DU PONT OF CANADA EXPLORATION LIMITED

REPORT OF GEOLOGICAL AND GEOCHEMICAL SURVEYS

on

SLOUCE PROJECT

by

B. Goad
(Supervised by F.M. Smith, P. Eng.)

January 1980

This report has been examined by the Geological Evaluation Unit and is recommended to the Commissioner to be considered as representation work in the amount of $ 193,300.00

Ruth Debicki, A-Reg-Geol.
Resident Geologist or June 5/81.
Resident Mining Engineer

Considered as representation work under Section 53 (4) Yukon Quartz Mining Act.

B. R. BAXTER
Supervising Mining Recorder

for Commissioner of Yukon Territory

TABLE OF CONTENTS

APPENDICES

LIST OF FIGURES

SLOUCE

SPECIFIC PROSPECT - SLOUCE CLAIMS (335-10)

1. LOCATION AND ACCESS

The SLOUCE group covers a portion of the southwest contact of the Cretaceous age Seagull Batholith with the Sylvester group metasediments at the headwaters of Screw Creek and an unnamed creek flowing into Dorsey Lake to the northwest. The eastern portion of the claims cover the west wall of Partridge and Goddart Creek. The mountains are part of the Dorsey Range, Cassiar Mountains, Yukon. The claim sheet is 105-B-3 and the centre of the group is at about 60°04'N and 131°23'W.

The claims are as yet only accessible via helicopter from Swift River, Yukon about 13 km southeast. Part of the road network into the old "Logjam Creek" property to the southwest passes within 8 km.

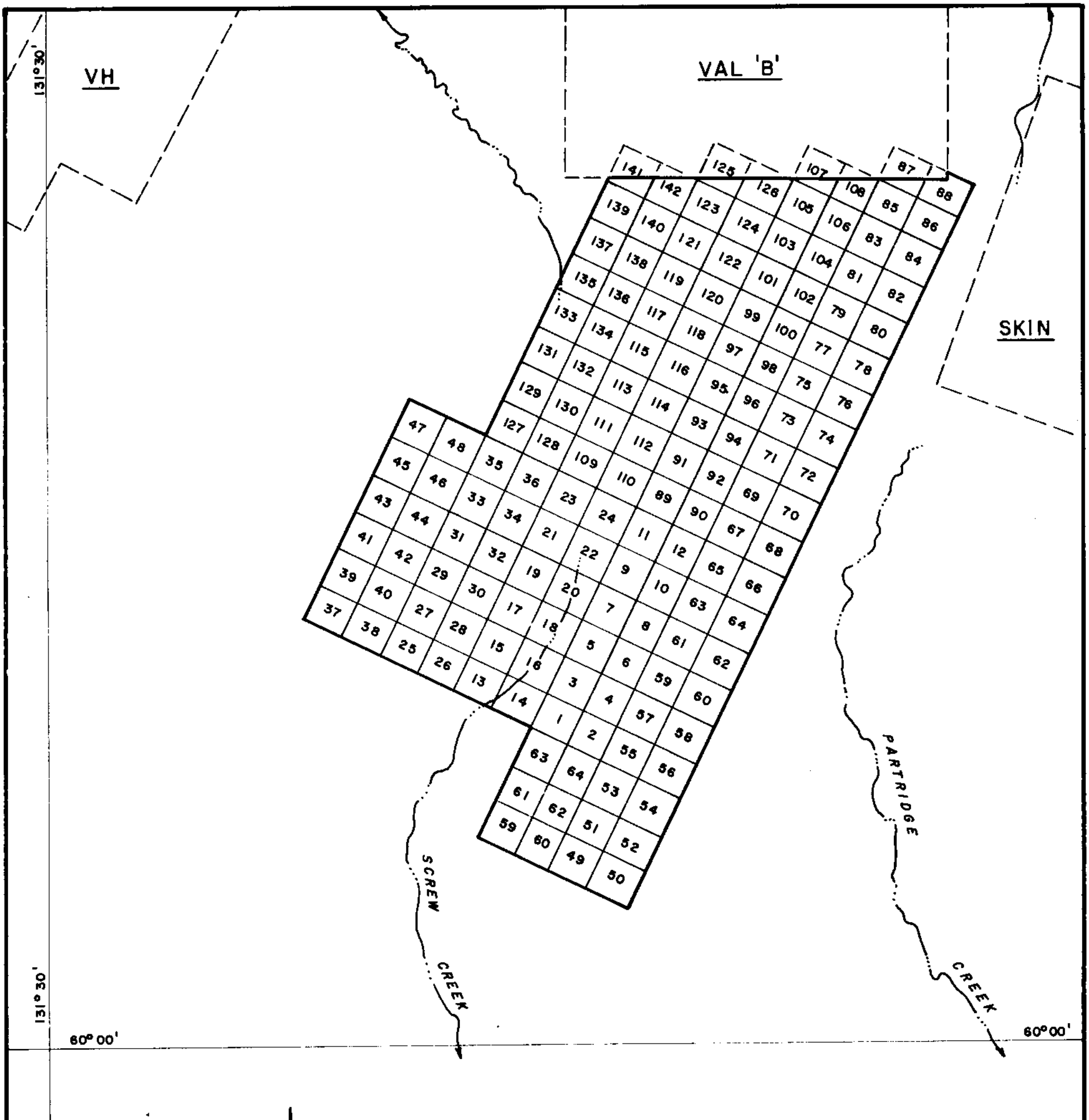
2. PHYSIOGRAPHY AND VEGETATION (Map KL 78-70)

The SLOUCE claim area covers a complex physiographic area of mountains, cirque basins and major stream headwaters. The two large streams are the south flowing Screw Creek draining the southern portion of the claims and the unnamed creek flowing north, then northwest to Dorsey Lake. The eastern side of the claims are drained by Partridge Creek to the south and southeast. The complex arete, horn and mountain ridges between Partridge and Screw Creek generally trend northerly and join the large horn at VAL(B) group. The west side of Screw Creek headwaters is an east-west ridge that joins the northwest trending complex ridge through the southside of the VH group. All northerly slopes are extremely steep to sheer cliffs and southerly slopes more subdued. Most of the claim group is felsenmeer covered with the large valley floor in the north a mixture of felsenmeer and outcrop.

Vegetation is generally sparse except for the headwaters of Screw Creek where alpine grassy slopes and meadows merge into ground birch and balsam cover southwards. The northern area has sparse patches of willow, ground birch and minor sedges. Most of the project area is free of vegetation cover.

3. CLAIMS

The SLOUCE group consists of the following claims:



DUPONT EXPLORATION
CANADA

KLINKIT JOINT VENTURE
SLOUCE PROJECT
CLAIM MAP
SWIFT RIVER AREA, YUKON TERRITORY

1 :

SCALE

1 INCH = 1 MILE

DATA BY : F.M.S.	REVISED :	N.T.S. No. : 105 B 3
DATE : MAR. 79		ACCT No. : 335 - 10
DRAWN BY : K.L.J.		
DATE : APR. 79		DRWG. No. : KL 79 - 8

Claim Name	Record Number	Date of Expiry
SLOUCE 1-64	YA29271-YA29334	1980 01 10
SLOUCE 59-138	YA34107-YA34186	1980 01 10
SLOUCE 139-142	YA34400-YA34403	1980 01 10

There are two sets of SLOUCE 59-64 claims with different record numbers, thus the total group consists of 148 rather than 142 claims.

The claims are recorded in the Watson Lake MD, Yukon in the name of Du Pont of Canada Exploration Limited.

4. HISTORY

The SLOUCE claims were located during the field season of 1978 to cover areas of Sn and W anomalies as indicated by initial regional geochemical survey. Previous to the locating of these claims no record of past work in the area existed. Initial geological examination of these claims after their location failed to fully explain the regional geochemical results.

5. PROPERTY EVALUATION

5.1 Preliminary

The SLOUCE claims were visited 1979 08 28, to prospect the contact area between the Seagull Batholith and the limey units of the Sylvester Group. Several skarn zones were located and this suggested that a more detailed examination of the property was required. Preliminary assessment of these skarn zones involved the blasting of two trenches (one approximately 30 meters and the other 15 meters long) to expose fresh rock and enable rock chip sampling to be carried out.

5.2 Geology

The oldest units in the SLOUCE project area are the arenaceous limestone and cherts of the Sylvester Group (Early Pennsylvanian - dated from preliminary identification of a fossil found in the limey units of the SLOUCE group. See appendix)exposed in the southwestern portion of the claims at and near the contact with the Cretaceous age granite of the suspected Hake phase of the Seagull Batholith.

The limestone and chert has been chevron folded, napped and pyrometasomatically altered by the granite in the area of the north facing cirque walls in the westernmost portion of the central part of the group. The source of float sample E-78-7-29-55 found in this area during 1978 was located this year. A tourmaline - magnetite - (actinolite) skarn forms a thin (0.3-0.5 meter) rind between the Seagull Batholith and the Sylvester Group sediments. This rind carries significant Sn values. To the south-east of this locality on the east side of Screw Creek the upper portions of the Sylvester Group are preserved with the tuffaceous argillite as the dominant member.

The Cretaceous age Seagull Batholith is usually a monotonous single phase throughout the claimed area. Variations on the crowded porphyry to coarse grained phase are late quartz tourmaline greisen in the near contact area on the southeast, minor pegmatite dykes in the extreme eastern portion and a poorly mapped micro-granite late phase in the central to eastern portion. The central to northern portion of the claims have had only geochemical traverses (1978) but the area appears to be only subcropping granite of the Seagull Batholith.

5.3 Geochemistry

No soil geochemical samples were collected on the SLOUCE claims during 1979. All rock samples collected were routinely analyzed for Sn and W. The chip samples from the trenches in addition to Sn and W, were also analyzed for Mo. No significant values have been located in any of the chip samples.

5.4 Mineralization

Five separate areas of skarn were located near the end of the 1979 field season, consequently, assessment of their economic potential is barely in the initial stages. Trenches across two of the mineralized zones have been located; however, they have not yet been examined by a geologist.

Mineralogically, the skarns fall into either of the following two catagories:

a. Tourmaline + magnetite $\pm$ actinolite $\pm$ chalcopyrite. This type forms a thin rind along the contact of the Seagull Batholith with the Sylvester group sediments. Skarns of this type carry the tin values on the SLOUCE claims.

b. Garnet + actinolite (± tourmaline, axinite, calcite, scheelite and molybdenite). The two skarns that have been trenched on the SLOUCE claims to date are of this type. No scheelite has been located in situ; however, two float samples (TS-1 & TS-2) contain significant visible scheelite mineralization.

The molybdenite in these skarns is disseminated throughout the garnet which exists in a massive form. Specific garnet crystals are rare. Chip samples were collected across the two trenched skarns and analyzed for Sn, W and Mo; no significant values were located.

Other anomalous skarn samples (by XRF) were also assayed by MIN-EN Labs as follows:

Slouce Tag No.	Field No.	Sn%
4607B	B-8-31-46	0.53
4610B	B-8-30-8	0.82
4612B	B-8-30-B	0.47
4613B	B-8-30-C	0.58
4614B	B-8-31-1(a)	1.20
4627B	B-8-29-3	1.05
4602B	B-8-31-5(c)	0.24
4604B	B-8-31-5(e)	0.81
6249A	B-8-31-1	0.61
6342A	D-7-28-20(a)	0.31
6344A	D-7-28-20(c)	0.75
6349A	D-7-28-29	0.10

6. CONCLUSIONS AND RECOMMENDATIONS

The only significant mineralization found on the SLOUCE claims has been in the south-west corner of the group. This area has been fairly thoroughly prospected and the skarn zones are known; however, a detailed map has not been produced. In places where the angle of the north slope is not too steep, a grid should be established and the hillside carefully mapped in order to define the extent of the skarn zones.

Trenching should be continued to expose fresh rock and try and locate the source of the two scheelite samples (TS-1 and

TS-2). The existing trenches require mapping and careful ultra-violet lamping to determine the location and extent of the scheelite mineralization.

The limestone hill adjacent to the small elongated lake due south of the trenched ridge, should be thoroughly prospected to establish if the known skarn zones extend across the valley or if they have been faulted off.

Work done during the 1979 field season has indicated that a majority of the existing SLOUCE claims can be dropped. The following claims should be retained:

Claim Name	Record No.	Date of Expiry
SLOUCE 13-48	YA29283-YA29318	1980 01 10
SLOUCE 77-88	YA34125-YA34136	1980 01 10
SLOUCE 99-108	YA34147-YA34156	1980 01 10
SLOUCE 119-126	YA34167-YA34174	1980 01 10
SLOUCE 139-142	YA34400-YA34403	1980 01 10

The remaining SLOUCE claims should be abandoned.

APPENDIX I

STATEMENT OF EXPENDITURES

January 1 - December 31, 1979

SLOUCE CLAIMS, YT

Casual Labour	$	129.26
Travel Expenses		396.92
Camp Expenses		2 352.00
Mapping, Gr. Surveys, Maps		5 929.30
Ground Clearing & Trenching		8 595.93
Freight, Hauling, Storage		278.31
Assaying		1 734.15
Salaries - Regular		1 392.80
Salaries - Temporary		3 386.10
Space Charges		30.66
Equipment Rental		841.26
Stationery & Supplies		38.30
Telephone		129.60
Auto Expenses		50.37
Repairs & Mtce (excl. Auto)		10.32
Non Capital Equip. Purchases		203.52
Depreciation Expenses		405.99
TOTAL	$	25 904.79

APPENDIX II

Petrographic Reports

J-78-7-26-6 Granodiorite - Quartz Monzonite

plagioclase	35%	veins	
K-feldspar perthite	30	kaolinite with mineral fragments	
quartz	30		
biotite	5		
muscovite	2- 3		
apatite, zircon, Ti-oxide	minor		

The rock is slightly porphyritic with rounded quartz grains up to 6 mm in size, K-feldspar up to 4 mm, and plagioclase up to 3 mm in a groundmass mainly 0.8 to 2 mm in size.

Plagioclase grains are subhedral to euhedral and are of two main types. The first contains a core of more calcic plagioclase surrounded by a thin rim of sodic plagioclase (An_8). The contact between the two zones is sharp; in all but one grain the core is strongly to completely altered to very fine grained kaolinite with dusty hematite-opaque. In some of these the central part of the kaolinite-hematite aggregate is replaced? by fine grained sericite with no Fe minerals.

The second type of plagioclase is albitic (An_{6-8}), and is slightly zoned towards more-sodic rims. Alteration is weak to locally moderate, and consists of scattered sericite flakes up to 0.1 mm long.

K-feldspar also shows a variety of textures. Some grains contain 10-20% fine to coarse, irregular patches of exsolution plagioclase, generally unaltered. Other grains contain a few regular patches of plagioclase and scattered zones with tiny blebs and lenses of plagioclase. Dusty alteration varies greatly in intensity within single grains. Some grains contain an unusual intergrowth consisting of wispy skeletal grains with the following properties: low to moderate relief (R.I. greater than that of quartz), pale yellow color, birefringence about 0.010 (color 1st order white). Except for the interference color the mineral resembles muscovite; the texture is similar to that in sample S-7-25-2. The low interference color may be because of the orientation of the grains, although this would require the same orientation over a large part of the section.

Quartz forms rounded to irregular grains and a few coarse rounded phenocrysts.

Biotite forms grains about 0.5 mm in size; pleochroism is from light straw to medium red brown. Commonly it is partly or completely altered to ragged muscovite with Ti-oxide and limonite. Apatite, zircon, and Ti-oxide occur mainly with or near biotite. Apatite also forms clusters of needles up to 0.1 mm long in quartz grains. Zircon forms a few subhedral grains up to 0.08 mm long in quartz. Ti-oxide grains are up to 0.2 mm across, and range from anhedral to euhedral.

The rock is cut by several thin veinlets composed of kaolinite in extremely fine grained aggregates, with scattered angular fragments of quartz. Most veinlets are less than 0.1 mm across.

Muscovite also forms scattered grains up to 0.5 mm across; the largest is slightly pleochroic from colorless to pale brown.

E-78-7-29-55 Skarn? or Zoned Cavity Filling?

pyrolusite?	35-40%
calcite	25-30
amphibole	20-25
quartz	10-15
muscovite	3- 5
chlorite	minor
limonite	minor

The rock is concentrically banded, with variation in mineral content between different bands. The most obvious variation is in pyrolusite content.

Pyrolusite forms fibrous to radiating clusters of acicular to prismatic grains, ranging widely in size from 0.05 to 3 mm. It also forms very fine grained parallel aggregates of prismatic to acicular grains over patches up to 1 sq.mm.; such growths transect boundaries between calcite and quartz. Lesser pyrolusite forms scattered anhedral equant grains averaging 0.1-0.2 mm in size, and a little occurs in very fine grained aggregates with amphibole and minor calcite.

The mineral has the following properties in reflected light: moderate reflectivity, hardness 4-5, strongly anisotropic from cream grey to deep blue grey with four extinctions per revolution.

Calcite, quartz, and muscovite form coarse grains (0.5-2 mm) interstitial to pyrolusite. Muscovite also occurs as inclusions in some coarse calcite grains.

Amphibole forms in three main modes.

1) Coarse anhedral grains are interstitial to opaque; generally these occur in bands without much quartz and little calcite. It is colorless with minor limonite stain.

2) Fine grained anhedral to subhedral prismatic grains are interstitial to pyrolusite, and in part intergrown with quartz and calcite. It commonly is stained light brown by limonite.

3) Very fine grained amphibole occurs in patches up to 0.5 mm across with lesser calcite and pyrolusite.

A few coarse amphibole grains are recrystallized? to a fine grained aggregate of subparallel grains.

Chlorite occurs with amphibole.

Limonite stains some amphibole (type 2) and forms along a few narrow fractures.

In the thin section the following zones are distinguished with gradational boundaries between each

1) calcite-muscovite-(pyrolusite)
2) pyrolusite-amphibole-(calcite)
3) calcite-quartz-(pyrolusite-actinolite)
4) pyrolusite-actinolite-calcite-(quartz)
5) calcite-actinolite-(pyrolusite)

The rock is cut by a tiny calcite veinlet.

APPENDIX III

Whole Rock and Trace Element Study

• CHEMICAL RESEARCH AND ANALYSIS
• CONTRACT LABORATORIES

TSL

TECHNICAL SERVICE LABORATORIES
DIVISION OF BURGENER TECHNICAL ENTERPRISES LIMITED
1301 FEWSTER DRIVE, MISSISSAUGA, ONT. L4W 1A2
TELEPHONE: (416) 625-1544
TELEX 06-960215

CERTIFICATE OF ANALYSIS

SAMPLE(S) FROM Du Pont of Canada Exploration Ltd.,
Suite 102,
1550 Alberni Street, Attn. Ms. G. Ditson
Vancouver, B.C.
V6G 1A5

REPORT No.
T - 134
Inv. #11249
Let. May 11/79

SAMPLE(S) OF ROCK

WHOLE-ROCK ANALYSIS IN %

Sample No.	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	Na_2O	K_2O	TiO_2	MnO	P_2O_5	LOI	Total
B	68.57	11.70	8.70	0.09	0.01	1.31	7.00	0.14	0.33	0.02	1.60	99.47
DU 3W/B1	74.00	12.02	1.30	0.39	0.00	3.16	5.11	0.09	0.01	0.01	0.71	96.80
DU 3WO/51	83.78	8.30	0.58	0.02	0.00	2.54	3.03	0.08	0.00	0.00	0.51	98.84
E-78-7-31-62	76.28	11.78	1.11	0.18	0.04	3.10	5.63	0.10	0.01	0.01	0.36	98.60
E-78-8-3-79	70.90	15.28	0.81	1.35	0.10	5.73	3.07	0.08	0.01	0.02	0.40	97.75
E-78-8-4-90	73.85	11.94	1.69	0.45	0.00	3.33	5.14	0.14	0.01	0.01	0.38	96.94
F 9-8-8-101	73.79	12.37	1.88	0.75	0.15	3.05	5.17	0.23	0.02	0.05	0.40	97.86
E-78-8-10-118	68.07	15.53	1.52	1.79	0.41	5.73	3.87	0.19	0.04	0.07	0.47	97.69
G-78-7-29-13	73.73	12.03	0.34	0.15	0.00	4.75	3.98	0.05	0.00	0.01	0.18	95.22
G-78-7-29-14	73.99	11.87	1.21	0.52	0.00	3.25	5.05	0.07	0.01	0.04	0.44	96.45
G-78-8-5-3	42.44	11.80	16.06	12.28	11.14	1.77	1.02	1.59	0.21	0.50	0.84	99.65
G-78-8-5-6	48.22	9.60	12.50	12.20	11.82	1.45	2.05	1.10	0.21	0.26	1.03	100.4
G-78-8-5-9	43.04	2.36	13.47	8.92	28.16	0.25	0.23	0.19	0.22	0.06	1.54	98.44
G-78-8-5-11	75.34	12.16	1.63	0.50	0.20	3.34	4.95	0.11	0.01	0.04	0.47	98.75
G-78-8-10-11	56.40	15.78	8.93	7.09	4.36	2.50	3.17	0.83	0.16	0.30	0.36	99.88
J-78-7-22-4	55.29	14.55	8.27	6.93	5.39	4.61	2.22	0.70	0.11	0.36	1.04	99.47
J-78-7-22-10	47.62	10.19	8.66	12.78	14.77	1.73	1.91	0.43	0.15	0.25	1.09	99.58
J-78-7-26-5	74.64	12.92	1.81	0.07	0.03	2.73	6.35	0.07	0.01	0.03	0.82	99.48
J-78-7-29-8	77.37	12.90	0.90	0.09	0.14	1.17	5.25	0.01	0.08	0.03	2.21	100.1
J-78-8-5-2	71.32	13.95	1.32	0.90	0.24	3.82	4.60	0.19	0.04	0.06	0.90	97.34
J-78-8-5-11	71.19	14.22	1.44	0.86	0.06	3.89	4.96	0.17	0.05	0.04	1.45	98.33
J-78-8-6-3	70.28	15.31	2.10	1.96	0.36	3.74	5.29	0.22	0.06	0.07	0.56	99.95
J-78-8-6-7F	72.70	13.58	1.79	1.28	0.19	3.85	4.73	0.19	0.07	0.06	0.55	98.99
S-7-25-2 (GR)	72.60	13.10	2.04	0.65	0.15	2.61	5.70	0.28	0.02	0.15	0.40	97.70
S-7-29-19	70.68	15.69	0.79	1.48	0.32	6.03	3.04	0.09	0.01	0.03	0.45	98.61
S-7-29-20	75.53	11.50	0.52	2.55	0.00	6.09	0.26	0.01	0.00	0.02	1.31	97.79
S-7-29-21	74.46	12.36	1.20	0.24	0 00	4.44	4.84	0.05	0.00	0.01	0.33	97.93
S-7-31-7	74.27	12.11	1.53	0.06	0.04	3.17	5.65	0.10	0.01	0.01	0.31	97.26
SG	77.26	10.96	1.25	0.36	0.01	3.33	4.44	0.11	0.01	0.01	0.31	98.05
SLOUCE	74.54	11.93	1.43	0.57	0.00	3.45	5.49	0.08	0.01	0.01	0.44	97.95
VH	74.44	12.70	1.66	0.28	0.01	3.28	6.58	0.09	0.01	0.01	0.35	99.41

Samples, Pulps and Rejects discarded after two months

DATE July 30, 1979 SIGNED [signature]

CTA

Copy to:- Ms. G. Ditson, Du Pont of Canada Exploration Ltd., General Delivery, Swift River, YT. Y0A 1A0

• CHEMICAL RESEARCH AND ANALYSIS
• CONTRACT LABORATORIES

TECHNICAL SERVICE LABORATORIES
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TELEPHONE: (416) 625-1544
TELEX 06-960215

CERTIFICATE OF ANALYSIS

SAMPLE(S) FROM Du Pont of Canada Exploration Ltd.

Attn. Ms. G. Ditson

REPORT No. T - 134

SAMPLE(S) OF ROCK

MINOR ELEMENTS IN PPM

	Rb	Cr	V	Pb	Sr	Ba	Sn	W	Zr	Mo
B	420	216	14	57	200	300	100	<2	150	<1
DU 3 W/BI	360	129	<2	32	<100	30	<5	<2	100	<1
DU 3 WO/BI	240	146	<2	67	<100	50	20	<2	100	<1
E-78-7-31-62	400	170	<2	25	<100	20	<5	<2	200	<1
E-78-8-3-79	80	115	2	21	1000	3000	<5	<2	50	<1
[illegible]-78-8-4-90	500	149	2	30	<100	20	5	<2	75	<1
E-78-8-8-101	320	179	<2	22	<100	300	<5	4	75	<1
E-78-8-10-118	80	121	10	19	3000	3000	10	<2	50	<1
G-78-7-29-13	300	130	2	18	<100	20	100	4	50	<1
G-78-7-29-14	410	190	<2	34	<100	10	<5	<2	50	<1
G-78-8-5-3	<80	403	340	32	500	300	10	<2	10	<1
G-78-8-5-6	<80	830	244	195	300	300	50	<2	10	<1
G-78-8-5-9	<80	2510	84	29	200	10	5	<2	<10	<1
G-78-8-5-11	510	155	2	20	<100	<10	<5	<2	150	<1
G-78-8-10-11	80	165	172	46	500	500	30	4	10	<1
J-78-7-22-4	<80	235	130	29	700	1000	5	4	20	<1
J-78-7-22-10	<80	1010	152	71	500	700	10	4	<10	<1
J-78-7-26-5	600	156	12	32	<100	10	<5	<2	200	<1
J-78-7-29-8	300	58	<2	21	<100	50	5	<2	50	<1
J-78-8-5-2	190	133	2	18	200	1000	5	<2	150	<1

Samples, Pulps and Rejects discarded after two months

DATE July 30th, 1979. SIGNED

TSL

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1301 FEWSTER DRIVE, MISSISSAUGA, ONT. L4W 1A2
TELEPHONE: (416) 625-1544
TELEX 06-960215

CERTIFICATE OF ANALYSIS

SAMPLE(S) FROM Du Pont of Canada Exploration Ltd.

Attn. Ms. G. Ditson

REPORT No. T - 134

SAMPLE(S) OF ROCK

MINOR ELEMENTS IN PPM (Cont'd)

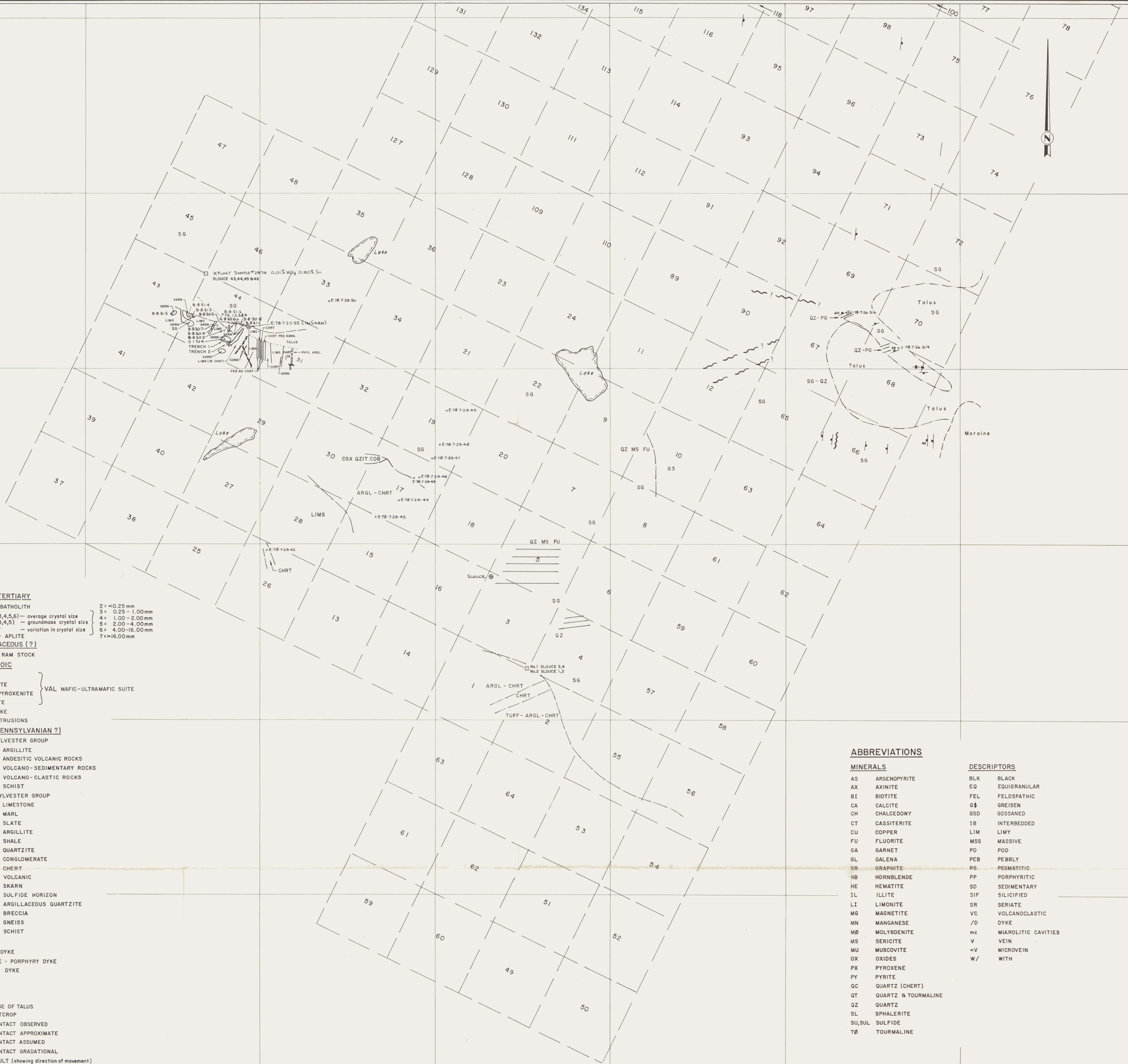
	Rb	Cr	V	Pb	Sr	Ba	Sn	W	Zr	Mo
J-78-8-5-11	210	112	2	18	300	1000	<5	<2	150	<1
J-78-8-6-3	120	100	14	18	600	4000	<5	<2	200	<1
J-78-8-6-7F	210	119	12	20	500	1000	<5	<2	150	<1
S-7-25-2 (GR)	280	145	4	21	<100	700	<5	<2	150	<1
[illegible]7-29-19	<80	105	<2	13	3000	4000	10	<2	50	<1
S-7-29-20	<80	122	<2	11	1500	150	30	6	150	<1
S-7-29-21	500	152	<2	31	<100	50	<5	<2	200	<1
S-7-31-7	510	111	<2	17	<100	20	<5	<2	150	<1
SG	320	161	<2	29	<100	50	<5	<2	50	<1
SLOUCE	500	172	<2	23	<100	<10	<5	<2	150	<1
VH	550	158	<2	31	<100	<10	<5	<2	200	<1

NOTE: Lithium could not be analysed. However this element was not detected with the spectrograph.

Samples, Pulps and Rejects discarded after two months

DATE July 30th, 1979. SIGNED

CTA



LEGEND

CRETACEOUS OR TERTIARY

SG	SEAGULL BATHOLITH

EQ2 (or 3,4,5,6) — average crystal size
PP2 (or 3,4,5) — groundmass crystal size
SR2 – 7 — variation in crystal size
APLT — APLITE

2 = <0.25 mm
3 = 0.25 - 1.00 mm
4 = 1.00 - 2.00 mm
5 = 2.00 - 4.00 mm
6 = 4.00 - 16.00 mm
7 = >16.00 mm

JURASSIC - CRETACEOUS (?)

CR	CASSIAR - RAM STOCK

PERMIAN - MESOZOIC

DIØR	DIORITE
PXNT	PYROXENITE
BI PXNT	BIOTITE PYROXENITE
PERD	PERIDOTITE
BC/D	BASIC DYKE
BR	BROCK INTRUSIONS

(DIØR, PXNT, BI PXNT, PERD: VAL MAFIC-ULTRAMAFIC SUITE)

MISSISSIPPIAN (PENNSYLVANIAN ?)

M3 UPPER SYLVESTER GROUP

ARGL	ARGILLITE
ANVC	ANDESITIC VOLCANIC ROCKS
VCSD	VOLCANO - SEDIMENTARY ROCKS
VLCC	VOLCANO - CLASTIC ROCKS
SCHS	SCHIST

M2 LOWER SYLVESTER GROUP

LIMS	LIMESTONE
MARL	MARL
SLAT	SLATE
ARGL	ARGILLITE
SHAL	SHALE
QZIT	QUARTZITE
CONG	CONGLOMERATE
CHRT	CHERT
VOLC	VOLCANIC
SKRN	SKARN
SUHØ	SULFIDE HORIZON
ARQZ	ARGILLACEOUS QUARTZITE
BRXX	BRECCIA
GNIS	GNEISS
SCHS	SCHIST

AGE UNKNOWN

DB/D	DIABASE DYKE
PXDK	PYROXENE - PORPHYRY DYKE
RYDK	RHYOLITE DYKE

SYMBOLS

EDGE OF TALUS
OUTCROP
CONTACT OBSERVED
CONTACT APPROXIMATE
CONTACT ASSUMED
CONTACT GRADATIONAL
FAULT (showing direction of movement)
ALTERATION AREA
BEDDING - INCLINED, VERTICAL
JOINTING - INCLINED, VERTICAL
FOLIATION - INCLINED, VERTICAL
VEIN - INCLINED, VERTICAL
AREA OF SMALL VEINS
ANTICLINE - UPRIGHT, OVERTURNED
AXIAL PLUNGE
GOSSANED AREAS
GEOLOGY / ROCK SAMPLE STATION
THIN SECTION
TRACE ELEMENT / WHOLE ROCK ANALYSES
THIN SECTION & TRACE ELEMENT / WHOLE ROCK ANALYSES
CHIP SAMPLE
Rock A (Rock B) — ROCK A more frequent than ROCK B
GULLY
CREEK
CLAIM POST

ABBREVIATIONS

MINERALS

AS	ARSENOPYRITE
AX	AXINITE
BI	BIOTITE
CA	CALCITE
CH	CHALCEDONY
CT	CASSITERITE
CU	COPPER
FU	FLUORITE
GA	GARNET
GL	GALENA
GR	GRAPHITE
HB	HORNBLENDE
HE	HEMATITE
IL	ILLITE
LI	LIMONITE
MG	MAGNETITE
MN	MANGANESE
MØ	MOLYBDENITE
MS	SERICITE
MU	MUSCOVITE
OX	OXIDES
PX	PYROXENE
PY	PYRITE
QC	QUARTZ (CHERT)
QT	QUARTZ & TOURMALINE
QZ	QUARTZ
SL	SPHALERITE
SU, SUL	SULFIDE
TØ	TOURMALINE

DESCRIPTORS

BLK	BLACK
EQ	EQUIGRANULAR
FEL	FELDSPATHIC
G$	GREISEN
GSD	GOSSANED
IB	INTERBEDDED
LIM	LIMY
MSS	MASSIVE
PD	POD
PEB	PEBBLY
PG	PEGMATITIC
PP	PORPHYRITIC
SD	SEDIMENTARY
SIF	SILICIFIED
SR	SERIATE
VC	VOLCANOCLASTIC
/D	DYKE
mc	MIAROLITIC CAVITIES
V	VEIN
<V	MICROVEIN
W/	WITH

DU PONT EXPLORATION
CANADA

KLINKIT PROJECT
GEOLOGY
SLOUCE CLAIMS
SWIFT RIVER AREA, YUKON TERRITORY

1 : 10 000
m 300 200 100 0 300 600 m
SCALE

MAPPED BY: L.E., C.G., M.S.	REVISED:	N.T.S. No.: 105 B
DATE: JUL.-AUG. '78	AUG. '79 by B.G.	ACCT No.: 335-10
DRAWN BY: K.L.J.		
DATE: OCT. '78		DRWG. No.: KL. 78-29

DUPONT CANADA EXPLORATION

KLINKIT PROJECT

SOIL & ROCK GEOCHEMISTRY

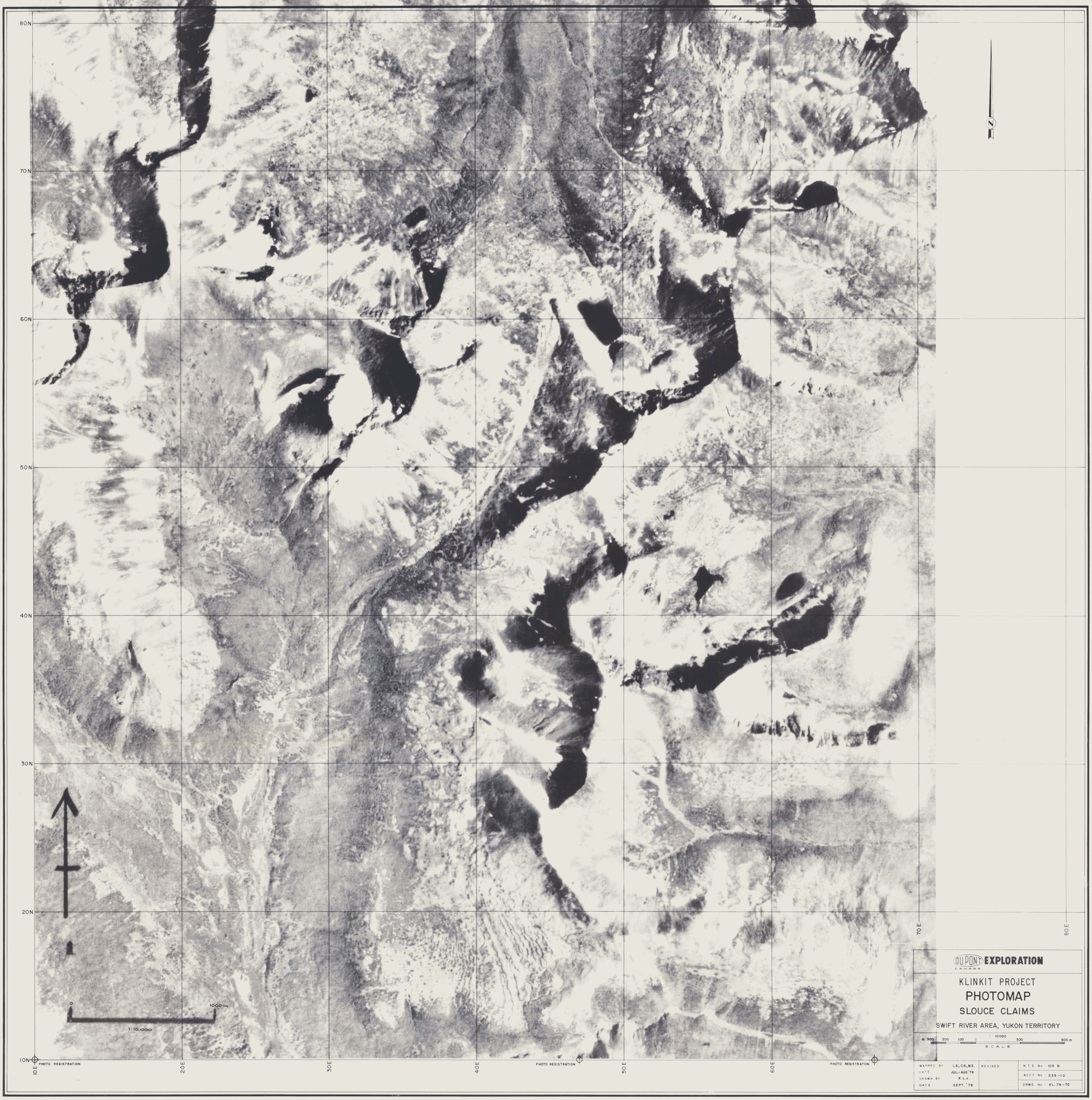
TIN - TUNGSTEN IN P.P.M.

SLOUCE CLAIMS

SWIFT RIVER AREA, YUKON TERRITORY

m 300 200 100 0 300 600 m — 10000 — SCALE

DATA BY	F.M.S.	REVISED	N.T.S. No 105 B
DATE	AUG-SEPT '78	NOV. '79	ACCT No 335-10
DRAWN BY	K.L.J.		DRWG No KL. 78-46
DATE	OCT. '78		


DU PONT EXPLORATION
CANADA
KLINKIT PROJECT
PHOTOMAP
SLOUCE CLAIMS
SWIFT RIVER AREA, YUKON TERRITORY
1 : 10000
m 300 200 100 0 300 600 m
SCALE
MAPPED BY L.E., C.G., M.S.
DATE JUL.-AUG.'78
DRAWN BY K.L.J.
DATE SEPT. '78
REVISED :
N.T.S. No.: 105 B
ACCT No.: 335-10
DRWG. No.: KL. 78-70
PHOTO REGISTRATION
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50E
60E
70E
80E
N

DU PONT OF CANADA EXPLORATION LIMITED

REPORT OF GEOLOGICAL AND GEOCHEMICAL SURVEYS

on

SWIFT PROJECT

by

G. Mato and F. M. Smith, P. Eng.

January 1980

090803

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF APPENDICES

SPECIFIC PROSPECT - SWIFT CLAIMS (335-21)

1. LOCATION AND ACCESS

The project is centred on and about peak 6321 (ft) in the Wolf Lake map sheet (105-B) between Morley River to the north and west, Smart River to the south, and Cabin Creek to the southwest, in the west central portion of the Dorsey Range, Cassiar Mountains, Yukon. The project consists of several claim groups on sheet 105-B-4 centred on about 60°12'N and 131°45'W.

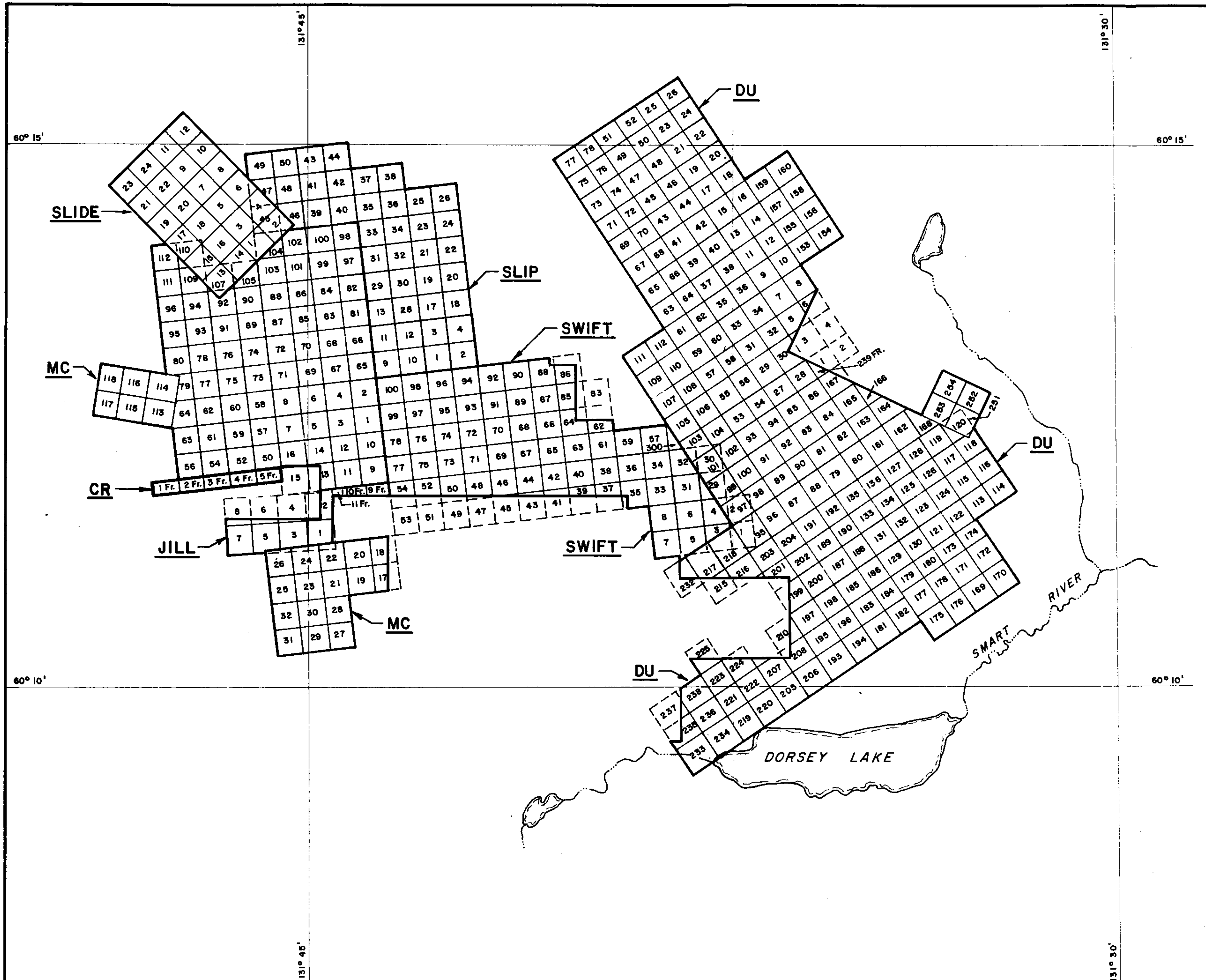
Dorsey Lake located 6 km southeast is usable by float plane as a staging point to the project area. A winter road crosses Smart River downstream from Dorsey Lake, traverses the southern portion of the project and terminates on the JC claims 2 km south of peak "6321". This winter road interconnects with several roads used as access to the "Logjam Creek/Pure Silver" properties from the Alaska Highway west of Swift River. Currently the only reasonable access is by helicopter from Swift River, Yukon approximately 38 km to the southeast.

2. PHYSIOGRAPHY AND VEGETATION (Map KL 78-67)

The project covers a horn peak with several ages of valley glacier incisions of the mountainous area. The north and northeast facing cirque areas have extremely steep head walls with subdued topography less than 1 km downstream.

South facing slopes are of more subdued topography with angle of repose slopes in the central portion and undulating slopes to Smart River, Cabin Creek and Morley River.

Vegetation is particularly thick in the southern portion of the claims (MC claims in southeast area) where black spruce, balsam and ground birch cover most of the slopes. Intermediate south slopes and all north facing lower slopes are covered in ground birch with patches of ground balsam. The alpine areas, cirque floors and subdued aretes are covered in either sedges and scattered low ground birch or felsenmeer or outcrop.



DU PONT EXPLORATION
CANADA

KLINKIT JOINT VENTURE

DU, SLIP & SWIFT PROJECTS

CLAIM MAP

SWIFT RIVER AREA, YUKON TERRITORY

1 :

SCALE

1 INCH = 1 MILE

DATA BY : F.M.S.	REVISED :	N.T.S. No. : 105 B4,5
DATE : MAR.'79	Dec.'79	ACCT No. : 335-00
DRAWN BY : K.L.J.		DRWG. No. : KL.79-1
DATE : MAR.'79		

3. CLAIMS

The SWIFT project consists of the following claims:

Claim Name	Record Numbers	Date of Expiry
MC 1-8	YA33303-YA33310	1980 01 10
MC 9-16	YA34392-YA34399	1980 01 10
MC 17-32	YA33497-YA33612	1980 01 10
MC 50	YA33614	1980 01 10
MC 52	YA33616	1980 01 10
MC 54	YA33618	1980 01 10
MC 56-105	YA33620-YA33669	1980 01 10
MC 107	YA33671	1980 01 10
MC 109-118	YA33673-YA33682	1980 01 10
SLIDE 1-24	YA33319-YA33342	1980 01 10
SWIFT 1-8	YA33223-YA33230	1980 01 10
SWIFT 29-54	YA33231-YA33256	1980 01 10
SWIFT 57	YA33259	1980 01 10
SWIFT 59	YA33261	1980 01 10
SWIFT 61-78	YA33263-YA33280	1980 01 10
SWIFT 83	YA33285	1980 01 10
SWIFT 85-100	YA33287-YA33302	1980 01 10
JILL 1-8	YA34381-YA34388	1980 01 10
JILL 9 Fr.-11 Fr.	YA34389-YA34391	1980 01 10

All claims are recorded in the Watson Lake MD, Yukon in the name of Du Pont of Canada Exploration Limited and are subject to agreement between the Joint Venture (Duval Mining Limited and Du Pont of Canada Exploration Limited) and Welcome North Mines Limited and McCrory Holdings (Yukon) Limited.

4. HISTORY

The claim groups of the SWIFT project tie-on to the north of the JC claims and north, south and east of the PLUG claims controlled by the DC Syndicate managed by J.C. Stephen Explorations Ltd. The JC claims cover an area that has had intermittent exploration including trenching, mapping and several geochemical and geophysical surveys. The past operators were examining the massive sulphide/vein potential of the fahlband zones in the central member of the Devono-Mississippian Sylvester Group. The "winter road into the area of the JC claims was constructed in the 1960's or early 1970's for a cat-tractor trenching programme on the area of the JC claims.

There is no history of physical exploration on most of the SWIFT PROJECT area. The winter road and two trenches from the early exploration are covered by the southwestern portion of the MC claims.

5. GEOLOGY

5.1 Sedimentary and Metamorphic Rocks - M2

5.1.1 Argillite - Chert - Quartzite

This lithologic division consists of predominant argillite with chert above minor quartzite beds from a few centimetres to tens of metres thick. Argillite (ARGL) is various shades of grey or black in colour, and is commonly phyllitic. Black ARGL generally contains disseminated pyrite (SUHO) and locally (esp. MC Ridge) such horizons contain more than 20% pyrite (with minor sphalerite and galena) over 1 to 2 m. Massive chert (CHRT) beds up to tens of metres thick are various shades of light green, grey and purple. Quartzites (QZIT) are laminated, varying in colour from light grey to greenish to brownish and dark grey.

5.1.2 Carbonates

Limestone (LIMS) forms lenticular 1 to 70 m thick marker beds within the monotonous argillite-chert quartzite sequence described above. Thick beds can be traced along the ridges, but correlation between ridges is difficult. Rarely fossiliferous or sandy limestone is fine-grained, laminated, white or light grey, and usually contains lenses of argillite or chert. Although limestone beds often occur with associated sulphide horizons, sulphide horizons are always accompanied by limestone beds.

5.1.3 Metamorphism

Most of the rocks in the area have been metamorphosed by the Seagull batholith to some degree. It is impossible to define the degree of metamorphism without thin section studies.

Metamorphosed clastics are characterized as hard, massive, fine-grained hornfels and schist. Colours range from dark grey to brown and green. Cherts and quartzites are commonly altered by silicification and/or cut by quartz-tourmaline microveinlets.

Limestones are generally recrystallized to fine- to medium-grained marble. Sandy limestones are altered to tremolite-actinolite-garnet-diopside-calcite-wollastonite skarns (SKRN) up to 5 m wide with varying axinite content. the position of these skarns within limestone beds does not appear to be consistent, although they do appear to be related to bedding. Small, irregularly-distributed limestone lenses in the MC cirque floor area (Map KL 79-51) were always seen to have their upper portions completely skarned to a green rock with a considerable sphalerite and uncommon galena (Figure 1). Two of three lenses also contain massive garnet and magnetite.

Within 50 m of the contact with batholithic rocks there is progressive weak granitization of pendant material. The few centimetres above the contact consists of fine-grained gneisses with a metamorphic assemblage of quartz, K-feldspar, biotite and tourmaline.

Figure 1. Local limestone lenses in the MC cirque floor (D-8-16-3) area are overlain by sphalerite-rich skarn zones which may also contain galena or garnet and magnetite.

5.2 Sedimentary and Metamorphic Rocks - M3

The dubious distinction between M2 and M3 is based primarily on differing responses to metamorphic phenomena.[1] M3 is dominated by argillite, quartzite and minor massively interbedded chert. The differences with respect to M2 are as follows:

1. The colour of massive green hornfels is attributed to a chloritic component which may be volcanic in origin.
2. Intraformational breccias (M-6-16-17) possibly indicative of basin instability have not been found in M2.
3. Uncommon limestone bodies within M3 are dark and "dirty" and sometimes completely altered by skarning and silification (c.f. large alteration area west-southwest of MC ridge, M-6-13-9).

5.3 Intrusive Rocks

5.3.1 Seagull Batholith (SG)

The granitic Seagull batholith intrudes all the sedimentary units described above. Average alaskite composition, based on 17 rocks, is 30% plagioclase, 40% K-feldspar and 30% quartz. Biotite is usually present in amounts up to 10% (average 3.5%).

Textures exhibited by batholithic rocks include the following:

a. Coarse-grained (EQ5-6) quartz, feldspar and biotite.

b. Porphyritic:

   i. PP3-4: quartz and feldspar phenocrysts in a groundmass of quartz, feldspar and biotite.

---

[1]M3 was initially defined as a principally volcanic package above sedimentary rocks. However, the amount and nature of volcanic material varies throughout the area, and therefore M3 now has many different definitions (c.f. GW,SIN and VAL(B) claims).

ii. Crowded porphyry (PP2): 20-40% quartz and feldspar phenocrysts are contained in a consistently fine-grained groundmass of quartz, feldspar and biotite.

c. Pegmatitic: 2 to 5 cm quartz and feldspar crystals and 0.5 to 7 cm biotite crystals.

d. Seriate: crystal size varies so much in places along the batholithic/pendant contact that the term seriate is used to imply a complete range of textures from aplitic to very coarse. Coarse-grained patches and bubbles contain crystals which map approach pegmatitic dimensions.

e. Aplitic: quartz, feldspar and biotite grain size is 0.2 to 0.5 cm.

Coarse-grained rocks are predominant throughout the batholith; porphyritic textures are normally located within 75 - 100 m from the contact with sedimentary rocks. The change from coarse to porphyritic is most commonly gradual, and porphyritic rocks can be surrounded by dominantly coarse-grained rocks.

Crowded porphyry does not appear to form a continium with other textural varieties of Seagull; its contacts are always sharp. It only appears as a mapped unit on map KL 79-52, since elsewhere it has not been separated from the other more common porphyritic variety. This porphyry is present on ECCLES Ridge and over a large area in the southeastern DU claims, but has not been located elsewhere in the Seagull batholith.

Pegmatitic facies are limited exclusively to the top of the batholith within 25 m of the contact. These lenticular, 0.2 to 1 m wide zones are subparallel to batholith contacts.

Rare aplitic rocks are normally dyke-like, crosscutting coarse and porphyritic rocks. These fine-grained "dykes" up to 20 m wide (c.f. Map KL 79-52), with E-W orientations.

There can be little doubt that porphyritic and aplitic textures are relatively younger than coarse-grained ones. Cross-cutting relationships between aplite and coarser rocks inticates that it is the youngest textural facies. Gower (1952) observed that plagioclase is more sodic in porphyritic and aplitic facies and that their tourmaline and fluorine content is higher.

5.3.2 Pyroxene Dykes (PXDK)

Although the field name for these rocks has been "hornblende dykes", thin section examination (T10, Appendix, 1978 report), reveals that most of the mafic phenocrysts are actually pyroxene (diopside-angite series). Sample T10C is described as medium-grained, equigranular peralkaline granite (quartz 11%; K-feldspar 39%; plagioclasse (An_{44}) 21%, mafics and opaques 29%). Field specimens commonly exhibit some degree of hydrothermal alteration. Amphibole, muscovite, chlorite, pyrrhotite, pyrite and common cassiterite are visible in thin section as products of hydrothermal acitivity.

These dykes have been found mainly on MC Ridge and adjacent areas. They do not have a defined pattern of orientation or width. They exclusively cut the sedimentary-metamorphic package and vary in width from a few centimetres to ten metres. On MC Ridge, (Map 79-42) the dykes are affected by the fracturing and veining that introduced tin mineralization. In the rest of the area, although they are not affected by fracturing, they always contin some of the hydrothermal alteration products described above.

5.3.3 Rhyolitic Dyke (RYDK)

This is a continuous sub-vertical, 2 to 7 m thick dyke with a general orientation of N25E which can be followed for more than 3 km on the DU claims. It clearly cross- cuts Seagull granite and sedimentary rocks, and therefore must be one of the latest igneous events in the area.

The dyke is characterized by a white porcelain-like interior with green obsidian margins. It has a porphyritic texture with plagioclase, quartz and biotite phenocrysts from 0.3 to 1.5 mm. Groundmass forms 80% of the rock and has approximately the same composition (S-7-25-2 and G-78-7-29-17; Appendix II).

6. STRUCTURE

In agreement with the regional trend of the Cordillera, NW-SE is the dominant structural trend in the area studied. This tendency can be observed not only between lithologic contacts in sedimentary rocks, but also in the general exposed outline of the Seagull batholith. Bedding planes dip generally south with angles from 10^{o} to almost vertical (dominant dips are between 15^{o} to 35^{o}).

The stresses that caused regional structural trends must have produced other types of structures, (folds or thrusted faults) that, due to homogeneity of sedimentary rocks, were not observed. There are only two places - SLIP and north of MC Plateau where open concentric folds with gently south-dipping axes have been found. The deformation that produced these folds is posterior (later than regional deformation) to the one that caused the major trends.

Emplacement of the Seagull batholith was extremely passive, and did not deform intruded rocks. The intrusive contact is generally subhorizontal, so that Seagull rocks occupy valley floors and sediments are located on ridge tops. Exceptions to this statement are present in the eastern DU area where limestone bodies exposed at low elevations are totally enclosed by batholithic rocks. In other cases, Seagull rocks form NW-SE dykes in the metamorphosed roof, as on the SLIP and DU claims.

Most recent movements have produced block faults, indicating relative uplift towards the east. In DU North, the granite-sediment contact has been elevated 300 metres along a fault striking N30E. The general direction of block faults is N30E, and movement is generally vertical with only a minor horizontal component.

Doleritic and rhyolitic dykes with attitudes similar to late block faults were noted mainly on ECCLES Ridge. These dykes indiscriminately cross-cut granitic and sedimentary rocks.

The rhyolite dyke has been displaced by minor perpendicular faults that must represent the most recent movements in the area.

7. GEOCHEMISTRY

7.1 Map KL 79-44

A total of 527 samples were collected in this map area with more detail sampling plotted on maps KL 79-45, 46, 67 and 70. Of all the samples, 284 were collected from the SLIP claims.

Major tin anomalies have been located on the MC and JILL claims in the south west corner, on the MC claims immediately south of MC Ridge (MC Plateau zone) and on the SLIP claims. All but the SLIP anomalies appear to be due to cassiterite mineralization. The check geochemical analysis by MIN-EN on the SLIP area anomalies gave very low response for tin.

7.2 Map KL 79-46

MC Ridge and Cirque Floor were grid and detail sampled with 536 samples collected and analysed for tin. Major anomalies have been located on two zones north of the Main Zone on MC ridge and over a major portion of the cirque floor grid especially proximal to the roof of the Seagull batholith.

The nature of the tin mineralization is as yet unknown throughout most of the area. No tin mineralization has been located in place to the north of the Main Zone to explain the two anomalies. Magnetite bearing skarn is known to grade 0.75% tin (assay) in a 5 m x 5 m chip (1978 work) but insufficient sampling has been done on the cirque floor to locate the source of the major anomalies.

7.3 Map KL 79-70

A total of 182 samples were collected over the detail grid on the MC Ridge main zone. The only major anomalies are to the north-west of the T1-9 zone where a few major tin values appear to correspond to the extension of the T9 mineralized zone.

8. ALTERATION AND MINERALIZATION

The continuity between evolutionary stages of development of the Seagull batholith is such that it is difficult to establish when autometasomatism ceased and hydrothermal alteration began. Crystallization of tourmaline to form miarolitic cavities and veins is probably the point where the water content of the rest melt began to play a dominant role. Tourmaline is found in miarolitic cavities and in veins associated with quartz, fluorite and sometimes cassiterite. Miarolitic cavities, common within the porphyritic facies, are generally spherical in shape (average 5 cm). They contain quartz, tourmaline and sometimes fluorite in crystals that in places have grown radially inwards toward the centre of the cavity. Bordering the cavity is a concentric "rind" where biotite is lacking; the width of this rind is proportional to the size of the cavity.

Parallel sets of quartz-tourmaline veins are found in both porphyritic and coarse-grained facies. Veins vary from 1 to 50 cm wide and sets can reach 50 m widths. They strike east-west with a density of 1 to 3 veins per metre and sometimes contain fluorite and cassiterite (Epic vein on VAL(B) claims). They have been seen to cut miarolitic cavities on the DU claims.

It is assumed that both miarolitic cavities and quartz-tourmaline veins were originally bubbles rich in volatiles which were widespread after solidification of the porphyritic facies. In some cases, because volatile content in the bubbles was higher than elsewhere, water pressure was also higher, and in this case veins developed instead of miarolitic cavities. This may be why fluorite and cassiterite were found only in veins and not in miarolitic cavities.

8.1 MC Ridge (Map KL 79-42)

Mineralization on MC ridge is totally enclosed in the metasedimentary package. The nearest Seagull outcrop is 1.5 km north-east, in the MC cirque floor.

Sedimentary rocks here consist of an interbedded sequence of argillite, black argillite, sulphidic horizons and quartzite, topped by a thick limy sequence. The limy sequence begins with an irregular limestone bed, partially skarned, whose thickness varies between 10 and 25 m. It is followed up sequence by 30 to 40 m of interbedded argillite and limy argillite beds 0.5 to 1 m thick. The package culminates with a 30 m thick limestone which also forms the top of the ridge.

Two areas of mineralization, spaced 15 m apart and probably related to the same mineralizating event, have been located - the main zone and the sheeted vein zone. The north zone is similar in character, but does not host significant tin mineralization.

8.1.1 Main Zone

Mineralization in the main zone is situated along a sub-vertical fractured structure striking N70W.

It has been sampled across two trenches, Tl and T9N, separated by 25 and 20 m, horizontally and vertically, respectively. Chip sample results can be observed on map KL 79-43.

In T9N, the mineralization-alteration zone is approximately 7 metres thick. Half of this distance corresponds to a skarn assemblage of recrystallized calcite, quartz, axinite, magnetite, pyrite and chalcopyrite, recognizable in hand specimens. The other half is highly fractured, and because of the high content of weathering products (hematite, clays, etc.) it is difficult to determine the original mineralogy. However, a quartz-calcite-cassiterite-sphalerite-chalcopyrite vein of irregular thickness, varying between 5 and 25 m wide, has produced specimens whose analyses indicate more than 50% tin (probably oxide) present. Cassiterite can be recognized visually in these specimens, forming aggregates of relatively large crystals (0.1 - 0.3 cm) distributed irregularly along the vein. Sphalerite, chalcopyrite and secondary malachite can also be observed, but unfortunately no relationship between economic and gangue minerals can be established.

In Tl, the highly fractured zone has a thickness of 1.5 to 2 metres. Except for the presence of hematite and dense fracturing, no original constituents or characteristics can be observed. However, chemical analyses do indicate the presence of cassiterite.

The difference between thicknesses of the fractured-mineralized zone in Tl and in T9N can be explained in two ways. One possibility is that the zone is thinning with elevation or distance from the underlying source. Another possibility is that fracturing and mineralizing phenomena react differently to different lithologies. Both processes may have interacted to give the actual disposition, but a description of the sheeted vein zone will shed more light on this question.

8.1.2 Sheeted Vein Zone

This zone is hosted by the intermediate limy argillaceous sequence located between the two limestones. The rocks here are cut by parallel, E-W, sub-vertical to 80° south-dipping fractures of varying degrees of intensity (Figure 2). Intensity has been quantified by counting the number of fractures per metre, those areas with more than 10 vein-filled fractures per metre have been outlined on the geological map. Although there are also barren fractures, those with mineralization are easily recognized because of oxides produced by the weathering of sulphides. This area can be extrapolated from surface outcrops as being 50 m long and 10 m wide. It has been sampled across four trenches, T9S, T10, T11 and T12. Chemical tin grades and the thickness of the tin-bearing zone are presented on map KL 79-43.

The thickness of the veins varies from 0.5 to 7.0 cm, smaller ones predominating. Veins carry quartz, axinite and calcite as dominant gangue minerals, along with pyrite, chalcopyrite, sphalerite, galena, magnetite and cassiterite. Cassiterite is visible in hand specimens as medium to small euhedral crytals and tends to be present more commonly within the vein than adjacent to it. Selveges are occupied mainly by pyrite and minor amounts of other sulphides, suggesting an earlier origin for sulphides relative to cassiterite.

Veins within argillite do not develop visible alteration envelopes, as opposed to those hosted by more limy horizons. In the latter case, alteration envelope assemblages are composed of clinozoisite, quartz, axinite and minor epidote and topaz. Disseminated cassiterite and sulphides have been observed in some samples of this this saussuritized rock. These alteration envelopes, as in the case of the skarned areas of the main zone, do not have a defined shape, suggesting that they are controlled by the chemistry of the host rock.

8.1.3 North Zone

This is a fracture zone of N60W strike and vertical dip which outcrops along 75 m with a thickness of 5-7 m. It has been sampled with a trench, T14, showing no significant tin values.

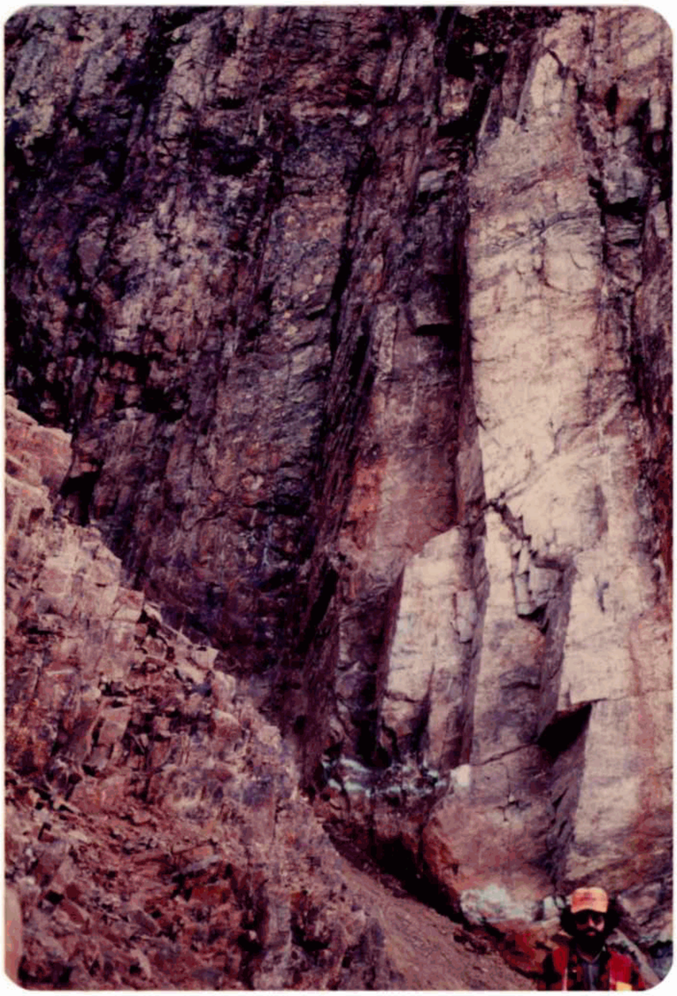


Figure 2. Intense fracturing (left and centre) characterizes the sheeted vein zone exposed in T9S. Blue paint outlines 1 m long chip samples.

Sphalerite and galena are present within saus-suritized rock similar to that of T9S (M31, M32, M45, etc.).

8.1.4 Discussion

Both the main zone and the sheeted vein zone have been produced by the same mineralizing event which also resulted in the presence of tin values at M4 and M18. Although there is no doubt about the continuation of the fractured structures at depth, the fact that all cassiterite occurrences are situated within or above the first limestone suggest that they have been derived from an initial tin skarn deposit located in the lime-stone and have been remobilized into their present position within fractures.

Another possibility is that the veins form part of a deeper mineralizing system, suggested by the presence of the north zone - the only intensely fractured zone below the first limestone. The lack of cassiterite in the north zone may be due to a high level position within a zoned system which evolves from top to bottom from sulphides to cassiterite to sulphide tin, a pattern that is considered normal for tin deposits elsewhere and is suspected to occur on DU Plateau. Of course, drilling is necessary to prove this point.

9. CONCLUSIONS AND RECOMMENDATIONS

The Main Zone on MC Ridge requires a diamond drill programme to define the depth extension of the tin bearing zones. MC Plateau requires detail sampling, geological mapping and possibly trenching to define the source and characteristics of known tin mineralization. The MC Cirque Floor requires detail chip sampling to locate the source of tin geochemical anomalies and as evaluation of greisen zones. MC Southwest, SWIFT east and SLIDE require detail evaluation of preliminary sampling anomalies.

All tin-bearing zones must be evaluated for the possibility of related silver mineralization.

APPENDIX I

STATEMENT OF EXPENDITURES

January 1 - December 31, 1979

SWIFT AND SLIP CLAIMS, YT

Casual Labour	$ 1 414.35
Consultant Fees	901.23
Travel Expenses	2 923.60
Camp Expenses	12 351.03
Mapping, Gr. Surveys, Maps	16 684.93
Ground Clearing & Trenching	25 489.84
Freight, Hauling, Storage	3 586.92
Assaying	9 723.75
Miscellaneous	4.80
Salaries - Regular	9 434.80
Salaries - Temporary	16 996.00
Space Charges	160.14
Equipment Rental	1 953.33
Stationery & Supplies	200.07
Telephone	708.47
Auto Expenses	263.06
Repairs & Mtce (excl. Auto)	53.88
Non Capital Equip. Purchases	1 441.65
Depreciation Expenses	2 234.52
	$ 106 526.37

APPENDIX II

Petrographic Report

E-78-8-1-67 Hornblende-Plagioclase Porphyry

phenocrysts:	40-45%	
hornblende	20-25	(some altered to biotite, chlorite, epidote)
plagioclase	15-20	
biotite	5- 7	(some altered to chlorite, epidote, opaque)
groundmass:	50-55%	
plagioclase	25-30	
quartz	15-20	
myrmekite	5- 7	
K-feldspar	3- 5	
opaque	2- 3	(includes opaque interstitial to hornblende phenocrysts)
apatite, sphene	minor	
Ti-oxide, zircon	trace	
alteration patches:	3-5%	
quartz	2- 3	
opaque	½-1½	
chlorite	0- 1	
hematite	minor	

Hornblende phenocrysts are from 0.2 to 2 mm in size. Coarser ones are euhedral, while finer ones are subhedral. Pleochroism is from light yellow green to medium green. Some contain intergrowths of biotite. Several are altered to chlorite-epidote. Scattered opaque, Ti oxide, and sphene occur with hornblende. Hornblende also forms clusters of many grains up to 5 mm across; grain size ranges from 0.1 to 0.3 mm. In some clusters is coarsely intergrown opaque near the center of the cluster; there hornblende is paler in color and nonpleochroic. Many hornblende grains and clusters are partly rimmed by very fine grained secondary biotite.

Plagioclase forms equant to very elongate grains from 0.5 to 3 mm in length. Some are partly recrystallized to very fine grained aggregates. Alteration to sericite is slight to strong.

Biotite forms phenocrysts from 0.3 to 0.8 mm in size. Some have intergrown opaque, Ti-oxide, and sphene. Many are altered to chlorite-epidote, with or without opaque. Some grains, both fresh and altered, have partial rims of very fine grained secondary biotite.

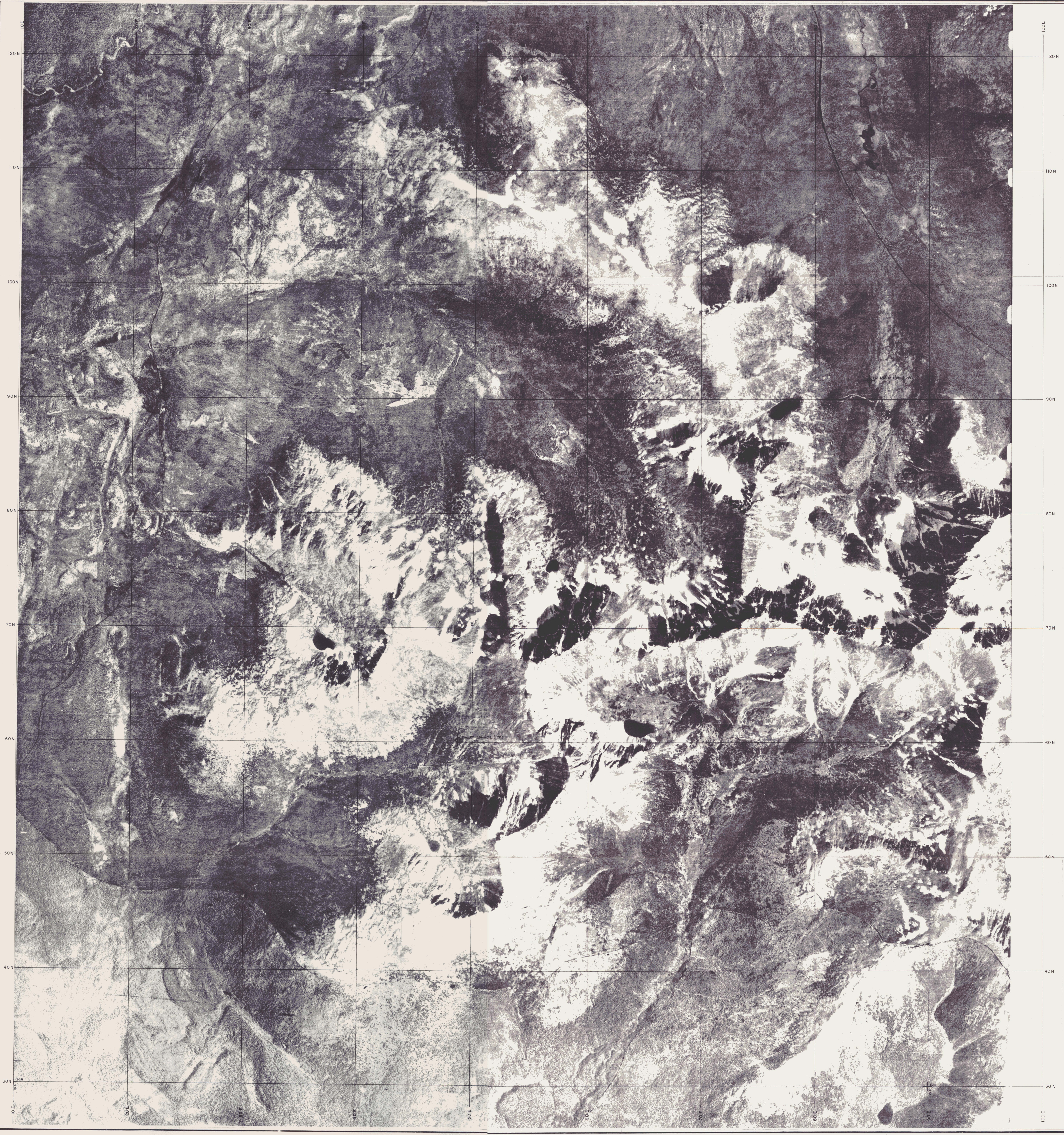
The groundmass consists mainly of an irregular fine grained (0.015-0.03 mm) aggregate of plagioclase and quartz. Grain size is variable in patches; grains are only slightly intergrown. Patches of myrmekitic intergrowths of plagioclase and quartz from 0.3 to 0.5 mm in diameter are scattered in the groundmass. Myrmekite is coarser than in S-7-25-2. K-feldspar may be present as suggested by the yellow stain on the block; it was not positively identified in the fine grained groundmass. Most accessory minerals occur in scattered grains from 0.05 to 0.10 mm in size.

Alteration patches consist of intergrown quartz, opaque, and in some chlorite; patches are from 0.5 to 1.5 mm across, rounded to irregular in outline, and from 0.03 to 0.2 mm in grain size. Minor hematite occurs in one coarse patch of opaque.

The presence of fine grained secondary biotite suggests that the sample is contact metamorphosed.

The sample may be genetically related to J-78-8-6-7F.


SLIDE CLAIMS (APPROX. BDY)
SLIP SLOPE
FOR DETAIL SEE DRWG. No. KL. 79-68
SLIP CLAIMS (APPROX. BDY)
MC CLAIMS (APPROX BDY)
MC Creek
Slip Creek
MC CIRQUE FLOOR
FOR DETAIL SEE DWG No. KL. 79-41
FOR DETAIL SEE DWG No. KL. 79-42
MC PLATEAU
MC TIN RIDGE
CR CLAIMS (APPROX. BDY)
Plug Creek
JC Creek
LAKE
(SOUTHERN BDY POSITION UNKNOWN)
SWIFT CLAIMS (APPROX. BDY)
JILL CLAIMS (APPROX. BDY)
MC CLAIMS (APPROX. BDY)
LEGEND
CRETACEOUS OR TERTIARY
SG SEAGULL BATHOLITH
EQ2 (or 3,4,5,6) — average crystal size
PP2 (or 3,4,5) — groundmass crystal size
SR2 - 7 — variation in crystal size
APLT — APLITE
2 = <0.25 mm
3 = 0.25 - 1.00 mm
4 = 1.00 - 2.00 mm
5 = 2.00 - 4.00 mm
6 = 4.00 - 16.00 mm
7 = >16.00 mm
JURASSIC - CRETACEOUS (?)
CR CASSIAR - RAM STOCK
PERMIAN - MESOZOIC
DIØR DIORITE
PXNT PYROXENITE
BI PXNT BIOTITE PYROXENITE
PERD PERIDOTITE
VAL MAFIC-ULTRAMAFIC SUITE
BC/D BASIC DYKE
BR BROCK INTRUSIONS
MISSISSIPPIAN (PENNSYLVANIAN ?)
M3 UPPER SYLVESTER GROUP
ARGL ARGILLITE
ANVC ANDESITIC VOLCANIC ROCKS
VCSD VOLCANO-SEDIMENTARY ROCKS
VLCC VOLCANO-CLASTIC ROCKS
SCHS SCHIST
M2 LOWER SYLVESTER GROUP
LIMS LIMESTONE
MARL MARL
SLAT SLATE
ARGL ARGILLITE
SHAL SHALE
QZIT QUARTZITE
CONG CONGLOMERATE
CHRT CHERT
VOLC VOLCANIC
SKRN SKARN
SUHØ SULFIDE HORIZON
ARQZ ARGILLACEOUS QUARTZITE
BRXX BRECCIA
GNIS GNEISS
SCHS SCHIST
AGE UNKNOWN
DB/D DIABASE DYKE
PXDK PYROXENE - PORPHYRY DYKE
RYDK RHYOLITE DYKE
SYMBOLS
EDGE OF TALUS
OUTCROP
CONTACT OBSERVED
CONTACT APPROXIMATE
CONTACT ASSUMED
CONTACT GRADATIONAL
FAULT (showing direction of movement)
ALTERATION AREA
BEDDING-INCLINED, VERTICAL
JOINTING-INCLINED, VERTICAL
FOLIATION - INCLINED, VERTICAL
VEIN - INCLINED, VERTICAL
AREA OF SMALL VEINS
ANTICLINE - UPRIGHT, OVERTURNED
AXIAL PLUNGE
GOSSANED AREAS
GEOLOGY / ROCK SAMPLE STATION
THIN SECTION
TRACE ELEMENT / WHOLE ROCK ANALYSES
THIN SECTION & TRACE ELEMENT / WHOLE ROCK ANALYSES
CHIP SAMPLE
Rock A (Rock B) ROCK A more frequent than ROCK B
GULLY
CREEK
CLAIM POST
ABBREVIATIONS
MINERALS
AS ARSENOPYRITE
AX AXINITE
BI BIOTITE
CA CALCITE
CH CHALCEDONY
CT CASSITERITE
CU COPPER
FU FLUORITE
GA GARNET
GL GALENA
GR GRAPHITE
HB HORNBLENDE
HE HEMATITE
IL ILLITE
LI LIMONITE
MG MAGNETITE
MN MANGANESE
MØ MOLYBDENITE
MS SERICITE
MU MUSCOVITE
OX OXIDES
PX PYROXENE
PY PYRITE
QC QUARTZ (CHERT)
QT QUARTZ & TOURMALINE
QZ QUARTZ
SL SPHALERITE
SU, SUL SULFIDE
TØ TOURMALINE
DESCRIPTORS
BLK BLACK
EQ EQUIGRANULAR
FEL FELDSPATHIC
G$ GREISEN
GSD GOSSANED
IB INTERBEDDED
LIM LIMY
MSS MASSIVE
PD POD
PEB PEBBLY
PG PEGMATITIC
PP PORPHYRITIC
SD SEDIMENTARY
SIF SILICIFIED
SR SERIATE
VC VOLCANOCLASTIC
/D DYKE
mc MIAROLITIC CAVITIES
V VEIN
<V MICROVEIN
W/ WITH
DUPONT CANADA EXPLORATION
KLINKIT JOINT VENTURE
SWIFT & SLIP PROJECTS
GEOLOGY
DORSEY RANGE, YUKON TERRITORY
1 : 10000
m 300 200 100 300 600 m
G.D.M.
JUN-SEP '79
C.H.K., K.L.J.
OCT. '79
105 B
335-11 & 20
KL. 79-39

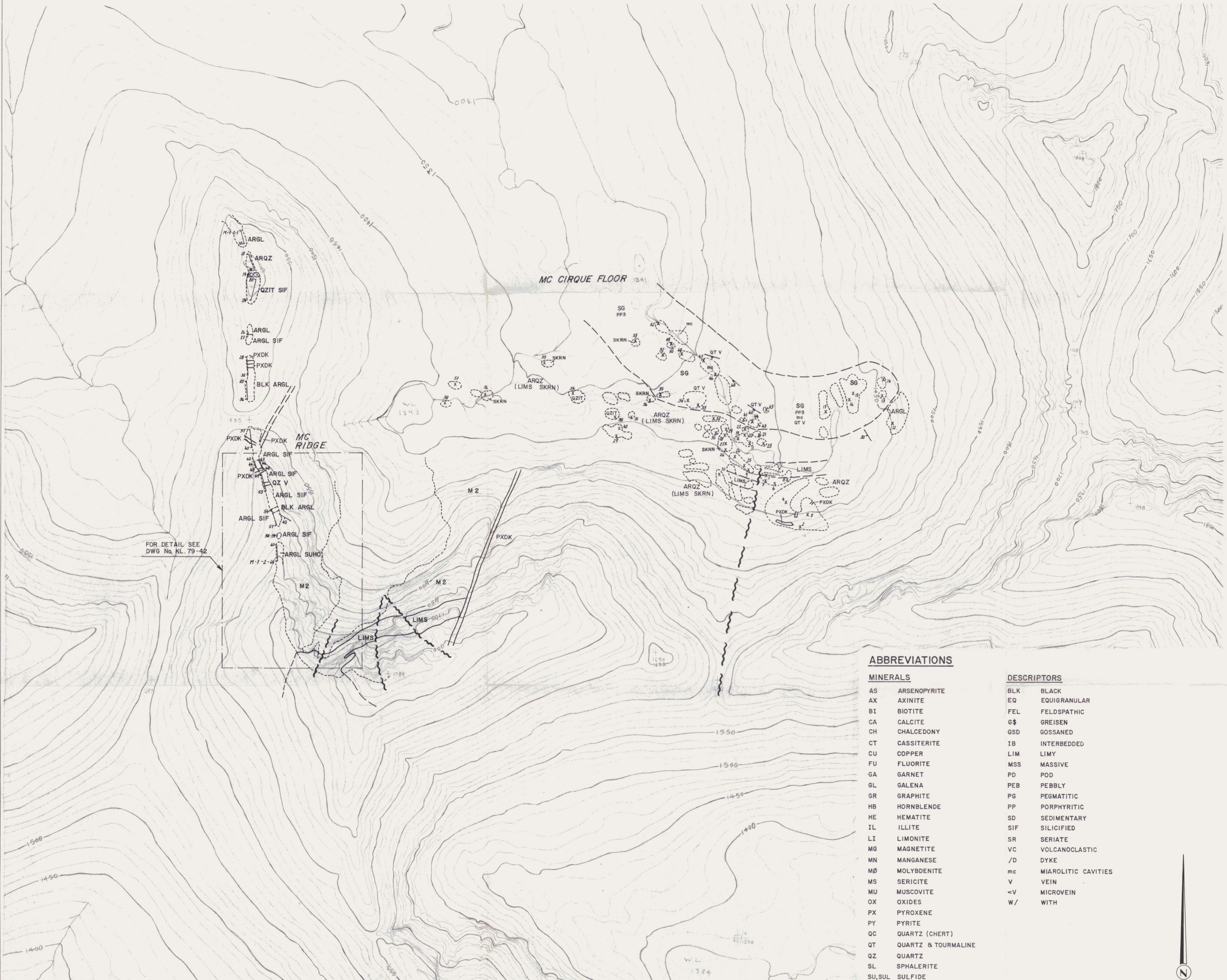


DU PONT EXPLORATION
CANADA

KLINKIT JOINT VENTURE
SWIFT & SLIP PROJECTS
PHOTOMAP
DORSEY RANGE, YUKON TERRITORY

1 : 10000
m 300 200 100 0 300 600 m
SCALE

MAPPED BY	G.D.M.	REVISED		N.T.S. No	105 B
DATE	JUN-SEP '79			A No	335-11 & 20
DRAWN BY	C.H.K., K.L.J.				
DATE	OCT. '79			DRWG No	KL. 79-40



LEGEND

CRETACEOUS OR TERTIARY

SG	SEAGULL BATHOLITH	
	EQ2 (or 3,4,5,6) — average crystal size	2 = <0.25 mm
	PP2 (or 3,4,5) — groundmass crystal size	3 = 0.25 - 1.00 mm
	SR2 - 7 — variation in crystal size	4 = 1.00 - 2.00 mm
	APLT — APLITE	5 = 2.00 - 4.00 mm
		6 = 4.00 - 16.00 mm
		7 = >16.00 mm

JURASSIC - CRETACEOUS (?)

CR	CASSIAR - RAM STOCK

PERMIAN - MESOZOIC

DIØR	DIORITE	VAL MAFIC-ULTRAMAFIC SUITE
PXNT	PYROXENITE	VAL MAFIC-ULTRAMAFIC SUITE
BI PXNT	BIOTITE PYROXENITE	VAL MAFIC-ULTRAMAFIC SUITE
PERD	PERIDOTITE	VAL MAFIC-ULTRAMAFIC SUITE
BC/D	BASIC DYKE	
BR	BROCK INTRUSIONS	

MISSISSIPPIAN (PENNSYLVANIAN ?)

M3	UPPER SYLVESTER GROUP	
	ARGL	ARGILLITE
	ANVC	ANDESITIC VOLCANIC ROCKS
	VCSD	VOLCANO-SEDIMENTARY ROCKS
	VLCC	VOLCANO-CLASTIC ROCKS
	SCHS	SCHIST
M2	LOWER SYLVESTER GROUP	
	LIMS	LIMESTONE
	MARL	MARL
	SLAT	SLATE
	ARGL	ARGILLITE
	SHAL	SHALE
	QZIT	QUARTZITE
	CONG	CONGLOMERATE
	CHRT	CHERT
	VOLC	VOLCANIC
	SKRN	SKARN
	SUHØ	SULFIDE HORIZON
	ARQZ	ARGILLACEOUS QUARTZITE
	BRXX	BRECCIA
	GNIS	GNEISS
	SCHS	SCHIST

AGE UNKNOWN

DB/D	DIABASE DYKE
PXDK	PYROXENE - PORPHYRY DYKE
RYDK	RHYOLITE DYKE

SYMBOLS

EDGE OF TALUS
OUTCROP
CONTACT OBSERVED
CONTACT APPROXIMATE
CONTACT ASSUMED
CONTACT GRADATIONAL
FAULT (showing direction of movement)
ALTERATION AREA
BEDDING - INCLINED, VERTICAL
JOINTING - INCLINED, VERTICAL
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VEIN - INCLINED, VERTICAL
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or GOSSANED AREAS
or GEOLOGY / ROCK SAMPLE STATION
THIN SECTION
TRACE ELEMENT / WHOLE ROCK ANALYSES
THIN SECTION & TRACE ELEMENT/WHOLE ROCK ANALYSES
or CHIP SAMPLE
Rock A (Rock B) ROCK A more frequent than ROCK B
GULLY
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CLAIM POST

ABBREVIATIONS

MINERALS

AS	ARSENOPYRITE
AX	AXINITE
BI	BIOTITE
CA	CALCITE
CH	CHALCEDONY
CT	CASSITERITE
CU	COPPER
FU	FLUORITE
GA	GARNET
GL	GALENA
GR	GRAPHITE
HB	HORNBLENDE
HE	HEMATITE
IL	ILLITE
LI	LIMONITE
MG	MAGNETITE
MN	MANGANESE
MØ	MOLYBDENITE
MS	SERICITE
MU	MUSCOVITE
OX	OXIDES
PX	PYROXENE
PY	PYRITE
QC	QUARTZ (CHERT)
QT	QUARTZ & TOURMALINE
QZ	QUARTZ
SL	SPHALERITE
SU,SUL	SULFIDE
TØ	TOURMALINE

DESCRIPTORS

BLK	BLACK
EQ	EQUIGRANULAR
FEL	FELDSPATHIC
G$	GREISEN
GSD	GOSSANED
IB	INTERBEDDED
LIM	LIMY
MSS	MASSIVE
PD	POD
PEB	PEBBLY
PG	PEGMATITIC
PP	PORPHYRITIC
SD	SEDIMENTARY
SIF	SILICIFIED
SR	SERIATE
VC	VOLCANOCLASTIC
/D	DYKE
mc	MIAROLITIC CAVITIES
V	VEIN
<V	MICROVEIN
W/	WITH

N

DUPONT CANADA EXPLORATION

KLINKIT JOINT VENTURE
SWIFT PROJECT
GEOLOGY
MC RIDGE & CIRQUE FLOOR
DORSEY RANGE, YUKON TERRITORY

1 : 5000
m 150 100 50 0 150 300 m
SCALE

MAPPED BY : G.D.M.	REVISED :	N.T.S. No. :	105 B
DATE : JUN-SEP.'79		ACCT No. :	335-20
DRAWN BY : C.H.K., K.L.J.		DRWG. No. :	KL. 79-41
DATE : OCT.'79			

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(DIØR, PXNT, BI PXNT, PERD:) VAL MAFIC-ULTRAMAFIC SUITE

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AGE UNKNOWN

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EDGE OF TALUS
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CONTACT ASSUMED
CONTACT GRADATIONAL
FAULT (showing direction of movement)
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MINERALS

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LI	LIMONITE
MG	MAGNETITE
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MØ	MOLYBDENITE
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FEL	FELDSPATHIC
G$	GREISEN
GSD	GOSSANED
IB	INTERBEDDED
LIM	LIMY
MSS	MASSIVE
PD	POD
PEB	PEBBLY
PG	PEGMATITIC
PP	PORPHYRITIC
SD	SEDIMENTARY
SIF	SILICIFIED
SR	SERIATE
VC	VOLCANOCLASTIC
/D	DYKE
mc	MIAROLITIC CAVITIES
V	VEIN
<V	MICROVEIN
W/	WITH

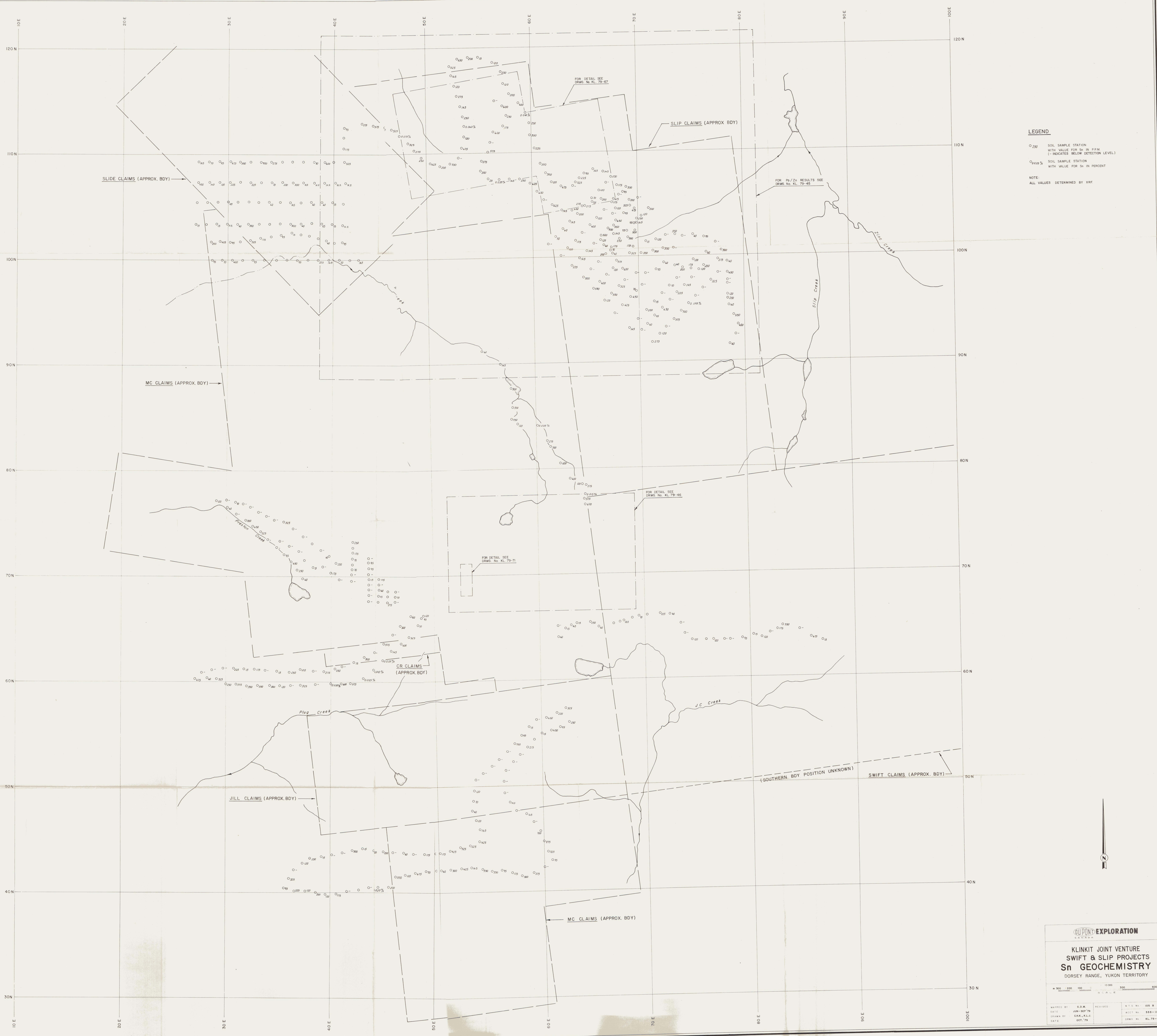
DUPONT EXPLORATION
CANADA

KLINKIT JOINT VENTURE
SWIFT PROJECT
GEOLOGY
MC RIDGE
DORSEY RANGE, YUKON TERRITORY

1 : 500
m 15 10 5 0 15 30 m
SCALE

MAPPED BY : G.D.M.	REVISED :	N.T.S. No. : 105 B
DATE : JUN-SEP '79		ACCT No. : 335 - 20
DRAWN BY : C.H.K., K.L.J.		DRWG. No. : KL.79-42
DATE : OCT. '79		


LEGEND
TRENCH
SAMPLE No AND LOCATION
PERCENT Sn (some samples run twice)
OUTCROP AREA
GULLY
TRENCH T12
TRENCH T13
TRENCH T11
TRENCH T10
TRENCH T9
TRENCH T1
TRENCH T14
OUTCROP
Gully
MC 12 CLAIM
YA 34395
MC 14 CLAIM
YA 34397
MC 3 CLAIM
YA 33305
MC 5 CLAIM
YA 33307
DU PONT EXPLORATION
CANADA
KLINKIT JOINT VENTURE
SWIFT PROJECT
TRENCH PLAN
MC CLAIMS
DORSEY RANGE, YUKON TERRITORY
SCALE
MAPPED BY: G.D.M.
DATE: JUN-SEP '79
DRAWN BY: K.L.J.
DATE: OCT.'79
REVISED:
N.T.S. No.: 105 B
ACCT No.: 335-20
DRWG. No.: KL. 79-43


LEGEND
250 SOIL SAMPLE STATION WITH VALUE FOR Sn IN P.P.M. (- INDICATES BELOW DETECTION LEVEL)
0.035 % SOIL SAMPLE STATION WITH VALUE FOR Sn IN PERCENT
NOTE: ALL VALUES DETERMINED BY XRF.
FOR DETAIL SEE DRWG. No. KL. 79-67
SLIP CLAIMS (APPROX BDY)
SLIDE CLAIMS (APPROX. BDY)
FOR Pb / Zn RESULTS SEE DRWG No. KL. 79-45
MC CLAIMS (APPROX. BDY)
FOR DETAIL SEE DRWG. No. KL. 79-46
FOR DETAIL SEE DRWG. No. KL. 79-71
CR CLAIMS (APPROX. BDY)
JILL CLAIMS (APPROX. BDY)
(SOUTHERN BDY POSITION UNKNOWN)
SWIFT CLAIMS (APPROX. BDY)
Slip Creek
Zinc Creek
JC Creek
Plug Creek
Preston Creek
DU PONT EXPLORATION CANADA
KLINKIT JOINT VENTURE
SWIFT & SLIP PROJECTS
Sn GEOCHEMISTRY
DORSEY RANGE, YUKON TERRITORY
1 : 10 000
m 300 200 100 0 300 600 m
SCALE
MAPPED BY: G.D.M.
DATE: JUN-SEP '79
DRAWN BY: C.H.K., K.L.J.
DATE: OCT. '79
REVISED:
N.T.S. No.: 105 B
ACCT No.: 335-11
DRWG No.: KL. 79-4

LEGEND

○300 SOIL SAMPLE STATION WITH VALUE FOR Sn IN P.P.M. (- INDICATES BELOW DETECTION LEVEL)

○0.030% SOIL SAMPLE STATION WITH VALUE FOR Sn IN PERCENT

NOTE:
ALL VALUES DETERMINED BY XRF.

DU PONT CANADA **EXPLORATION**

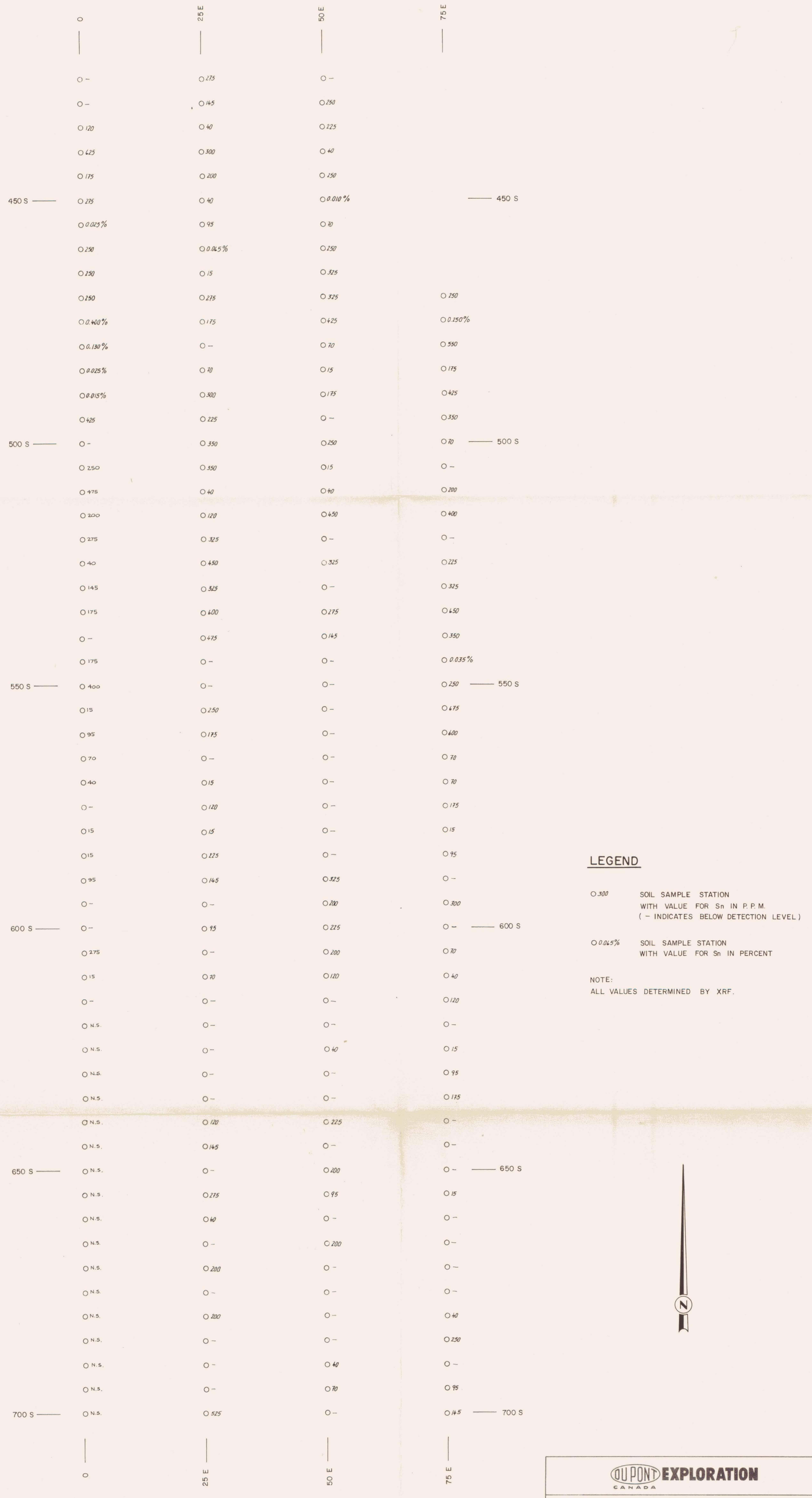
KLINKIT JOINT VENTURE
SWIFT PROJECT
Sn GEOCHEMISTRY
MC RIDGE & CIRQUE FLOOR
DORSEY RANGE, YUKON TERRITORY

1 : 5000

m 150 100 50 0 150 300 m

SCALE

MAPPED BY : G.D.M.	REVISED :	N.T.S. No. : 105 B
DATE : JUN-SEP '79		ACCT No. : 335-20
DRAWN BY : C.H.K., K.L.J.		DRWG. No. : KL. 79-46
DATE : OCT. '79		



DUPONT EXPLORATION
CANADA

KLINKIT JOINT VENTURE
SWIFT PROJECT
Sn GEOCHEMISTRY
MC RIDGE
DORSEY RANGE, YUKON TERRITORY

1 : 500
m 15 10 5 0 15 30 m
SCALE

MAPPED BY : G.D.M.	REVISED :	N.T.S. No. : 105 B
DATE : AUG. '79		ACCT No. : 335-20
DRAWN BY : C.H.K., K.L.J.		DRWG. No. : KL. 79-70
DATE : NOV. '79		

DU PONT OF CANADA EXPLORATION LIMITED

REPORT OF GEOLOGICAL AND GEOCHEMICAL SURVEYS

on

VAL(A) PROJECT

by

B. Goad

(Supervised by F.M. Smith, P.Eng.)

January 1980

TABLE OF CONTENTS

APPENDICES

LIST OF FIGURES

VAL(A)

SPECIFIC PROSPECT - VAL(A) CLAIMS (335-08)

1. LOCATION AND ACCESS

The VAL(A) claim group, commonly known as "little" VAL, is located in the southern portion of the Seagull batholith between Seagull(E) and Goddart(W) Creeks, on claim sheet 105-B-3, Watson Lake MD, Yukon. The central portion of the group is at about 60°06'N and 131°15'W. Access is only possible by helicopter from Swift River, Yukon, 12 km to the southeast.

2. PHYSIOGRAPHY AND VEGETATION (Map KL 78-64)

The VAL(A) group covers an east trending ridge that lies between two alpine creeks that flow into Seagull Creek to the east. The north facing slope is steep with the south facing consisting of "angle of repose" slope covered in felsenmeer. The easterly trending ridge terminates in the west as a north-south arete as the head walls of the two cirques. Almost all the claims are traversable except for some portions of the north and east facing cirque wall.

Vegetation is limited to minor clumps of balsam and ground birch on the eastern portion of the claims with diffuse patches of sedges and wildflowers.

3. CLAIMS

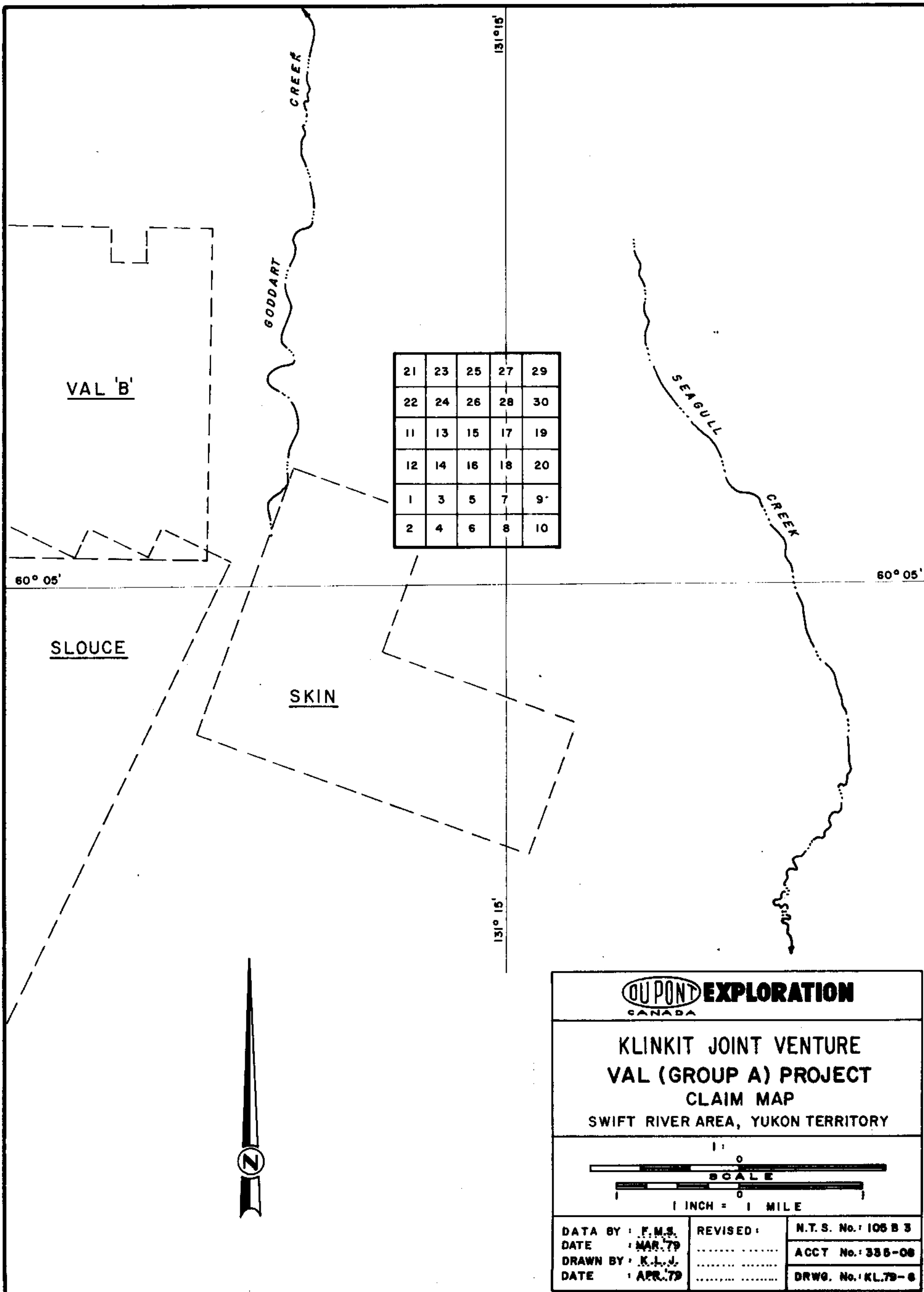
The VAL(A) group consists of the following claims:

Claim Name	Record Numbers	Date of Expiry
VAL 1-30	YA28773-YA28804	1981 01 10

The claims are recorded in the Watson Lake MD, Yukon in the name of Du Pont of Canada Exploration Limited.

4. HISTORY

The VAL(A) claims cover the area of the GSC "occurrence" of float with tin mineralization. At the time of the acquisition of DU, PONT(B) and VAL(A) claims, we noted that the best tin values were in areas that had small roof pendants (based on GSC mapping) and had several orange/red to dark red/brown gossans. The VAL(A) area was not geochemically sampled but appeared to be similar to the DU etc. claimed areas and hence the ground was acquired on a speculative basis. We were aware of the reported GSC float and Archer Cathro Mineral Inventory write-up of the



DU PONT EXPLORATION CANADA

KLINKIT JOINT VENTURE
VAL (GROUP A) PROJECT
CLAIM MAP
SWIFT RIVER AREA, YUKON TERRITORY

SCALE
1 INCH = 1 MILE

DATA BY : F.M.S. DATE : MAR. '79 DRAWN BY : K.L.J. DATE : APR. '79	REVISED :	N.T.S. No. : 105 B 3 ACCT No. : 335-06 DRWG. No. : KL.79-6

GSC area and considered this along with the small roof pendant and the multiple gossans to be sufficient justification for the acquisition of the small claim groups.

AMAX optioned the Minex 1977 STQ claims to the north of the VAL(A) group and enlarged the STQ group by staking southward to the north edge of the VAL(A) claims. The SKIN claims merge with the southwest boundaries of the VAL(A) claim group.

5. PROPERTY EVALUATION

5.1 General

B. Goad re-examined the VAL(A) claims July 15-20, 1979 for the purpose of extending the existing skarn zone by mapping and prospecting the area of the small roof pendant. Also under consideration was the potential for Sn mineralization being associated with several gossanous zones within the adjacent Seagull Batholith.

5.2 Geology

The oldest rocks in the VAL(A) area are portions (as a roof pendant) of the Devono-Mississippian limestones, cherts and argillites. The small central roof pendant is totally surrounded by unaltered Seagull or Hake phase of the Seagull Batholith. The northern portion of the claims has the Seagull Batholith in the floor of the cirque and argillites of the lower sequence of the Devono-Mississippian assemblage in the cirque walls.

The central roof pendant is 920 m long and 450 m wide with most of the outcrop as relatively sand-free limestone. The northern portion has the interlayered chert sequence in contact with the roof of the batholith and in faulted contact with the overlying limestone of virtually E-W strike and 52° dip to the south.

Alteration of the Seagull Batholith on the VAL(A) claims is identical to one of the types seen on the SKIN claims, just to the south. This alteration is related to the intrusion of the late, east-west trending quartz breccia dikes. The host quartz monzonite has been clayed progressively inwards (over a distance of 1-10's of meters) towards the central quartz breccia dike. Immediately adjacent to these dikes (over 1-2 cm) the quartz monzonite has been silicified and beyond this zone the feldspars are totally clayed (illite) giving the rock a bright yellow to rusty colour and causing it to be extremely friable. Introduction of Mn staining may or may not be associated with this alteration. As on the SKIN claims, no in situ Sn mineralization was associated with this alteration.

5.3 Geochemistry

No soil geochemistry was obtained from the VAL(A) claims as the skarn zones and the areas of gossans had been previously delineated in 1978. All rock samples collected were analyzed for Sn so the values of various alterations within the Seagull Batholith gossanous zones could be observed.

5.4 Mineralization

Samples from the roof pendant and skarn area of VAL(A) were assayed as below:

Tag No.	Field No.	Sn
6850A	B-7-15-02D	3500 ppm
6851A	B-7-15-02B	2900 ppm
6874A	B-7-15-03B	20000 ppm
6875A	B-7-15-03C	9000 ppm
6878A	B-7-15-03F	4000 ppm
6897A	B-7-15-03I	9000 ppm
6898A	B-7-15-03J	6000 ppm

Also, 10 samples from within the Seagull Batholith, including samples from the gossanous zones, were run for Sn. Only one sample, which was not taken in situ, had a significant Sn value:

Tag No.	Field No.	Sn	Description
6890A	B-7-16-21(a)	7500 ppm	Highly altered granite with pervasive Mn staining and fluorite.

The hosting Sn mineral is presently being identified. Cassiterite is suspected as the host in the altered granite (6890A). However, the Sn mineralization in the skarn may be totally hosted in garnet or magnetite.

6. CONCLUSIONS AND RECOMMENDATIONS

The mineralization of the VAL(A) skarn zone appears to grade sufficiently high to be of interest, but the size of the mineralized zone may be too small for economic viability and the Sn may be hosted in magnetite or garnets. Assessment work should be filed in the future to keep the central skarn area of the VAL(A) claims until a point at which the economic potential of adjacent (i.e. SKIN) Sn bearing claims in the area has been assessed. At this point a decision to keep or abandon the VAL(A) claims can be made.

During 1980, the source of sample B-7-16-21(a) should be located. After which, a decision can be made to drop or keep several of the outlying claims in the VAL(A) Group.

APPENDIX I

STATEMENT OF EXPENDITURES

January 1 - December 31, 1979

VAL(A) AND SKIN CLAIMS, YT

Casual Labour	$	100.45
Travel Expenses		281.18
Camp Expenses		1 666.20
Mapping, Gr. Surveys, Maps		3 490.65
Freight, Hauling, Storage		139.50
Assaying		959.26
Salaries - Regular		725.32
Salaries - Temporary		2 416.65
Space Charges		21.72
Equipment Rental		173.46
Stationery & Supplies		27.14
Telephone		91.80
Auto Expenses		35.68
Repairs & Mtce (excl. Auto)		7.30
Non Capital Equip. Purchases		144.18
Depreciation Expenses		287.60
TOTAL	$	10 568.09

LIST OF FIGURES

List of Figures (continued)

LIST OF APPENDICES

SPECIFIC PROSPECT - VAL(B) CLAIMS (335-19)

1. LOCATION AND ACCESS

The VAL(B) group is located in the south central to eastern portion of the Seagull batholith and includes peak '6828' in the southern portion of the claimed area. The mountains are part of the Dorsey Range, Cassiar Mountains, Yukon in claim sheet 105-B-3 at about 60°06'N and 131°22'W.

The claims are accessible only by helicopter from Swift River, Yukon about 15 km to the southeast.

2. PHYSIOGRAPHY AND VEGETATION (Map KL 79-61)

The claimed area covers a complex of mountain peaks with U-shaped valleys cutting the central peaks from all quadrants. The principal cirques are "Barr" trending west from the southwest side, three parallel east trending cirques as hanging valleys on the Partridge Creek and Goddart Creek valley, "Mun" cirque facing north to Munson Lake and "Sin" cirque starting northwest and finally trending west on the SIN project area. The two horn peaks are on the north and south headwall of "Barr" cirque with the south peak as '6828' on the government topographic maps.

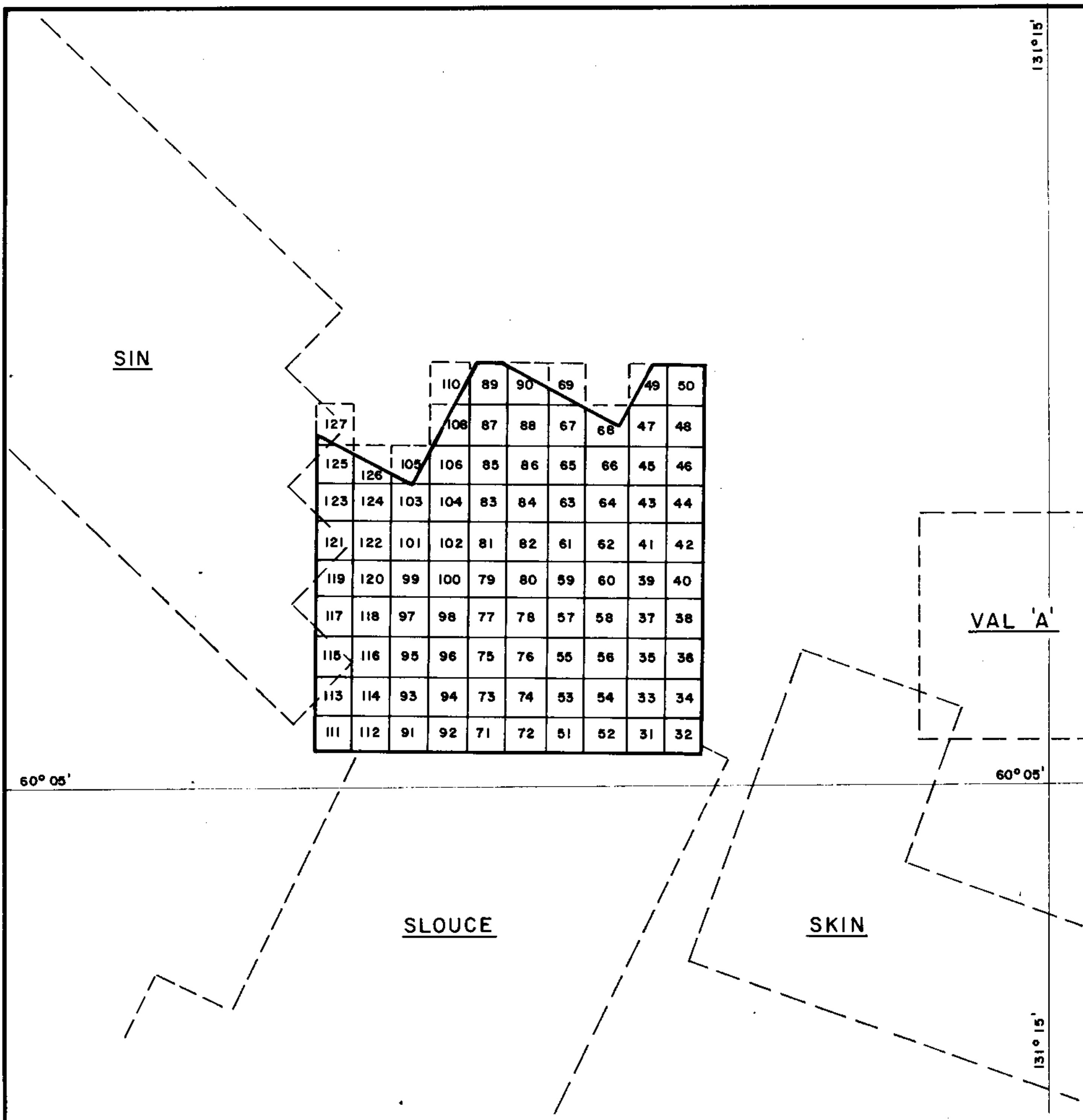
All north and east facing slopes are sheer to very steep with south and west facing of more subdued topography.

Vegetation is generally limited to south or west facing slopes with ground birch in patches to near the arete tops and becoming dominant cover by the 1700 m level. At lower levels ground balsam is dispersed in the ground birch and becomes dominant just above the main drainage levels. Alpine meadows are common on all cirque floors and most of the north and east facing lower slopes.

3. CLAIMS

The VAL(B) group consists of the following claims:

Claim Name	Record Number	Expiry Date
VAL 31-69	YA28804 - YA28841	1980 01 10
VAL 71-106	YA28843 - YA28878	1980 01 10
VAL 108	YA28880	1980 01 10
VAL 110-127	YA2882 - YA28899	1980 01 10



DUPONT CANADA EXPLORATION

KLINKIT JOINT VENTURE
VAL (GROUP B) PROJECT
CLAIM MAP
SWIFT RIVER AREA, YUKON TERRITORY

SCALE
1 INCH = 1 MILE

DATA BY : F.M.S.	REVISED :	N.T.S. No. : 105 B 3
DATE : MAR. 79		ACCT No. : 335-19
DRAWN BY : K.L.J.		
DATE : MAR. 79		DRWG. No. : KL. 79-5

The VAL(B) group consists of 84 claims recorded in the Watson Lake MD, Yukon, in the name of Du Pont of Canada Exploration Limited.

4. HISTORY

According to the Archer Cathro mineral inventory, the northern portion of the VAL(B) group (or southern portion of the MUN group of DC Syndicate) has had several years of exploration for massive sulphides in the fahlband zone in the Sylvester group. The last known work dates from 1969 when an El Paso subsidiary sampled two areas of sphalerite mineralization on the contact zone of the Cassiar Batholith and Sylvester limy sedimentary rocks.

Several ages of sample flags and old cans were noted throughout the northern portion of the claims. Old claim posts are present along the most northerly east-west trending ridge, covering large limestone bodies with heavy sphalerite mineralization localized in skarn pods.

The MUN claims to the north of the VAL(B) group were located in 1977 to cover several zones of scheelite bearing limy skarns. The VAL(B) group probably fully covers the southern end of this group but no MUN posts were noted in any of our field work.

The SLOUCE project was enlarged from the original 64 claims to protect the southern portion of the VAL(B) claims.

After locating the VAL(B) group, Welcome North Mines Ltd. located the SIN claims from the western side of the VAL(B) project to the PONT(B) project. Field work in the area of VAL(B), SIN, PONT(B) and the northern portion of SLOUCE was done considering the claims as a large group, thus assessment is filed on these claims on a shared basis.

5. GEOLOGY

5.1 Sylvester Group

The only large area of sedimentary rocks mapped is in the extreme northern end of the VAL 1:10 000 geology map (KL 79-60,61); a small pendant of quartzite is also present near the southwestern end of the mafic-ultramafic roof pendant. Several zones of limestone and quartzite are located within the major roof pendant as remnants of pre-mafic-ultramafic rocks. All sedimentary rocks on the VAL claims belong to the lower subdivision (M2) of the Sylvester Group. As defined on the SIN and PONT(B) claims, M2 is described in general as follows:

> "The lowermost portion of M2 is an interbedded mixture of quartzites whose colour varies from white to dark grey and whose texture and grain size varies from coarse sand to aphanitic crystalline. Amongst these variegated quartzites are fine, dark, argillaceous beds, minor chert, and bedded, light grey, crystalline limestone. Interbeds vary in thickness from a few centimeters to tens of meters ....
>
> Overlying quartzites and limestones are highly gossanous, medium to dark grey, cherty argillites with visible pyrite as disseminations and rarely along narrow (about 1 mm) siliceous bands conformable to bedding. This sulphidic layer has been referred to as the "fahlband" or "sulphide schist" previously, and although in other areas there may be evidence for more than one sulphidic horizon, on the SIN and PONT(B) claims it appears to be a single unit above variegated quartzites and limestone and below volcano-sedimentary rocks of M3."

Points of interest regarding remnant sedimentary rocks within the main roof pendant are as follows:

5.1.1 "Skarn" pods within the large northwestern limestone pendant (Figure 1) (D-6-9-12,14) are identical in appearance to lenticular sphaleritic bodies in the SWIFT area which lie along the uppermost contacts of limestone beds; the stratigraphically-controlled nature of these bodies suggests they are volcano-sedimentary in nature (refer to the SWIFT report for complete discussion).

5.1.2 The eastern contact of the small limestone and quartzite body (D-6-9-16,18) east of the one described above is mapped as gradational between skarn and pyroxenite. A sample from station 18a is composed of medium green pyroxene, red/brown garnet (?) and very minor white feldspar (??). Moving east, less and less garnet and feldspar is

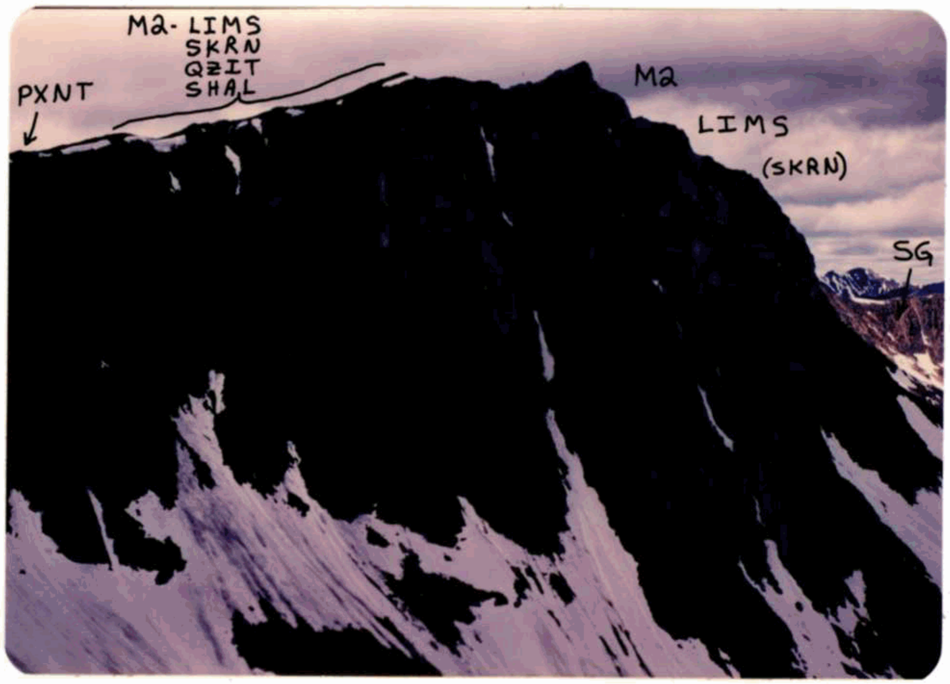


Figure 1. Large limestone pendant within the VAL mafic-ultramafic pendant (VAL north ridge). Pendant rocks within the ultramafic suite are highly deformed.

present until only pyroxene is present (18b,c); the biotite component of pyroxenite at 18d is as high as 50%.

5.1.3 The southeastern limestone body has gone through considerable skarning (Figure 2). The relationship between limestone/skarn and diorite is extremely complex; massive skarn contains pockets of unaltered limestone and diorite. Station D-7-16-52 marks a small skarn pod composed of coarsely crystalline white calcite, red garnet, green pyroxene, purple axinite, green quartz, purple fluorite and magnetite. The larger skarn zone to the west is composed of fluorite, garnet, pyroxene, actinolite, epidote, calcite, limonite, and rare specks of galena at station 54; actinolite, magnetite and limonite (massive - resembling goethite) are present between 54 and 55; and at 55 massive dark red garnet forms the entire skarn zone near the diorite contact.

5.1.4 The contact zone between ultramafic rocks and M2 quartzites near the east-central pendant contact (D-7-17-78) is a structurally complex zone containing rocks representative of every unit in the area, including pegmatitic quartz of probable Seagull affinity.

5.2 VAL Mafic-Ultramafic Rocks

The mafic-ultramafic suite of rocks forming the large roof-pendant confined to the VAL claims was previously referred to as the "VAL gabbro". Compositionally, however, gabbro comprises only a portion of the suite; pyroxenite is the predominant rock type, followed in abundance by peridotite, gabbroic diorite and pegmatitic diorite.

5.2.1 Pyroxenite (Figure 3)

Pyroxenite (PXNT) is medium to dark green, medium- to coarse-grained, equigranular, and in some places contains substantial amounts of dark red-brown biotite (BI-PXNT). A thin section of pyroxenite (G-78-8-6-9; Appendix I) reveals considerable alteration of pyroxene to a tremolite/epidote assemblage; a section of biotitic pyroxenite (VAL; Appendix I) reveals a possibly cumulate

Figure 2. Complex character of pendant rocks on Skarn ridge. Seagull granite underlies an intimate mixture of limestone, skarn and diorite. Unlabelled diorite is also present amongst skarn in the centre of the ridge.

Figure 3. Biotite pyroxenite (BI PXNT) from the VAL mafic-ultramafic suite. Biotite content (0-30%) is the only visible difference between pyroxenite and biotite-pyroxenite.

mixture of olivine and pyroxene in a matrix of intercumulate biotite. Pyroxenite accounts for over 50% of the mafic-ultramafic suite.

5.2.2 Peridotite (Figure 4)

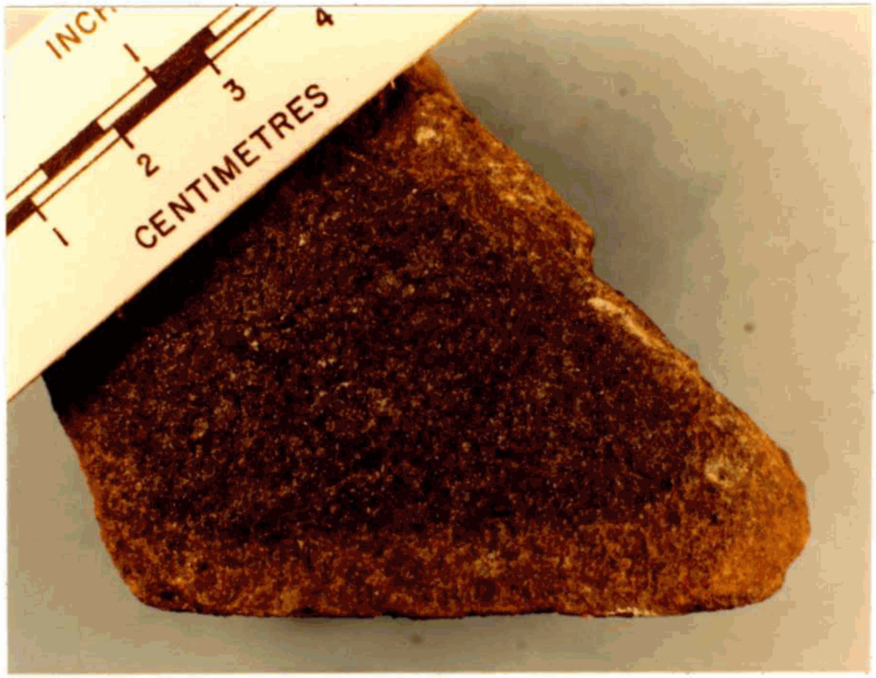
Peridotite (PERD) is fine-grained and dark green when fresh; large bodies weather bright orange, and are readily identified from a distance. Olivine is easily recognized in hand specimens of coarser varieties. No thin section information is available to date. The attitude at D-7-12-16 is of (compositional?) layering in peridotite where thin (about 5 mm) regular bands are easily visible on weathered surface (Figure 4b).

Peridotite commonly occurs with pyroxenite in so intimate a mixture that it is inseparable (Figure 5). In the north-central region of the pendant, the area labelled peridotite (D-7-8-67,68) also contains minor pyroxenite in a fragmental relationship where large (about 10 cm) rounded fragments of peridotite occur within a pyroxenite matrix and vice-versa. In the northwest area of the pendant (D-6-9-9) spheres and dykelets of coarse pyroxenite occur in a peridotite matrix.

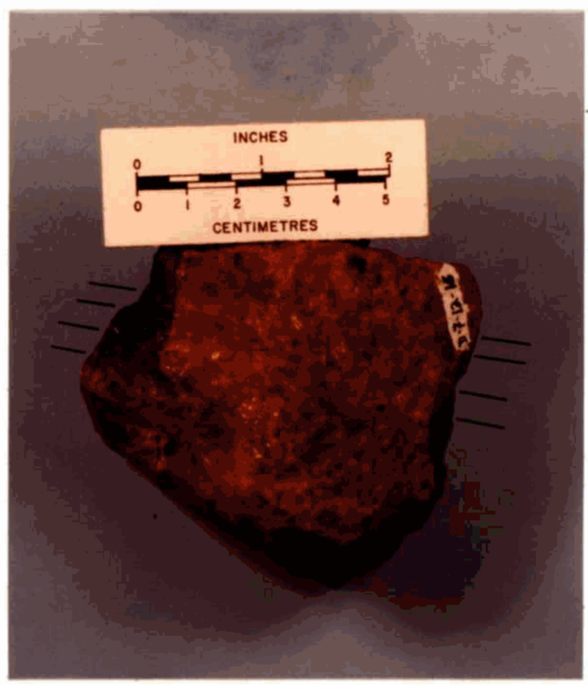
5.2.3 Diorite (Figure 6)

Gabbroic diorite (DIOR) is fine- to medium-grained, equigranular, with a salt and pepper appearance from evenly distributed white plagioclase and dark pyroxene. Hornblende is identified in thin section (G-78-8-10-9; Appendix I) as patchy replacements of and rims around pyroxene. Plagioclase is of intermediate (An_{49}) composition, and it is on this basis that the rock name used is shortened from gabbroic diorite to diorite.

With one exception, some proportion of diorite (commonly mixed with biotite-pyroxenite) is always present where mafic-ultramafic rocks are in contact with the Seagull batholith. The northern arm of the pendant has proportionately more diorite than any other rock type, but it is intimately mixed with biotite-pyroxenite. Diorite is also present in SIN

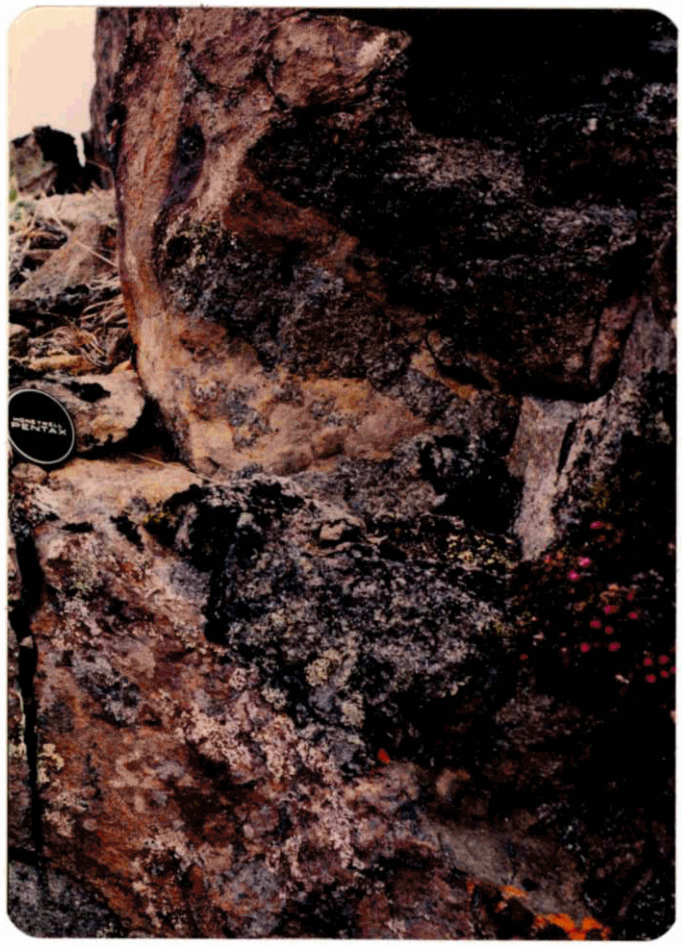


(a)

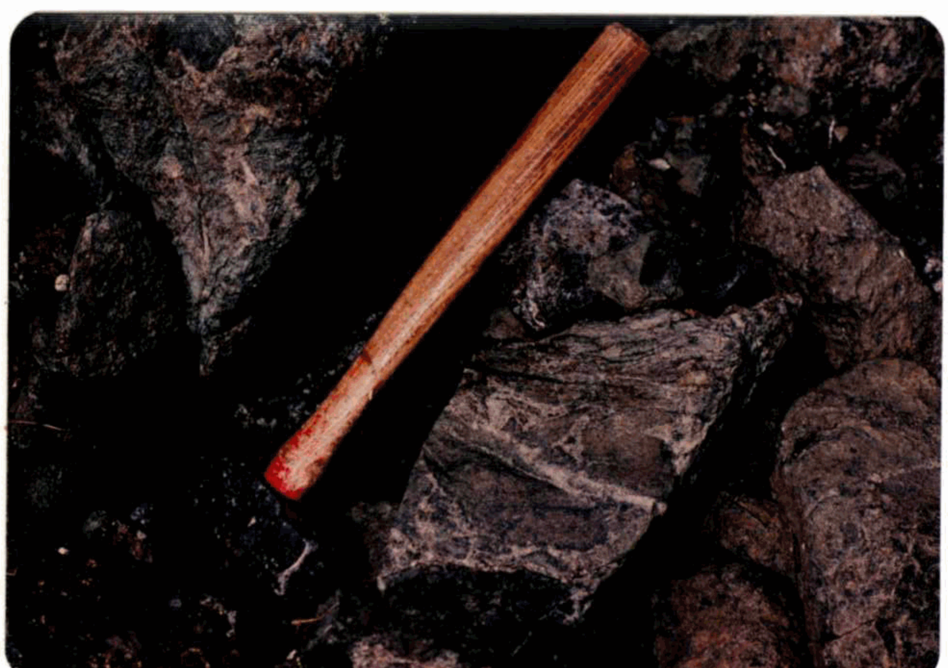


(b)

Figure 4. Fine-grained peridotite (PERD) from the VAL mafic-ultramafic suite.
(a) The bright orange weathering rind illustrated here makes this rock type easy to identify from near or far.
(b) Layering in peridotite approximately parallel to surrounding contacts was recognized only once (D-7-12-16).



(a)



(b)

Figure 5. Examples of observed PERD-PXNT relationships.
(a) Near D-6-9-9, coarse, dark-weathering PXNT dykelets, spheres and irregularly-shaped masses are clearly visible within buff-weathering PERD.
(b) Station D-7-8-68 is within a large area of fragmental ultramafic rocks. Some of the fragments are quite rounded, as in the upper left corner, but the block beside the sledge contains highly angular fine (PERD?) fragments within coarse light green PXNT.

Figure 6. Medium and fine-grained salt-and-pepper diorite (DIOR) from the VAL mafic-ultramafic suite.

cirque in a narrow strip between M2 quartzites above and Seagull batholith below; three small zones/pods of biotite-pyroxenite are also present along this diorite zone. These spatial relationships between diorite and pyroxenite plus the presence of aplitic Seagull dykes through diorite near the northwest contact (Figure 7) indicate that diorite is pre-Seagull, and possibly part of the mafic-ultramafic suite.

5.2.4 Pegmatitic Diorite (Figure 8)

The most unusual and least common rock of the mafic-ultramafic suite is pegmatitic diorite (PG DIØR). Hornblende occurs as phenocrysts up to several centimeters long in a matrix of up to 50% white plagioclase (3078-9; Appendix I). Irregular pods and zones of this visually spectacular rock are found only within pyroxenite; the southern end of the pendant has up to 5% of this material amongst pyroxenite, as does the very center portion near the small Seagull plug. Some hand specimens exhibit a brecciated texture of broken hornblende crystals, and similar-looking white matrix material occurs in zones hosting large, rounded fragments of pyroxenite (Figure 9).

Pegmatitic diorite and coarser varieties of previously-described gabbroic salt and pepper diorite strongly resemble one another visually. The fact that hornblende is a late-crystallizing constituent of salt and pepper diorite suggests that perhaps pegmatitic diorite is late product of the same intrusion, therefore post-dating pyroxenite.

5.3 Seagull Batholith

The Seagull batholith underlies and surrounds sedimentary and mafic-ultramafic rocks on the VAL claims (Figure 10). Pendant contacts are generally subhorizontal, but may be steeply concave beneath the mafic-ultramafic pendant.

5.3.1 Composition

Average compositions are about 30% quartz, 30% plagioclase and 40% K-feldspar, based on

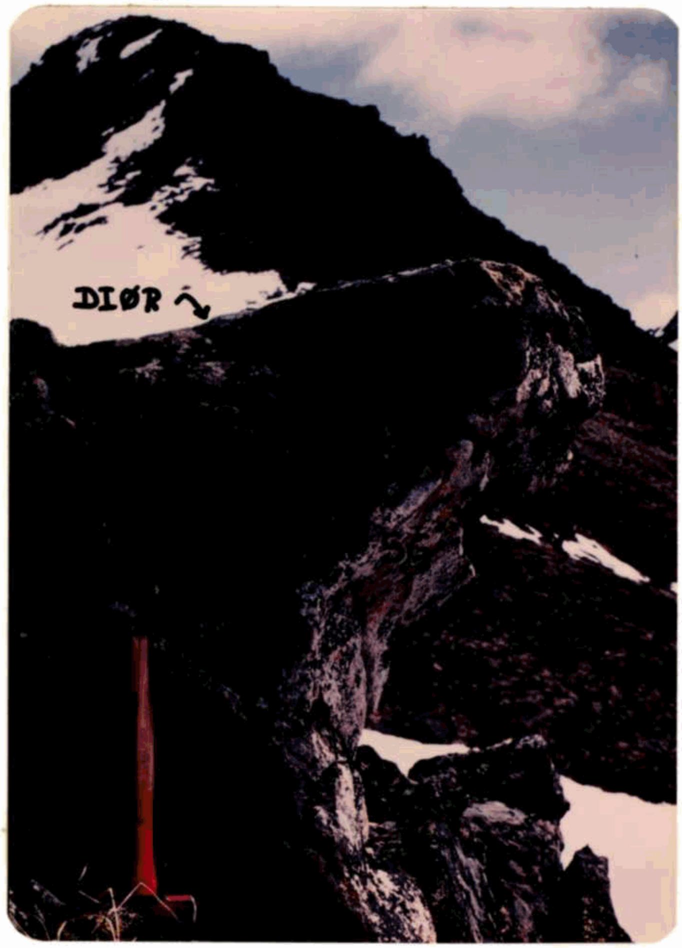


Figure 7. Narrow Seagull dykes in diorite near the pendant/ batholith contact (D-6-11-22).

Figure 8. Pegmatitic diorite (PG DIOR) from the VAL mafic-ultramafic suite.

Figure 9. Rounded and sub-angular fragments of coarse PXNT occur in a matrix of white PG DIOR with hornblende phenocrysts near VAL peak (D-7-12-14).

(a)

(b)

Figure 10. Pendant/batholith relationships in and near the VAL claims. Although the upper contact of the Seagull batholith is most commonly sub-horizontal, a few places in the VAL area appear to have very steep contacts.

(a) Scenic view of the east side of the VAL area - this shot looks north from VAL peak.

(b) View of the southern end of the VAL claims, looking north from the SLOUCE claims.

thin section examination of 17 rocks from the DU, MC, MLS, SIN, VAL(B), and VH claims. It is thus classified as granite. Biotite is usually present in amounts up to 10% (average 3-5%). Muscovite was noted only in thin section up to 5%, but is commonly an alteration product, and is not visible in hand specimen.

5.3.2 Textures

All possible textural variations of granitic rocks are evident in the Seagull batholith on the VAL claims. Coarsely equigranular and porphyritic varieties are present, along with aplite, fine-grained porphyries with rare to abundant phenocrysts, pegmatite and seriate varieties which may have aplitic and pegmatitic textures in a single hand specimen. The two most common varieties are as follows:

a. Coarse-grained[1] (EQ 5 or 6; Figure 11): 2-6 mm grain size; most commonly very light tan colour; can be very coarsely porphyritic; quartz pale to dark grey.

b. Porphyritic[2] (PP3; Figure 12): groundmass 0.5-1.0 mm; feldspar and quartz phenocrysts up to 1 cm constitute less than 10% of the rock (they are often very rare and have been noted to amount to up to 30%); common orange colour (fresh and weathered); outcrops sometimes gossaned; quartz phenocrysts most commonly dark grey or black.

The coarse-grained variety is by far the most common on the VAL claims. Mapping was not done in sufficient detail within the batholith to distinguish textural phases, with the

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[1]This textural subdivision is sometimes referred to as "Seagull phase" (or "Hake phase") by other authors or in other reports regarding the Seagull batholith.

[2]This textural subdivision is sometimes referred to as "DU phase" by other authors or in other reports regarding the Seagull batholith.

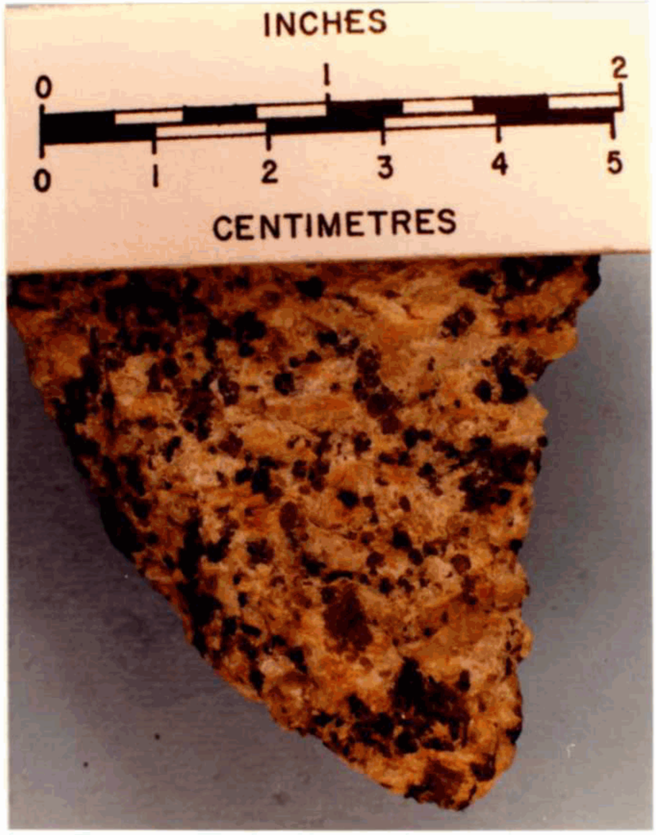

Figure 11. Seagull batholith: "typical" coarse-grained variety. Although generally described as equigranular, grain size is often variable, and porphyritic varieties are not uncommon.

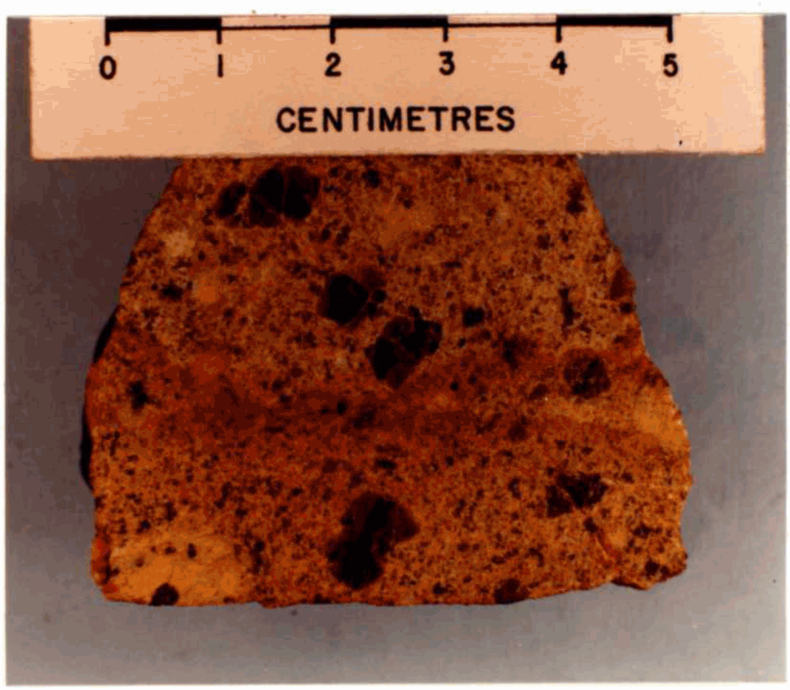

Figure 12. Seagull batholith: fine-grained porphyritic variety with large dark grey quartz phenocrysts (cut face).

ABBREVIATIONS

MINERALS

AS	ARSENOPYRITE
AX	AXINITE
BI	BIOTITE
CA	CALCITE
CH	CHALCEDONY
CT	CASSITERITE
CU	COPPER
FU	FLUORITE
GA	GARNET
GL	GALENA
GR	GRAPHITE
HB	HORNBLENDE
HE	HEMATITE
IL	ILLITE
LI	LIMONITE
MG	MAGNETITE
MN	MANGANESE
MØ	MOLYBDENITE
MS	SERICITE
MU	MUSCOVITE
OX	OXIDES
PX	PYROXENE
PY	PYRITE
QC	QUARTZ (CHERT)
QT	QUARTZ & TOURMALINE
QZ	QUARTZ
SL	SPHALERITE
SU,SUL	SULFIDE
TØ	TOURMALINE

DESCRIPTORS

BLK	BLACK
EQ	EQUIGRANULAR
FEL	FELDSPATHIC
G$	GREISEN
GSD	GOSSANED
IB	INTERBEDDED
LIM	LIMY
MSS	MASSIVE
PD	POD
PEB	PEBBLY
PG	PEGMATITIC
PP	PORPHYRITIC
SD	SEDIMENTARY
SIF	SILICIFIED
SR	SERIATE
VC	VOLCANOCLASTIC
/D	DYKE
mc	MIAROLITIC CAVITIES
V	VEIN
<V	MICROVEIN
W/	WITH

SYMBOLS

- EDGE OF TALUS
- OUTCROP
- CONTACT OBSERVED
- CONTACT APPROXIMATE
- CONTACT ASSUMED
- CONTACT GRADATIONAL
- FAULT (showing direction of movement)
- ALTERATION AREA
- BEDDING - INCLINED, VERTICAL
- JOINTING - INCLINED, VERTICAL
- FOLIATION - INCLINED, VERTICAL
- VEIN - INCLINED, VERTICAL
- AREA OF SMALL VEINS
- ANTICLINE - UPRIGHT, OVERTURNED
- AXIAL PLUNGE
- or — GOSSANED AREAS
- or x — GEOLOGY / ROCK SAMPLE STATION
- THIN SECTION
- TRACE ELEMENT / WHOLE ROCK ANALYSES
- THIN SECTION & TRACE ELEMENT / WHOLE ROCK ANALYSES
- or — CHIP SAMPLE
- Rock A (Rock B) — ROCK A more frequent than ROCK B
- GULLY
- CREEK
- CLAIM POST

LEGEND

CRETACEOUS OR TERTIARY

SG — SEAGULL BATHOLITH

- EQ2 (or 3,4,5,6) — average crystal size
- PP2 (or 3,4,5) — groundmass crystal size
- SR2 - 7 — variation in crystal size
- APLT — APLITE

2 = <0.25 mm; 3 = 0.25 - 1.00 mm; 4 = 1.00 - 2.00 mm; 5 = 2.00 - 4.00 mm; 6 = 4.00 - 16.00 mm; 7 = >16.00 mm

JURASSIC - CRETACEOUS (?)

CR — CASSIAR - RAM STOCK

PERMIAN - MESOZOIC

VAL MAFIC-ULTRAMAFIC SUITE:
- DIØR — DIORITE
- PXNT — PYROXENITE
- BI PXNT — BIOTITE PYROXENITE
- PERD — PERIDOTITE

- BC/D — BASIC DYKE
- BR — BROCK INTRUSIONS

MISSISSIPPIAN (PENNSYLVANIAN ?)

M3 — UPPER SYLVESTER GROUP
- ARGL — ARGILLITE
- ANVC — ANDESITIC VOLCANIC ROCKS
- VCSD — VOLCANO-SEDIMENTARY ROCKS
- VLCC — VOLCANO-CLASTIC ROCKS
- SCHS — SCHIST

M2 — LOWER SYLVESTER GROUP
- LIMS — LIMESTONE
- MARL — MARL
- SLAT — SLATE
- ARGL — ARGILLITE
- SHAL — SHALE
- QZIT — QUARTZITE
- CONG — CONGLOMERATE
- CHRT — CHERT
- VOLC — VOLCANIC
- SKRN — SKARN
- SUHØ — SULFIDE HORIZON
- ARQZ — ARGILLACEOUS QUARTZITE
- BRXX — BRECCIA
- GNIS — GNEISS
- SCHS — SCHIST

AGE UNKNOWN

- DB/D — DIABASE DYKE
- PXDK — PYROXENE - PORPHYRY DYKE
- RYDK — RHYOLITE DYKE

DUPONT EXPLORATION
CANADA

KLINKIT PROJECT
GEOLOGY
VAL (A) CLAIMS
SWIFT RIVER AREA, YUKON TERRITORY

m 300 200 100 0 300 600 m — 1:10000 — SCALE

MAPPED BY: L.E., C.G., M.S.	REVISED:		N.T.S. No.: 105 B
DATE: JUL.-AUG.'78	JUN-SEP.'79 by B.G.		ACCT. No.: 335-08
DRAWN BY: K.L.J.			
DATE: SEPT. '78			DRWG. No.: KL.78-23

DUPONT EXPLORATION
CANADA

KLINKIT PROJECT
PHOTOMAP
VAL (A) CLAIMS
SWIFT RIVER AREA, YUKON TERRITORY

m 300 200 100 0 10000 300 600 m
SCALE

MAPPED BY	L.E., C.G., M.S.	REVISED	N.T.S. NO.	105 B
DATE	JUL.-AUG.'78			
DRAWN BY	K.L.J.		A... N	335 - 8
DATE	SEPT. '78		DRWG. N	KL.78 - 64

DU PONT OF CANADA EXPLORATION LIMITED

REPORT OF GEOLOGICAL AND GEOCHEMICAL SURVEYS

on

VAL(B) PROJECT

by

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TABLE OF CONTENTS

Table of Contents (continued)

exception of the VAL/SLOUCE ridge discussed below.

Fine-grained Seagull is often intermixed amongst coarser-grained rocks a considerable distance from the roof contact. At D-7-17-82a (400 m east of the east-central pendant contact), fine-grained, equigranular textures account for about 30% of batholithic rocks, the majority being much coarser-grained (EQ or PP6). Both fine and coarse varieties are light grey and contain accessory biotite. The fine-grained variety here is visually identical to the small plug at D-7-16-50, described below.

On the VAL-SLOUCE ridge, at station D-7-18-97 (and further south beyond the map edge), coarsely aplitic (EQ3; little or no biotite) rocks are inseparable from coarse equigranular rocks, 1 km and more from the pendant contact.

Thin section studies on rocks collected in 1978 (contained in Appendices of reports for claims listed above) show no compositional variations between coarse-grained and porphyritic varieties. The two compositionally-defined "phases" from thin section information differ only in the nature of the plagioclase, one group (earlier?) contains zoned oligoclase, the other contains unzoned albite. However, these subdivisions each contain both textural varieties described above.

5.3.3 Special Contact Relationships

Nowhere in the Seagull batholith is a chill zone better developed than around the small M2 quartzite pendant in the southern VAL claims. The most common occurrence is of seriate or fine-medium grained porphyritic textures near pendant contacts, but here there is a chill zone of light grey, finely aplitic quartz and feldspar, with less than 1% biotite, weathering to pale pinkish-grey. Rare feldspars are up to 3 mm long, but crystal size is for the most part less than 1 mm.

The contact with ultramafic rocks in the same vicinity (D-7-12-20,21) is sharp. As exposed on the ridge, the contact is a fracture with massive diorite and quartz monzonite on either side. A sample of medium-grained quartz monzonite from near the contact has an unusually high BI content (up to 20%), but "normal" medium-grained porphyritic quartz monzonite is the most abundant rock near the ultramafic.

It is interesting to note that very coarse pegmatite was located only twice (possibly three times); at D-6-16-55 in the extreme northern end of the VAL map and at D-7-17-78 in the complex contact zone near the east-central edge of the main pendant. In both areas, pegmatite consists of extremely coarse quartz crystals (over 5 cm long), some large feldspars (about 2 cm) and a tan-coloured aplitic matrix with accessory biotite. Both localities are float material.

Station D-6-16-60 (northwest corner of VAL claims) records the presence of pegmatite, but it is a unique occurrence unlike those discussed above. Here pegmatite is composed of large white feldspars up to 2.5 cm with fine (less than 1 mm) poikilitically-enclosed quartz; black biotite flakes up to 1.5 cm long form about 3% of the rock. This white pegmatite occurs as dykelets within diorite, and contacts are irregular but sharp. This pegmatite may be related to diorite in origin, but it is so unlike the more commonly recognized pegmatitic diorite previously described that a possible affinity to Seagull cannot be ignored.

Seriate-textured rocks in contact zones often contain coarse-grained patches or bubbles in which crystals may approach or exceed 1 cm dimensions (Figure 13). Rarely are these coarse-grained portions coarse enough over any substantial distance to warrant using the term pegmatite.

A unique occurrence of fine-grained biotite porphyry within the Seagull batholith is located at D-7-8-86, at the northeastern pendant contact. Biotite occurs as disseminations and in patches (individual crystals up to 2mm) which make up about 3% of the rock in a matrix

Figure 13. Seagull batholith: seriate texture found near contacts with pendant rocks. Crystal size in coarse pockets approaches pegmatitic dimensions; tourmaline and fluorite may be present. Coarse pocket size and shape is variable.

which can only be described as flesh-coloured rusty-weathering aplite. The exact nature or shape of this occurrence is not known, but its proximity to the pendant contact suggests that it is a contact zone phenomenon.

5.3.4 Limonitic vs. Grey Granitic Rocks

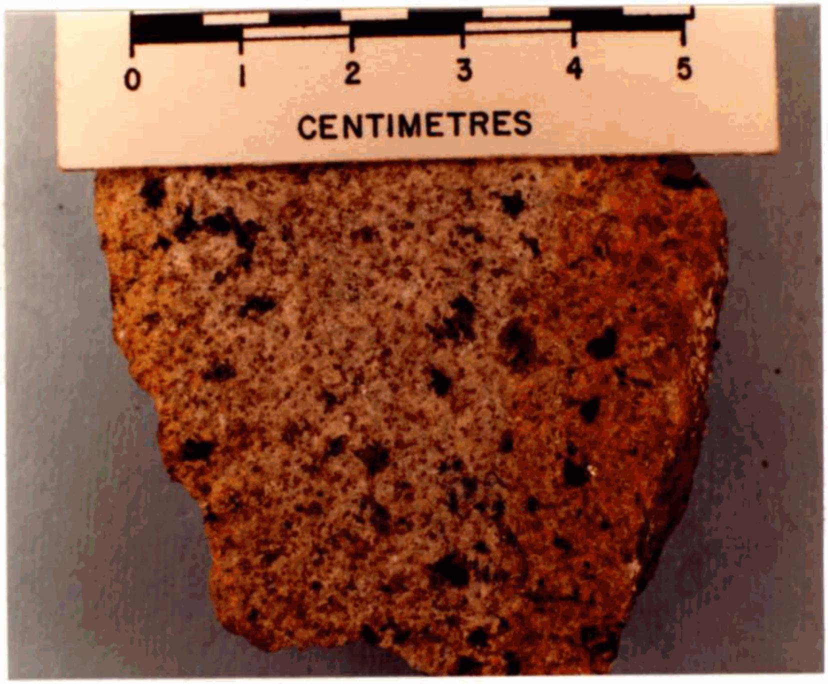
The colour of Seagull rocks has been used to differentiate "phases" also, grey (non-limonitic) varieties were in the past referred to as MBFP, while orange or tan-weathering (limonitic) varieties were referred to as Seagull. Large areas of Seagull have been noted elsewhere (i.e., PONT(B)) to not exhibit the more common orange colour (therefore MBFP) and usually orange-weathering rocks show no change between weathered and fresh surfaces (therefore Seagull). On the DU claims, a dyke-like zone of grey-weathering granitic rock (MBFP) appears to intrude texturally and compositionally similar, but orange-weathering granitic rocks (Seagull).

Although the cause of this visual distinction is not known with certainty (beyond the presence/absence of limonite), it is believed that it is a result of an externally-controlled phenomenon (possibly fracturing), as some grey granitic rocks have a surficially-related orange rind which can only be attributed to weathering (Figure 14).

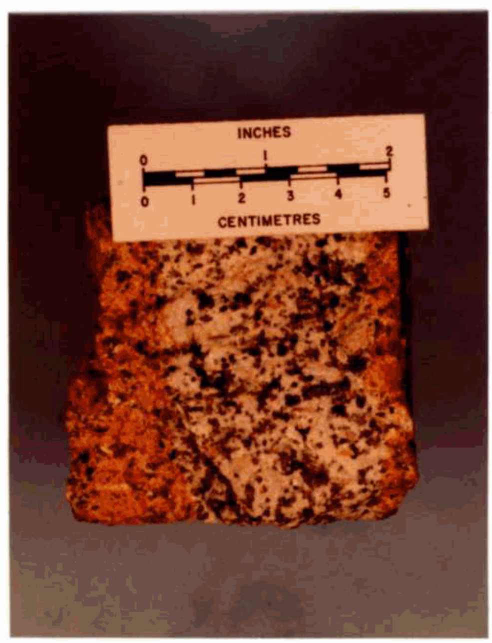
A whole-rock and trace element study (Appendix II) on rocks collected in 1978 from various locations within the Seagull batholith shows that texturally and compositionally there is no discernable difference between grey and orange-weathering rocks, with the exception of slightly more iron present in grey-weathering varieties.

5.3.5 Miarolitic Cavities and Parallel Vein Sets

A characteristic common to the Seagull batholith is the presence of quartz-tourmaline miarolitic cavities and parallel vein sets (Figure 15). Miarolitic cavities are predominantly spheroidal masses of varying sizes (average 5 cm) which rarely exhibit crystals formed by open-space filling. Dark, fine-grained



(a)



(b)

Figure 14. Limonitic weathering rind on (a) fine-grained porphyritic and (b) coarse-grained varieties of Seagull granite.

(a)

(b)

Figure 15. Quartz-tourmaline veins and miarolitic cavities in the upper portions of the Seagull batholith.

(a) Two parallel veins and a few irregular patchy miarolitic cavities are illustrated at D-8-13-23 on VAL south ridge.

(b) A close-up of the same location illustrates the presence of a biotite-free envelope around veins.

textures are more common; thin section examination reveals replacement textures in spheres composed of quartz, tourmaline, relict feldspars and some fluorite (G-78-8-5-11, Appendix I). The significance of these features is that they should represent the upper portions of the batholith where rising bubbles of late-stage fluids/vapours were trapped.

Parallel vein sets of quartz-tourmaline (and fluorite?) are commonly present in the vicinity of miarolitic cavities. As with all structural features of the Seagull batholith, their orientation is approximately east-west, vertical. Widths very from hairline veinlets and fracture coatings to wider (1-2 cm), fine-grained, pervasive replacement zones with diffuse and variable boundaries. Their origin is assumed to be related to that of miarolitic cavities, i.e., late-stage magmatic adjustments during final crystallization of the batholith.

The spectacular zone of miarolitic cavities and parallel quartz-tourmaline vein sets illustrated in Figure 15a, is located between stations D-7-12-22 and 28, west of the southern tip of the mafic-ultramafic pendant.

5.3.6 Alteration Zones

Yellow (illitic) alteration zones within granite are present on the VAL claims at D-6-11-24 (west of the northwestern lobe of the mafic-ultramafic pendant), D-6-16-61 and D-6-24-87 (both are float in the northwest corner of the VAL claims), and D-8-13-17 and 18 (west of the southwestern lobe of the mafic-ultramafic pendant; located on the 1:5 000 geology map, KL 79-62). In outcrop these zones are on the order of 1 to 10 m wide. Narrow white or clear quartz veinlets are common, and a frequent limy green tinge is believed to be attributed to the addition of sericite. Relict quartz phenocrysts may be clear, light grey, or dark, smoky grey as in D-6-11-24. Similar narrow (less than 0.5 m) zones are also present west of D-6-11-24, oriented vertically east-west.

Alteration in the rusty zone at D-7-17-81, near the east-central pendant contact, produces a rusty, dark green rock whose origin is attributed to heavy sericitization and limonite. Although the rusty area is believed to be related to a prominent north-northeast gully along a proposed fault, parallel, vertical and heavily manganese-stained zones within the gossanous area are oriented east-west.

Alteration associated with chalcedony veining on the VAL-SLOUCE ridge is discussed below.

5.3.7 Dykes and Small Intrusive Bodies

True aplite dykes are present in two (possibly three) locations, both on the edge of the most southerly lobe of the mafic-ultramafic pendant. At D-7-12-19, the pinkish-grey aplite dyke is identical to the aplite chill zone surrounding the small quartzite pendant to the northwest. The dyke at D-7-18-88 is similar but for the presence of tourmaline microveins.

The zone marked as aplite at D-7-17-71,76 near the east-central pendant contact is a roughly horizontal feature (dyke?) consisting of fine-grained equigranular quartz and feldspar. The proportion of feldspar is not known because it is clear and glassy; a few flat, striated crystals are visible in hand specimen, but visually the rock resembles quartzite rather than an intrusive.

Seagull Dykes in the northeastern portion of the main pendant (D-7-8-73,78) are pale tan coloured, medium-grained equigranular (EQ4) without biotite. Dykes within the swarm at station 78 are thin (about 10 cm wide) and cover a horizontal distance of about 10 m along the ridge.

Two dykes in the southern lobe of the main pendant (D-7-12-85,86) are unlike any other Seagull dykes or intrusions observed. Strongly reminiscent of the Brock intrusions in appearance, these dykes are medium tan coloured, medium-grained, equigranular to porphyritic in a fine-grained groundmass. Smoky quartz and perthite phenocrysts are up to 0.8 cm long and constitute up to 40% of the rock.

Specks (less than 0.5 mm) of an unidentified mafic or opaque mineral are rare or up to 0.5% of the rock.

The small intrusive body mapped in the central portion of the pendant (D-7-17-73) is probably related to the Seagull batholith (Figure 16). It is light grey, fine- to coarse-grained, equigranular, composed of quartz, feldspar and about 5% biotite. Small (about 1 mm) veinlets of quartz are present. The deep gully here exposes the plug on a rock face about 20 m high, so that the plug and its offshooting dykes are easily seen. Small, unmapped dykes of similar material were noted between stations 72 and 74. The presence of biotite and grey colour are the only features which distinguish the plug from dykes at D-7-8-73,78 described above.

A small plug of fine-grained, equigranular, grey-weathering granitic rock with 5-10% accessory biotite is present along the contact of the southeastern pendant lobe (D-7-16-50). Porphyritic Seagull rocks just below the diorite contact at D-7-16-49 are visually similar to the plug with the exception of rare phenocrysts. Plug rocks are sub-outcropping and only gently heaved, but the diorite/Seagull contact is approximated from float material. Although rare or no Seagull float was seen above the contact as drawn, the uncertainty of cross-cutting relationships should be noted.

5.3.8 VAL-SLOUCE Ridge

Along this ridge one encouters three main rock types:

a. ultramafic rocks of the VAL roof pendant capping the Seagull batholith, which is here composed of

b. coarse equigranular, and

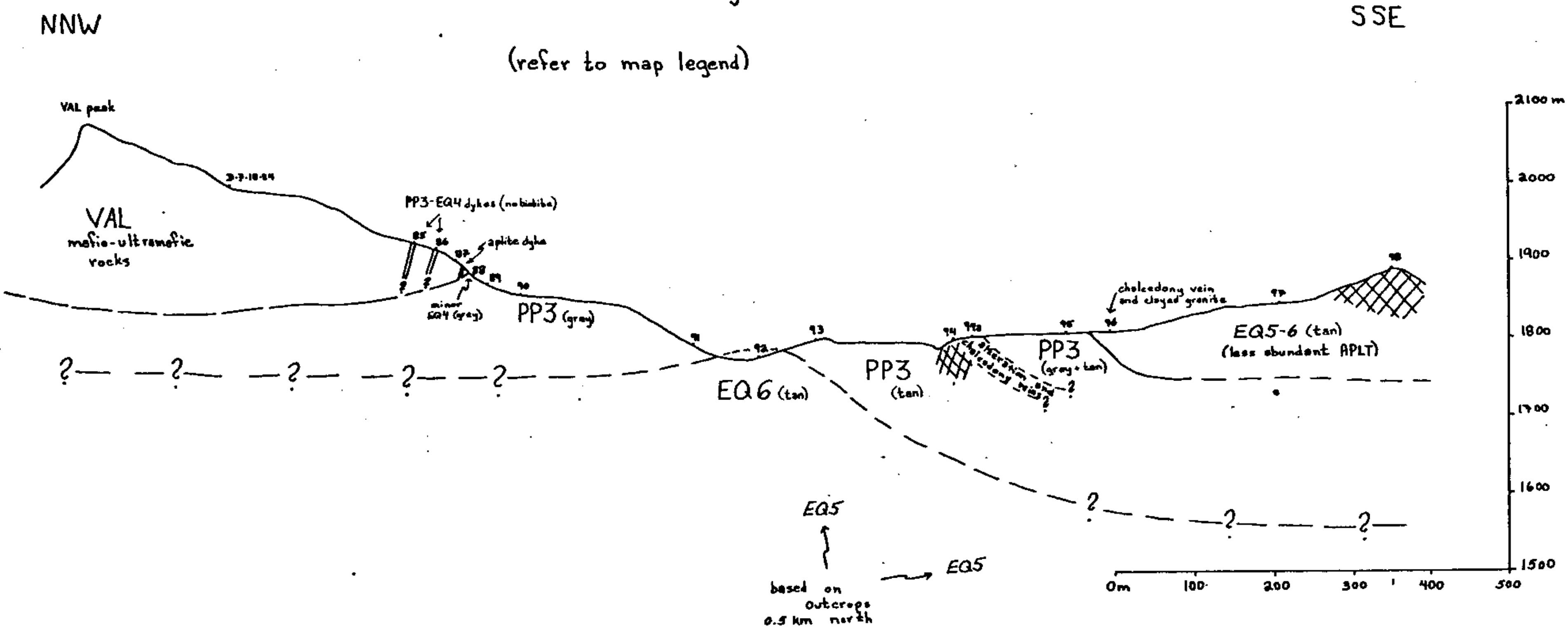
c. finely porphyritic granite.

The cross-section of Figure 17 illustrates proposed relationships between granitic textural phases which are based on a single

Figure 16. Small granitic plug and associated dykelets within the central portion of the mafic-ultramafic pendant. Surrounding the plug here (D-7-17-73) is a complex mixture of diorite, pegmatitic diorite and pyroxenite.

VAL-SLOUCE ridge

cross section by GMD



traverse along the ridge and a distinct horizontal lineament visible along cliffs below the south-southeast end of the ridge.

Granite colours are noted because the northern exposure of porphyritic rocks is dominantly grey on fresh and weathered surfaces, whereas the southern exposure is distinctly limonitic (i.e., tan-coloured) and sometimes highly gossanous. However, a sample from station 95 has a limonitic weathering rind 2-3 cm thick on grey fine-grained granite with rare phenocrysts. The relevance of grey versus limonitic granite is as yet unknown, but as it is a conspicuous feature of the western porphyritic exposure, it has been noted for future reference.

The sub-horizontal, convex nature of the lower contact between coarse equigranular and fine porphyritic textures is hypothesized for several reasons:

a. Textures on cut surfaces of specimens from stations 91 and 94 are identical even though 91 is distinctly grey and 94 is highly gossanous in outcrop.

b. The presence of coarse equigranular granite at lower elevations north of the ridge suggests an extensive area of this texture rather than a vertical feature of limited extent (refer to 1:10 000 geology map KL 79-60 where coarse-grained rocks of stations D-7-16-66 and 67 are vertically below fine porphyry of stations D-7-18-93 and 94).

c. The steep-to-horizontal contact crosscutting the ridge between stations 95 and 96 is visually distinct from a distance and can be seen on the 1:10 000 photomap KL 79-61. The contact was drawn in prior to the ridge traverse when textural distinctions were noted. Below this contact, along the cliffs (refer to photomap) is another horizontal lineament which may correspond to the hypothesized lower contact on the cross-section.

Chalcedony veins (Figure 18) are present in a wide area beside highly gossanous porphyry at

Figure 18. Chalcedony veinlets from VAL-SLOUCE ridge. These samples are from a wide zone at D-7-18-94a which contains anastomosing veinlets of variable dimensions and orientations, complexly intermixed with fine-grained porphyritic granite. Further south along this ridge are additional veins of a more regular nature within coarse granite.

94a, in coarse-grained granite at 96 and as rare occurrences scattered further south along the ridge.

Veins were not seen to exceed 10 cm widths; they are most commonly less than 2 cm. Within the alteration area at 94a, narrow veins are somewhat randomly oriented, but sub-vertical. Alteration of finely porphyritic granite here is dominantly replacement by clay (up to 20%) and addition of limonite to give rocks an orange colour. Alteration is not present everywhere in the zone as depicted on map and cross section but is present in noticeable quantities throughout the zone.

An approximately 10 cm wide chalcedony vein is located at station 96 within an area of altered granite. Alteration consists of heavy pervasive limonite with 10-20% white clay replacement patches and manganese staining. Yellowish-green illite/sericite alteration is also present, as is a combination green and orange alteration resembling propylitization and K-feldspar metasomatism.

The abundance of chalcedony veins in the area can only be suspect; the two narrow ones that were noted further south along the ridge were not obvious on weathered surfaces. A visit to a zone of dense chalcedony veins on the SKIN claims where they are readily noted in outcrop suggests that their density on SLOUCE is relatively low.

6. GEOCHEMISTRY (Map KL 79-63)

Information on collection, treatment and analysis of geochemical samples is contained in Appendix A.

6.1 Reconnaissance Side-Hill Soil Sampling

Only one side-hill sample traverse was done on the VAL claims (inset, map KL 79-60), in the most northeasterly corner of the area. Sixty-six samples taken at approximately 50 m intervals reveal several spot anomalies and one zone across 250 m with tin values between 120 and 300 ppm. This zone coincides with upper portions of the Seagull batholith below the mafic-ultramafic pendant, but as sample results were not available until late August, time did not permit further geochemical or geological follow-up.

6.2 Contour Grid Soil Sampling

Three ridges were detail sampled at 50 m intervals along 50 m topographic contour lines. The two ridges on the west side of the VAL claims are referred to as "VAL north ridge" and "VAL south ridge". The eastern ridge (northeast of VAL peak and VAL south ridge) is referred to as "skarn ridge". Map KL 79-63 shows geochemical values for all three grids; map KL 79-62 is a geological overlay to facilitate interpretations. All grids cover the upper portions of the Seagull batholith below the VAL mafic-ultramafic pendant.

6.2.1 VAL north ridge

This grid follows up results of a 1978 side-hill soil line which gave tin values of 34 to 92 ppm over nearly 1 km.

The results from tin analyses of 219 soil samples on the grid vary from less than 15 ppm to 0.085%. Values greater than 250 ppm are scattered over the entire grid with the predictable exception of the eastern end where pendant rocks overly granite. The paucity of high values on the extreme western end of the grid may suggest that mineralized structures do not continue into that area. The highest value (0.085%) is located on the very top of the ridge, as are several anomalously high values. The downslope train of values greater than 500 ppm below the 0.085% value may be either a mechanical effect by erosion of mineralized material above, or an indication of a north-south axis of mineralization.

Samples from the western end of the grid were also analyzed for tungsten in order to follow-up on values of 18, 20 and 25 ppm tungsten from regional soils taken in 1978. Several values between 25 and 30 ppm were obtained this year, along with one 85 ppm and an isolated 115 ppm. All anomalous values are downslope amongst rubble and were not examined further.

6.2.2 . VAL south ridge

Side-hill soil sample traverses were done on the north and south sides of this ridge in 1978. The western end of the south side line gave tin results of 28, 32, 37, 52, 85 and 190 ppm over 0.5 km; the north side line gave results averaging 43 ppm over 1.25 km.

Tin values of 401 soil samples taken in 1979 are predictably high over granite and low (usually less than 15 ppm) over pendant rocks. As in the VAL north ridge grid, values over 250 ppm are common. The only notable patterns are (1) a central area within granite where values seldom approach 200 ppm and (2) the eastern end where several values greater than 500 ppm and two values of 0.01% are located.

Since tin mineralization is known to occur in the central portion of this grid, two points may be noted regarding the distribution of tin in soils.

1. A soil sample taken less than 5 m from the vein at D-8-8-4a yielded only 40 ppm tin; samples on the contour line below were 325 and 275 ppm; still lower, a value of 525 ppm tin occurs.

2. Four veins (possibly more) occur at the northern limit of mapping within this grid. Soils directly below these veins (to the north) carry very little tin, but the line of samples north and considerably east of these veins has values which increase dramatically downslope to a highly anomalous value of 700 ppm.

Disregarding eastward displacement of the anomalous line in the second example (no explanation will be attempted here), there appears to be a consistent downslope migration and accumulation of tin in soils. Both instances are excellent examples of mechanical liberation and transportation of cassiterite so that anomalous values are displaced downslope.

A small area of samples within this grid were also analyzed for tungsten to follow-up on one sample from 1978 which ran 35 ppm. Only one value of 25 ppm was obtained this year; all others were under 10 ppm. The possiblity of significant tungsten mineralization here will not be considered further.

6.2.3 Skarn ridge

Results from 1978 side-hill traverses were encouraging enough to warrant detail follow-up in 1979. Tin values between 32 and 79 ppm were located around the ridge, and several tungsten values of 25 ppm were located on the south side of the ridge.

A few values (out of 157 samples) around 300 ppm tin are present on the 1979 grid, located over granitic rocks. Considering tin values obtained on the north and south ridges discussed above, values here are not considered sufficiently anomalous over a large enough area to warrant further examination.

The 475 and 275 ppm tin values in the central area of the grid are located within a massive garnet skarn.

Moderate to high tungsten values (up to 350 ppm) are spottily distributed in the area of skarn.

7. MINERALIZATION (Map KL 79-62)

Tin mineralization located to date on VAL and the northern portion of the SLOUCE claims is contained in east-west veins within the Seagull batholith. An exception is the occurrence of tin-rich garnets on Skarn ridge, from which a sample was determined to contain between 0.05 and 0.21% tin. As the tin in this sample is believed to be incorporated within the garnet crystal structure and is therefore not recoverable, and no tungsten mineralization was encountered, this occurrence will not be discussed further.

7.1 VAL north ridge

Veins here occupy closely-spaced east-west vertical fractures along the top of the ridge. Widths between diffuse vein boundaries vary from 1 to 30 cm, and separation between veins is commonly less than 1 m. The slightly heaved nature of outcrops along the ridge - and the discontinuous nature of the veins themselves - makes it difficult to trace specific veins along strike. XRF and assay values of single samples from each vein vary from less than 15 ppm to 1.83% tin (Table I; 6459-6472A). Of the eight veins sampled in place, six have notable tin values.

The complete mineralogy of these veins is not yet known; subsequent thin section studies will help determine their composition. Tourmaline and quartz are visible as major constituents, limonite is usually present, minor disseminated sulphides (pyrite and/or arsenopyrite) are visible in places, and finely disseminated cassiterite is believed to be present.

The areal extent of this vein swarm is not known. Continuation northward is hampered by 300 m of vertical and near-vertical cliffs, although heavily gossaned and closely-fractured rocks are noticeable. Outcrop along the edge of the ridge is limited to a narrow strip which quickly gives way to heaved rubble and talus downslope, away from the cliffs.

7.2 VAL south ridge

Two types of vein occurrences are present on this ridge, an isolated, continuous vein and a swarm of discontinuous veins.

7.2.1 Epic vein

The Epic vein is located within quartz monzonite between pendants of ultramafic and sedimentary rocks (Figure 19a). Its width varies between 5 and 15 cm; it was traced for 70 m along strike and appears to extend beyond that distance. Vein boundaries are generally distinct.

The three known constituents are easily seen on Figure 19b to be quartz, green tourmaline(?) and cassiterite. The sample illustrated in Figure 19b is particularly coarse-grained, and it is in these coarser sections of the vein that the best values are found (up to 7.10% tin; Map KL 79-62 and Table I). Portions of the vein are extremely fine-grained and appear to have minor limonite and sulphides as do veins in the swarms.

Another tin-bearing vein (D-8-8-3) was located east of the Epic vein, but a detailed examination of freshly-exposed rocks to the west, between the Epic vein and the small quartzite pendant, did not reveal the presence of additional similar veins. Instead, a high density of miarolitic cavities and parallel quartz-tourmaline veins was encountered

TABLE I: Analyses of rock specimens and chip samples collected in VAL and the northern portion of the SLOUCE claims during the 1979 field season.

Sample No.	Location(s)	Description[1]	Sn[2] XRF	Sn[2] MIN-EN
4201B	D-6-11-24	Seagull - green alteration zone	-	
4203B	D-6-13-42	M2 - white quartzite	-	
(4204B)[3]	D-6-16-55	Seagull - pegmatitic	-	
(4205B)	D-6-16-55	M2 - granitized, QZ/TØ microveins	-	
4206B	D-6-16-61	Seagull - yellow (illitic) alteration zone	70 p	
4272B	D-7-8-73b	Brock - dyke	70 p	
4273B	D-7-8-77	Seagull	625 p	
4274B	D-7-8-78b	Seagull - dyke	225 p	
4275B	D-7-8-86b	Seagull	-	
4276B	D-7-8-86c	Seagull	-	
4277B	D-7-8-87	Seagull	95 p	
4278B	D-7-8-88	Seagull	95 p	
(6250A)	D-7-12-18	Seagull	325 p	
6251A	D-7-12-19	Seagull - aplite dyke	-	
6252A	D-7-12-21	Seagull	-	
6253A	D-7-12-22	Vein - QZ, TØ, CT	2.0%	5.0%
6254A	D-7-12-23	Seagull - QZ/TØ microveins & miarolitic cavities	145 p	
6255A	D-7-12-27	Seagull - green alteration zone	175 p	
6256A	D-7-12-28	Seagull - QZ/TØ miarolitic cavities	-	
6257A	D-7-12-29	Vein - QZ, TØ	120 p	
(6267A)	D-7-16-48	Seagull - PP2, QZ/TØ miarolitic cavities	15 p	
6268A	D-7-16-49	Seagull - PP3	120 p	
(6269A)	D-7-16-50	Seagull - PP3	200 p	
6270A	D-7-16-52	Skarn - GL	-	
6271A	D-7-16-52b	Skarn - FU, AX, GA, CA, PX	-	
6272A	D-7-16-52b	Skarn - QZ, GA, CA	500 p	
6273A	D-7-16-52b	Skarn - QX, GA, CA	325 p	
6274A	D-7-16-55	Skarn - GA only	0.21%	0.05%
6275A	D-7-16-55	Skarn - MG, AC	-	
(6276A)	D-7-16-63	Seagull - PP5, QZ/TØ miarolitic cavities, TØ microveins	-	

Page 2 (Table I, cont.)

Sample No.	Location(s)	Description	Sn XRF	Sn MIN-EN
6277A	D-7-16-65	Seagull - EQ	145 p	
6278A	D-7-16-66	Seagull - EQ5	-	
6279A	D-7-16-67	Seagull	40 p	
6280A	D-7-17-71b	Pyroxenite - disseminated PØ and CP	-	
6281A	D-7-17-71c	Dyke - felsitic	-	
6282A	D-7-17-73c	Seagull - EQ3	70 p	
6283A	D-7-17-76	Seagull - EQ3	15 p	
6284A	D-7-17-78c	Skarn - PX, EP, CA	325 or 175 p	
6285A	D-7-17-78f	Seagull - pegmatitic pod	145 p	
6286A	D-7-17-80	Seagull - PP2	70 p	
6287A	D-7-17-81c	Seagull - yellow alteration zone	-	
6288A	D-7-17-81c	Seagull - QZ/TØ alteration zone	-	
6289A	D-7-17-81b	Seagull - EQ6	-	
6290A	D-7-17-82a	Seagull - EQ6	-	
6291A	D-7-18-85	Seagull dyke - PP2, FU	175 p	
6292A	D-7-18-86	Seagull dyke - PP2, FU	225 p	
6293A	D-7-18-88a	Seagull dyke - EQ3, FU	500 p	
6294A	D-7-18-88b	Seagull - PP4	-	
6437A	D-8-8-1a	Vein - TØ, MN, AS, LI, HE	-	
6438A	D-8-8-1c	Vein - TØ, MN	475 p	
6439A	D-8-8-1d	Vein - FU, LI, CL	-	
6440A	D-8-8-2a	Vein - MN, LI, FU, CY, CP	-	
6441A	D-8-8-2b	Seagull - pegmatitic, MN stained, MØ	-	
6442A	D-8-8-3a	Seagull - EQ3, CL(?) veins, QZ/TØ miarolitic cavities	0.01%	0.08%
6443A	D-8-8-3b	Vein - QZ, AS, TØ; TØ microveins	0.145%	0.43%
6444A	D-8-8-4a	Vein - QZ, TØ, CT	3.25%	4.78%
6445A	D-8-8-4b	Vein - QZ, TØ, CT	0.05%	0.12%
6446A	D-8-8-4c	Vein - QZ, TØ, CT	3.48%	7.10%
6447A	D-8-8-5a	QZ/TØ pod in Seagull w/FU	40 p	

Sample No.	Location(s)	Description	Sn XRF	Sn MIN-EN
6448A	D-8-8-5b	QZ/TØ pod in Seagull	15 p	
6449A	D-8-8-6	Vein - QZ/TØ	70 p	
6450A	D-8-8-7b	Vein - TØ w/FU	-	
6451A	D-8-8-7c	Vein - QZ, TØ, FU	0.675%	0.40%
6452A	D-8-8-8	Vein - QZ, TØ	575 p	
(6453A)	D-8-8-9a	M2 - brown TØ fracture fillings	-	
(6454A)	D-8-8-9b	M2 - brown TØ fracture fillings	200 p	
6455A	D-8-8-12a	Vein - QZ, TØ, AS	4.0%	7.78%
6456A	D-8-8-12b	Vein - TØ	95 p	
6457A	D-8-8-12c	Vein - TØ with FU	225 p	
6458A	D-8-8-12d	Seagull - TØ microveins	400 p	
6459A	D-8-10-1	Seagull - PP4	120 p	
6460A	D-8-10-2	Vein - QZ/TØ, in Seagull	0.07%	0.09%
(6461A)	D-8-10-3	Vein - QZ/TØ, in Seagull	-	
6462A	D-8-10-4	Vein - " " " "	1.5%	1.59%
(6463A)	D-8-10-6	Vein - " " " "	0.14%	0.31%
6464A	D-8-10-7	Vein - " " " "	15 p	
(6465A)	D-8-10-7a	Vein - " " " "	95 p	
6466A	D-8-10-8	Vein - " " " "	0.765%	0.84%
6467A	D-8-10-9	Vein - " " " "	0.17%	0.48%
6468A	D-8-10-10	Vein - " " " "	-	
6469A	D-8-10-10a	Vein - " ", Seagull fracture zone	1.75%	1.83%
6470A	D-8-10-10b	Vein - " " " " "	0.085%	
6471A	D-8-10-11	Vein - " " " " "	0.025%	0.14%
6472A	D-8-10-12	Vein - " ", in Seagull	600 p	
*6473A	D-8-13-13a	Vein	3.0%	4.29%
*6474A	D-8-13-13b	Vein	0.2%	0.48%
*6475A	D-8-13-13c	Vein	0.39%	0.47%
*6476A	D-8-13-14	Vein - QZ, TØ, CT	4.3%	9.95%
*6477A	D-8-13-15	Seagull with 4 lensing veins	120 p	
6478A	D-8-13-16	Vein	200 p	

Sample No.	Location(s)	Description	Sn XRF	Sn MIN-EN
6479A	D-8-13-16a	Seagull - alteration zone around vein-cutting fault	95 p	
6480A	D-8-13-17	Vein in Seagull	120 p	
6481A	D-8-13-17b	QZ vein in yellow alteration zone w/GL	-	
(6482A)	D-8-13-17a	Vein - QZ/TØ, AS	-	
(6483A)	D-8-13-20	Vein in Seagull	15 p	
(6484A)	D-8-13-21a	Vein in Seagull	40 p	
(6485A)	D-8-13-21b	Vein	-	
6486A	D-8-13-21c	Vein	120 p	
6487A	D-8-13-22	Vein - AS	120 p	
6488A	D-8-13-23	Vein	-	
6489A	D-8-13-17c	Yellow alteration zone	-	
6490A	D-8-13-14a	Seagull - EQ2, aplite	40 p	
6491A	D-8-13-15a	Seagull - EQ3, aplite	145 p	
6492A	D-8-13-18	Seagull - PP4	15 p	
6493A	D-8-13-19	Seagull - PP4	175 p	

The following analyses are from samples collected on the SLOUCE (north portion) claims:

Sample No.	Location(s)	Description	Sn XRF	Sn MIN-EN
6295A	D-7-18-89	QZ/TØ pod in Seagull	475 p	
6296A	D-7-18-90	Seagull - PP3	120 p	
6297A	D-7-18-91	Seagull - PP3	325 or 175 p	
6298A	D-7-18-92	Seagull - EQ6	70 p	
6299A	D-7-18-93	Seagull - PP3	-	
6300A	D-7-18-94	Seagull - PP3	120 p	
6301A	D-7-18-94a	Seagull	-	
6302A	D-7-18-94a	Vein - calcedony in Seagull	175 p	
6303A	D-7-18-95	Seagull - PP3	-	
6304A	D-7-18-96b	Seagull - EQ6, alteration zone, MN, CY	175 p	
6305A	D-7-18-96b	Vein - calcedony	145 p	

Sample No.	Location(s)	Description	Sn XRF	Sn MIN-EN
6306A	D-7-18-96b	Seagull - EQ6, green/yellow alteration zone	145 p	
6307A	D-7-18-97	Seagull - EQ6	120 p	
6308A	D-7-18-98a	Seagull - EQ6, QZ/TØ miarolitic cavities	250 p	
6309A	D-7-18-98b	Seagull - PP3	120 p	
6310A	D-7-18-99	QZ/TØ pod	-	

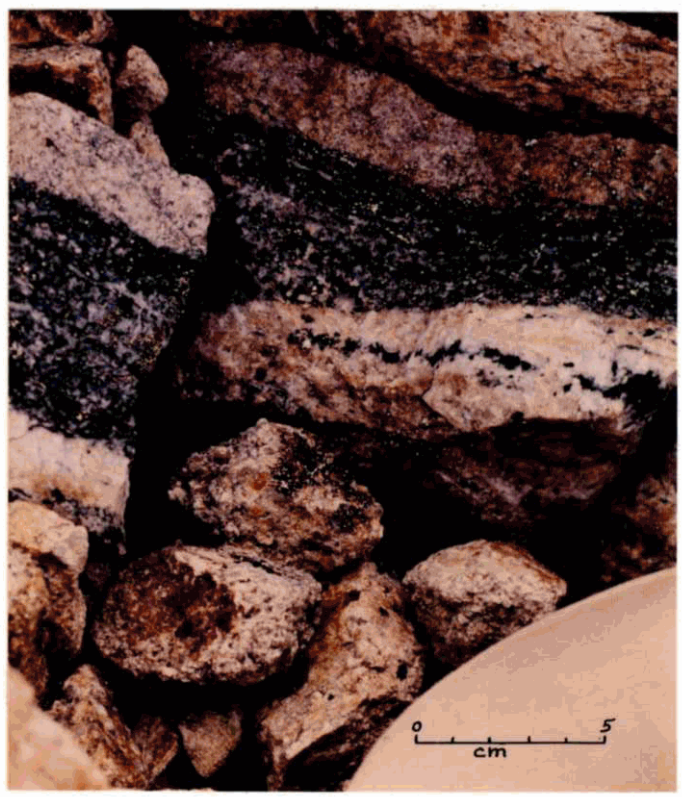
[1]Abbreviations are defined in Geological Legend, Map KL 79-60.

[2]"-" indicates below detection level; "p" indicates value in ppm.

[3]Float

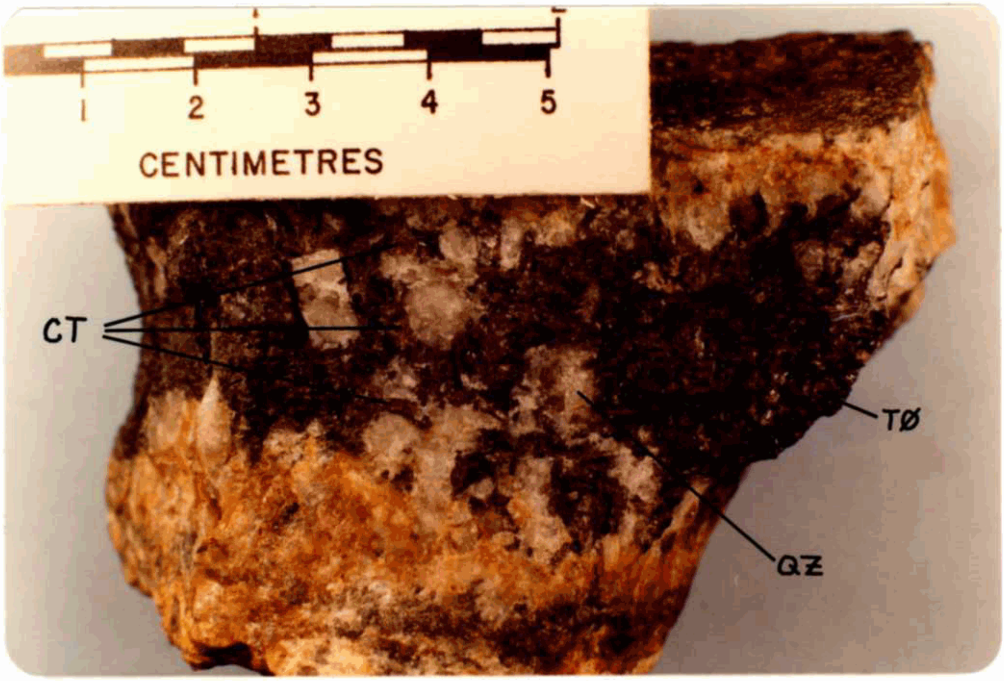
*Chip sample.

(a)



(b)

Figure 19. The Epic vein on VAL south ridge.
(a) The vein is located midway between pendants within Seagull granite.
(b) Sharp contacts and a long strike length distinguish this vein from others in the vicinity.



(c)

Figure 19 (cont.).
(c) Brown cassiterite in a matrix of green tourmaline and white quartz is clearly visible in this coarse portion of the vein. An assay of 7.10% tin was obtained from a sample of this vein.

(Figure 15a). These veins are normally barren, but one narrow (2 cm) vuggy vein with visible purple fluorite returned an assay of 0.40% tin.

7.2.2 Vein swarm

Veins encountered on the small spur at D-8-13-13,14 are discontinuous along strike and dip. The three veins of station 13 total about 12 cm in width across 4 m, but each one extends only about 1 m horizontally. The average of XRF and assay values from these veins is 1.72% tin. The vein at station 14 (Figure 20) is a 1.5 m vertical lens along a fracture. An assay of 9.95% tin was obtained from a sample of coarse-grained material with easily visible cassiterite from the 20 cm wide portion of the lens.

Hand specimens of these veins are similar in appearance to other veins described above. Within the coarse portion of the vein at station 14, tourmaline laths, quartz crystals and irregular patches of cassiterite commonly approach 1 cm dimensions. Station 13 veins are finer grained, and with the exception of quartz and the odd tourmaline lath, mineralogy is not easily discernible. Arsenopyrite is present in small amounts, and fine-grained areas are dark grey or green.

Veins identical in outward appearance to those at station 13 are present to the southwest over a distance of about 150 m. A chip sample was taken at station 15 over a 2 m zone across 4 lensing veins (Figure 21), and single hand specimens of several exposed veins and float material were collected and analyzed up to and including station 17. Tin values of these samples are exceptionally low, not exceeding 200 ppm by XRF.

Physically, veins at and between stations 13 through 17 appear to be fracture-controlled alterations which randomly thicken and thin to micro dimensions as fracture coatings. Vein boundaries are diffuse and irregular. Hosting batholithic rocks are generally medium-grained and slightly porphyritic, but a considerable proportion of very fine-

Figure 20. A high-grade pod-vein (D-8-13-14) in the vein swarm on VAL south ridge. Although similar to the Epic vein in content, vein boundaries are diffuse and width varies from a maximum of 20 cm to a hairline fracture-filling. Flage are located above and below (in shadow) the pod, about 2 m apart along the hosting fracture. An assay of 9.95% tin was obtained from a sample of this pod-vein.

Figure 21. A portion of the vein swarm on VAL south ridge. Vertical east-west fractures often host vein material and/or sporadic dark alteration (D-8-13-15).

grained equigranular varieties are present around stations 14 and 15. Low tin values and the diminishing presence of fine-grained granitic rocks to the south-west are the only distinctions which can be made at this point between mineralized and barren areas.

Sampling of individual veins has proven to be difficult; the case of station 13 illustrates the erratic nature of mineralization. Initial sampling of these veins returned low XRF values of 95 and 225 ppm for two of the three veins when single hand specimens were analyzed. Subsequent sampling, using many chips taken along each vein, returned assay values of 0.48% and 0.47% tin.

The remainder of the August 13 traverse encountered a high density of quartz-tourmaline miarolitic cavities and veins. No samples from this area contained greater than 175 ppm tin. Veins associated with miarolitic cavities here appear to be more regular than mineralized veins along their strike. Widths between diffuse boundaries are generally consistent (1-10 cm), and veins are not always located along fractures (Figure 15b).

8. CONCLUSIONS AND RECOMMENDATIONS

8.1 VAL North Ridge

Tin mineralization in veins has been located, but must be defined in areal extent by further prospecting along the ridge and below the precipitous north slope, in SIN cirque. Trenching along known veins on the ridge crest should also be done.

8.2 VAL South Ridge

8.2.1 Epic Vein

The high grade and regularity of this vein suggest that it may be suitable for underground exploitation. However, systemmatic sampling along the vein to determine grade consistency and delineation of the exposed strike length are prerequisites.

8.2.2 Vein Swarm

Detail grid mapping to define the areal extent of these veins is the first priority. Meticulous sampling of all the veins and trenching in areas of high vein density will enable average grade estimations to be made.

8.3 VAL-SLOUCE Ridge

High soil values at the southern end of the VAL south ridge grid are downslope from a highly gossanous zone of granite. Prospecting in this area and below the precipitous north-facing slope should be undertaken.

8.4 Northeasternmost Ridge

Relatively high soil values on the north (1978) and south (1979) sides of this ridge have not been examined further. Comparison to the north and south ridges suggests that prospecting for possible similar vein-type mineralization is necessary.

APPENDIX I

STATEMENT OF EXPENDITURES

January 1 - December 31, 1979

VAL(B), SIN & PONT(B) CLAIMS, YT

Casual Labour	$ 133.34
Travel Expenses	972.49
Camp Expenses	5 762.65
Mapping, Gr. Surveys, Maps	11 845.71
Freight, Hauling, Storage	482.45
Assaying	4 361.86
Salaries - Regular	3 532.98
Salaries - Temporary	10 459.55
Space Charges	75.12
Equipment Rental	599.93
Stationery & Supplies	93.85
Telephone	317.54
Repairs & Mtce (excl. Auto)	25.27
Auto Expenses	123.39
Non Capital Equip. Purchases	498.64
Depreciation Expenses	994.71
TOTAL	$ 40 279.48

APPENDIX II

Petrographic Reports

G-78-8-69 Altered Pyroxenite

original rock: pyroxene 100% ?

alteration: tremolite-epidote-opaque, biotite

present composition		late vein	
pyroxene	50-55%	muscovite or talc	50%
tremolite	25-30	epidote	35
epidote	15-20	tremolite	10
opaque	3- 5	opaque	5
biotite	1- 2		
Mineral W	0.2		

Pyroxene forms a coarse grained (1-3 mm) irregular mosaic of equant to slightly prismatic grains. They are altered in part giving the following textures:

1) pervasive replacement by patchy tremolite in optical continuity in one grain, and by dusty to very fine grained opaque. This has affected most grains in the section.
2) more intense alteration has produced thin to thick rims of tremolite surrounding a corroded core of pyroxene. This has affected about half the pyroxene grains. In some grains opaque is intergrown with tremolite; it has a feathery texture somewhat similar to that in E-78-7-29-55.

The rock contains replacement patches of tremolite-epidote-opaque up to a few mm across. Tremolite commonly is feathery and epidote forms very irregular fine to coarse grains.

Biotite forms scattered grains from 0.1 to 0.3 mm in size, interstitial to pyroxene, and not necessarily related to tremolite-epidote alteration. It may be original interstitial material in the pyroxenite.

Mineral W forms scattered patches with tremolite-epidote. The mineral has the following properties: moderate to high relief, medium greenish-brown color, very fine grain size (0.01-0.02 mm).

The sample is cut by an irregular late vein composed of a mosaic of fine grained muscovite or talc with epidote and lesser opaque, and scattered euhedral tremolite crystals up to 1 mm long. Optical distinction of muscovite from talc is not possible, and either mineral could exist with the rest of the alteration assemblage.

J-78-8-6-7F Hornblende-Biotite Quartz Monzonite

plagioclase	30-35%
perthitic K-feldspar	30
quartz	25-30
hornblende	2- 3
biotite	1- 2
epidote	1- 2
sphene	1
chlorite, opaque	minor
calcite, zircon	trace
quartz-epidote veins	5

Plagioclase, perthitic K-feldspar, and quartz form a coarse grained patchy aggregate, with monomineralic patches up to 15 mm across. Plagioclase is subhedral to euhedral, and K-feldspar and quartz are anhedral. Plagioclase is moderately altered to very fine grained (0.01-0.03 mm) patches and flakes of sericite, and in a few grains to dusty to fine grained epidote. Perthite consists of 90% K-feldspar and 10% plagioclase, the latter as irregular fine patches in optical continuity within each individual perthite grain. About half the quartz forms a finer grained (0.1-0.2 mm) mosaic, interpreted as the result of recrystallization.

Mafic minerals form irregular finer grained clusters between felsic grains. Hornblende is pleochroic from light to medium green, except for a few isolated brown grains up to 0.5 mm in size; the latter are partly rimmed by epidote. Biotite is pleochroic from pale to medium green. Sphene forms scattered grains, commonly with hornblende. Chlorite forms a mild alteration of a few hornblende grains, and occurs intergrown with fine hornblende grains and sphene in a few mafic aggregates.

Epidote is widespread as rims on hornblende, irregular alteration patches in plagioclase and in some mafic clusters, and in quartz veins.

Opaque forms a few grains in hornblende, and one grain rimmed by epidote.

Zircon forms one grain 0.1 mm across.

Calcite forms irregular grains (0.02 mm) with finer grained mosaic quartz.

The rock, especially perthite and plagioclase grains, is cut by abundant narrow, fine grained quartz veins, many containing trains of epidote parallel to their lengths and commonly in the center of the vein.

G-78-8-5-2 Diorite-Gabbro

plagioclase	50-55%	
hornblende	25-30	(partly altered to biotite, sphene, epidote)
apatite	2- 3	

patches: epidote-plagioclase-opaque 10-15%

veins:	1) epidote	5
	2) amphibole	1

The original rock is a coarse grained aggregate of anhedral plagioclase and euhedral to subhedral hornblende, with scattered subhedral apatite.

Plagioclase grains are mainly 0.5 to 1.5 mm in size, and are moderately concentrically zoned; composition grades from more calcic cores to more sodic rims. Grains are slightly to moderately altered to dusty to fine grained sericite, minor biotite, and local patches of epidote. Fine grained plagioclase occurs along some coarse grain borders.

Hornblende forms elongated prismatic grains with wedge-shaped terminations on some. Grains are partly to completely altered to an aggregate of biotite-epidote-sphene, with minor quartz. Hornblende grains are up to 5 mm long, averaging 2 mm. Biotite alteration consists of randomly oriented laths 0.05-0.2 mm in length and a few very fine grained patches of anhedral flakes intergrown with sphene. Epidote forms very fine to coarse anhedral, commonly poikilitic patches. Sphene forms clusters of very fine grains (0.01-0.02 mm). Identification of sphene is on the basis of high relief and high birefringence.

Apatite forms subhedral grains averaging 0.2-0.3 mm, with a few up to 0.5 mm in size. They are randomly scattered through the rock.

Patches of fine to coarse grained epidote-plagioclase-opaque are scattered through the rock. Most patches are 1-2 mm in size, with grain size 0.1-0.3 mm. Plagioclase in patches is fresh, in contrast to that in the rock. Opaque grains are anhedral and commonly interstitial. Some patches appear to be related to the amphibole vein.

Chlorite forms a few patches of fine grains with hornblende.

Fluorite forms one irregular replacement patch in plagioclase near the amphibole vein.

The sample is cut by a prominent set of veins composed mainly of epidote as irregular, in part poikilitic grains 0.2-0.5 mm in size. Plagioclase is locally abundant; it is fresh as in the replacement patches. Probably the veins and replacement patches have the same origin.

A later vein composed of amphibole cuts the rock and the earlier epidote vein. Amphibole in the vein is slightly pleochroic from light yellow-green to medium bluish green, in contrast to that in the rock which has no bluish pleochroism. A little amphibole with bluish green pleochroism occurs in the rock near the vein, and is associated with coarse grained epidote as in the epidote-plagioclase patches.

In hand sample hornblende crystals are up to 15 mm long.

3078-9 Pegmatitic Diorite

hornblende	type 1	50-55%
	type 2	3- 5
biotite		15-20
plagioclase		15-20
apatite		3- 4
opaque		1- 2
muscovite		minor

The rock consists of pegmatitic hornblende and lesser biotite with interstitial plagioclase.

Hornblende forms grains averaging 3 to 10 mm across and up to 30 mm long; most grains show weak pleochroism from light yellow-green to medium green, one elongate grain having bluish-green pleochroism. Scattered fine grained biotite inclusions are common. On grain borders is type 2 hornblende, very fine to fine grained intergrowths with bluish green pleochroic colors. Type 2 hornblende is also intergrown with alteration products of plagioclase.

Biotite forms grains up to 5 mm long; many coarse grains have abundant inclusions of fine grained biotite as randomly orineted laths. Pleochroism is strong from pale orange-brown to dark orange brown and locally medium red brown.

Plagioclase forms equant grains up to 5 mm across interstitial to hornblende. Much plagioclase is partly recrystallized and altered to a very fine grained aggregate of epidote, plagioclase, sericite, and type 2 hornblende.

Apatite forms subhedral to euhedral grains up to 2 mm long, and patches of subhedral to anhedral grains 0.2-0.5 mm in size.

Opaque occurs with biotite as fine grained granular aggregates (0.01-0.03 mm). Some aggregates have a poikilitic appearance.

Muscovite forms a few equant grains 0.2 mm across, possibly pseudomorphing another mineral.

VAL Olivine Pyroxenite with Biotite groundmass

pyroxene	45-50%
olivine	20
biotite	20
hornblende	10-15
opaque	3- 5
limonite	1
apatite	minor
epidote	minor

tremolite vein

The rock is medium to coarse grained, with cumulus(?) olivine and pyroxene, and intercumulus biotite.

Olivine forms rounded anhedral grains mainly 0.5 to 2 mm in size. A few clusters of finer grains 0.2-0.5 mm in size occur. Grains are fresh, with irregular fractures.

Pyroxene forms an anhedral aggregate of grains from 0.3 to 2 mm in size. They may represent cumulus grains with adcumulus overgrowths. Most grains are partly replaced by light brown hornblende; replacement is as fine grained, very irregular patches, which in a single pyroxene grain commonly are in optical continuity. Minor biotite also occurs in pyroxene. Most pyroxene grains contain abundant very fine grained opaque (0.01-0.03 mm).

Biotite forms interstitial irregular grains and aggregates up to 0.5 mm in size. Pleochroism is pale straw to medium reddish brown.

Opaque forms interstitial grains with biotite up to 0.3 mm across, and as fine grains in pyroxene as described above.

Limonite forms interstitial veinlets and patches.

Apatite forms a few subhedral grains up to 0.3 mm in size.

Epidote forms minor patches with hornblende.

The rock is cut near one end by a vein or alteration patch of fibrous tremolite; it is colorless and contains very little opaque. Grain size ranges from 0.02 to 1 mm, with finer grains in felty patches and coarser grains in subparallel growths. Olivine grains along the vein are strongly fractured, with abundant opaque and limonite grains along the fractures.

G-78-8-5-21 Quartz Monzonite

K-feldspar perthite	45-50%	
quartz	25-30	
plagioclase	15-20	(replaced by kaolinite, quartz, sericite)
biotite	5	
muscovite	0.2	
zircon	trace	

veins

quartz, kaolinite, Ti-oxide, limonite

The rock is coarse grained with very variable grain size.

K-feldspar perthite grains are up to 5 mm in size, equant, and anhedral in shape. They contain 0-20% exsolved plagioclase, some as tiny lenses but most as coarse irregular patches. Dusty alteration is abundant.

Quartz forms rounded to irregular interstitial grains up to 6 mm across, but mainly 0.5-2.5 mm.

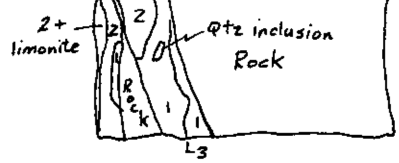
Plagioclase forms subhedral to irregular grains 1-2 mm in size. A few grains are slightly altered, but most are strongly to completely altered to fine grained aggregates of kaolinite, kaolinite-quartz, or quartz. Sericite forms patchy alteration in some grains, especially in their cores. Some grains have a thin rim of unaltered albitic plagioclase surrounding a strongly to completely altered core. One fairly fresh grain shows slight concentric zonation, with a core of An_{13} and a rim of An_{10} (Michel-Levy method). Plagioclase in perthite is altered to quartz-kaolinite intergrowths. One altered grain contains elongate prismatic grains of an unknown mineral; grains are up to 0.1 mm long and have the following properties: moderate relief, pale green-yellow color, low birefringence, parallel extinction, length slow. The mineral is similar to apatite but with lower relief.

Biotite grains are up to 2 mm across, with pleochroism from pale straw to medium brown. Some are altered to muscovite and dusty Ti-oxide.

Muscovite forms grains with biotite and as alteration of biotite, and a few scattered grains in feldspars.

Zircon forms grains about 0.05 mm in size; in K-feldspar they are euhedral while in biotite they are anhedral with strongly pleochroic halos.

The major veins are distributed as in the sketch below. Relative ages of veins are not known, but all appear to have formed along the same major fracture zone.



Vein 1. (white in stained block) mainly kaolinite (0.005-0.02 mm) with scattered to abundant intergrown quartz grains from 0.03 to 0.2 mm in size. Outlines of quartz are very ragged and irregular because the grains are intergrown with kaolinite. Dusty hematite-opaque forms patches mainly from 0.005 to 0.05 mm in size, with a few up to 0.2 m, across.

Vein 2. quartz with lesser kaolinite, variable grain size, commonly finer on grain borders (0.002-0.005 mm) and coarser in centers (up to 0.05 mm).

Vein 3. late veinlet with dusty hematite, much less prominent in thin section than in the stained block.

3075-77 (4314) Quartz Monzonite cut by Kaolinite Breccia Vein

rock (coarsely banded)

quartz	35-40%
K-feldspar perthite	40%
plagioclase	20%
biotite	2- 3
fluorite	minor
zircon, Ti-oxide	minor
apatite, muscovite	trace
tourmaline	trace

vein

kaolinite	60-65%
coarse rock fragments	15-20
fine mineral fragments	15-20
quartz patches	2- 3

The rock is coarse to very coarse grained; minerals show a wide variation in abundance between crudely banded zones, as is apparent in the stained block.

Quartz forms rounded to irregular coarse grains up to 5 mm across, commonly with undulatory extinction. Some fine grained quartz occurs interstitially, possibly as an alteration of plagioclase.

K-feldspar perthite forms irregular grains up to 10 mm in size. Most contain 10-30% exsolution plagioclase as irregular lenses and patches; these have been strongly to completely altered to fine grained aggregates of quartz and lesser kaolinite.

Plagioclase forms irregular grains from 0.5 to 2 mm in size; they are completely altered to kaolinite with lesser quartz, and locally abundant sericite flakes and fluorite patches.

Biotite forms scattered grains 1-3 mm in size, and is concentrated in one rounded patch 7 mm across. Pleochroism is very strong from pale straw to bright red brown. Accessory minerals are associated with biotite, with zircon and Ti-oxide especially abundant in the rounded cluster of biotite grains. Grain size ranges from 0.05 to 0.15 mm for accessory minerals.

Zircon also occurs as anhedral grains in quartz. Muscovite and tourmaline form one grain each within a coarse quartz grain.

The main vein set consists of extremely fine grained kaolinite containing abundant patches of wall rock. Coarser patches up to 3 mm in size are mainly rounded and polymineralic. Finer patches are mainly monomineralic; biotite grains are rounded while quartz forms angular shards. One tourmaline grain 0.05 mm long is present; pleochroism is strong from pale yellow to medium yellowish green.

A few quartz veinlets cut the rock; they appear to be of the same age as the quartz-kaolinite alteration of plagioclase.

G-78-8-5-11 Greisen

plagioclase	35-40%
quartz	25-30
K-feldspar	25-30
biotite	2- 3
muscovite	minor
fluorite	1
limonite,hematite	minor
zircon	trace

alteration

quartz	55-60%
tourmaline	25-30
fluorite	5- 7
feldspars	10-15

The rock is a fine to medium grained granodiorite-quartz monzonite.

Plagioclase is fresh; grains are anhedral to subhedral prismatic with grain size 0.3 to 1 mm. Composition is An_8 by the Michel-Levy method.

Quartz grains are mainly 0.5 to 1 mm in size and are interstitial to plagioclase.

K-feldspar forms irregular grains mainly about 0.3 mm in size, and is interstitial to plagioclase and quartz. It contains scattered fine grained fluorite patches. Dusty semi-opaque to opaque alteration occurs in many grains, and is most intense along grain borders. Minor plagioclase in K-feldspar may be of exsolution origin.

Biotite forms ragged grains up to 0.3 mm in size, with pleochroism from pale straw to medium reddish brown. It contains minor zircon grains up to 0.05 mm in size with weakly developed pleochroic halos. Muscovite forms a few grains with biotite, and may be an alteration of biotite.

Fluorite forms scattered patches mainly 0.1-0.3 mm in size with one 1 mm across; these are interstitial to or along grain borders of plagioclase and quartz.

Limonite and hematite form scattered small patches mainly 0.03 mm in size.

Zircon forms scattered anhedral grains in biotite and subhedral grains in quartz and feldspars.

One grain of a very high relief mineral is present. The mineral is semiopaque, and the interference color is masked by the dark grey mineral color. The grain is subhedral and 0.3 mm across.

The alteration is gradational. The first stage is replacement of the feldspar grains along their borders by skeletal tourmaline, with weak to moderate pleochroism and two main color zones - light to medium brown, and pale to light bluish green. During more intense replacement feldspars are more completely replaced and fluorite is abundant; tourmaline forms coarser grains with some skeletal zones surrounding feldspars. Still more intense replacement produces a rock consisting mainly of medium to coarse quartz and tourmaline, with minor fluorite and relic feldspars. Zircon is preserved through the alteration.

The rock is cut by two narrow fracture-filling veinlets of kaolinite of grain size 0.01-0.02 mm; these cut the tourmaline-fluorite alteration assemblage as well as the rock.

The sample is similar to S-7-29-20, but contains K-feldspar.

G-78-8-10-9 Gabbro-Diorite

plagioclase	50%
pyroxene	15-20
amphibole	15-20
biotite	10
quartz	2- 3
apatite	1
K-feldspar	0.5- 1
zircon	trace
tourmaline	trace
opaque	minor
chlorite	minor

Plagioclase forms aggregates of slightly elongated prismatic grains with a slightly preferred orientation. Grain size is mainly 0.3 to 1 mm. Composition is An_{49} from combined Carlsbad-albite twin method. Plagioclase is fresh.

Pyroxene forms euhedral to subhedral grains, mainly 0.7 to 1 mm across, with a few megacrysts up to 3.5 mm long. Many are zoned with zonation indicated by slight changes in extinction angles and inclusions. The largest grain shows prominent concentric zones, is simply twinned, and contains lattices of rutile? needles along cleavage planes. Pyroxene is partly altered to amphibole. Alteration consists of pervasive replacement or rims of amphibole on pyroxene.

Amphibole is probably hornblende. It is slightly pleochroic from light yellow green to light bluish green. It forms ragged pseudomorphs and partial replacements after pyroxene. Locally hornblende is altered to biotite. Several patches up to 1 mm across consist mainly of fine grained fibrous to mosaic amphibole, possibly actinolite.

Biotite occurs in clusters of laths 0.1 to 0.3 mm long in random orientation. Two types are present, one with moderate pleochroism from pale to medium reddish brown, and the other with weak pleochroism and fainter colors. Both colors occur in the same mineral grain, suggesting some type of compositional zonation.

Quartz forms anhedral interstitial grains averaging 0.5 mm in size.

K-feldspar forms a few interstitial grains with quartz.

Apatite forms subhedral to euhedral grains from 0.05 to 0.08 mm.

Zircon forms a few grains from 0.05 to 0.1 mm in size; some are subhedral and others anhedral.

Tourmaline forms one grain 0.08 mm across; it is irregular in shape and strongly pleochroic from pale yellow-green to dark forest green.

Opaque forms scattered rounded to irregular grains from 0.05 to 0.1 mm across.

Chlorite occurs in one patch intergrown with biotite, and possibly is a replacement of biotite.

APPENDIX III

Whole Rock and Trace Element Study

- CHEMICAL RESEARCH AND ANALYSIS
- CONTRACT LABORATORIES

AUG - 2 1979

TECHNICAL SERVICE LABORATORIES

DIVISION OF BURGENER TECHNICAL ENTERPRISES LIMITED
1301 FEWSTER DRIVE, MISSISSAUGA, ONT. L4W 1A2
TELEPHONE: (416) 625-1544
TELEX 06-960215

CERTIFICATE OF ANALYSIS

SAMPLE(S) FROM Du Pont of Canada Exploration Ltd.,
Suite 102,
1550 Alberni Street, Attn. Ms. G. Ditson
Vancouver, B.C.
V6G 1A5

REPORT No. T - 134

Inv. #11249
Let. May 11/79

SAMPLE(S) OF ROCK

WHOLE-ROCK ANALYSIS IN %

Sample No.	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	Na_2O	K_2O	TiO_2	MnO	P_2O_5	LOI	Total
B	68.57	11.70	8.70	0.09	0.01	1.31	7.00	0.14	0.33	0.02	1.60	99.47
DU 3W/B1	74.00	12.02	1.30	0.39	0.00	3.16	5.11	0.09	0.01	0.01	0.71	96.80
DU 3WO/51	83.78	8.30	0.58	0.02	0.00	2.54	3.03	0.08	0.00	0.00	0.51	98.84
E-78-7-31-62	76.28	11.78	1.11	0.18	0.04	3.10	5.63	0.10	0.01	0.01	0.36	98.60
E-78-8-3-79	70.90	15.28	0.81	1.35	0.10	5.73	3.07	0.08	0.01	0.02	0.40	97.75
E-78-8-4-90	73.85	11.94	1.69	0.45	0.00	3.33	5.14	0.14	0.01	0.01	0.38	96.94
r 78-8-8-101	73.79	12.37	1.88	0.75	0.15	3.05	5.17	0.23	0.02	0.05	0.40	97.86
. 8-8-10-118	68.07	15.53	1.52	1.79	0.41	5.73	3.87	0.19	0.04	0.07	0.47	97.69
G-78-7-29-13	73.73	12.03	0.34	0.15	0.00	4.75	3.98	0.05	0.00	0.01	0.18	95.22
G-78-7-29-14	73.99	11.87	1.21	0.52	0.00	3.25	5.05	0.07	0.01	0.04	0.44	96.45
G-78-8-5-3	42.44	11.80	16.06	12.28	11.14	1.77	1.02	1.59	0.21	0.50	0.84	99.65
G-78-8-5-6	48.22	9.60	12.50	12.20	11.82	1.45	2.05	1.10	0.21	0.26	1.03	100.4
G-78-8-5-9	43.04	2.36	13.47	8.92	28.16	0.25	0.23	0.19	0.22	0.06	1.54	98.44
G-78-8-5-11	75.34	12.16	1.63	0.50	0.20	3.34	4.95	0.11	0.01	0.04	0.47	98.75
G-78-8-10-11	56.40	15.78	8.93	7.09	4.36	2.50	3.17	0.83	0.16	0.30	0.36	99.88
J-78-7-22-4	55.29	14.55	8.27	6.93	5.39	4.61	2.22	0.70	0.11	0.36	1.04	99.47
J-78-7-22-10	47.62	10.19	8.66	12.78	14.77	1.73	1.91	0.43	0.15	0.25	1.09	99.58
J-78-7-26-5	74.64	12.92	1.81	0.07	0.03	2.73	6.35	0.07	0.01	0.03	0.82	99.48
J-78-7-29-8	77.37	12.90	0.90	0.09	0.14	1.17	5.25	0.01	0.08	0.03	2.21	100.1
J-78-8-5-2	71.32	13.95	1.32	0.90	0.24	3.82	4.60	0.19	0.04	0.06	0.90	97.34
J-78-8-5-11	71.19	14.22	1.44	0.86	0.06	3.89	4.96	0.17	0.05	0.04	1.45	98.33
J-78-8-6-3	70.28	15.31	2.10	1.96	0.36	3.74	5.29	0.22	0.06	0.07	0.56	99.95
J-78-8-6-7F	72.70	13.58	1.79	1.28	0.19	3.85	4.73	0.19	0.07	0.06	0.55	98.99
S-7-25-2 (GR)	72.60	13.10	2.04	0.65	0.15	2.61	5.70	0.28	0.02	0.15	0.40	97.70
S-7-29-19	70.68	15.69	0.79	1.48	0.32	6.03	3.04	0.09	0.01	0.03	0.45	98.61
S-7-29-20	75.53	11.50	0.52	2.55	0.00	6.09	0.26	0.01	0.00	0.02	1.31	97.79
S-7-29-21	74.46	12.36	1.20	0.24	0 00	4.44	4.84	0.05	0.00	0.01	0.33	97.93
S-7-31-7	74.27	12.11	1.53	0.06	0.04	3.17	5.65	0.10	0.01	0.01	0.31	97.26
SG	77.26	10.96	1.25	0.36	0.01	3.33	4.44	0.11	0.01	0.01	0.31	98.05
SLOUCE	74.54	11.93	1.43	0.57	0.00	3.45	5.49	0.08	0.01	0.01	0.44	97.95
VH	74.44	12.70	1.66	0.28	0.01	3.28	6.58	0.09	0.01	0.01	0.35	99.41

Samples, Pulps and Rejects discarded after two months

DATE July 30, 1979 SIGNED [illegible]

CTA

Copy to:- Ms. G. Ditson, Du Pont of Canada Exploration Ltd., General Delivery, Swift River, YT. Y0A 1A0

• CHEMICAL RESEARCH AND ANALYSIS
INTRACT LABORATORIES

TECHNICAL SERVICE LABORATORIES
DIVISION OF BURGENER TECHNICAL ENTERPRISES LIMITED
1301 FEWSTER DRIVE, MISSISSAUGA, ONT. L4W 1A2
TELEPHONE: (416) 625-1644
TELEX 06-960216

CERTIFICATE OF ANALYSIS

SAMPLE(S) FROM Du Pont of Canada Exploration Ltd.

Attn. Ms. G. Ditson

REPORT No. T - 134

SAMPLE(S) OF ROCK

MINOR ELEMENTS IN PPM

	Rb	Cr	V	Pb	Sr	Ba	Sn	W	Zr	Mo
B	420	216	14	57	200	300	100	<2	150	<1
DU 3 W/B1	360	129	<2	32	<100	30	<5	<2	100	<1
DU 3 WO/51	240	146	<2	67	<100	50	20	<2	100	<1
E-78-7-31-62	400	170	<2	25	<100	20	<5	<2	200	<1
E-78-8-3-79	80	115	2	21	1000	3000	<5	<2	50	<1
E-78-8-4-90	500	149	2	30	<100	20	5	<2	75	<1
E-78-8-8-101	320	179	<2	22	<100	300	<5	4	75	<1
E-78-8-10-118	80	121	10	19	3000	3000	10	<2	50	<1
G-78-7-29-13	300	130	2	18	<100	20	100	4	50	<1
G-78-7-29-14	410	190	<2	34	<100	10	<5	<2	50	<1
G-78-8-5-3	<80	403	340	32	500	300	10	<2	10	<1
G-78-8-5-6	<80	830	244	195	300	300	50	<2	10	<1
G-78-8-5-9	<80	2510	84	29	200	10	5	<2	<10	<1
G-78-8-5-11	510	155	2	20	<100	<10	<5	<2	150	<1
G-78-8-10-11	80	165	172	46	500	500	30	4	10	<1
J-78-7-22-4	<80	235	130	29	700	1000	5	4	20	<1
J-78-7-22-10	<80	1010	152	71	500	700	10	4	<10	<1
J-78-7-26-5	600	156	12	32	<100	10	<5	<2	200	<1
J-78-7-29-8	300	58	<2	21	<100	50	5	<2	50	<1
J-78-8-5-2	190	133	2	18	200	1000	5	<2	150	<1

Samples, Pulps and Rejects discarded after two months

DATE July 30th, 1979. SIGNED [signature]

CTA

• CHEMICAL RESEARCH AND ANALYSIS
CONTRACT LABORATORIES

TECHNICAL SERVICE LABORATORIES
DIVISION OF BURGENER TECHNICAL ENTERPRISES LIMITED
1301 FEWSTER DRIVE, MISSISSAUGA, ONT. L4W 1A2
TELEPHONE: (416) 625-1544
TELEX 06-960215

CERTIFICATE OF ANALYSIS

SAMPLE(S) FROM Du Pont of Canada Exploration Ltd.

Attn. Ms. G. Ditson

REPORT No. T - 134

SAMPLE(S) OF ROCK

MINOR ELEMENTS IN PPM (Cont'd)

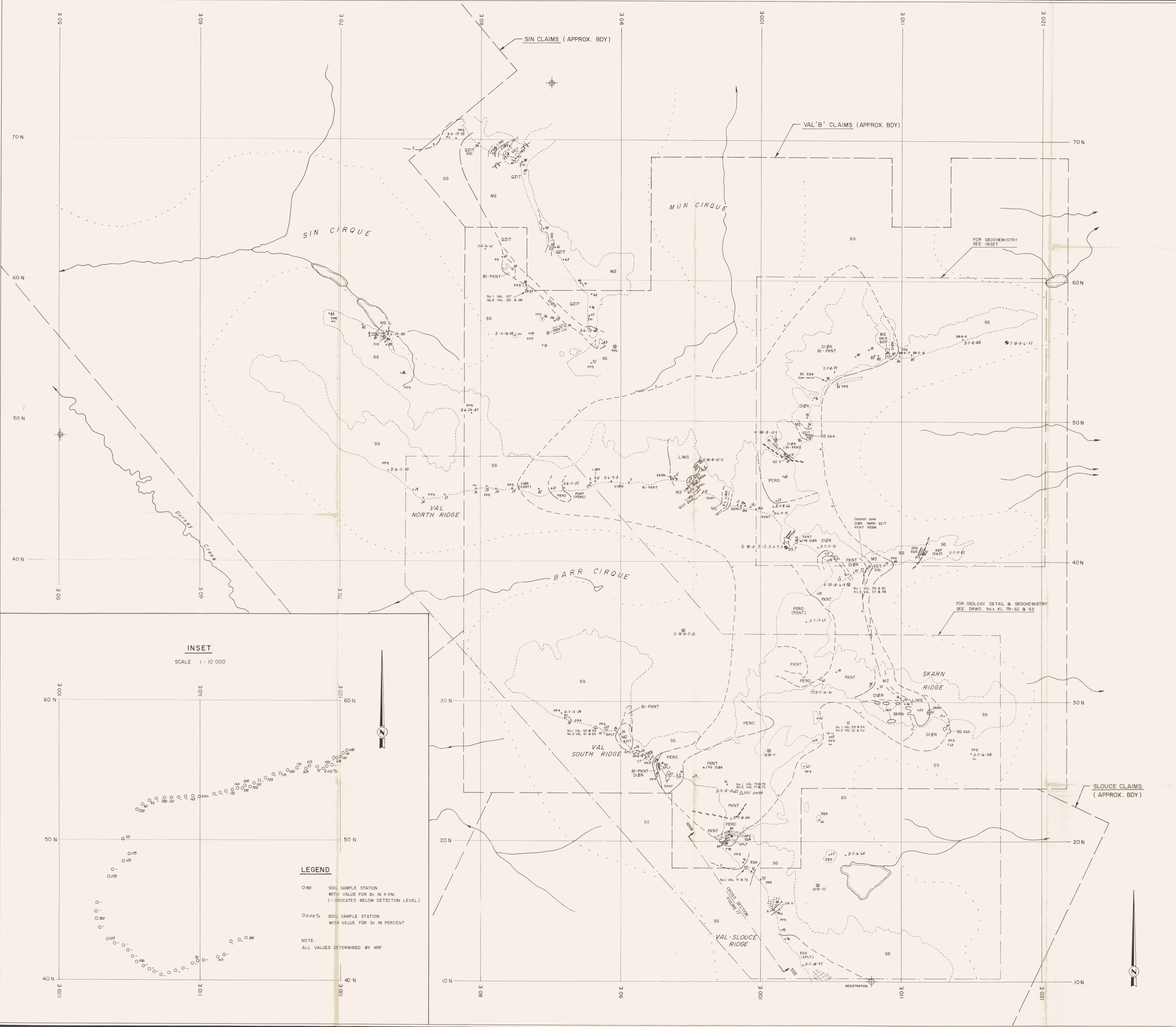
	Rb	Cr	V	Pb	Sr	Ba	Sn	W	Zr	Mo
J-78-8-5-11	210	112	2	18	300	1000	<5	<2	150	<1
J-78-8-6-3	120	100	14	18	600	4000	<5	<2	200	<1
J-78-8-6-7F	210	119	12	20	500	1000	<5	<2	150	<1
S-7-25-2 (GR)	280	145	4	21	<100	700	<5	<2	150	<1
7-29-19	<80	105	<2	13	3000	4000	10	<2	50	<1
S-7-29-20	<80	122	<2	11	1500	150	30	6	150	<1
S-7-29-21	500	152	<2	31	<100	50	<5	<2	200	<1
S-7-31-7	510	111	<2	17	<100	20	<5	<2	150	<1
SG	320	161	<2	29	<100	50	<5	<2	50	<1
SLOUCE	500	172	<2	23	<100	<10	<5	<2	150	<1
VH	550	158	<2	31	<100	<10	<5	<2	200	<1

NOTE: Lithium could not be analysed. However this element was not detected with the spectrograph.

Samples, Pulps and Rejects discarded after two months

DATE July 30th, 1979. SIGNED [signature]

CTA



LEGEND

CRETACEOUS OR TERTIARY

SG — SEAGULL BATHOLITH

- EQ2 (or 3,4,5,6) — average crystal size
- PP2 (or 3,4,5) — groundmass crystal size
- SR2 – 7 — variation in crystal size
- APLT — APLITE

2 = <0.25 mm
3 = 0.25 - 1.00 mm
4 = 1.00 - 2.00 mm
5 = 2.00 - 4.00 mm
6 = 4.00 - 16.00 mm
7 = >16.00 mm

JURASSIC - CRETACEOUS (?)

CR — CASSIAR - RAM STOCK

PERMIAN - MESOZOIC

- DIØR — DIORITE
- PXNT — PYROXENITE
- BI PXNT — BIOTITE PYROXENITE
- PERD — PERIDOTITE

(DIØR, PXNT, BI PXNT, PERD: VAL MAFIC-ULTRAMAFIC SUITE)

- BC/D — BASIC DYKE
- BR — BROCK INTRUSIONS

MISSISSIPPIAN (PENNSYLVANIAN ?)

M3 — UPPER SYLVESTER GROUP

- ARGL — ARGILLITE
- ANVC — ANDESITIC VOLCANIC ROCKS
- VCSD — VOLCANO-SEDIMENTARY ROCKS
- VLCC — VOLCANO-CLASTIC ROCKS
- SCHS — SCHIST

M2 — LOWER SYLVESTER GROUP

- LIMS — LIMESTONE
- MARL — MARL
- SLAT — SLATE
- ARGL — ARGILLITE
- SHAL — SHALE
- QZIT — QUARTZITE
- CONG — CONGLOMERATE
- CHRT — CHERT
- VOLC — VOLCANIC
- SKRN — SKARN
- SUHØ — SULFIDE HORIZON
- ARQZ — ARGILLACEOUS QUARTZITE
- BRXX — BRECCIA
- GNIS — GNEISS
- SCHS — SCHIST

AGE UNKNOWN

- DB/D — DIABASE DYKE
- PXDK — PYROXENE - PORPHYRY DYKE
- RYDK — RHYOLITE DYKE

SYMBOLS

- EDGE OF TALUS
- OUTCROP
- CONTACT OBSERVED
- CONTACT APPROXIMATE
- CONTACT ASSUMED
- CONTACT GRADATIONAL
- FAULT (showing direction of movement)
- ALTERATION AREA
- 45 — BEDDING - INCLINED, VERTICAL
- 50 — JOINTING - INCLINED, VERTICAL
- 55 — FOLIATION - INCLINED, VERTICAL
- VEIN - INCLINED, VERTICAL
- AREA OF SMALL VEINS
- ANTICLINE - UPRIGHT, OVERTURNED
- AXIAL PLUNGE
- or — GOSSANED AREAS
- ∘ or × — GEOLOGY / ROCK SAMPLE STATION
- ⊗ — THIN SECTION
- ⊕ — TRACE ELEMENT / WHOLE ROCK ANALYSES
- THIN SECTION & TRACE ELEMENT / WHOLE ROCK ANALYSES
- or — CHIP SAMPLE
- Rock A (Rock B) — ROCK A more frequent than ROCK B
- GULLY
- CREEK
- ⊡ — CLAIM POST

ABBREVIATIONS

MINERALS

AS	ARSENOPYRITE
AX	AXINITE
BI	BIOTITE
CA	CALCITE
CH	CHALCEDONY
CT	CASSITERITE
CU	COPPER
FU	FLUORITE
GA	GARNET
GL	GALENA
GR	GRAPHITE
HB	HORNBLENDE
HE	HEMATITE
IL	ILLITE
LI	LIMONITE
MG	MAGNETITE
MN	MANGANESE
MØ	MOLYBDENITE
MS	SERICITE
MU	MUSCOVITE
OX	OXIDES
PX	PYROXENE
PY	PYRITE
QC	QUARTZ (CHERT)
QT	QUARTZ & TOURMALINE
QZ	QUARTZ
SL	SPHALERITE
SU, SUL	SULFIDE
TØ	TOURMALINE

DESCRIPTORS

BLK	BLACK
EQ	EQUIGRANULAR
FEL	FELDSPATHIC
G$	GREISEN
GSD	GOSSANED
IB	INTERBEDDED
LIM	LIMY
MSS	MASSIVE
PD	POD
PEB	PEBBLY
PG	PEGMATITIC
PP	PORPHYRITIC
SD	SEDIMENTARY
SIF	SILICIFIED
SR	SERIATE
VC	VOLCANOCLASTIC
/D	DYKE
mc	MIAROLITIC CAVITIES
V	VEIN
<V	MICROVEIN
W/	WITH

DU PONT EXPLORATION
CANADA

KLINKIT JOINT VENTURE
VAL(B) & SLOUCE (north part) PROJECTS
GEOLOGY

DORSEY RANGE, YUKON TERRITORY

1 : 10 000
m 300 200 100 0 300 600 m
SCALE

MAPPED BY :	G.M.D.	REVISED :	N.T.S. No. :	105 B
DATE :	JUN - SEP '79		ACCT No. :	335 - 19 & 10
DRAWN BY :	C.H.K., K.L.J.		DRWG. No. :	KL. 79 - 60
DATE :	NOV. '79			

DU PONT EXPLORATION
CANADA

KLINKIT JOINT VENTURE
VAL(B) & SLOUCE (north part) PROJECTS
PHOTOMAP
DORSEY RANGE, YUKON TERRITORY

1 : 10 000
m 300 200 100 0 300 600 m
SCALE

MAPPED BY : G.M.D.	REVISED :	N.T.S. No. : 105 B
DATE : JUN-SEP '79		ACCT No. : 335 - 19 & 10
DRAWN BY : C.H.K., K.L.J.		
DATE : NOV. '79		DRWG No. : KL. 79-61

VAL NORTH RIDGE
BARR CIRQUE
SKARN RIDGE
VAL SOUTH RIDGE
VAL - SLOUCE RIDGE
CROSS SECTION FIGURE 17
NNW
SSE
SG
PERD
PXNT
DIØR
M2
QZIT
BI-PXNT
LIMS
SKRN
LEGEND
CRETACEOUS OR TERTIARY
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BRXX BRECCIA
GNIS GNEISS
SCHS SCHIST
AGE UNKNOWN
DB/D DIABASE DYKE
PXDK PYROXENE - PORPHYRY DYKE
RYDK RHYOLITE DYKE
SYMBOLS
EDGE OF TALUS
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CONTACT ASSUMED
CONTACT GRADATIONAL
FAULT (showing direction of movement)
ALTERATION AREA
BEDDING - INCLINED, VERTICAL
JOINTING - INCLINED, VERTICAL
FOLIATION - INCLINED, VERTICAL
VEIN - INCLINED, VERTICAL
AREA OF SMALL VEINS
ANTICLINE - UPRIGHT, OVERTURNED
AXIAL PLUNGE
or GOSSANED AREAS
or GEOLOGY / ROCK SAMPLE STATION
THIN SECTION
TRACE ELEMENT / WHOLE ROCK ANALYSES
THIN SECTION & TRACE ELEMENT / WHOLE ROCK ANALYSES
or CHIP SAMPLE
Rock A (Rock B) ROCK A more frequent than ROCK B
GULLY
CREEK
CLAIM POST
ABBREVIATIONS
MINERALS
AS ARSENOPYRITE
AX AXINITE
BI BIOTITE
CA CALCITE
CH CHALCEDONY
CT CASSITERITE
CU COPPER
FU FLUORITE
GA GARNET
GL GALENA
GR GRAPHITE
HB HORNBLENDE
HE HEMATITE
IL ILLITE
LI LIMONITE
MG MAGNETITE
MN MANGANESE
MØ MOLYBDENITE
MS SERICITE
MU MUSCOVITE
OX OXIDES
PX PYROXENE
PY PYRITE
QC QUARTZ (CHERT)
QT QUARTZ & TOURMALINE
QZ QUARTZ
SL SPHALERITE
SU, SUL SULFIDE
TØ TOURMALINE
DESCRIPTORS
BLK BLACK
EQ EQUIGRANULAR
FEL FELDSPATHIC
G$ GREISEN
GSD GOSSANED
IB INTERBEDDED
LIM LIMY
MSS MASSIVE
PD POD
PEB PEBBLY
PG PEGMATITIC
PP PORPHYRITIC
SD SEDIMENTARY
SIF SILICIFIED
SR SERIATE
VC VOLCANOCLASTIC
/D DYKE
mc MIAROLITIC CAVITIES
V VEIN
<V MICROVEIN
W/ WITH
DU PONT EXPLORATION
CANADA
KLINKIT JOINT VENTURE
VAL(B) & SLOUCE (north part) PROJECTS
GEOLOGY
DORSEY RANGE, YUKON TERRITORY
1 : 5000
m 150 100 50 0 150 300 m
SCALE
MAPPED BY : G.M.D.
DATE : JUN.-SEP.'79
DRAWN BY : C.H.K., K.L.J.
DATE : NOV.'79
REVISED :
N.T.S. No. : 105 B
ACCT No. : 335 - 19 & 10
DRWG. No. : KL. 79-62


LEGEND
425 ◐ 12 SOIL SAMPLE STATION
WITH Sn/W VALUE IN P.P.M.
(– INDICATES BELOW DETECTION LEVEL)
0.015% ○ SOIL SAMPLE STATION
WITH VALUE FOR Sn IN PERCENT
NOTE:
ALL VALUES FOR Sn DETERMINED BY XRF
DU PONT EXPLORATION
CANADA
KLINKIT JOINT VENTURE
VAL(B) & SLOUCE(north part) PROJECTS
Sn/W GEOCHEMISTRY
DORSEY RANGE, YUKON TERRITORY
1 : 5000
m 150 100 50 0 150 300 m
SCALE
MAPPED BY : G.M.D.
DATE : JUN.-SEP.'79
DRAWN BY : C.H.K., K.L.J.
DATE : DEC. '79
REVISED :
N.T.S. No. : 105 B
ACCT No. : 335 - 19 & 10
DRWG. No. : KL. 79 - 63

DU PONT OF CANADA EXPLORATION LIMITED

REPORT OF GEOLOGICAL AND GEOCHEMICAL SURVEYS

on

VH PROJECT

by

B. Goad

(Supervised by F.M. Smith, P. Eng.)

January 1980

TABLE OF CONTENTS

APPENDICES

LIST OF FIGURES

VH

SPECIFIC PROSPECT - VH CLAIMS (335-14)

1. LOCATION AND ACCESS

The VH claims are located on the west central portion of the Seagull batholith, 19 km northwest of Swift River, Yukon. The claims are on claim sheet 105-B-3, centered approximately at 60°04'N and 131°28'W.

Access is only possible via helicopter from Swift River at present. The road access to the old Logjam Creek property passes within 5 km of the southwest end of the VH claims.

2. PHYSIOGRAPHY AND VEGETATION (Map KL 79-65)

The alpine area consists of a NW trending ridge located between two unnamed rivers: one (Dorsey Creek) flowing northwest into Dorsey Lake and the other (Midnight Creek) flowing west-northwest into the southern end of Cabin Lake. Two parallel aretes on the central and northern claims, with north facing cirques, trend and run off the claim group to the northeast. The northern faces of the aretes and cirque walls are sheer; however, the talus slopes and the gentle south facing (talus covered) side of the mountain can be traversed.

3. CLAIMS

The VH group consists of the following claims:

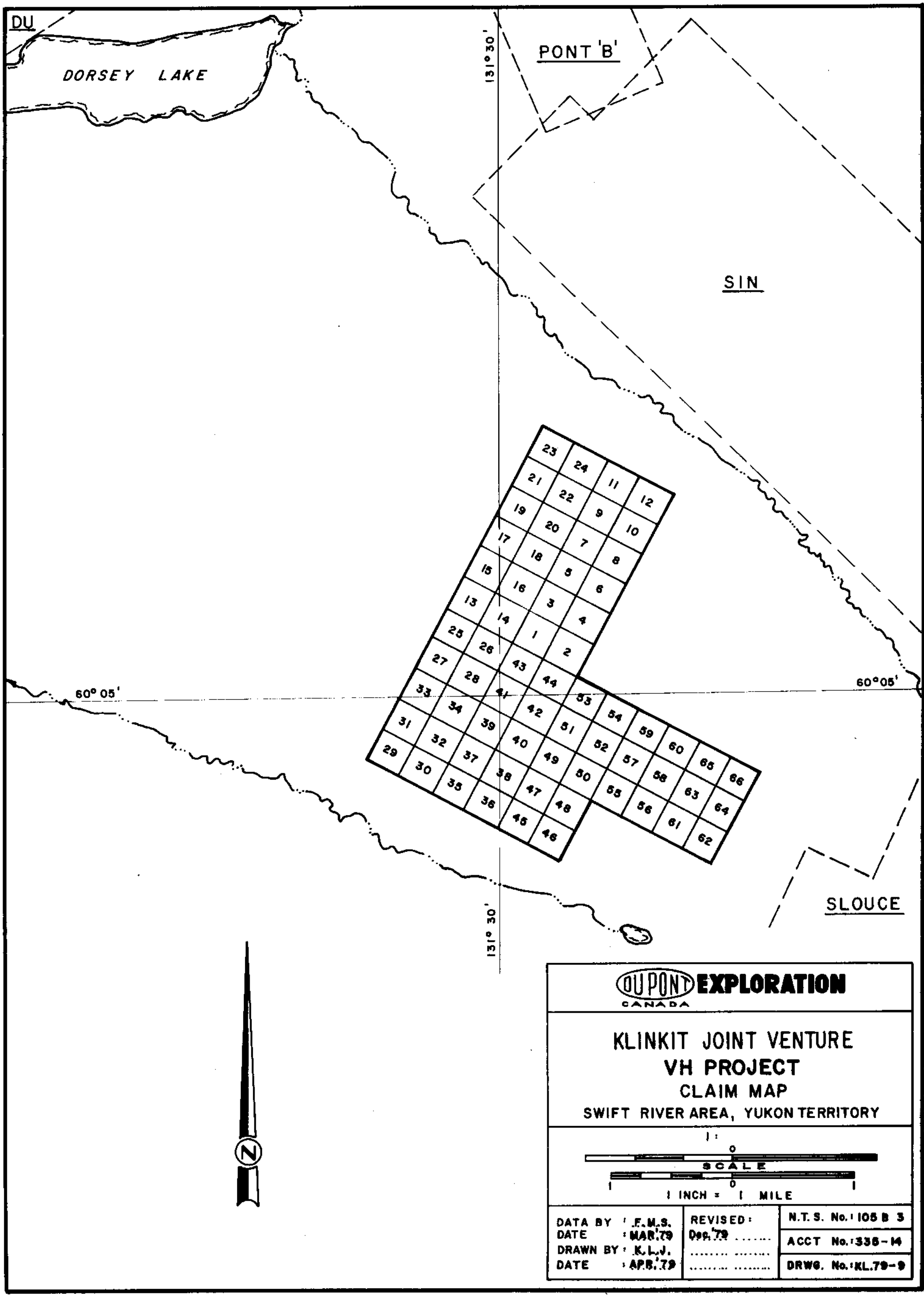
Claim Name	Record Numbers	Date of Expiry
VH-1-28	YA34079-YA34106	1980 01 10
VH-29-34	YA36995-YA37000	1980 06 19
VH-35-66	YA44001-YA44032	1980 06 19

All the claims are recorded in the Watson Lake MD, Yukon in the name of Du Pont of Canada Exploration Limited.

4. HISTORY

The original VH claims (VH 1-28) were located to cover the headwaters of two creeks that ran anomalous in tungsten. After these claims were located the DC syndicate located the MW claims southwest of the VH claims. In 1979, the new VH claims (VH 29-66) were located for protection between these above two groups covering the contact area of the Seagull batholith.

There is no record of work done in the area of the VH claims, nor were any old posts located. The streams draining the



DUPONT EXPLORATION
CANADA

KLINKIT JOINT VENTURE
VH PROJECT
CLAIM MAP
SWIFT RIVER AREA, YUKON TERRITORY

1 :

SCALE

1 INCH = 1 MILE

DATA BY : F.M.S. DATE : MAR.'79 DRAWN BY : K.L.J. DATE : APR.'79	REVISED : Dec.'79	N.T.S. No. : 105 B 3 ACCT No. : 336-14 DRWG. No. : KL.79-9

area have been sampled several times as flags of various ages and colours were noted in the main drainage to the north.

5. PROPERTY EVALUATION

5.1 Preliminary

The VH claims were initially visited between June 13-19, 1979 during which time only selected areas could be prospected due to the still heavy snow cover. More detailed prospecting was carried out August 6-10, 1979 and September 10, 1979.

5.2 Geology (Map KL 79-64)

The predominant rock type outcropping in all but the extreme southwestern portion of the original VH claims (VH 1-29) is "Seagull or Hake phase" of the Seagull batholith. This portion of the Dorsey Range potassic quartz monzonite to granite has roof pegmatite zones, minor tourmaline greisens and no visible sub-phases of the "DU" type of intrusives. Portions of the gossanous areas (in sheared zones) have the weathered chroma of the "DU" type intrusive and may represent fluid discharge from a buried subphase.

The southern and southeastern portions of the claim group are not mapped in detail as they are sheer cliffs of sediments of the Sylvester Group. These Sylvester group sediments are an extension of the bedding attitude as located on the northwest side of the SLOUCE group (strike NW dip W to SW). The principal units are white weathering arenites to cherts and limestone capped by volcano-wackes with minor intercalated sandy limestones in all units. The main lime unit is the "thick" lime as at the PONT(B), DB and SLOUCE groups. This unit is rich in arenite and forms the thickest skarn members.

Only one area of skarn was located on the VH group. It is in the saddle of the northeast trending ridge at the western end of the claims. It consists mainly of andradite garnet, wollastonite, diopside and calcite with minor scheelite, chalcopyrite and magnetite. Exposure is extremely poor being mainly covered by skarn talus.

5.3 Geochemistry (Map KL 79-66)

In total, 145 soil and 26 stream pan samples were taken, covering the sidehills and watershed of the new VH claims. Samples were analyzed for tin by XRF and tungsten by MIN-EN Labs. One major tungsten anomaly occurs at the contact of the Seagull batholith and Sylvester sediments.

Minor tin anomalies are located in the northwestern and southwest portion of the map. Neither zone has been prospected for tin mineralization but both are in areas of Sylvester sediments above but near the contact with granite of the Seagull batholith.

5.4 No *in situ* exposure of tungsten mineralization has been located on the mapped portion of the claim group; however, several samples of talus scheelite have been found below the skarned area in the western portion of the claims, only one of which proved to be anomalous:

Tag No.	W	Description
7108	3250 ppm	Skarn

6. CONCLUSIONS AND RECOMMENDATIONS

Initial work indicates the presence of a skarned area along the contact of the Seagull batholith with the Sylvester Group Sediments. This skarn should be trenched to expose the actual size and position and to assess its potential for economic mineralization.

The "old" VH claims apparently have no potential for mineralization, therefore the following claims should be dropped:

VH-2	YA34080
VH-4	YA34083
VH-5-12	YA34084 - YA34090
VH-17-24	YA34095 - YA34102

The remaining "old" VH claims should be kept for protection around the skarn zone until the point when its economic potential has been assessed.

Further prospecting and mapping on the "new" VH claims should be carried out during 1980 looking for possible skarn scheelite zones.

These claims (VH 1, 3, 13-16, 25-28 and 29-66) should be retained and have minimal assessment work filed to 1981 01 10.

APPENDIX I

STATEMENT OF EXPENDITURES

January 1 - December 31, 1979

VH CLAIMS, YT

Casual Labour		$ 131.46
Travel Expenses		217.49
Camp Expenses		1 288.77
Mapping, Gr. Surveys, Maps		404.27
Freight, Hauling, Storage		107.90
Assaying		1 026.61
Salaries - Regular		787.79
Salaries - Temporary		1 858.84
Space Charges		16.80
Equipment Rental		134.17
Stationery & Supplies		20.99
Telephone		71.01
Auto Expenses		27.60
Repairs & Mtce (excl. Auto)		5.65
Non Capital Equip. Purchases		111.52
Depreciation Expenses		222.46
	TOTAL	$ 6 433.33

APPENDIX II

Petrographic Reports

HAKE CREEK   Contact: Coarse Granite, Hornfelsed Sediment

granite		hornfelsed sediment	
perthitic K-feldspar	45%	quartz	65-70%
quartz	30	biotite	20-25
plagioclase	20	plagioclase	10
biotite	2- 3	apatite	trace
muscovite	minor	sericite	trace
epidote, fluorite, zircon, myrmekite, chlorite:	trace		

The granite is coarse to very coarse grained, with intergrown perthitic K-feldspar, plagioclase, and quartz. Perthite contains 5-15% exsolved plagioclase in two modes, one elongated parallel lenses with smooth borders and of small size, and larger, more irregular subparallel lenses and patches. Minor epidote occurs with plagioclase in one grain.

Most quartz is coarse grained, but a few fine grains occur interstitial to feldspars, and wispy quartz veinlets cut some perthite grains.

Plagioclase grains are prominently zoned, with a core of more-calcic plagioclase moderately altered to sericite, and a border of fresh more-albitic plagioclase. Some fine grained plagioclase grains occur along perthite-perthite grain borders, and may represent early exsolution of plagioclase from the perthite grains. A few grains contain minor myrmekitic intergrowths of quartz.

Biotite grains are up to 1 mm long, and strongly pleochroic from pale straw to medium reddish or greenish brown. Muscovite and minor chlorite occur along some biotite grain borders. Zircon forms scattered grains up to 0.02 mm across in biotite; they are surrounded by dark brown pleochroic halos.

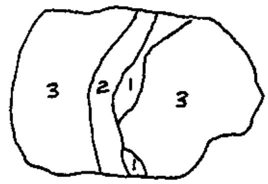
Muscovite forms a few isolated grains up to 0.15 mm long in quartz.

Fluorite forms one irregular grain 0.1 mm long in biotite.

The contact with the hornfelsed sediment is sharp. The sediment is metamorphosed to give a mosaic texture of intergrown quartz-plagioclase-biotite of grain size 0.02-0.15 mm. Coarser grained quartz and sparse plagioclase are enclosed in the fine grained aggregate. Apatite is minor, and sericite alteration occurs in a small irregular patch.

G-78-7-29-7 (a) 3 Phases: Granite, Biotite QM, Quartz Monzonite

The distinction of units in this sample is not as obvious as in sample (b); their distribution is shown in the sketch below:



1. Fine Grained Granite

microcline	40-45
quartz	30-35
plagioclase	20-25
biotite	2- 3
zircon	0.1
hematite	trace

This unit is fine grained (0.1-0.5 mm), with rounded equant quartz enclosed in anhedral microcline and plagioclase. Microcline contains very little exsolved plagioclase. Possibly this rock has been metamorphosed during inclusion in the coarser grained quartz monzonite.

2. Biotite Quartz Monzonite

quartz	30-35
perthitic K-feldspar	30
plagioclase	25-30
biotite	7-10
zircon	0.2
opaque	0.2
hematite	0.2

This rock is medium grained and contains abundant biotite. It has a moderately sharp contact with Unit 1, and a gradational contact with Unit 3, whose description below includes data for Unit 2.

3. Quartz Monzonite (coarse grained)

This unit has a gradational contact with Unit 2 and a sharp contact with Unit 1.

quartz	35
perthitic K-feldspar	30
plagioclase	30
biotite	4
muscovite	1
zircon	0.2
kaolinite-sericite	0.2
opaque	0.2
hematite	0.2
Ti-oxide	0.2

G-78-7-29-7 (a) (continued)

Grains are coarse to very coarse, anhedral, and slightly to moderately interlocking. Perthitic K-feldspar grains up to 8 mm across contain 5-35% exsolved plagioclase, mainly as irregular patches up to 1 mm long in optical continuity within individual perthite grains. K-feldspar is partly altered to dusty semiopaque; alteration is most intense along wispy sericitic fractures. Exsolved plagioclase in these grains is not affected by the alteration.

Plagioclase forms slightly elongated grains, some of which are slightly zoned; composition by the Michel Levy method is An_{10-8}. Alteration is minor except for a few grains where alteration to patches of sericite and fine grained hematite is strongly fracture controlled.

Quartz forms very coarse irregular grains.

Biotite forms ragged laths and flakes up to 1.5 mm across; pleochroism is from light straw to medium reddish brown. Some grains are slightly to strongly altered to muscovite, with fine grained Ti-oxide and/or opaque along cleavage planes.

Zircon forms scattered grains in quartz, and local concentrations of grains in some biotite flakes. Zircon in biotite is up to 0.1 mm in size, commonly anhedral to subhedral, and have strongly pleochroic halos. Some zircon grains are rimmed by sericite? and opaque.

Kaolinite-sericite forms very fine grained patches associated with biotite; patches are rounded and contain a few opaque grains. It forms alteration zones between some zircon grains and biotite, and some may replace zircon, as suggested by pleochroic halos surrounding some kaolinite-sericite patches. Identification of the mineral is difficult because of the fine grain size. Properties are: felty prismatic grains, parallel extinction, length-slow, light brownish-green color, low R.I. and low relief.

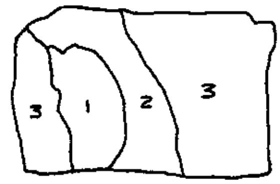
Opaque forms fine grained patches with kaolinite-sericite, it rims one zircon grain, it occurs with muscovite after biotite, and it forms scattered aggregates of a few grains up to 0.15 mm in grain size.

Hematite forms one grain 0.1 mm across surrounded by a rim of limonite and biotite-hornblende (lack of cleavage suggests hornblende); the latter mineral forms three small anhedral grains nearby. Hematite also forms an alteration of plagioclase as described above.

Ti-oxide occurs with muscovite in altered biotite.

G-78-7-29-7 (b)   Same as G-78-7-29-7 (a) except as noted below

The distribution of the three phases is shown below; contact relations are similar to those in sample (a).



The main difference from sample (a) is a slightly higher content of plagioclase in Unit 3, which would give this rock the name granodiorite rather than quartz monzonite. However, it is the same rock as Unit 3 in sample (a).

composition: plagioclase 30-35%, quartz 30, perthitic K-feldspar 30.

The data suggest that Unit 1 is an earlier phase, possibly partly metamorphosed during inclusion in the younger magma of units 2 and 3. Unit 2 would be a mafic-rich border zone of Unit 3, although in part Unit 3 is in contact with Unit 1 and no border zone intervenes.

G-78-7-29-8 Quartz Monzonite

perthitic K-feldspar	35-40%
plagioclase	25
quartz	20-25
biotite	3- 5
muscovite	1
zircon	minor
apatite	minor
amphibole, fluorite, opaque, epidote	trace

The rock is a medium to coarse grained aggregate of mainly anhedral feldspars and quartz. Some finer grained plagioclase enclosed in K-feldspar is subhedral to euhedral. Perthite contains 10-20% coarse patches of plagioclase of exsolution origin. In places perthite is slightly to moderately altered by dusty opaque. Plagioclase is slightly altered to sericite.Tentative composition from Michel-Levy method is An_{6-8}.

Biotite forms coarse scattered grains and finer aggregates. Pleochroism is from light straw to medium to dark reddish or orange-brown. Some grains are intergrown with muscovite, in some parallel to cleavage and in others perpendicular to cleavage. Muscovite also forms scattered fibrous aggregates with quartz.

Zircon forms several euhedral grains up to 0.15 mm in size in quartz grains, and small (0.02-0.05 mm) grains with strongly pleochroic halos in biotite.

Apatite forms one large grain 1.2 mm long and several smaller irregular grains in quartz and plagioclase.

Amphibole forms irregular grains up to 0.1 mm long in plagioclase.

Fluorite forms one grain 0.02 mm across in quartz.

Opaque forms a few grains 0.05-0.10 mm across mainly with biotite.

Epidote forms a few fine grained patches.

G-78-7-29-14 Quartz Monzonite - Granodiorite

perthitic K-feldspar	35%
plagioclase	30
quartz	30
biotite	3- 5
fluorite	0.5- 1
zircon	0.2
limonite	0.2
opaque, semi-opaque	minor
epidote, tourmaline	trace
rutile (?)	trace

The rock has an average grain size of 0.5 to 1 mm, with about 20% coarser grains, mainly of perthite and locally of quartz. Most grains are anhedral with rounded borders and for perthite irregular outlines.

Perthite grains are up to 6 mm across and contain 5-30% exsolved plagioclase in optical continuity within one grain. On the border of the largest perthite grain is a graphic intergrowth of quartz and K-feldspar.

Plagioclase grains are slightly concentrically zoned, but zonation is not prominent except in a few grains. Grains are very slightly to moderately altered, mainly to sericite with minor biotite and/or fluorite. More strongly altered grains contain patches of sericite (muscovite) and fluorite up to 0.1 mm in size. Some grains are altered to sericite-limonite. In zoned grains, cores are much more strongly altered than rims.

Quartz forms rounded to irregular interstitial grains, and is concentrated in a few coarse patches, where grain size is up to 5 mm.

Biotite forms subhedral to ragged laths. Most are pleochroic from light straw to medium brown, and contain sparse to abundant zircon grains with very strongly pleochroic halos. Locally biotite is intergrown poikilitically with quartz. Two more ragged biotite grains have light green-brown to dark greenish-brown pleochroism; they resemble biotite in sample J-78-8-6-7F. One biotite grain is completely altered to a ragged intergrowth of sericite, limonite, and Ti-oxide?

Fluorite forms scattered patches up to 0.4 mm across mainly between felsic grains, and fine alteration patches in plagioclase.

Zircon forms subhedral to euhedral zoned crystals up to 0.1 mm long in quartz. In biotite it forms anhedral to subhedral grains mainly 0.02-0.05 mm in size.

Limonite forms scattered interstitial patches up to 0.15 mm in size, and fracture filling and dusty alteration of a few grains of most other minerals.

Opaque and semiopaque form dusty alteration of some feldspar grains. A very high relief semi-opaque mineral forms a cluster of three grains 0.02-0.04 mm in size surrounded by quartz and feldspar.

Epidote forms a few light yellow very fine grains. Tourmaline forms two tiny grains in quartz; pleochroism is from yellow-green to bluish green. Rutile(?) forms a few needles in quartz.

G-78-7-29-17 Altered Hornfelsed Quartz-Plagioclase Porphyritic Dacite

phenocrysts	8-10%	
quartz	6- 7	
plagioclase	2- 3	(completely altered to kaolinite, limonite?, sericite)
groundmass	80-85%	
plagioclase	65-70	(altered in part to sericite and kaolinite
kaolinite-limonite ?	7-10	
quartz	3- 5	
garnet?	minor	
opaque	minor	
cavity fillings	5-7%	(includes discontinuous veinlets)
quartz	3-4	
opaque	1½-2½	
kaolinite	0.5	

The rock contains phenocrysts of quartz and plagioclase. Quartz phenocrysts are up to 3 mm across and most are euhedral with corroded and resorbed borders. A few consist of clusters of several smaller (0.3-0.5 mm) subhedral to euhedral grains. Plagioclase phenocrysts form clusters of euhedral grains 1-1.5 mm in size; some occur with quartz phenocrysts. Plagioclase is completely destroyed, being replaced by fine grained aggregates of fibrous to flaky sericite, and kaolinite-limonite? intergrowths of extremely fine grain size (less than 0.003 mm). Much of the alteration minerals have been plucked from the section, leaving cavities in the shape of the original plagioclase phenocrysts. Kaolinite-limonite? aggregates are medium brown-grey in color, which suggests that the mineral causing the color may not be limonite.

The groundmass has a texture which suggests that the rock has been partially recrystallized in a contact metamorphic zone. (I have seen similar textures in the contact metamorphic aureole at Britannia where dacite porphyry is baked by the Squamish granodiorite pluton). Plagioclase grains are 0.2 to 0.5 mm in size, with very irregular feathery outlines, and are partly replaced by flakes of sericite and patches of very fine grained kaolinite. No albite twins are present, and identification of plagioclase is on the basis of refractive index, birefringence, and abundance. Minor K-feldspar may be present in the groundmass, but not necessarily; the yellow stain on the polished block is more probably produced by absorption of the stain by sericite and clay than by K-feldspar.

Quartz forms scattered interstitial grains 0.03-0.08 mm in size. Kaolinite-limonite? forms light to medium brown colored patches of extremely fine grained aggregates averaging 0.2-0.3 mm in size. The original nature of these is unknown, but they more probably represent original mafic minerals than original feldspar.

One grain of garnet? is present; it is subhedral, light pink in color, with high relief and is isotropic. The grain is 0.5 mm across, and contains several inclusions of opaque 0.02 mm in size.

Cavity fillings and veinlets consist mainly of quartz, which appears to have grown outwards from the walls of the cavity in spherical growths. Quartz grains have uniform extinction, but concentric zones of kaolinite inclusions indicate the manner of growth. Some cavities have opaque or kaolinite in their centers, a few consist entirely of opaque. Both opaque and kaolinite are very fine grained.

The groundmass texture may have formed by hornfelsing and recrystallization of spherulitic groundmass as in S-7-25-2.

E-78-8-8-108 Quartz Monzonite with Tourmaline, Vein

K-feldspar perthite	40%
quartz	25-30
plagioclase	15-20
muscovite	5- 7
tourmaline	5- 7
muscovite after tourmaline ?	2- 3
apatite, zircon	minor
fluorite	minor

The rock is very coarse grained, with most grains between 1 and 5 mm.

K-feldspar perthite forms huge anhedral grains, with about 20% exsolved plagioclase which has been completely altered to calcite and kaolinite. Some of the K-feldspar may also have been altered in this manner, and the remaining K-feldspar has a dusty semiopaque alteration. Calcite forms lenses and irregular patches elongated in a preferred direction, and kaolinite forms very fine grained patches, also elongated in the same direction. This is the original orientation of exsolution plagioclase.

Quartz forms anhedral grains interstitial in part to feldspars.

Plagioclase grains are moderately to completely altered to fine grained sericite and irregular patches of calcite.

Muscovite forms scattered clusters of grains up to 3 mm long.

Tourmaline forms irregular to equant grains in a large patch in the center of the slide, and along the vein. Pleochroism is mainly from pale to medium orange-brown. Minor secondary? tourmaline intergrown with muscovite-sericite has plae blue-green pleochroism; it forms mainly on the borders and fractures of orange-brown tourmaline. Some grains are strongly poikilitic with intergrown quartz.

A few grains near tourmaline clusters are completely altered to muscovite with an unusual texture. In part the muscovite is coarse, and in part extremely fine; grains are in subparallel felted aggregates, and no cleavage is present. Some of these are surrounded by normal muscovite in thin rims in optical continuity all the way around the inner grain, but not in optical continuity with the inner grain.

Apatite forms one grain 1 mm long. It appears to be partly replaced by radiating clusters of very fine grained sericite, which has a light brown color in contrast to colorless muscovite adjacent to it.

Zircon forms one subhedral grain 0.5 mm long.

Fluorite forms a patch 0.3 mm across with tourmaline and muscovite.

The rock is cut by a complex vein at one end of the sample. The vein is zoned; zonation is outlined briefly below:

Border of vein: poikilitic tourmaline or epidote patch, fine grained quar

Zone 1: carbonate-kaolinite: irregular carbonate grains 0.05-0.1 mm scattered in very fine grained kaolinite (0.005-0.01 mm)

2: quartz-chlorite-(sericite-Ti oxide) (0.02-0.05 mm)

3: same as 1

4: tourmaline-biotite-quartz-chlorite-kaolinite (0.05-0.08 mm)

5: quartz-muscovite-fluorite-opaque: coarser (0.15 mm) very irregular interlocking quartz with fine grained other minerals

6: biotite-tourmaline-kaolinite-calcite-Ti oxide (similar to 4)

7: same as 5

8: same as 6

9: same as 5

G-78-7-29-15 Quartz Monzonite

perthitic K-feldspar	35%
quartz	25-30
plagioclase	25-30
biotite	5- 7
fluorite	3
muscovite	1
zircon	0.2
hematite	0.1
dusty opaque	0.1

The rock is a medium to coarse irregular aggregate of quartz and feldspars, with scattered grains and clusters of biotite and abundant interstitial fluorite.

Perthite contains variable amounts of exsolved plagioclase, from none to 20%, mainly in irregular patches. Dusty alteration by opaque(?) and other minerals forms patches in perthite and some plagioclase grains. Plagioclase is moderately altered to one or more of muscovite (sericite), biotite, and fluorite; a common alteration consists of coarse grained (up to 0.5 mm) patches of each mineral scattered through the plagioclase grain. One plagioclase grain is strongly altered to fine grained felty sericite.

Quartz forms coarse grains from 0.5 to 2 mm in size.

Biotite forms ragged grains up to 1 mm across. Pleochroism is strong from light straw to medium reddish-brown. Some grains contain abundant tiny zircons (0.02-0.1 mm) with strongly pleochroic halos.

Fluorite forms patches up to 0.8 mm across interstitial to the other minerals, and as alteration patches in plagioclase. Some fluorite patches contain inclusions of a fine grained, moderate relief, green mineral and locally of hematite.

Muscovite forms scattered grains in quartz, as an alteration of plagioclase, and locally intergrown with biotite parallel to cleavage.

Zircon forms zoned euhedral grains up to 0.2 mm across in quartz, and smaller grains in biotite as described above.

Hematite forms patchy alteration of plagioclase and occurs locally with fluorite. Dusty opaque forms an alteration of feldspars; its intensity varies widely.

APPENDIX III

Whole Rock and Trace Element Study

• CHEMICAL RESEARCH AND ANALYSIS
• CONTRACT LABORATORIES

TECHNICAL SERVICE LABORATORIES
DIVISION OF BURGENER TECHNICAL ENTERPRISES LIMITED
1301 FEWSTER DRIVE, MISSISSAUGA, ONT. L4W 1A2
TELEPHONE: (416) 625-1544
TELEX 06-960215

CERTIFICATE OF ANALYSIS

SAMPLE(S) FROM Du Pont of Canada Exploration Ltd.,
Suite 102,
1550 Alberni Street, Attn. Ms. G. Ditson
Vancouver, B.C.
V6G 1A5

REPORT No. T - 134
Inv. #11249
Let. May 11/79

SAMPLE(S) OF ROCK

WHOLE-ROCK ANALYSIS IN %

Sample No.	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	Na_2O	K_2O	TiO_2	MnO	P_2O_5	LOI	Total
B	68.57	11.70	8.70	0.09	0.01	1.31	7.00	0.14	0.33	0.02	1.60	99.47
DU 3W/B1	74.00	12.02	1.30	0.39	0.00	3.16	5.11	0.09	0.01	0.01	0.71	96.80
DU 3WO/51	83.78	8.30	0.58	0.02	0.00	2.54	3.03	0.08	0.00	0.00	0.51	98.84
E-78-7-31-62	76.28	11.78	1.11	0.18	0.04	3.10	5.63	0.10	0.01	0.01	0.36	98.60
E-78-8-3-79	70.90	15.28	0.81	1.35	0.10	5.73	3.07	0.08	0.01	0.02	0.40	97.75
E-78-8-4-90	73.85	11.94	1.69	0.45	0.00	3.33	5.14	0.14	0.01	0.01	0.38	96.94
E-78-8-8-101	73.79	12.37	1.88	0.75	0.15	3.05	5.17	0.23	0.02	0.05	0.40	97.86
E-78-8-10-118	68.07	15.53	1.52	1.79	0.41	5.73	3.87	0.19	0.04	0.07	0.47	97.69
G-78-7-29-13	73.73	12.03	0.34	0.15	0.00	4.75	3.98	0.05	0.00	0.01	0.18	95.22
G-78-7-29-14	73.99	11.87	1.21	0.52	0.00	3.25	5.05	0.07	0.01	0.04	0.44	96.45
G-78-8-5-3	42.44	11.80	16.06	12.28	11.14	1.77	1.02	1.59	0.21	0.50	0.84	99.65
G-78-8-5-6	48.22	9.60	12.50	12.20	11.82	1.45	2.05	1.10	0.21	0.26	1.03	100.4
G-78-8-5-9	43.04	2.36	13.47	8.92	28.16	0.25	0.23	0.19	0.22	0.06	1.54	98.44
G-78-8-5-11	75.34	12.16	1.63	0.50	0.20	3.34	4.95	0.11	0.01	0.04	0.47	98.75
G-78-8-10-11	56.40	15.78	8.93	7.09	4.36	2.50	3.17	0.83	0.16	0.30	0.36	99.88
J-78-7-22-4	55.29	14.55	8.27	6.93	5.39	4.61	2.22	0.70	0.11	0.36	1.04	99.47
J-78-7-22-10	47.62	10.19	8.66	12.78	14.77	1.73	1.91	0.43	0.15	0.25	1.09	99.58
J-78-7-26-5	74.64	12.92	1.81	0.07	0.03	2.73	6.35	0.07	0.01	0.03	0.82	99.48
J-78-7-29-8	77.37	12.90	0.90	0.09	0.14	1.17	5.25	0.01	0.08	0.03	2.21	100.1
J-78-8-5-2	71.32	13.95	1.32	0.90	0.24	3.82	4.60	0.19	0.04	0.06	0.90	97.34
J-78-8-5-11	71.19	14.22	1.44	0.86	0.06	3.89	4.96	0.17	0.05	0.04	1.45	98.33
J-78-8-6-3	70.28	15.31	2.10	1.96	0.36	3.74	5.29	0.22	0.06	0.07	0.56	99.95
J-78-8-6-7F	72.70	13.58	1.79	1.28	0.19	3.85	4.73	0.19	0.07	0.06	0.55	98.99
S-7-25-2 (GR)	72.60	13.10	2.04	0.65	0.15	2.61	5.70	0.28	0.02	0.15	0.40	97.70
S-7-29-19	70.68	15.69	0.79	1.48	0.32	6.03	3.04	0.09	0.01	0.03	0.45	98.61
S-7-29-20	75.53	11.50	0.52	2.55	0.00	6.09	0.26	0.01	0.00	0.02	1.31	97.79
S-7-29-21	74.46	12.36	1.20	0.24	0 00	4.44	4.84	0.05	0.00	0.01	0.33	97.93
S-7-31-7	74.27	12.11	1.53	0.06	0.04	3.17	5.65	0.10	0.01	0.01	0.31	97.26
SG	77.26	10.96	1.25	0.36	0.01	3.33	4.44	0.11	0.01	0.01	0.31	98.05
SLOUCE	74.54	11.93	1.43	0.57	0.00	3.45	5.49	0.08	0.01	0.01	0.44	97.95
VH	74.44	12.70	1.66	0.28	0.01	3.28	6.58	0.09	0.01	0.01	0.35	99.41

Samples, Pulps and Rejects discarded after two months

DATE July 30, 1979 SIGNED [signature]

CTA

Copy to:- Ms. G. Ditson, Du Pont of Canada Exploration Ltd., General Delivery, Swift River, YT. Y0A 1A0

TSL

• CHEMICAL RESEARCH AND ANALYSIS
• CONTRACT LABORATORIES

TECHNICAL SERVICE LABORATORIES
DIVISION OF BURGENER TECHNICAL ENTERPRISES LIMITED
1301 FEWSTER DRIVE, MISSISSAUGA, ONT. L4W 1A2
TELEPHONE: (416) 625-1544
TELEX 06-960215

CERTIFICATE OF ANALYSIS

SAMPLE(S) FROM Du Pont of Canada Exploration Ltd.

Attn. Ms. G. Ditson

REPORT No. T - 134

SAMPLE(S) OF ROCK

MINOR ELEMENTS IN PPM

	Rb	Cr	V	Pb	Sr	Ba	Sn	W	Zr	Mo
B	420	216	14	57	200	300	100	<2	150	<1
DU 3 W/BI	360	129	<2	32	<100	30	<5	<2	100	<1
DU 3 WO/BI	240	146	<2	67	<100	50	20	<2	100	<1
E-78-7-31-62	400	170	<2	25	<100	20	<5	<2	200	<1
E-78-8-3-79	80	115	2	21	1000	3000	<5	<2	50	<1
-78-8-4-90	500	149	2	30	<100	20	5	<2	75	<1
E-78-8-8-101	320	179	<2	22	<100	300	<5	4	75	<1
E-78-8-10-118	80	121	10	19	3000	3000	10	<2	50	<1
G-78-7-29-13	300	130	2	18	<100	20	100	4	50	<1
G-78-7-29-14	410	190	<2	34	<100	10	<5	<2	50	<1
G-78-8-5-3	<80	403	340	32	500	300	10	<2	10	<1
G-78-8-5-6	<80	830	244	195	300	300	50	<2	10	<1
G-78-8-5-9	<80	2510	84	29	200	10	5	<2	<10	<1
G-78-8-5-11	510	155	2	20	<100	<10	<5	<2	150	<1
G-78-8-10-11	80	165	172	46	500	500	30	4	10	<1
J-78-7-22-4	<80	235	130	29	700	1000	5	4	20	<1
J-78-7-22-10	<80	1010	152	71	500	700	10	4	<10	<1
J-78-7-26-5	600	156	12	32	<100	10	<5	<2	200	<1
J-78-7-29-8	300	58	<2	21	<100	50	5	<2	50	<1
J-78-8-5-2	190	133	2	18	200	1000	5	<2	150	<1

Samples, Pulps and Rejects discarded after two months

DATE July 30th, 1979.   SIGNED

CTA

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TELEX 06-960215

CERTIFICATE OF ANALYSIS

SAMPLE(S) FROM Du Pont of Canada Exploration Ltd.

Attn. Ms. G. Ditson

REPORT No. T - 134

SAMPLE(S) OF ROCK

MINOR ELEMENTS IN PPM (Cont'd)

	Rb	Cr	V	Pb	Sr	Ba	Sn	W	Zr	Mo
J-78-8-5-11	210	112	2	18	300	1000	<5	<2	150	<1
J-78-8-6-3	120	100	14	18	600	4000	<5	<2	200	<1
J-78-8-6-7F	210	119	12	20	500	1000	<5	<2	150	<1
S-7-25-2 (GR)	280	145	4	21	<100	700	<5	<2	150	<1
7-29-19	<80	105	<2	13	3000	4000	10	<2	50	<1
S-7-29-20	<80	122	<2	11	1500	150	30	6	150	<1
S-7-29-21	500	152	<2	31	<100	50	<5	<2	200	<1
S-7-31-7	510	111	<2	17	<100	20	<5	<2	150	<1
SG	320	161	<2	29	<100	50	<5	<2	50	<1
SLOUCE	500	172	<2	23	<100	<10	<5	<2	150	<1
VH	550	158	<2	31	<100	<10	<5	<2	200	<1

NOTE: Lithium could not be analysed. However this element was not detected with the spectrograph.

Samples, Pulps and Rejects discarded after two months

DATE July 30th, 1979. SIGNED

CTA

APPENDIX A

GEOCHEMICAL AND ASSAY PROCEDURES

1. Sampling
2. Sample Preparation
3. XRF Determination
4. Min-En Geochemical and Assay Analysis

Table A

Ecko Mineral Analyzer

GEOCHEMICAL AND ASSAY PROCEDURES

1. Sampling

1.1 Soil samples were collected below the root zone on vegetated slopes, or from sand size material on talus slopes, using a prospectors grub hoe for digging. An approximately 0.5 to 1.0 kg sample was put into a Kraft wet-strength bag that had an indestructible pre-numbered tag attached. Standard field data was logged on the tag and the arbitrary co-ordinates from the topo map were recorded for later plotting. Elevation and traverse distance were controlled with metric altimeters and metric hip chains, respectively. Additional control of specific sites was possible with 1:10 000 photo mosaics or 1:5 000 contour maps. Some samples were collected on detail grids (e.g. DU PLATEAU and MC RIDGE) with chained picket stations.

1.2 Geological sample locations were controlled by 1:10 000 photo maps, 1:5 000 topo maps, or picket grids. Notes were logged on International Geosystems' 6B02 Geoform using the "geolog" coding system. Samples of granitic material and "type" specimens were of sufficient size for thin section and whole rock analysis, with a few large samples collected for possible age dating.

1.3 Chip or panel samples were taken with hammer and moil, either on "fresh" rock faces or in vertical walls or horizontal floors of trenches. In general, we attempted to collect 2-3 kg of sample from a 1 m long sample train, with care taken in collecting fines. Only two one-meter-square "panel" samples were attempted; but proved too time-consuming to be cost-efficient. All samples were logged on the same type of data sheets as the soil samples, and bagged in plastic with a pre-numbered tag attached.

1.4 Bulk samples were collected from the area of the fault on trench T9 (i.e., T9N), from the gossanous zone on trench T9 (i.e., T9S) and from the northern end of T10/11 by blasting and hand mucking material. The blasted rock was shovelled into large plastic bags, attempting to mix the size fractions as evenly as possible. Three 45 gallon barrels from each of T9N and T9 were filled and two barrels were collected from T10. The barrels were capped and shipped to Vancouver, from where one barrel from each of T9N, T9S and T10/11 were sent to the Warren Spring laboratory in Great Britain for recovery analysis.

2. Sample Preparation

2.1 Soil samples were dried in two steel cabinet ovens for at least 12 hours. The whole sample was pulverized in a 8" (20 cm) manganese steel disc pulverizer producing a majority of pulverized material finer than 200 mesh, but all was finer than 80 mesh. The rock/soil pulp was split into two equal portions, one bagged in coin envelope and the other put through the tin analysis system (See section 3, XRF Determination) or sent to Min-En Labs for analysis of other elements. Those samples which produced significant tin values by XRF were sent to Min-En for a check analysis by geochemical or assay methods. Those samples not sent to Min-En for duplicate analysis were bagged in coin envelopes and stored separately from the duplicate pulps. All pulps were transported to Vancouver and are stored in the Du Pont of Canada Exploration Ltd.'s warehouse.

2.2 Geological samples were cut on a screw-fed diamond saw. One portion was crushed in a 4" x 6" (10 cm x 15 cm) jaw crusher, pulverized, and split into two pulps. Usually one pulp was analyzed for tin by XRF. The uncrushed sample was retained for binocular microscope examination, labeled, bagged and shipped to Vancouver for storage in the warehouse.

2.3 Rock chip samples were dried, passed through the jaw crusher and split to 1/8 or 1/16 portions in a coarse splitter. The small split was pulverized to form two rock pulps with the fine splitter. All rock chip pulps were analyzed for tin and check assays run on "anomalous" values by Min-En Labs. In November, Min-En was given all rejects (coarse split) to make a large pulp and these pulps were re-assayed.

2.4 The bulk sample had two 3 kg samples removed from one of the T9S barrels for analysis by Warren Spring Laboratory and Duval International Corp.

3. XRF Determination

Analysis of the tin content of rock, soil or rock chip pulps was done at the Swift River Lab., which was designed and set up by Min-En Labs Ltd.

The principal equipment is an Ekco Instruments Ltd, M8524 Mineral Analyzer, which uses a 1 curie promethium/aluminum source filtered by silver/paladium.

Pulped samples were placed in foam cups, covered by metalized mylar, blended by rolling, and inverted on the probe. The sample was exposed for a 10 second count with each of the two filters. The first count (up count) and the difference count (down count) were recorded.

J. Barakso of Min-En, working with Overseas Monitor Corp. of Vancouver, developed a standardizing equation (for the high energy source) using 1978 rock pulps as standards and a series of pulped granite samples with varying amounts of SnO_2 added.

The regression equation is:

$$\text{XRF value} = \frac{2400}{\text{Up count}} \times \text{Down count}$$

Using the standards and 1979 results, we devised two straight-line regressions for the standard curve. These were labeled "ppm" and "%" as they represented the low and high values, respectively.

Thus, when reporting results for the XRF determinations, the low side (50 ppm - 700 ppm) were reported as ppm and the high (0.005% - 5%) were reported as "%". The following tables give the conversion from XRF to % or ppm.

Comparison of XRF % to Min-En assay shows the XRF was consistantly conservative (lower) by varying amounts, but increasingly conservative with increasing tin content. Min-En geochemical analysis uses ammonium-iodide extraction, which will not extract tin bonded in silicates or borates, and only partially liberates tin in sulphides. Thus, XRF determinations of +0.1% where Min-En results are only a few ppm are probably all silicate tin. For reconnaissance work, we utilize the partial extraction by Min-En to separate those areas requiring follow-up examination for cassiterite and those of less importance but having tin silicate or sulphide mineralization.

4. Min-En Laboratory Ltd. utilized two different digestions for geochemical or assay analysis. Geochemical analysis uses the sublimation of tin iodide from a mixture of the pulp and ammonium iodide, and colourimetric comparison against standards to give partial (primarily tin as cassiterite) tin content.

   Assay determination is by fusion and A.A. Analysis to give "total" tin content of the sample.

TABLE A

XRF	% Tin	XRF	% Tin	XRF	% Tin
119	0.005	206	0.44	297	0.90
120	0.010	208	0.45	299	0.91
121	0.015	210	0.46	301	0.92
122	0.020	212	0.47	303	0.93
123	0.025	214	0.48	305	0.94
124	0.030	216	0.49	307	0.95
126	0.040	218	0.50	309	0.96
128	0.050	220	0.51	311	0.97
130	0.060	222	0.52	313	0.98
132	0.070	224	0.53	315	0.99
134	0.080	226	0.54	317	1.00
136	0.090	228	0.55	319	1.01
138	0.10	230	0.56	321	1.02
140	0.11	232	0.57	323	1.03
142	0.12	234	0.58	325	1.04
144	0.13	236	0.59	327	1.05
146	0.14	238	0.60	329	1.06
148	0.15	240	0.61	331	1.07
150	0.16	242	0.62	333	1.08
152	0.17	244	0.63	335	1.09
154	0.18	246	0.64	337	1.10
156	0.19	248	0.65	339	1.11
158	0.20	250	0.66	341	1.12
160	0.21	252	0.67	343	1.13
162	0.22	254	0.68	345	1.14
164	0.23	256	0.69	347	1.15
166	0.24	258	0.70	349	1.16
168	0.25	260	0.71	351	1.17
170	0.26	262	0.72	353	1.18
172	0.27	264	0.73	355	1.19
174	0.28	266	0.74	357	1.20
176	0.29	268	0.75	359	1.21
178	0.30	270	0.76	361	1.22
180	0.31	272	0.77	363	1.23
182	0.32	274	0.78	365	1.24
184	0.33	276	0.79	367	1.25
186	0.34	277	0.80	369	1.26
188	0.35	279	0.81	371	1.27
190	0.36	281	0.82	373	1.28
192	0.37	283	0.83	375	1.29
194	0.38	285	0.84	377	1.30
196	0.39	287	0.85	379	1.31
198	0.40	289	0.86	381	1.32
200	0.41	291	0.87	383	1.33
202	0.42	293	0.88	385	1.34
204	0.43	295	0.89	387	1.35

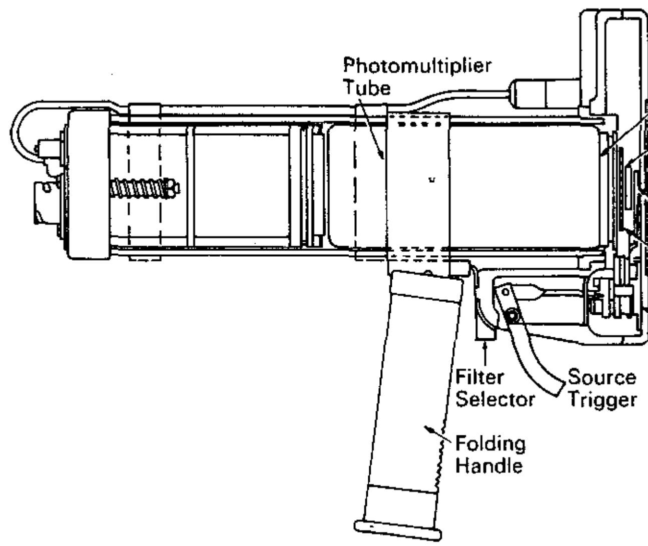
XRF	% Tin	XRF	ppm tin	XRF	ppm tin
389	1.36	91.4	0	91	0
391	1.37	91.8	10	92	15
393	1.38	92.1	20	93	40
395	1.39	92.5	30	94	70
397	1.40	92.9	40	95	95
417	1.5	93.3	50	96	120
437	1.6	93.6	60	97	145
457	1.7	94.0	70	98	175
477	1.8	94.4	80	99	200
497	1.9	94.8	90	100	225
517	2.0	95.1	100	101	250
537	2.1	95.5	110	102	275
557	2.2	95.9	120	103	300
577	2.3	96.2	130	104	325
597	2.4	96.6	140	105	350
616	2.5	97.0	150	106	400
636	2.6	98.9	200	107	425
656	2.7	100.8	250	108	450
676	2.8	102.6	300	109	475
696	2.9	104.5	350	110	500
716	3.0	106.4	400	111	525
816	3.5	108.3	450	112	550
915	4.0	110.1	500	113	575
1115	5.0	113.9	600	114	600
1314	6.0	117.6	700	115	625
1514	7.0	121.4	800	116	650
1713	8.0	125.1	900	117	675
1912	9.0	128.9	1000	118	700
2112	10.0				

EKCO Mineral Analyser

The Ekco Mineral Analyser was developed by Ekco in association with the British Institute of Geological Sciences and the United Kingdom Atomic Energy Authority.

QUICK, ACCURATE, EFFICIENT

- **Analysis in less than 30 seconds**
- **X-ray fluorescence and scaler techniques give greater accuracy**
- **P.H.A. improves efficiency**
- **Auto subtract device – difference reading is shown as a net count**
- **Simple press-button operation**
- **Easy-read digital presentation**
- **Portable, lightweight solid state design**
- **Power options – rechargeable batteries or A.C. mains**
- **Rugged go-anywhere construction**



Applications

Mining Industry On site assay of ores, off-stream sample analysis of ore pulp and tailings. Ore sorting for blending and storage.

Whilst the Ekco Mineral Analyser was primarily designed for use in the Mining Industry it has applications in much wider fields.

Steel and Metals. Analysis of alloy in ingot, sheet, bar and tubes. Assay of slags. Scrap sorting. Alloy identification of extrusions and forgings. Coating thickness measurement. Analysis of electroplating bath solutions.

Chemicals. Analysis of elemental chemical compositions.

Petroleum. Analysis of additives and impurities in petrol, lubricating oils, hydrocarbons and petroleum products.

General Description

PROBE M8563

The radioisotope is held in a 'central-source' arrangement which has an automatic, fail safe shutter. This obviates any possible error due to partial opening.

The two filters are in a 'spectacle frame' and a toggle action switch places the required filter before the scintillator window and switches scale count direction.

By using spare heads with different sources and filters the analyser can be changed to cover a wide range of applications.

The complete probe is constructed in aluminium alloy. It is light, easy to operate and has a fold away pistol-grip handle.

MINERAL ANALYSER M8524

This provides seven specific functions : bi-directional counting ; timing, pulse-height analysis, H.V. supply ; amplifier ; ratemeter and display. Circuit board mounted integrated devices are used throughout, apart from the H.V. Unit which is contained in an easily removable thermal insulated can. This form of construction simplifies servicing, maintains a high packaging density and gives exceptional reliability. The rechargeable batteries give ten hours continuous use. The battery pack can be replaced by an identical sized power unit for mains operation ; this will also act as a battery charger.

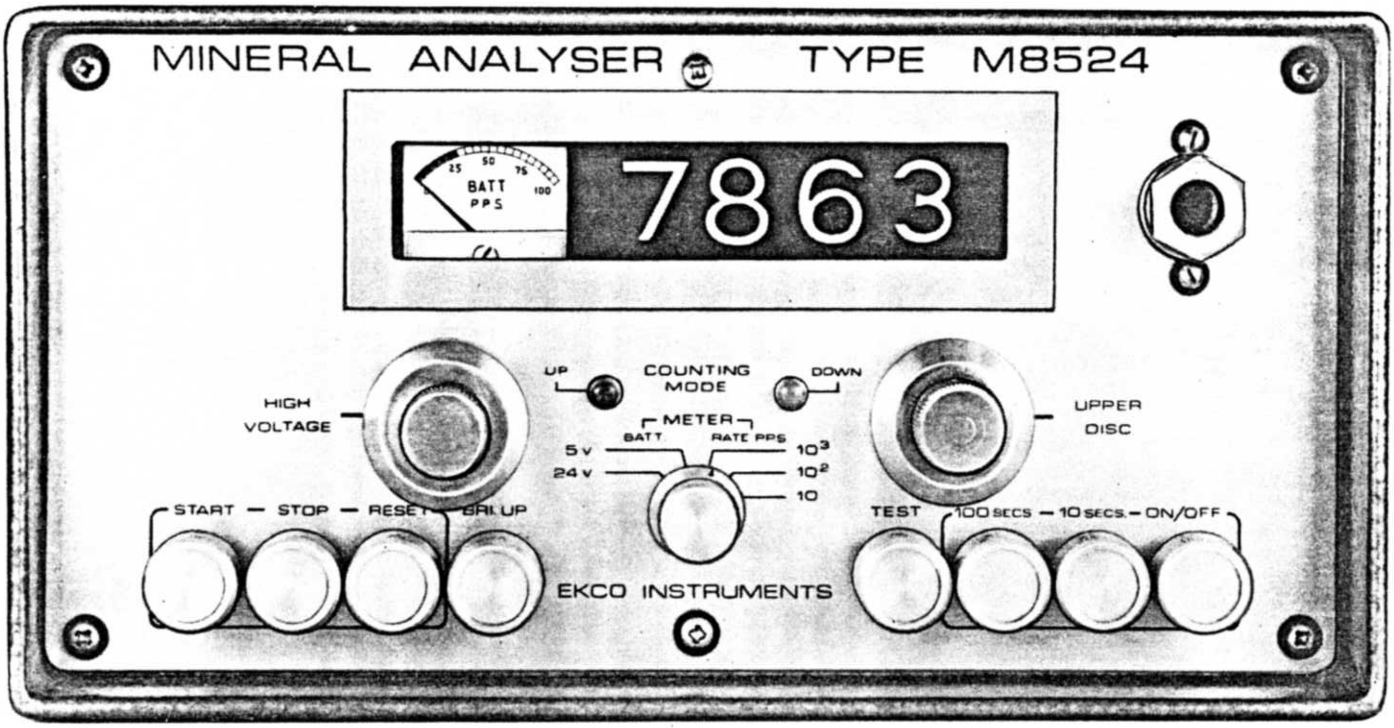
Carrying Case

The complete equipment is carried in a waterproof case. It is lined with expanded polythene and gives the instrument the climatic and environmental protection it requires in its 'go-anywhere' role. The shoulder straps are designed so that the instrument can be secured at waist level, leaving the operator's hands free.

LABORATORY STAND M8568

A special stand is available for the simple conversion of the mineral analyser to a bench-mounted system. The probe is inverted and screwed to the underside of the stand and the system is ready for operation.

Adjustable blocks are incorporated to position core samples over the face of the probe. Powdered samples in the special containers, which are available, may also be placed on the probe face.



Operation

The mineral analyser may be used as a hand-held instrument with the probe unit pressed against the mineral sample (rock face, rock sample, metal sheet, etc.) or as a laboratory system with the probe mounted on a stand.

The probe trigger is pulled, exposing the gamma (or X) ray source and irradiating the sample.

The 'counting time' is selected by pressing the appropriate push-buttons and the count is initiated by pressing the Reset and Start buttons.

On completion of the 'up' count the filters are changed, by simply operating a toggle-lever on the probe unit, which also automatically changes the mode to 'subtract'. The Start button on the analyser is again pressed.

The resulting 'difference count' may be converted to a 'percentage concentration' by comparison with a calibration graph of a standard sample.

Table of approximate detectable limits, 10 seconds counting time

Metal	Source	Filter	Detectable Limit
Titanium	5 mCi ^{55}Fe	Ti/Sc	0·1 %
Iron	30 mCi ^{238}Pu	Mn/Cr	0·2 %
Nickel	30 mCi ^{238}Pu	Co/Fe	0·06 %
Copper	30 mCi ^{238}Pu	Ni/Co	0·05 %
Zinc	30 mCi ^{238}Pu	Cu/Ni	0·02-0·04 %
Molybdenum	2 mCi ^{109}Cd 0·4 Ci ^{147}Pm/Al Brems	Zr/Y Zr/Y	0·005-0·01 % 0·05 %
Tin	1 Ci ^{147}Pm/Al Brems 10 mC Am241	Ag/Pd	0·02-0·03 % 0·05 %
Lead	0·3 mCi ^{57}Co(K) 30 mCi ^{238}Pu(L)	Ir/Re Ge/Ga	0·03-0·06 % 0·05-0·1 %

Metal	Source	Filter	Detectable Limit
Tungsten	0·3 mCi ^{57}Co(K) 30 mCi ^{238}Pu(L)	Yb/Ho Cu/Ni	— 0·5 %
Arsenic	30 mCi ^{238}Pu	Ge/Ga	0·1 % (estimated)
Cobalt	30 mCi ^{238}Pu	Mn/Fe	0·1 % „
Niobium	2 mCi ^{109}Cd	Y/Sr	0·01 % „
Chromium	30 mCi ^{238}Pu	V/Ti	0·3 % „
Manganese	30 mCi ^{238}Pu	V/Cr	0·3 % „
Silver	1 Ci ^{147}Pm/Al Brems.	Ru/Rh	0·03 % „
Gold	0·3 mCi ^{57}Co(K)	W/Ta	0·04 % „

Note: The Mineral Analyser M8524 is also used in the Ekco Borehole Logger M8524/C2540. At present this has been specifically developed for tin but other applications are being investigated. The design concept is based on compatible spares and, in special circumstances, a multi-use system.

Principle of Operation

The electrons which orbit about the nucleus of each atom are held in place by the attraction of positively charged protons in the nucleus. The energy required to eject an electron from the atom varies with each element. Also it varies according to the ring or shell in which the electron is located.

By selecting an external X-ray source with an X-ray energy greater than the binding energy of an electron in a specific ring of a given element, an electron in that ring can be ejected. After losing the electron, the atom is said to be 'excited'. During the process of excitation an X-ray is normally emitted.

The energy of the X-ray emitted, like the binding energy of the electron, is characteristic of the atom. Given a means of detecting that X-ray and measuring its energy, one can readily determine the element from whose atom it came.

The Ekco Mineral Analyser uses a radio isotope X-ray source selected to excite the atoms of the element of interest. The source is mounted in the probe assembly and it irradiates the sample when the safety shutter is opened. The resulting characteristic X-rays from the sample are detected by a sodium iodide crystal coupled to a photomultiplier tube. Pulses from the photomultiplier are then amplified and counted with the scaler.

Some method of energy determination is then required since in the usual case unwanted X-radiation from other elements in the sample as well as backscattered radiation from the source will be present. Since the pulses from the photomultiplier are proportional in height to the energy of the radiation, the single channel analyser can be used to accept for scaling only those pulses representing the energy range of interest. In many cases however the extraneous radiations lie too close in energy to the desired X-ray to be completely rejected by the pulse height technique.

The technique used in the Ekco Mineral Analyser for energy selection is that of balanced filters. The filters are constructed of thin foils or composite films and are mounted in the probe assembly immediately behind the radioisotope source. All radiation emitted from the sample passes through a filter before reaching the detector.

Filters are selected for each specific application. By suitable adjustment of thickness, the X-ray transmissions through the filters are made equal over a wide range of energies. The only exception is the pass band between their two absorption edges where the transmissions will differ greatly. This pass band includes the energy of the X-ray of interest.

The 'up-down' scaler counts X-ray transmissions with one filter in place and then subtracts X-ray transmissions with second filter in place. The difference is proportional to the desired X-ray intensity and thus to the percent concentration of the element being analysed. The principle of operation is normally referred to as secondary X-ray fluorescence spectrometry.

CALIBRATION

Calibration is effected by using a number of standard samples of known density and matrix composition which approximate as near as possible to those of the samples under investigation. The concentrations of the required element in these samples should cover the desired range.

(A typical calibration chart is shown on page 6)

RADIATION SAFETY

A provisional survey by the Radiological Protection Service has shown that the shuttered source in the M8563 conforms to the recommendations contained in the 'Code of Practice for the Protection of Persons Exposed to Ionising Radiations in Research and Teaching'.

Dr. S. H. U. Bowie,

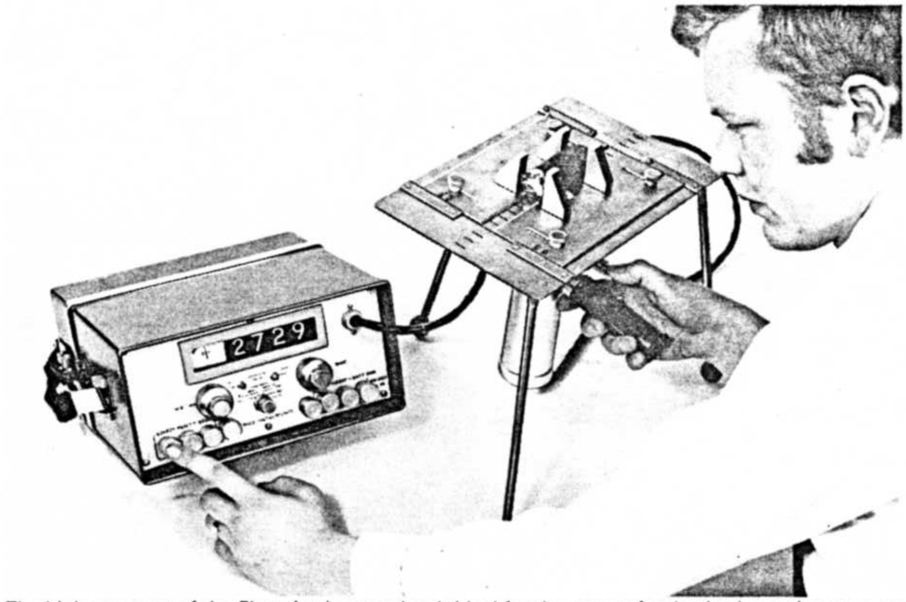
Head, Geochemical Division, Institute of Geological Sciences, in a review of Portable X-ray fluorescence Analysers in the Mining Industry ('Mining Magazine') says:

'The introduction of radio-isotopes to excite characteristic X-rays has revolutionised the concept of XRF to such an extent that the use of bulky conventional equipment should be re-examined in instances where such apparatus is difficult to use because of cost, non-portability, lack of cooling water supply, or shortage of skilled technicians. Fully portable instruments have numerous applications in the mining industry at all stages from prospecting to the refining of the end product. They also have an immense scope in other industrial fields, for example, in the non-destructive analysis of steels, copper alloys, nickel alloys and lead in glass; but such applications are beyond the scope of the present paper. In the mining industry, portable instruments can, in principle, be used for the determination of any element above atomic number 20. This means that it is possible to determine all the main metals such as titanium, chromium, manganese, iron, cobalt, nickel, copper, zinc, zirconium, niobium, molybdenum, tin, antimony, barium, tantalum, tungsten, lead bismuth and uranium as well as several non-metals.'

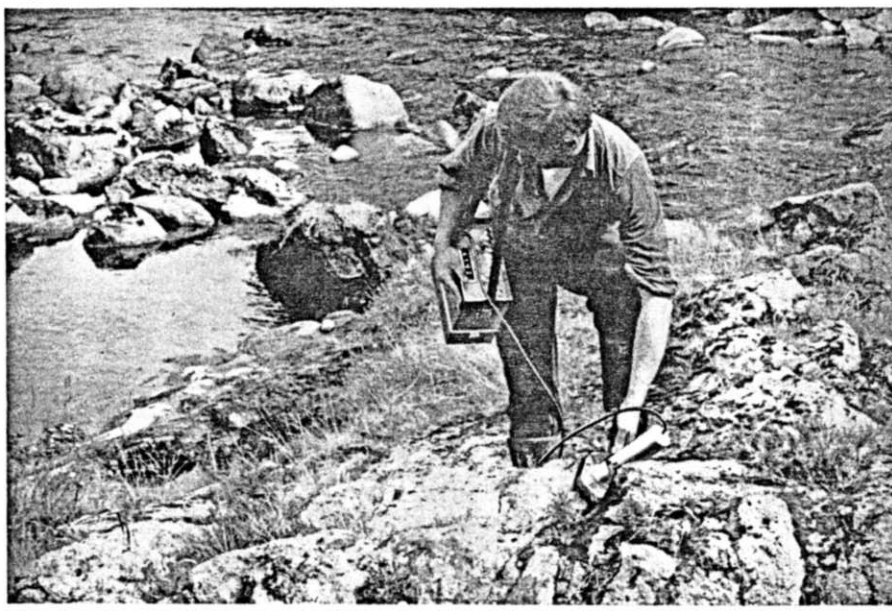
Dr. M. J. Gallagher,

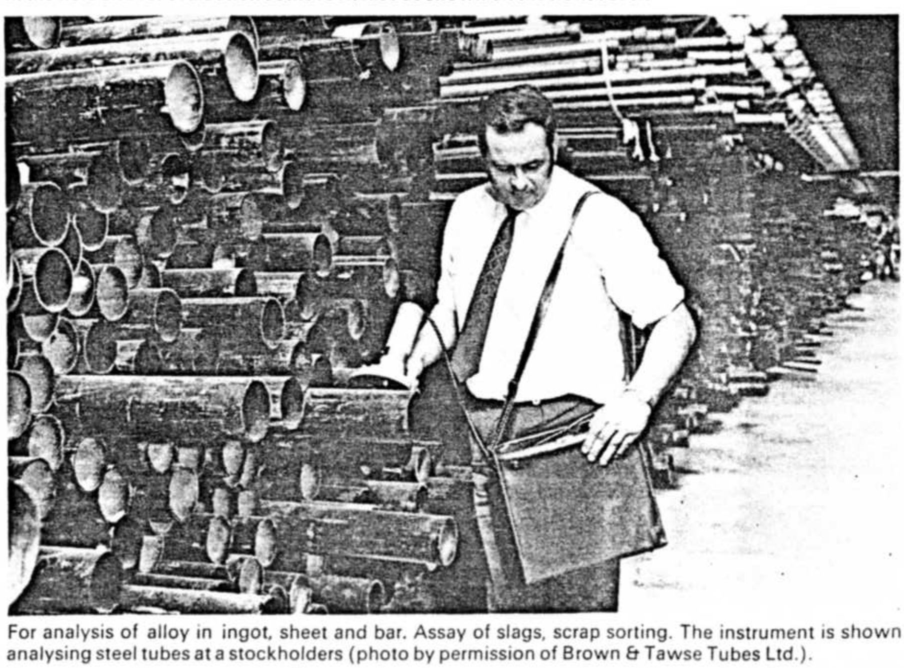
Institute of Geological Sciences, in reporting on the Ekco Mineral Analyser, summarises as follows:

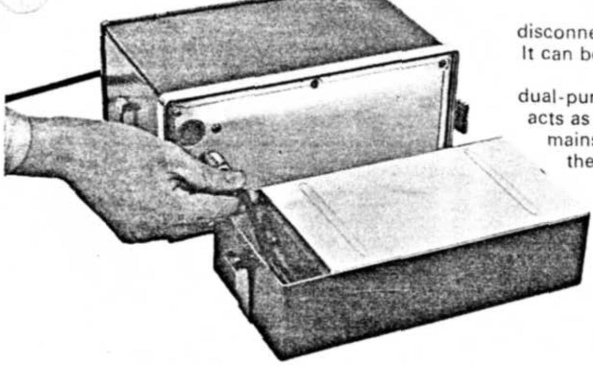
'1. The new features of pulse-height analysis and digital presentation provided by the Mineral Analyser allow substantial improvements to be made in detectable limits with portable radioisotope X-ray fluorescence analysers.
2. Variations due to counting statistics (at two standard deviations) from three 10-second counts can be as low as 300 ppm Cu, 200 ppm Zn, 300 ppm Pb, 1000 ppm W, 50-100 ppm Mo, and 100-150 ppm Sn from determinations on powdered low-grade ores and on geochemical exploration samples.
3. Although the improvements in precision yield excellent detectable limits, the accuracy of X-ray fluorescence analyses with any equipment is matrix-dependent and can only be assessed from measurements on accurately analysed samples of similar composition, such as those from a specific ore deposit.'



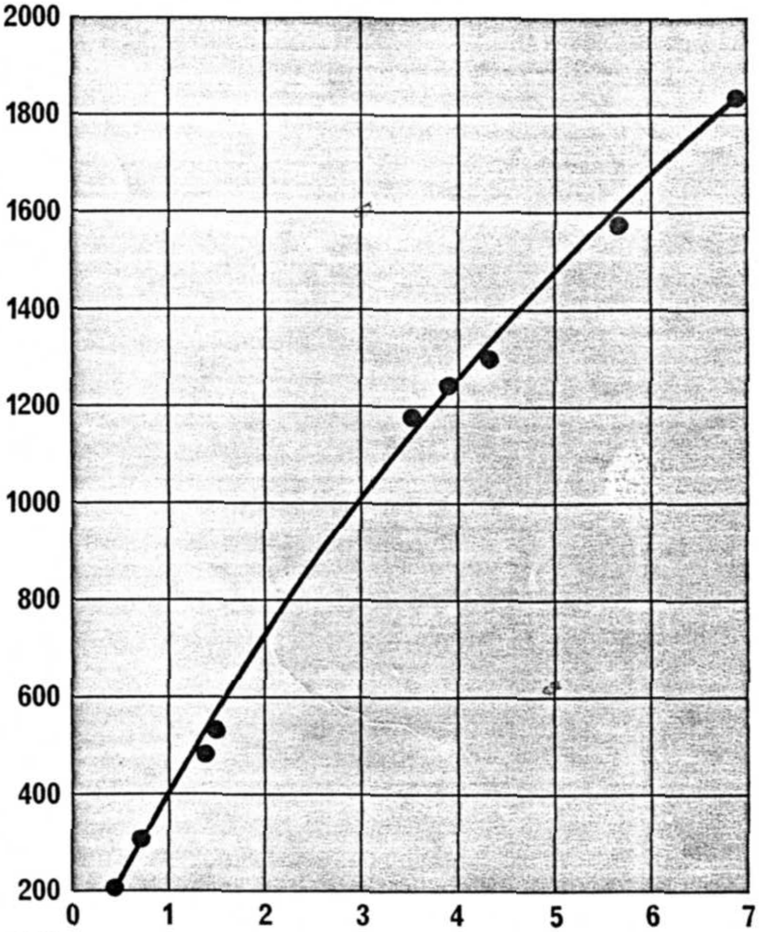
The high accuracy of the Ekco Analyser makes it ideal for the assay of pulverised samples or cores in the laboratory. The probe is inverted and mounted on the special stand which is available (M8568). Adjustable blocks position core samples over the face of the probe.


Simple to operate, with easily read digital presentation the Ekco Mineral Analyser is designed for use in the field and for evaluation at the rock face as shown on the front cover.


For analysis of alloy in ingot, sheet and bar. Assay of slags, scrap sorting. The instrument is shown analysing steel tubes at a stockholders (photo by permission of Brown & Tawse Tubes Ltd.).



The detachable base carries the re-chargeable battery pack. It is easily removed by slackening off two screws and disconnecting as shown. It can be replaced by an identical sized, dual-purpose unit which acts as a power unit for mains operation or as the battery charger.



Calibration curve determined from typical samples.
% Tin in Slag

Specification

Probe M8563

P.M. tube	EMI 6097
Crystal	NaI(T1) 2mm thick
Source and filters	Selected for specific application (See table on page 3)

Mineral Analyser M8524

Amplifier

Input impedance	50 ohms (adjustable between 25-100 ohms to match input cable)
Voltage gain	60 dB ± 2 dB
Integral linearity	0·1 % for outputs up to 8 volts
Maximum output	greater than 8 volts (neg. pulse)
time	*less than 50 n secs at 8 volts output*

Pulse height analyser

Lower discriminator	preset internally between 0·8 and 1·0 volt
Upper discriminator	continuous variable in ratio between 1:1 and 6·5:1 with respect to lower disc

Scaler

Maximum count rate	not less than 5 MHz
Count capacity	10^6 counts (i.e. six decades) or 10^7 counts with pre-scaling decade in circuit
Operating modes	Add (count up) or Subtract (count down)
Display	4 numerical indicator tubes (displaying four most significant scaler decades)
Display bright-up	push button brightens display (for use in high ambient light levels)

Timer

Ranges	10 secs. 100 secs. or manual control
Timebase	100 KHz quartz crystal oscillator

Ratemeter

Rate ranges	10^3, 10^4, 10^5, c/s f.s.d. (all X10 if optional pre-scaling decade in circuit)
Ratemeter accuracy	± 5 %
Time constant	1 second approx.

H.V. supply

H.V. output voltage	*700-1,600 volts continuously variable (neg.)*
Maximum output current	100 μA
Stability (at constant load)	0·2 % from —20°C to +50°C
Resetability	± 0·1 % (under constant temp. conditions)
Self test facility	scaler counts 100 KHz for 10 sec. period

Battery Pack SA7069

Batteries	4 × Deac SD4 cells; 20 × Deac 1000 DKZ cells } Re-chargeable Ni-Cad
Battery life	10 hours of continuous use
Charging time	*16 hours maximum using Ekco M3189B Power* Supply/Charger unit
Battery test	switch on mineral analyser enables internal meter to monitor battery voltages
Dimensions/Weight Mineral Analyser & battery pack	$9\frac{1}{2}'' \times 11\frac{1}{2}'' \times 5\frac{1}{2}''$ (24·1 × 29·2 × 14 cm) $14\frac{1}{4}$ lb (6·5 kg.)

Optional Accessories

Power Supply/Battery Charger (M3189B). Provides constant current charging facility for the SA7069 battery pack or alternatively may be used as a mains power unit for the Mineral Analyser (mains voltage requirement 100/120V or 200/250V 50/60 Hz).

Alternative filters/sources. These are available to accommodate a range of mineral ores (see table on page 3).

Laboratory Stand M8568. See page 2 and first illustration on page 5.

Six Filter Head M8564. For analysis of up to three different minerals using the same source.

OVERSEAS MONITOR CORP. LTD.
4533 DUNBAR STREET
VANCOUVER 8, B. C.
224-6636

EKCO INSTRUMENTS LTD
SOUTHEND-ON-SEA
ESSEX
ENGLAND SS2 6PS

Telephone Southend-on-Sea 30851 Telex 99167

A MEMBER OF THE PYE OF CAMBRIDGE GROUP L8524-5-71

APPENDIX B

STATEMENT OF QUALIFICATIONS

I, Bruce E. Goad of 304 - 1000 Markham Road, Winnipeg, Manitoba, do hereby certify that:

1. I am a graduate of the University of Western Ontario with a B.Sc. (Honours) in Geology in 1976.

2. I have practiced my profession continuously since 1976 including post graduate work at the University of Manitoba towards a M.Sc. degree.

3. I carried out the field work on the VAL(A), SKIN, VH, AP, KEDAH, CABIN and SLOUCE projects for Du Pont of Canada Exploration Limited during the period June to September 1979.

[signature]

STATEMENT OF QUALIFICATIONS

I, Gwendolen May Ditson of 3943 W. Broadway, Vancouver, BC, do hereby certify that:

1. I am a graduate of the University of Southern California with a B.Sc. (Cum Laude) in Geology in 1974, and a graduate of the University of British Columbia with a M.Sc. in Geology in 1978.

2. I have practiced my profession continuously since 1978.

3. I carried out field work on the VAL(B), SIN, PONT(B), SLOUCE, DU, SLIP, SWIFT, AP, KEDAH and CABIN projects for Du Pont of Canada Exploration Limited during the period June to September, 1979.

STATEMENT OF QUALIFICATIONS

I, Gonzalo Mato Diaz of 5566 Catania Circle, Vancouver, BC, do hereby certify that:

1. I am a graduate of the University of OVIEDO, Spain with a B.Sc. in Geology in 1973.

2. I have practiced my profession continuously since 1973 in Iberia, U.S.A. and Canada including post graduate work at the University of British Columbia.

3. I carried out field work on the DU, SWIFT and SLIP projects for Du Pont of Canada Exploration Limited during the period June to September, 1979.

STATEMENT OF QUALIFICATIONS

I, F. Marshall Smith, do hereby certify that:

1. I am a geologist residing at 6580 Mayflower Drive, Richmond, BC and employed by Du Pont of Canada Exploration Limited.

2. I am a graduate of the University of Toronto with a B.Sc. in geology.

3. I am a registered Professional Engineer of the Province of British Columbia, Member of the Association of Exploration Geochemists and Fellow of the Geological Association of Canada.

4. I have practised my profession continuously for the last 12 years in Canada.

5. Between 1978 03 28 and this date, I have directed the exploration programme for the Klinkit Joint Venture in British Columbia and Yukon Territory.

F.M. Smith
1980.01.24
F. M. Smith

CREW -- KLINKIT J.V. PROJECT - 1979

Name and Address	Home Phone No.
CARLSON, Dayle M. R.R. #6 Cobourg, Ontario K9A 4J9	(416) 372-2782
COLWELL, Jennifer H. Box 108 Atlin, BC V0W 1A0	651-7670
CONNOLLY, Linda Brentwood College Mill Bay P.O. Mill Bay, BC V0R 2P0	743-5521
DIONNE, Camille H. 515 Hendry Avenue North Vancouver, BC V7L 4C6	987-3940
DITSON, Gwen M. 3943 W. Broadway, Vancouver, BC V6R 2C2	228-1618
FLORENCE, Diane Box 41 Atlin, BC V0W 1A0	651-7520 or 651-7543
GOAD, Bruce E. 304-1000 Markham Road Winnipeg, Manitoba R3T 2M2	261-1003
JONES, Murray I. 350 Belgo Road Kelowna, BC V1X 2Z6	765-5897
MATO, Gonzalo D. 5566 Catania Circle Vancouver, BC V6T 1N2	228-8875
MICHELL, Cathy F. Box 63 Heffley Creek, BC V0E 1Z0	578-7745
MURPHY, Beverly M. Box 57 Atlin, BC V0W 1A0	651-7637

Name and Address	Home Phone No.
WHITICAR, Doug M. 662 Pembroke Avenue Coquitlam, BC - V3K 2N1	939-4100

LEGEND

CRETACEOUS OR TERTIARY

- SG — SEAGULL BATHOLITH
  - EQ2 (or 3,4,5,6) — average crystal size
  - PP2 (or 3,4,5) — groundmass crystal size
  - SR2 – 7 — variation in crystal size
  - APLT — APLITE

2 = <0.25 mm
3 = 0.25 - 1.00 mm
4 = 1.00 - 2.00 mm
5 = 2.00 - 4.00 mm
6 = 4.00 - 16.00 mm
7 = >16.00 mm

JURASSIC - CRETACEOUS (?)

- CR — CASSIAR - RAM STOCK

PERMIAN - MESOZOIC

- DIØR — DIORITE
- PXNT — PYROXENITE
- BI PXNT — BIOTITE PYROXENITE
- PERD — PERIDOTITE

(DIØR, PXNT, BI PXNT, PERD: VAL MAFIC - ULTRAMAFIC SUITE)

- BC/D — BASIC DYKE
- BR — BROCK INTRUSIONS

MISSISSIPPIAN (PENNSYLVANIAN ?)

- M3 — UPPER SYLVESTER GROUP
  - ARGL — ARGILLITE
  - ANVC — ANDESITIC VOLCANIC ROCKS
  - VCSD — VOLCANO - SEDIMENTARY ROCKS
  - VLCC — VOLCANO - CLASTIC ROCKS
  - SCHS — SCHIST
- M2 — LOWER SYLVESTER GROUP
  - LIMS — LIMESTONE
  - MARL — MARL
  - SLAT — SLATE
  - ARGL — ARGILLITE
  - SHAL — SHALE
  - QZIT — QUARTZITE
  - CONG — CONGLOMERATE
  - CHRT — CHERT
  - VOLC — VOLCANIC
  - SKRN — SKARN
  - SUHØ — SULFIDE HORIZON
  - ARQZ — ARGILLACEOUS QUARTZITE
  - BRXX — BRECCIA
  - GNIS — GNEISS
  - SCHS — SCHIST

AGE UNKNOWN

- DB/D — DIABASE DYKE
- PXDK — PYROXENE - PORPHYRY DYKE
- RYDK — RHYOLITE DYKE

SYMBOLS

- EDGE OF TALUS
- OUTCROP
- CONTACT OBSERVED
- CONTACT APPROXIMATE
- CONTACT ASSUMED
- CONTACT GRADATIONAL
- FAULT (showing direction of movement)
- ALTERATION AREA
- BEDDING - INCLINED, VERTICAL
- JOINTING - INCLINED, VERTICAL
- FOLIATION - INCLINED, VERTICAL
- VEIN - INCLINED, VERTICAL
- AREA OF SMALL VEINS
- ANTICLINE - UPRIGHT, OVERTURNED
- AXIAL PLUNGE
- GOSSANED AREAS
- GEOLOGY / ROCK SAMPLE STATION
- THIN SECTION
- TRACE ELEMENT / WHOLE ROCK ANALYSES
- THIN SECTION & TRACE ELEMENT / WHOLE ROCK ANALYSES
- CHIP SAMPLE
- Rock A (Rock B) — ROCK A more frequent than ROCK B
- GULLY
- CREEK
- CLAIM POST

ABBREVIATIONS

MINERALS

AS	ARSENOPYRITE
AX	AXINITE
BI	BIOTITE
CA	CALCITE
CH	CHALCEDONY
CT	CASSITERITE
CU	COPPER
FU	FLUORITE
GA	GARNET
GL	GALENA
GR	GRAPHITE
HB	HORNBLENDE
HE	HEMATITE
IL	ILLITE
LI	LIMONITE
MG	MAGNETITE
MN	MANGANESE
MØ	MOLYBDENITE
MS	SERICITE
MU	MUSCOVITE
OX	OXIDES
PX	PYROXENE
PY	PYRITE
QC	QUARTZ (CHERT)
QT	QUARTZ & TOURMALINE
QZ	QUARTZ
SL	SPHALERITE
SU, SUL	SULFIDE
TØ	TOURMALINE

DESCRIPTORS

BLK	BLACK
EQ	EQUIGRANULAR
FEL	FELDSPATHIC
G$	GREISEN
GSD	GOSSANED
IB	INTERBEDDED
LIM	LIMY
MSS	MASSIVE
PD	POD
PEB	PEBBLY
PG	PEGMATITIC
PP	PORPHYRITIC
SD	SEDIMENTARY
SIF	SILICIFIED
SR	SERIATE
VC	VOLCANOCLASTIC
/D	DYKE
mc	MIAROLITIC CAVITIES
V	VEIN
<V	MICROVEIN
W/	WITH

DUPONT EXPLORATION
CANADA

KLINKIT JOINT VENTURE
VH PROJECT
GEOLOGY
DORSEY RANGE, YUKON TERRITORY

1 : 10 000
m 300 200 100 0 300 600 m
SCALE

MAPPED BY : B.G.	REVISED :	N.T.S. No. : 105 B
DATE : JUL. '79		ACCT No. : 335 - 14
DRAWN BY : C.H.K., K.L.J.		
DATE : DEC. '79		DRWG. No. : KL. 79 - 64

DU PONT **EXPLORATION**
CANADA

KLINKIT JOINT VENTURE
VH PROJECT
PHOTOMAP
DORSEY RANGE, YUKON TERRITORY

m 300 200 100 0 1:10000 300 600 m
SCALE

MAPPED BY : B.G.	REVISED :	N.T.S. No. :	105 B
DATE : JUL. '79		ACCT No. :	335 - 14
DRAWN BY : C.H.K., K.L.J.			
DATE : NOV. '79		DRWG No. :	KL. 79 - 65


LEGEND
SOIL SAMPLE STATION WITH VALUES FOR Sn/W/Mo IN P.P.M. (– INDICATES BELOW DETECTION LEVEL)
Sn Mo W
SOIL SAMPLE STATION WITH VALUE FOR Sn IN PERCENT
NOTE: ALL VALUES FOR Sn DETERMINED BY XRF
VH CLAIMS (APPROX. BDY)
DUPONT CANADA EXPLORATION
KLINKIT JOINT VENTURE
VH PROJECT
Mo/Sn/W GEOCHEMISTRY
DORSEY RANGE, YUKON TERRITORY
SCALE
MAPPED BY: B.G.
DATE: JUL.'79
DRAWN BY: C.H.K., K.L.J.
DATE: NOV.'79
REVISED
N.T.S. No.: 105 B
ACCT No.: 335-14
DRWG. No.: KL. 79-66