06	11.6 193	6.88	11.7 1223	7.88
82L	7.21 170	3.52	9.83 302	4.99	9.01 734	4.68	8.06 81	3.93					8.96 1308	4.71
82M	8.53 83	4.74	17.2 10	8.04	9.46 452	4.69	10.0 489	5.91			13.6 116	4.05	10.0 1150	5.74
92H	6.00 435	3.85	10.9 298	5.77							10.3 134	11.6	8.55 914	7.14
92I	8.63 155	4.74	11.3 273	4.14	15.9 36	8.12					10.7 82	4.30	10.8 572	5.40
92J	7.15 431	5.49	15.9 219	8.85							12.2 90	6.80	10.9 780	9.17
92O	12.6 110	14.5	12.4 343	4.77			12.1 159	11.4	13.9 43	4.78	15.3 228	9.00	13.2 883	9.06
92P	8.51 171	4.26	12.1 447	6.84			8.77 160	4.12	12.6 25	7.23	11.9 60	5.43	10.8 853	6.12
93A	9.02 64	5.15	11.9 189	9.04	11.8 336	9.22	10.8 435	5.20	13.7 94	6.78	11.0 89	6.69	11.4 1220	7.44
93B			9.52 312	5.60			9.62 255	6.76	9.93 28	4.38	10.5 39	3.37	9.69 701	6.07
103I	7.47 1061	6.20	13.0 259	5.21	8.43 417	3.65	8.37 30	2.79			11.5 357	5.10	9.03 2124	5.87
103P	9.85 409	5.35	16.1 147	7.37							19.6 1213	13.7	17.0 1778	12.5
104N	6.97 152	6.77	21.8 84	9.94			10.1 401	6.98	11.8 32	5.83	15.0 189	11.1	12.1 833	10.0
104O	7.78 418	5.45	16.0 101	10.8	11.8 93	7.10	10.9 75	6.10	12.7 26	10.2	11.0 161	8.29	10.1 832	7.79
104P	5.58 59	2.63	17.2 145	12.5			7.50 248	6.09	8.66 259	4.56	9.33 64	3.03	9.99 801	8.46
WEIGHTED MEANS	7.13	5.24	12.2	6.80	10.4	5.93	9.65	6.30	10.7	5.58	14.4	10.0	10.5	7.58
TOTAL SPLS	5145		3534		3117		2520		584		3476		18953	

TABLE 7

ELEMENT Mn (ppm)

ROCK TYPE	INTR		VOLC		METAM		TILL		CARB		SEDM		MAP SHEET AVERAGE	
MAP SHEET	MEAN CONC.	MEAN S.D.	MEAN CONC.	MEAN S.D.										
	NO.	SPLS.	NO.	SPLS.										
82E	430	405	509	701	410	464	360	254			576	851	448	541
		729		313		250		71				23		1543
82F	440	260	604	253	501	484					438	282	461	302
		485		62		252						439		1318
82K	274	220	490	334	564	416	470	870	546	943	275	339	492	518
		213		30		547		116		77		193		1223
82L	565	543	564	514	406	395	490	545					470	461
		170		302		734		81						1308
82M	432	179	593	489	473	1141	405	405			453	364	440	783
		83		10		452		489				115		1150
92H	386	547	600	562							516	300	484	527
		435		298								134		914
92I	506	610	639	938	447	212					666	868	588	800
		155		273		36						82		572
92J	263	358	513	270							368	204	356	341
		431		219								90		780
92O	497	760	771	1638			1150	3660	568	417	674	620	771	1910
		110		343				159		43		228		883
92P	838	881	857	1290			773	1440	617	770	764	640	825	1200
		171		447				160		25		60		863
93A	599	570	1046	2094	447	385	738	836	438	325	754	2330	695	1330
		64		189		336		435		94		89		1220
93B			913	1750			818	1540	1830	4980	836	1730	928	1900
				312				255		28		39		701
103I	407	709	852	503	314	201	670	382			675	470	492	606
		1061		259		417		30				357		2124
103P	538	378	913	552							1710	3190	1380	2700
		409		147								1213		1776
104N	556	1094	857	768			732	1200	744	688	1033	5231	807	2770
		152		84				401		32		189		883
104O	498	799	1155	2600	936	2628	822	841	733	599	787	1490	701	1510
		418		101		93		75		26		161		892
104P	362	281	634	314			407	468	443	551	292	134	449	456
		59		145				248		259		64		801
WEIGHTED MEANS	443	578	741	1178	460	720	647	1299	568	1229	985	2330	642	1348
TOTAL SPLS	5145		3534		3117		2520		584		3476		18951	

TABLE 8

ELEMENT As (ppm)

ROCK TYPE	INTR		VOLC		METAM		TILL		CARB		SEDM		MAP SHEET AVERAGE	
MAP SHEET	MEAN CONC.	MEAN S.D.	MEAN CONC.	MEAN S.D.										
	NO.	SPLS.	NO.	SPLS.										
82E														
82F														
82K														
82L														
82M														
92H	7.82	48.6	10.9	19.0							13.3	33.1	9.98	37.9
		435		298								134		914
92I	6.55	18.2	4.09	14.6	30.0	32.1					7.05	6.23	7.05	14.8
		155		273		36						82		572
92J	6.06	16.3	25.1	45.0							11.8	14.8	12.3	29.4
		431		219								90		780
92O	7.49	11.7	6.04	14.9			5.54	9.58	1.62	1.48	9.46	19.4	6.79	15.0
		110		343				159		43		228		883
92P	1.96	5.61	4.01	10.5			2.37	6.46	1.3	0.72	5.46	6.60	3.32	8.90
		171		447				160		25		60		863
93A	4.09	4.5	8.56	18.7	5.79	41.3	5.78	8.68	7.86	8.01	5.34	6.40	6.24	23.8
		64		189		336		435		94		89		1220
93B			2.69	6.8			4.23	9.37	4.25	2.95	5.99	7.20	3.64	7.72
				312				255		28		39		701
103I	1.12	2.45	2.93	5.1	0.73	0.64	3.02	2.06			9.72	13.6	2.74	7.45
		1061		259		417		30				357		2124
103P	5.33	13.5	21.4	23.5							15.7	28.6	13.8	25.9
		409		147								1213		1778
104N														
104O														
104P														
WEIGHTED MEANS	4.17	21.3	8.07	19.0	4.22	27.8	4.76	8.59	5.05	5.81	12.7	24.0	7.34	21.2
TOTAL SPLS	2836		2487		789		1039		190		2292		9835	

TABLE 9

ELEMENT Mo (ppm)

ROCK TYPE	INTR		VOLC		METAM		TILL		CARB		SEDM		MAP SHEET AVERAGE	
MAP SHEET	MEAN CONC. NO.	MEAN S.D. SPLS.	MEAN CONC. NO.	MEAN S.D. SPLS.										
82E	2.01	4.77 729	2.05	3.87 313	1.28	0.92 250	1.61	1.57 71			1.26	0.69 23	1.82	3.78 1543
82F	1.60	1.32 485	2.05	2.66 62	1.76	1.33 252					1.50	2.26 439	1.61	1.79 1318
82K	1.88	3.33 213	1.40	1.19 30	1.86	1.60 547	1.56	0.95 116	1.63	0.85 77	1.72	2.74 193	1.77	2.18 1223
82L	1.99	2.96 170	1.66	1.59 302	1.68	1.22 734	1.57	1.05 81					1.79	1.75 1308
82M	1.94	1.66 83	1.40	0.84 10	2.08	7.27 452	1.56	1.13 489			1.50	0.88 115	1.79	4.65 1150
92H	1.45	1.27 435	1.72	1.28 298							1.54	2.28 134	1.58	1.49 914
92I	1.46	1.38 155	1.40	0.81 273	2.61	3.62 36					1.34	1.20 82	1.59	1.48 572
92J	1.61	2.15 431	2.11	2.63 219							1.79	1.74 90	1.76	2.22 780
92O	2.32	7.92 110	1.22	0.89 343			1.08	0.46 159	1.47	1.08 43	1.21	0.69 228	1.34	2.90 883
92P	2.47	5.51 171	1.62	3.14 446			1.32	1.23 160	1.40	0.82 25	1.47	1.02 60	1.72	3.42 862
93A	1.14	0.66 64	4.63	36.0 189	1.49	2.47 336	1.89	9.97 435	1.17	0.56 94	1.16	0.74 89	2.06	15.5 1220
93B			1.12	0.52 312			1.18	0.68 255	1.32	0.82 28	1.08	0.35 39	1.15	0.69 702
103I	1.51	3.93 1061	2.02	5.24 259	1.48	1.17 417	1.33	0.71 30			2.20	3.19 357	1.68	3.62 2124
103P	3.07	10.6 409	2.96	3.35 147							2.30	8.30 1213	2.53	8.60 1778
104N	2.56	2.79 152	1.60	1.17 84			2.05	3.67 401	2.31	1.20 32	2.27	1.81 189	2.20	3.28 883
104O	3.03	3.85 418	1.68	1.80 101	2.73	5.95 93	1.67	2.35 75	2.58	3.18 26	2.12	1.71 161	2.53	3.66 892
104P	3.07	3.19 59	2.03	2.64 145			1.61	2.07 248	2.53	4.72 259	1.56	2.44 64	2.13	3.47 801
WEIGHTED MEANS	1.97	4.56	1.87	8.71	1.74	3.27	1.62	4.53	2.00	3.28	1.91	5.20	1.86	5.48
TOTAL SPLS	5145		3533		3117		2520		584		3476		18953	

TABLE 10

ELEMENT Hg (ppb)

ROCK TYPE	INTR		VOLC		METAM		TILL		CARB		SEDM		MAP SHEET AVERAGE	
MAP SHEET	MEAN CONC.	MEAN S.D.	MEAN CONC.	MEAN S.D.										
	NO.	SPLS.	NO.	SPLS.										
82E														
82F	28.2	37.8	79.0	252	30.2	37.1					27.2	26.6	30.6	65.2
	484		62		252						439		1317	
82K	17.0	15.4	17.5	10.5	25.2	27.7	25.6	30.0	46.7	57.9	22.9	29.1	26.6	59.3
	210		30		547		114		77		193		1218	
82L														
82M	14.0	11.1			16.2	15.2	15.4	13.0			13.6	8.59	15.2	12.8
	15				108		236				84		443	
92H	66.6	245	75.6	165							104	321	76.3	232
	432		297								133		908	
92I	43.9	28.7	57.3	60.9	38.9	37.0					58.4	42.2	52.0	49.1
	153		273		36						82		570	
92J	20.1	25.4	66.2	179							156	802	49.6	305
	429		219								90		778	
92O	144	567	107	123			93.4	90.1	79.5	66.5	241	556	142	402
	110		342				158		43		223		881	
92P	81.7	36.1	82.1	74.0			72.9	34.2	56.4	20.6	109	32.9	81.4	59.5
	169		445				160		25		60		859	
93A	49.5	22.8	64.3	40.7	41.3	23.0	70.6	168	44.3	21.2	39.0	24.2	56.4	104
	65		189		336		436		94		89		1222	
93B			53.3	43.4			58.0	35.1	58.6	32.3	57.9	34.7	56.8	38.6
			309				254		23		39		697	
103I	29.2	43.2	31.0	49.0	20.7	15.1	37.0	25.5			38.1	31.4	29.6	38.5
	1061		259		417		30				357		2124	
103P	34.6	27.7	109	177							105	53.0	88.9	79.0
	409		146								1212		1776	
104N	29.0	22.2	86.7	140			43.0	38.2	75.0	57.9	119	456	62.2	223
	151		83				400		30		189		878	
104O														
104P														
WEIGHTED MEANS	39.0	133	71.9	115	27.7	25.6	54.1	91.0	55.5	46.0	87.9	259	58.2	160
TOTAL SPLS	3688		2654		1696		1788		297		3195		13671	

TABLE 11

ELEMENT U (ppm)

ROCK TYPE	INTR		VOLC		METAM		TILL		CARB		SEDM		MAP SHEET AVERAGE	
MAP SHEET	MEAN CONC.	MEAN S.D.	MEAN CONC.	MEAN S.D.										
	NO.	SPLS.	NO.	SPLS.										
82E	11.9	18.2	5.69	6.72	7.97	8.61	7.07	6.48			5.71	2.68	10.2	17.7
		729		313		250		71				23		1544
82F	23.0	37.6	3.44	2.21	7.43	8.76					7.54	13.8	13.7	27.6
		485		62		253						439		1318
82K	20.6	38.9	4.51	6.70	7.02	14.7	6.77	15.0	4.91	8.44	6.80	11.6	8.99	21.2
		213		30		548		116		77		193		1224
82L	6.92	7.23	3.57	8.89	7.67	5.93	5.48	5.12					6.48	7.33
		170		302		734		81						1308
82M	18.3	20.4	4.91	2.12	10.2	12.1	8.27	7.29			5.58	5.18	9.44	11.2
		83		10		453		490				115		1152
92H	4.75	8.90	2.45	5.49							1.80	0.75	3.50	7.15
		393		225								113		767
92I	3.61	4.80	1.69	1.06	1.99	0.97					2.05	0.97	2.28	2.77
		155		273		36						82		572
92J	3.76	6.03	2.28	2.59							2.84	5.52	3.15	5.10
		429		219								90		778
92O	3.23	4.31	1.78	1.48			1.67	1.09	1.28	0.91	1.53	0.79	1.85	1.96
		109		343				159		43		227		881
92P	6.31	7.14	2.97	4.04			2.86	2.29	1.58	0.51	2.30	1.49	3.53	4.60
		171		447				160		25		60		863
93A	4.74	5.05	2.62	1.70	6.86	5.02	2.96	1.90	4.54	1.78	5.85	2.67	4.40	3.73
		64		189		336		436		94		89		1221
93B			2.65	2.53			2.41	1.53	2.27	2.66	1.92	0.87	2.59	2.10
				310				257		28		39		703
103I	5.60	7.68	2.89	2.94	3.59	2.53	2.97	1.50			2.98	2.12	4.40	5.84
		1061		259		417		30				357		2124
103P	10.3	9.62	3.64	3.98							1.60	2.14	3.77	6.21
		404		146								1208		1767
104N	37.1	44.3	2.85	1.68			8.17	16.0	2.09	0.73	4.36	14.2	11.4	27.2
		152		83				401		32		190		883
104O	16.6	18.9	6.61	11.4	6.49	11.7	3.90	2.70	5.52	5.48	5.23	5.64	10.7	15.4
		418		101		93		75		26		161		892
104P	21.6	30.3	3.18	2.05			3.61	6.15	3.45	6.35	6.78	9.82	5.12	11.1
		59		145				248		259		64		801
WEIGHTED MEANS	11.1	19.6	3.09	4.73	7.19	9.34	5.14	8.28	3.54	5.45	3.54	7.09	6.50	13.6
TOTAL SPLS	5095		3457		3120		2524		584		3450		18798	

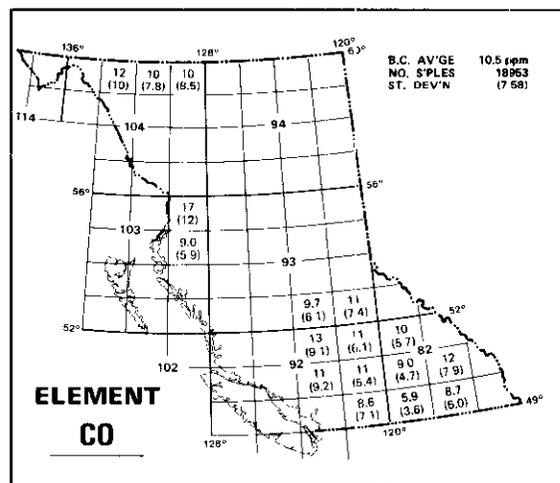
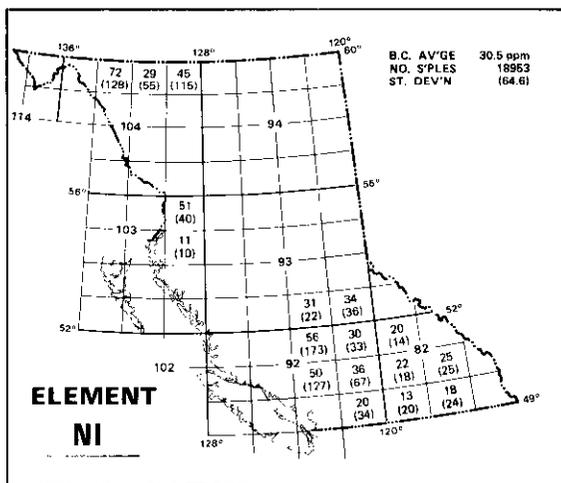
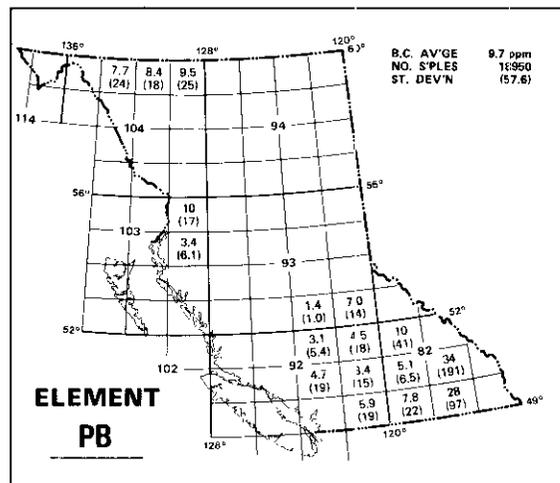
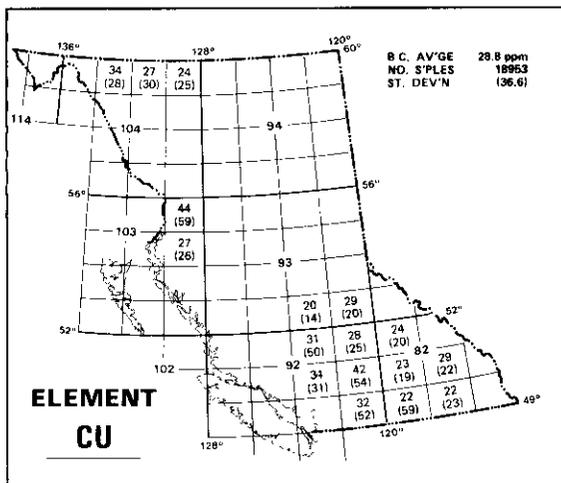
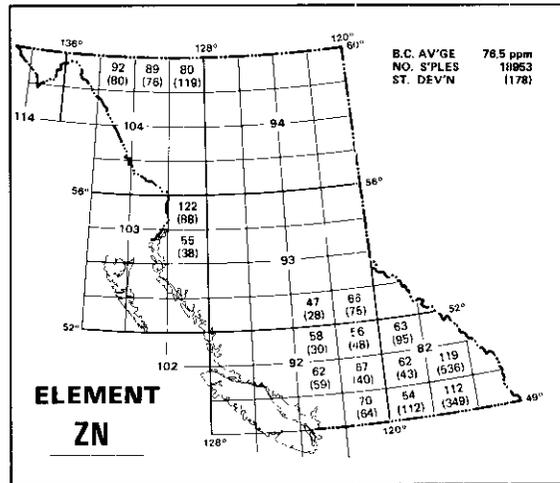
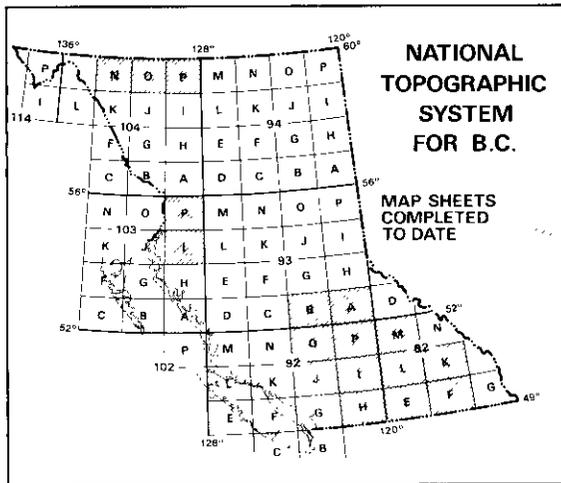


Figure 70. Map sheet averages for the 10 elements analysed for each rock type group (continued on page 200).

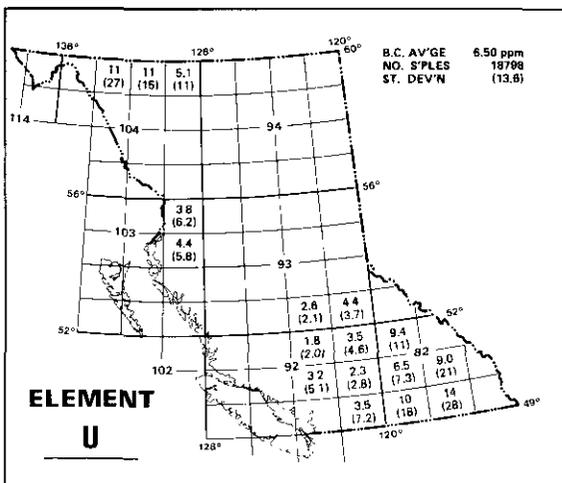
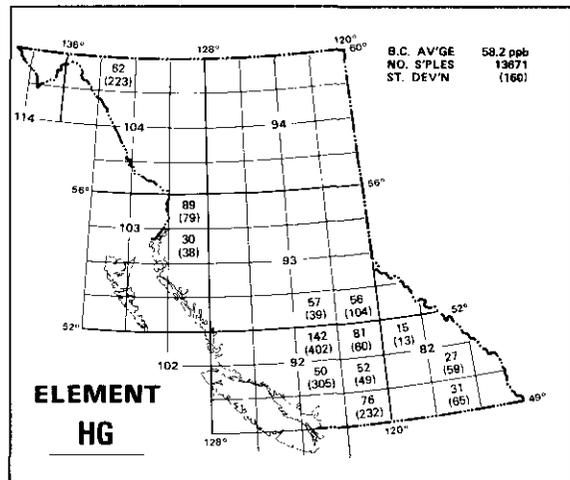
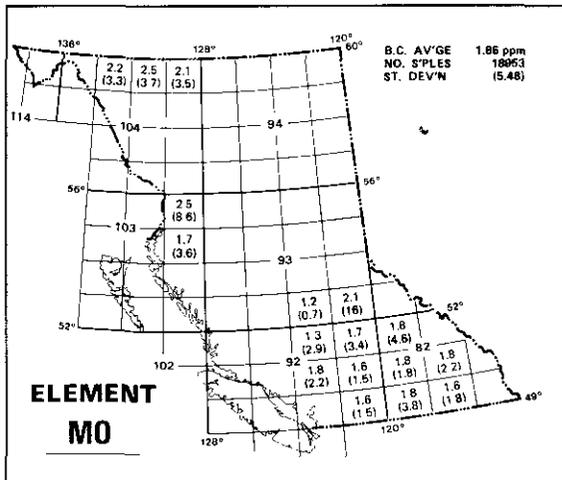
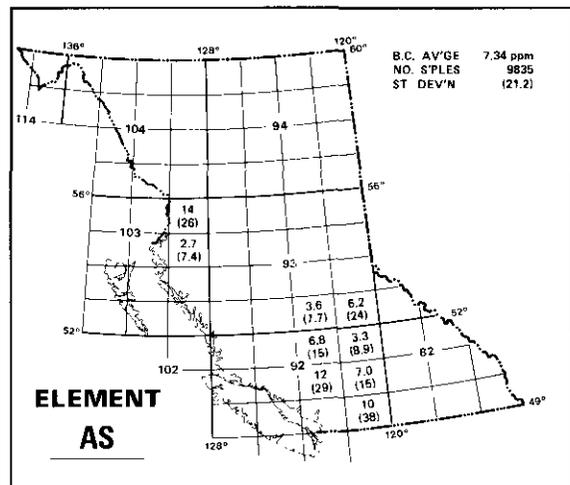
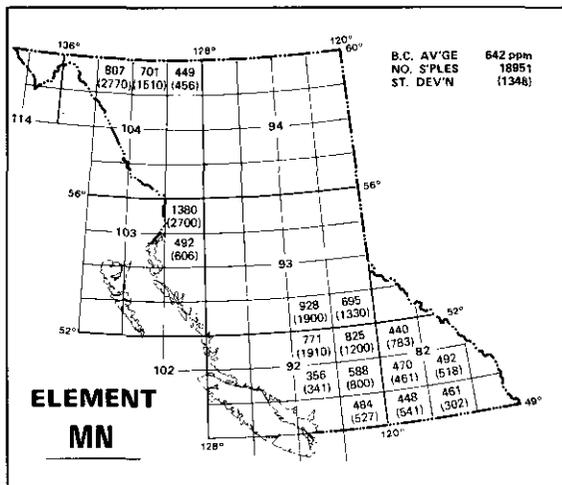


Figure 70 (continued): Map sheet averages for the 10 elements analysed for each rock type group.

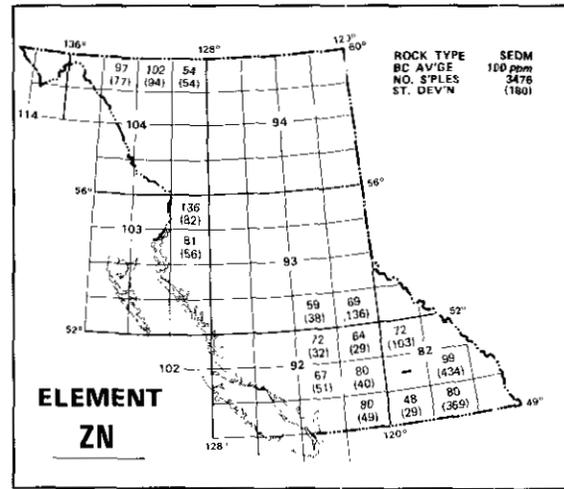
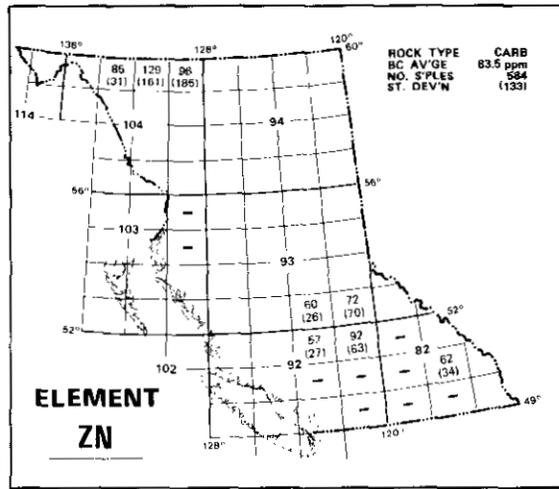
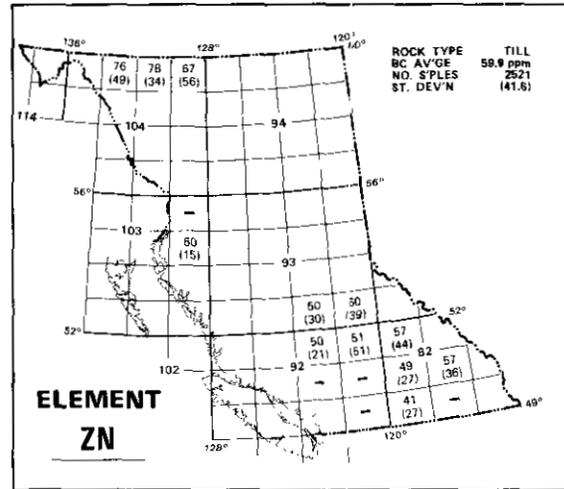
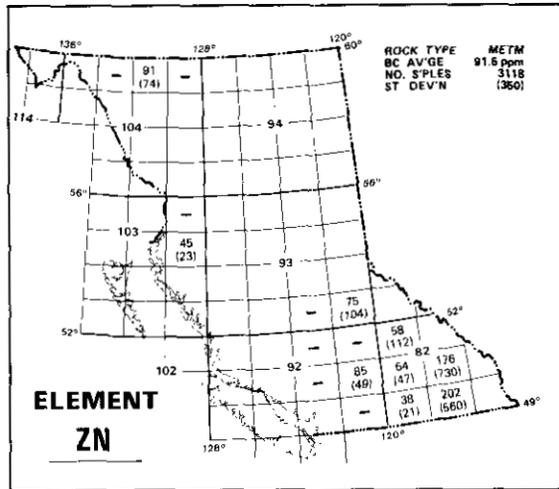
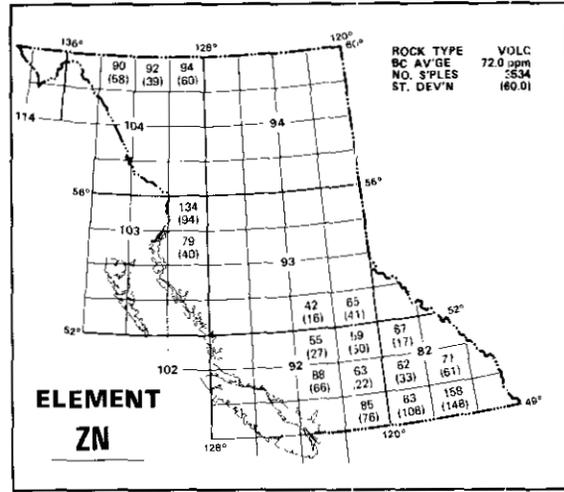
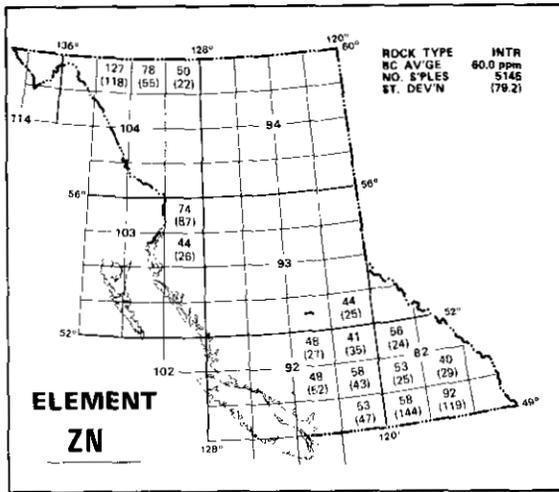


Figure 71. Map sheet average for zinc for each rock type group.

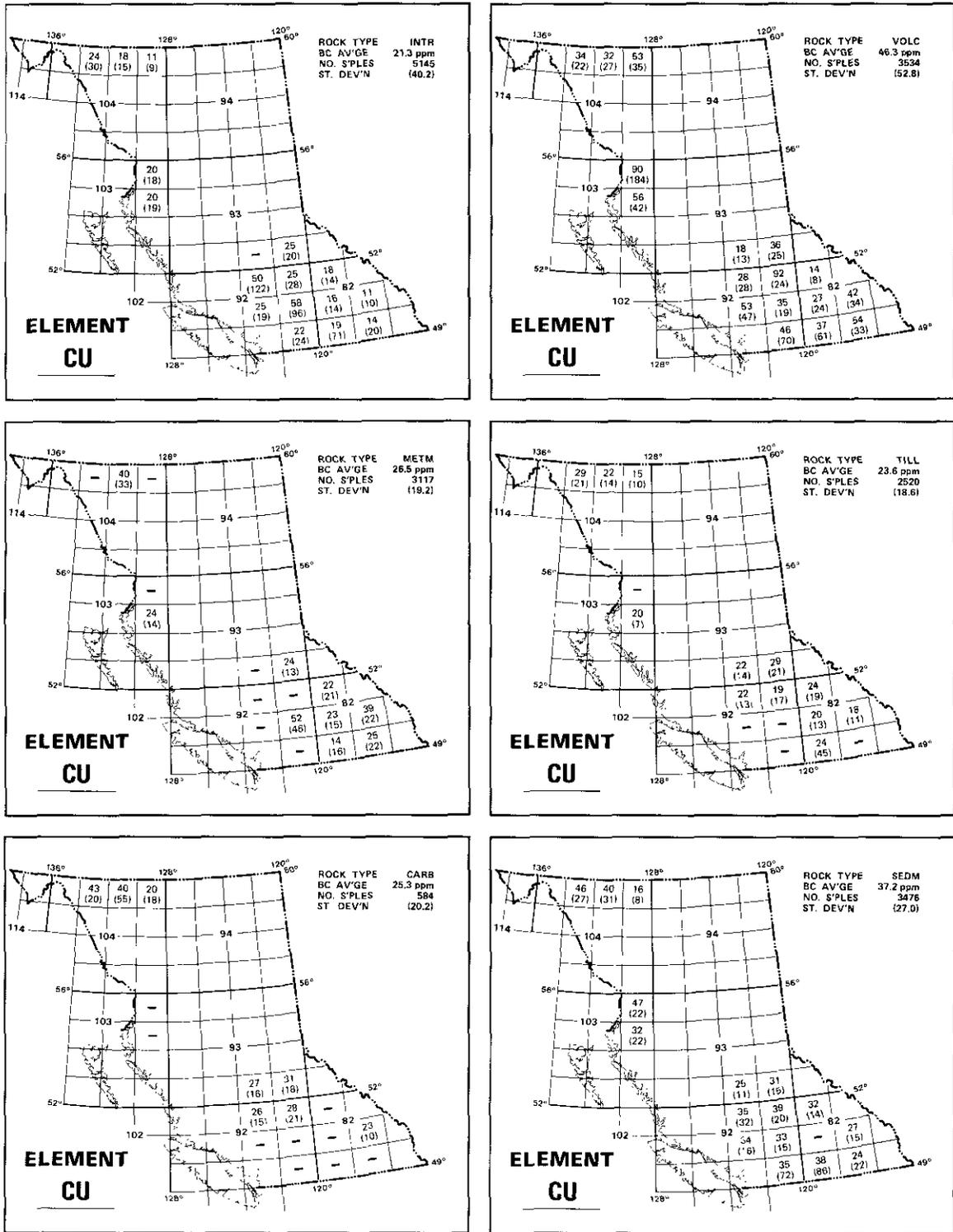


Figure 72. Map sheet average for copper for each rock type group.

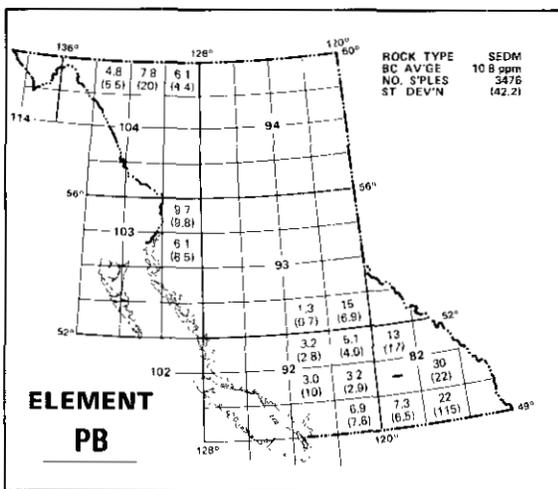
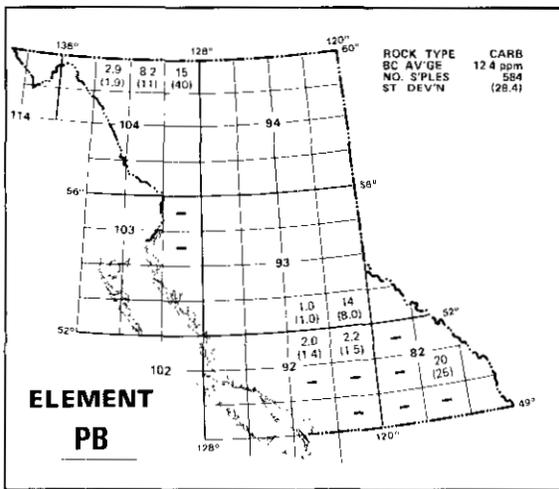
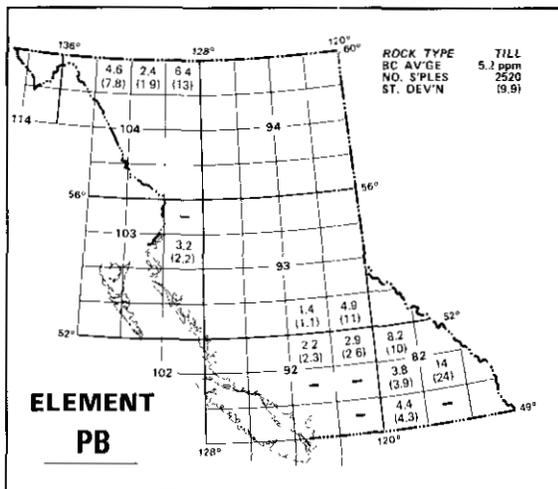
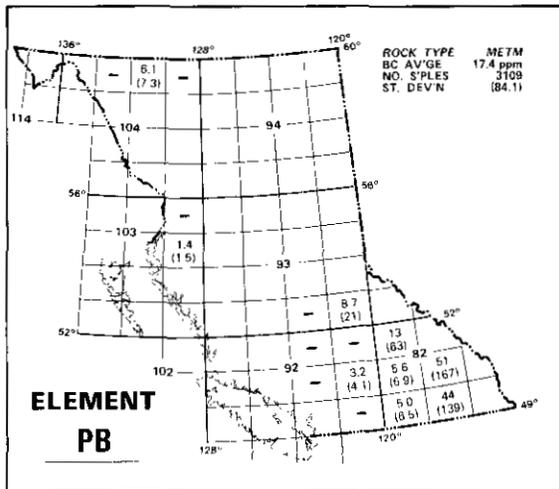
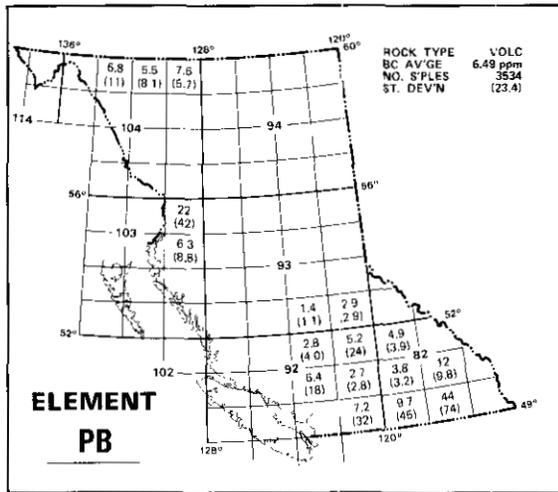
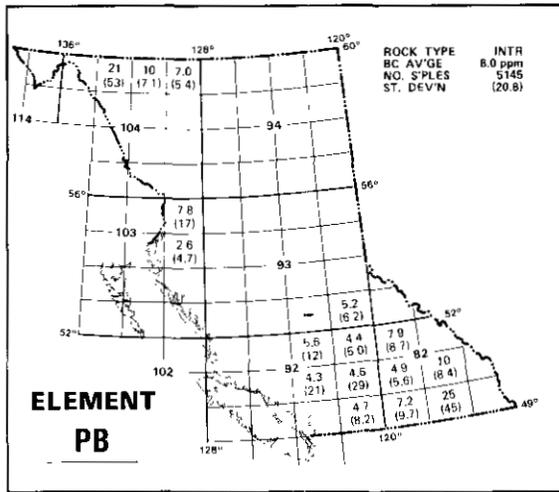


Figure 73. Map sheet average for lead for each rock type group.

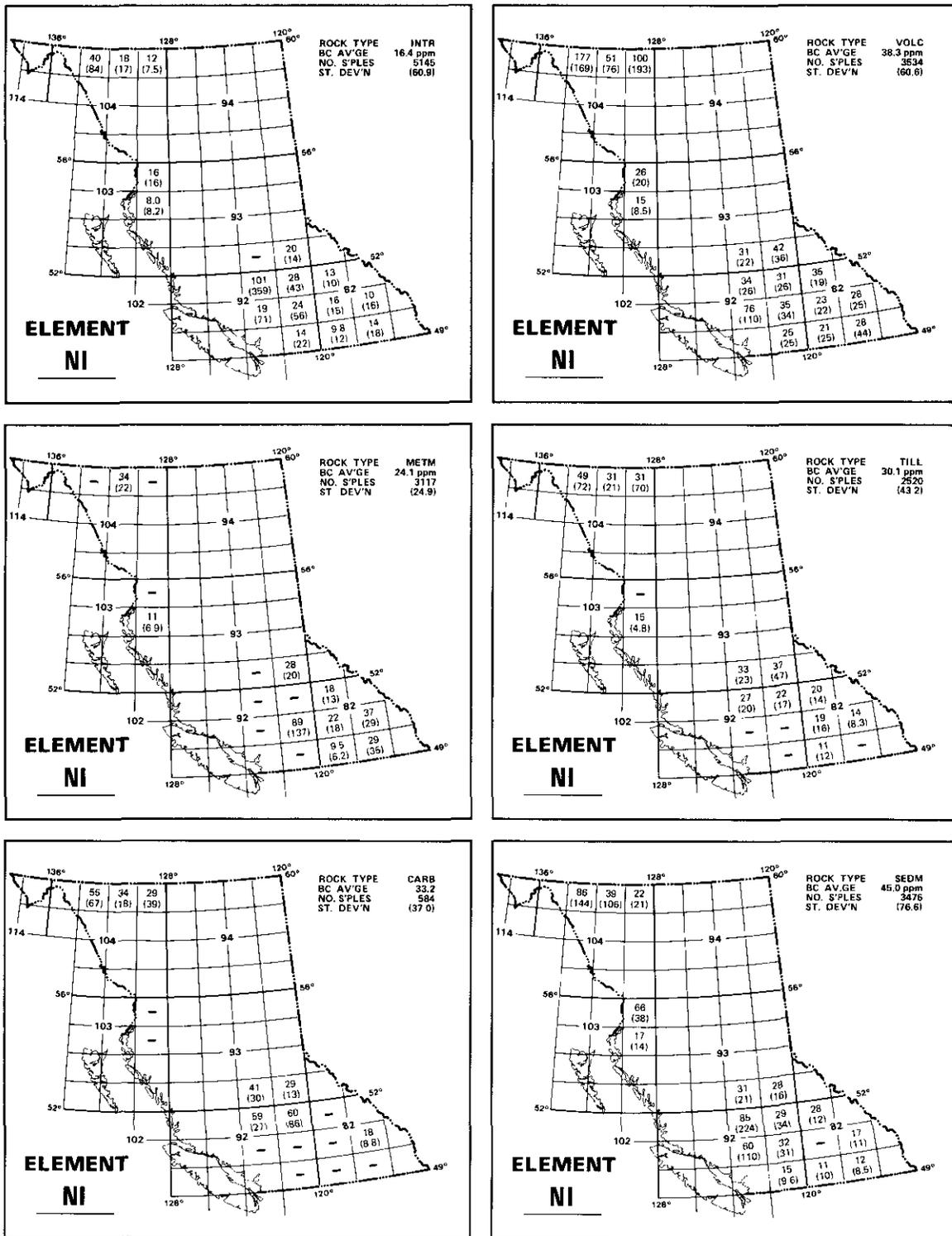


Figure 74. Map sheet average for nickel for each rock type group.

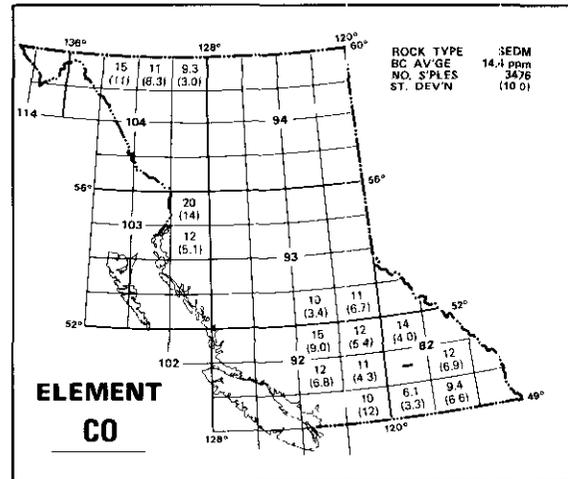
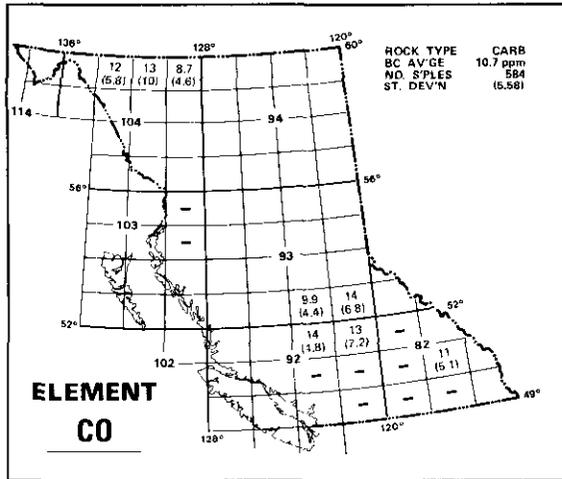
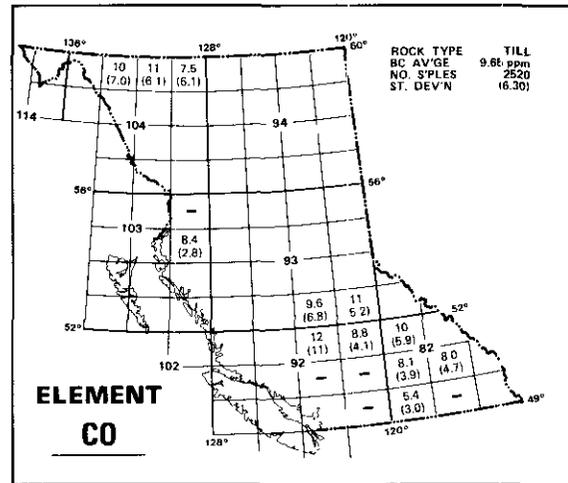
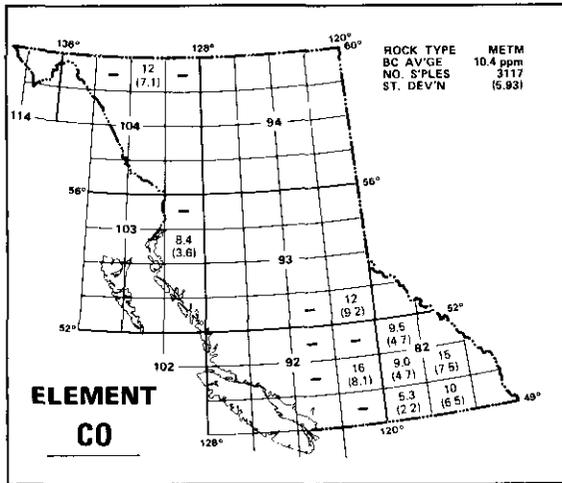
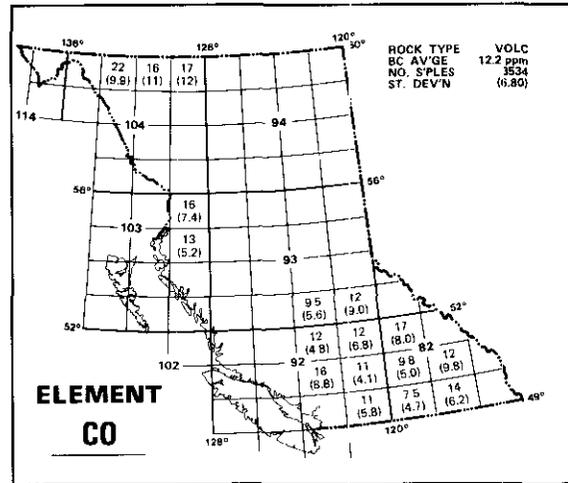
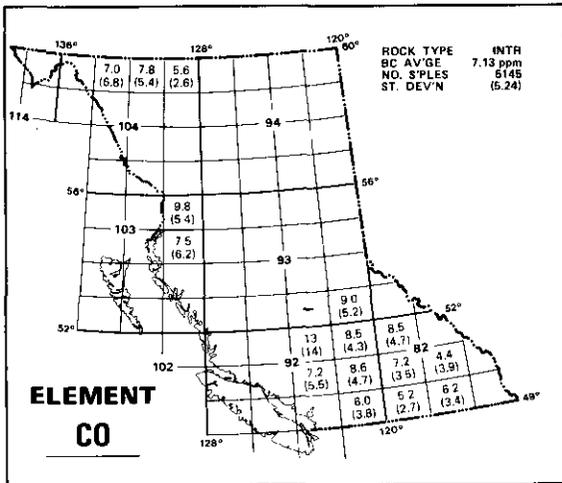


Figure 75. Map sheet average for cobalt for each rock type group.

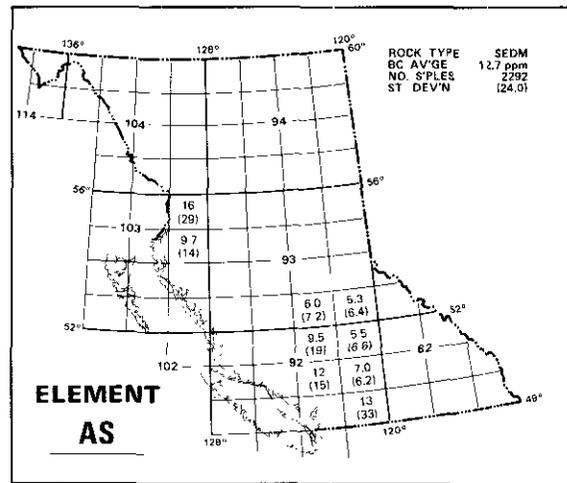
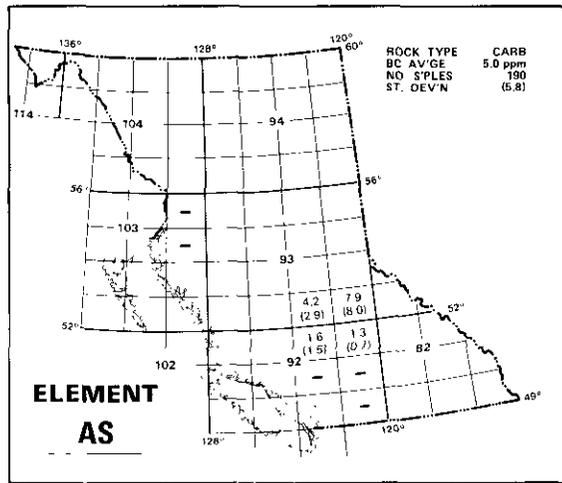
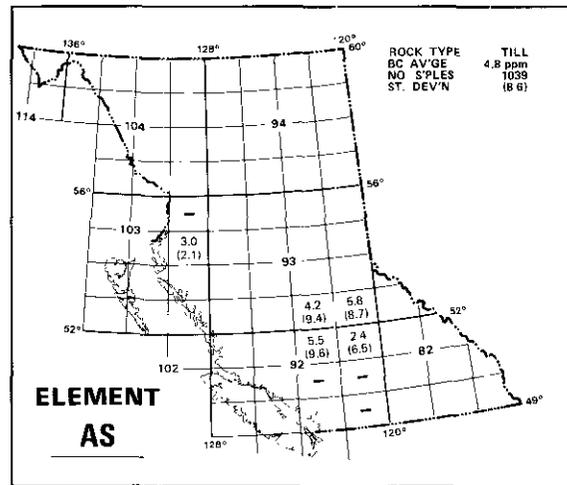
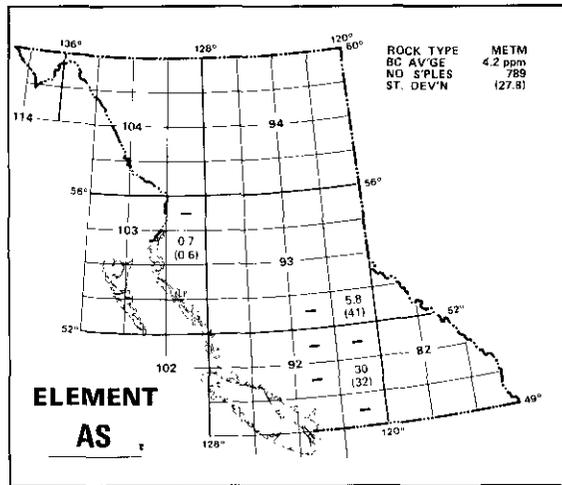
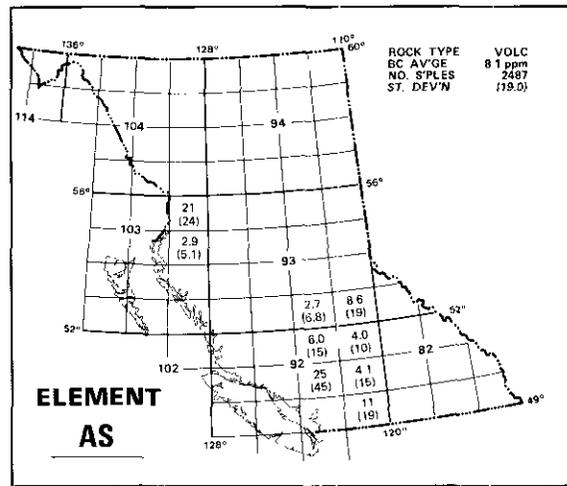
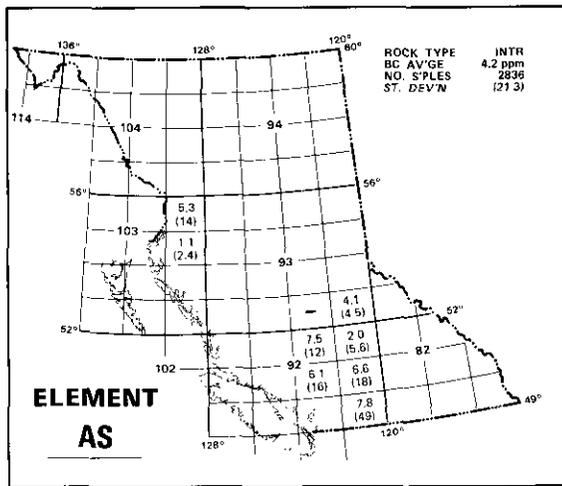


Figure 77. Map sheet average for arsenic for each rock type group.

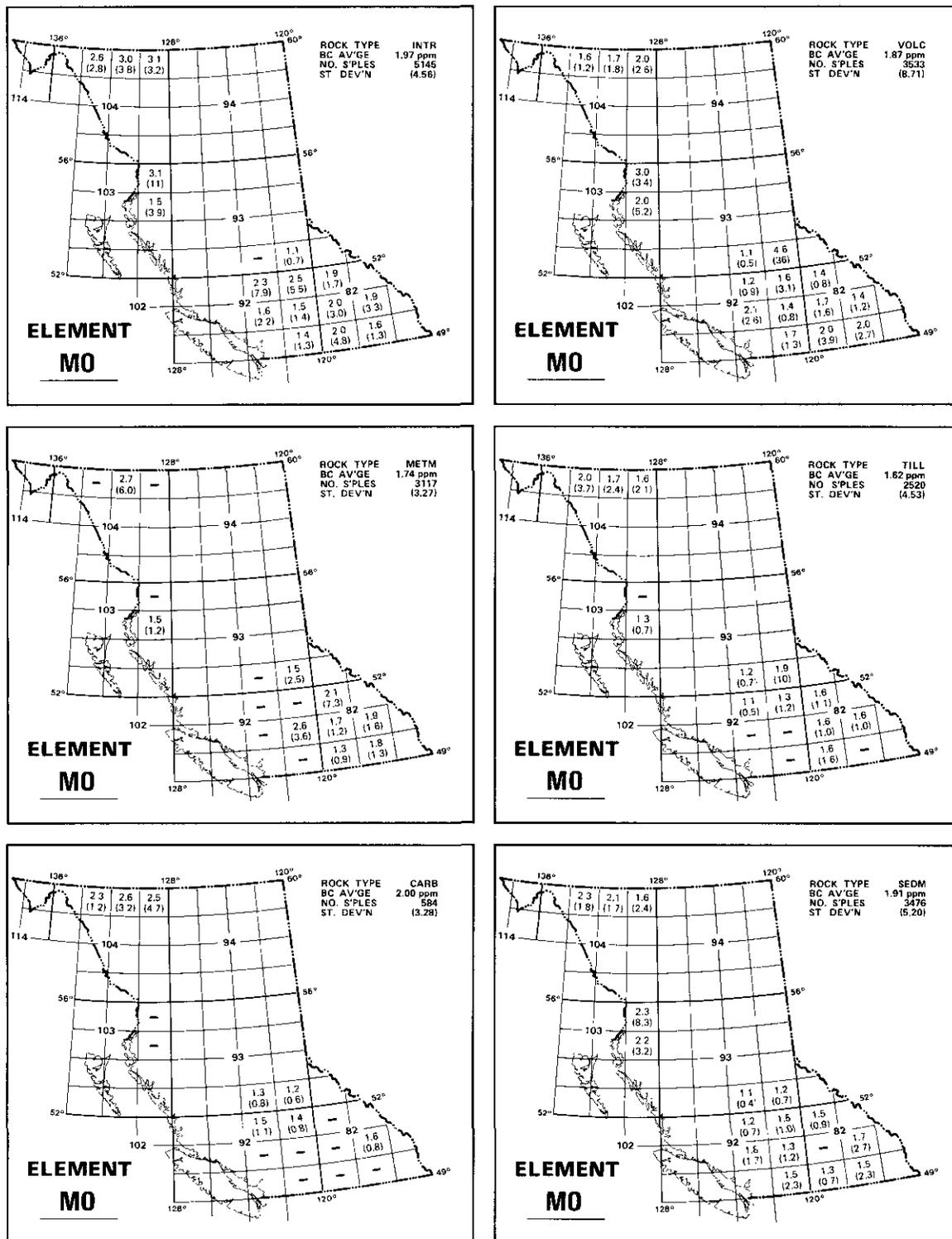


Figure 78. Map sheet average for molybdenum for each rock type group.

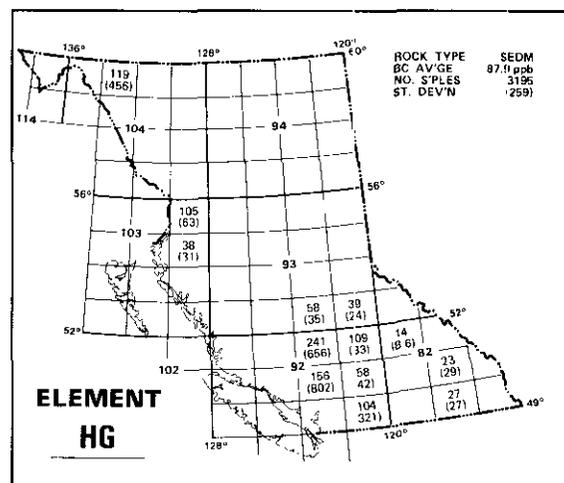
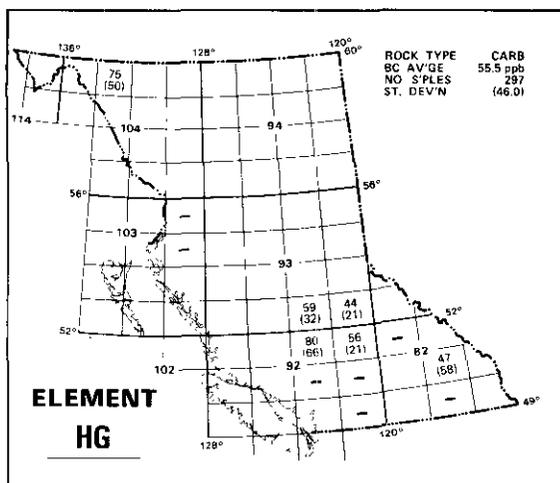
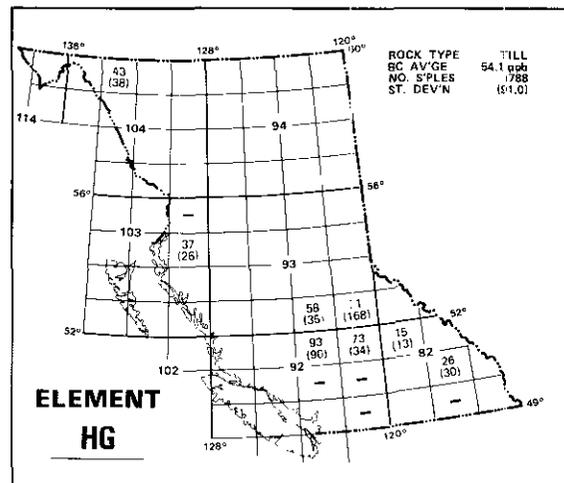
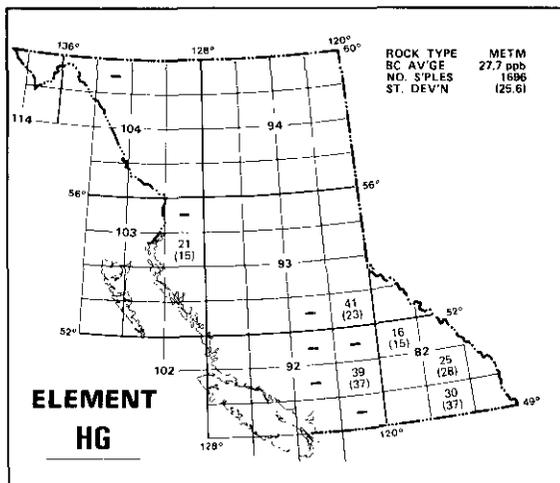
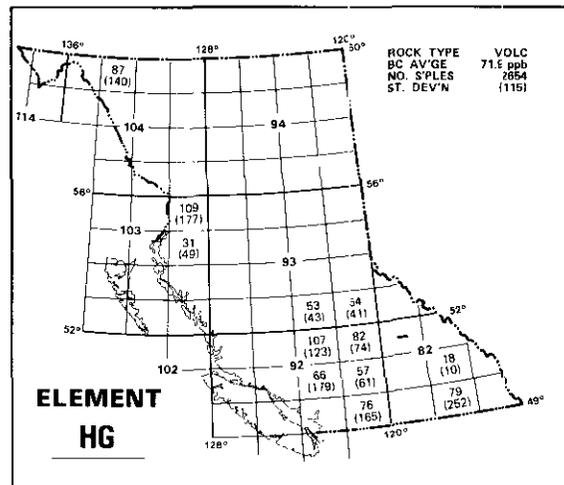
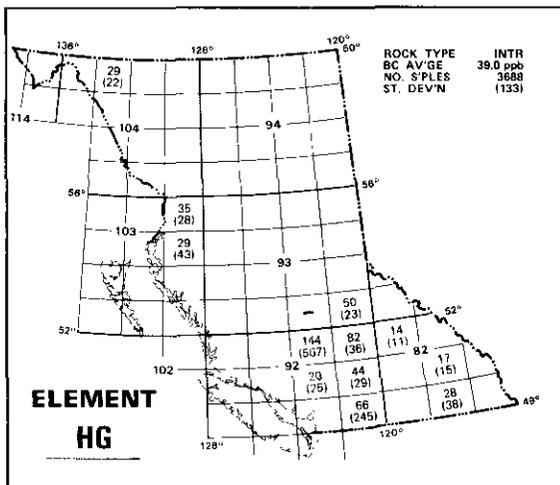


Figure 79. Map sheet average for mercury for each rock type group.

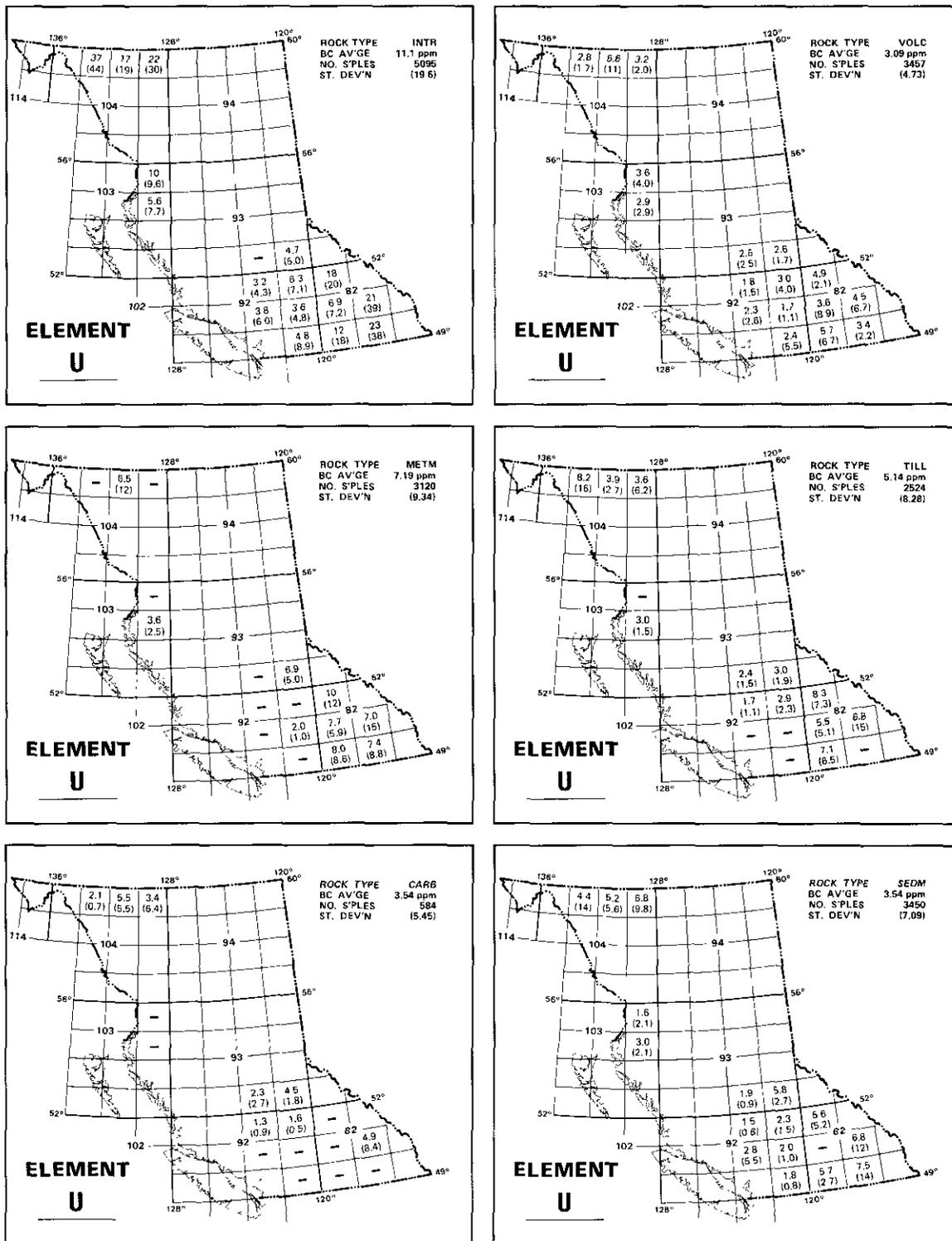


Figure 80. Map sheet average for uranium for each rock type group.