DU PONT OF CANADA EXPLORATION LIMITED

Office of the Supervising Mining Recorder
FEB 26 1980
WHITEHORSE
Yukon Territory

KLINKIT JOINT VENTURE

(Du Pont of Canada Exploration Limited
with
Duval Mining Limited)

RECEIVED
19 FEB 1980
MINING RECORDER
WATSON LAKE, Y.T.
I.A. & N.D.

1979 PROGRAMME

YUKON TERRITORY

FEB 26 1980
WHITEHORSE, Y.T.

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

January 1980

090557

This report has been examined by the Geological Examination Unit and is recommended to the Commissioner to be considered as representing the amount of
$ 195,300.00

J A Morin

Geologist or
Mining Engineer

Considered as representation work under Section 53 of the Yukon Quartz Mining Act.

R. R. BAXTER
Supervising Mining Recorder

Commissioner of Yukon Territory

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Branch of Alaskan Geology
1209 Orca Street
Anchorage, Alaska 99501

JAN - 8 1980

907 271-4150

January 3, 1980

F.M.S.

F. Marshall Smith
Dupont of Canada Exploration Ltd.
Suite 102, 1550 Alberni Street
Vancouver, B. C. V6G 1A5 Canada

Dear Marshall:

I could hardly beileve my eyes when I opened your package. What a Christmas present! I tried to call and thank you at that time, but learned you would be out of the office until January 1. Your wishes on use of the data will be respected. Ed Chip came down last week and we spent a few hours going over the analyses and talking about tin granites in general. I had good intentions of attending the NWM meeting in Spokane (specifically for your paper), but emergency personal business required my presence on the east coast. I regret I was not there.

I do not know what computation facilities are available to you so enclose a few computer generated diagrams, statistics on the chemical data, and CIPW normative minerals for your possible interest. I personally entered the chemical data at my terminal here in Anchorage. No one, with exception of Ed, has seen this information or has access to it.

I have noted some discrepencies in assignment of sample numbers to rock units in the text as compared to the grouping of sample numbers given in your letter. I have used the sample assignment given in your letter. Because you may wish to compare individual rock units I have divided the chemical data into groups:

seagul.c	chemical data on all 31 samples
seagul.n	CIPW norms on all 31 samples
sea.c	chemical data on Seagull intrusive (6 samples)
sea.n	CIPW norms on Seagull intrusive (6 samples)
hake.c	chemical data on Hake intrusive (3 samples)
hake.n	CIPW norms on Hake intrusive (3 samples)
brock.c	chemical data on Brock intrusive (4 samples)
brock.n	CIPW norms data on Brock intrusive (4 samples
etc....	

In other words I have used your names but indicate the chemical data by a ".c" and the CIPW norms by a ".n".

On the enclosed printout the first tabulation of data is for the 31 samples (seagull.c) and consists of the raw data. This is included in case you want to check the data for any input errors. The chemical analyses list only Fe_2O_3. There is no FeO. I have converted Fe_2O_3 to FeO (0.9 X Fe_2O_3 = FeO) whereas, when both oxides are given, the normal conversion to FeO (total) is FeO + 0.9 X Fe_2O_3. Converting to total FeO has the effect of eliminating mt in the CIPW norms--whereas by leaving it as Fe_2O_3 il is affected. You will note that there is no mt for any of these norms. This, most assuredly, is not the case, but is was the decision I went with.

Following the tabulation of the raw data are univariate statistics and correlations for the data. The same information is given for the 31 CIPW norms (seagul.n) and for some of the separate intrusive phases. I wanted to take a quick look at what the 31 samples looked like on a Harker type diagram and enclose the Tektronix output with a least squares line. the last four '3D' diagrams are an exercise in "making pictures" for the fun of it. Sometimes this breaks data into obvious groups. Also enclosed are a couple of ternary plots--again these were done for the exercise as I don't know what your particular interests may be.

I can not comment to any extent on the enclosed for I have no idea as to the geologic setting of the samples. Significant aspects of the data, as you grouped the samples in your letter, are quite apparent. I feel somewhat like the kid in the candy store with a penny to spend, but allow myself one observation. . . . the Brock intrusion. It is noteably enriched in Na_2O relative to K_2O. Where sufficient chemical data are available I have observed that the later stages of a 'tin granite' sequence often show soda enrichemnt. I do not see the 'Brock' intrusion on your diagrams. Could it by chance be, a late stage of the Seagull?

I really have enjoyed the priviledge of receiving and working with the chemical analyses. Once this information is into a computer it involves but little time to examine or portray it in several fashions. I will keep the data in the computer for a couple of weeks before deleting it. If you have anything specific you would like to see in the way of diagrams or statistical analyses let me know. I will be than happy to 'run it through again'.

I certainly hope to see this data published because it is some of the best available on a tin granite intrusive sequence in North America.

Sincerely,

BR

Bruce Reed

Enclosures
BR/mg

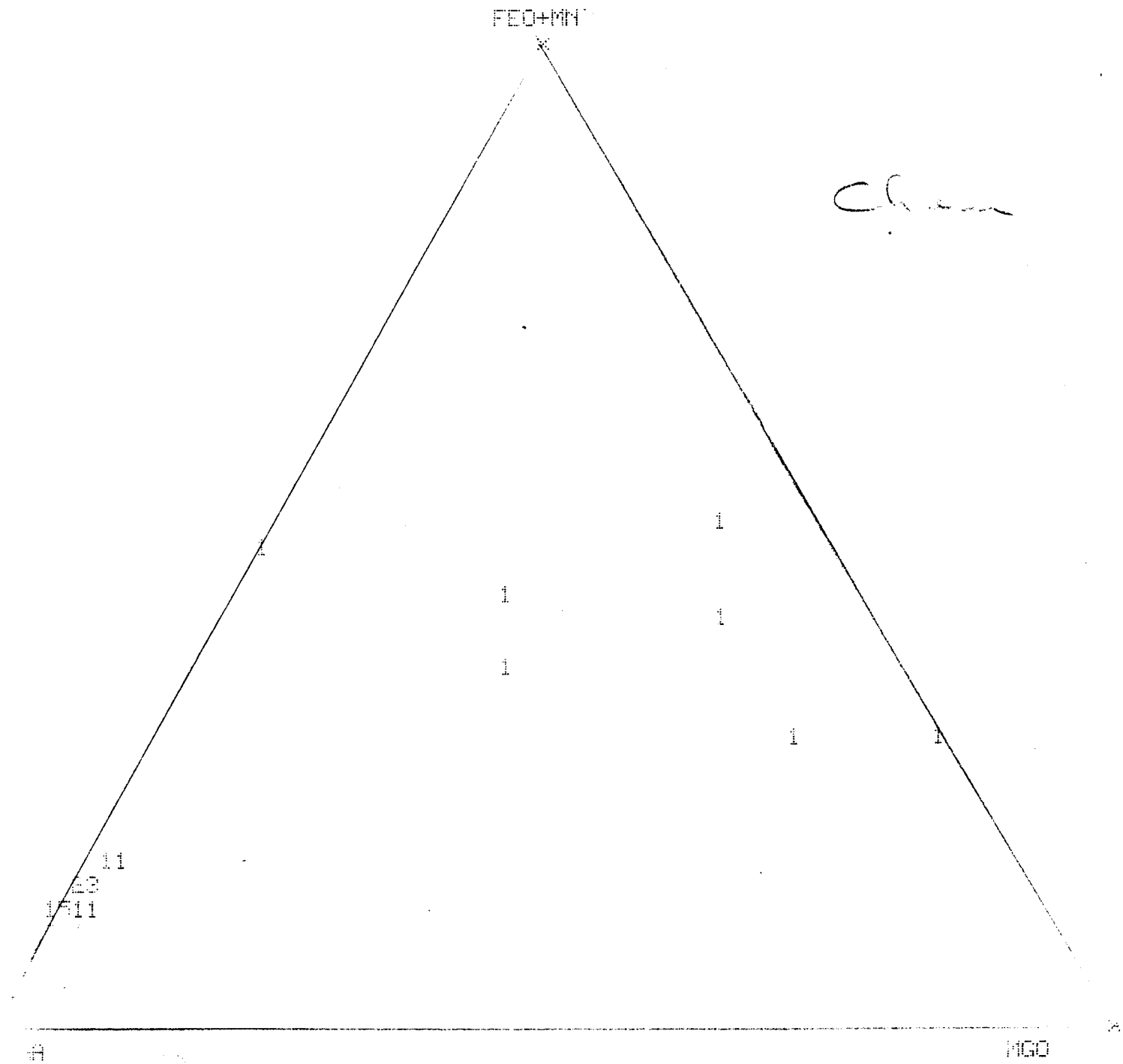
FEO+MN X+MA

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.(ID = SER.CT FILE = SER.CT DATE 12/31/79

[illegible] DIAGRAM :
INDICATES NO OF POINTS
* INDICATES 10 OR MORE POINTS



PTS PLOTTED OUT OF A POSSIBLE 31 PTS.

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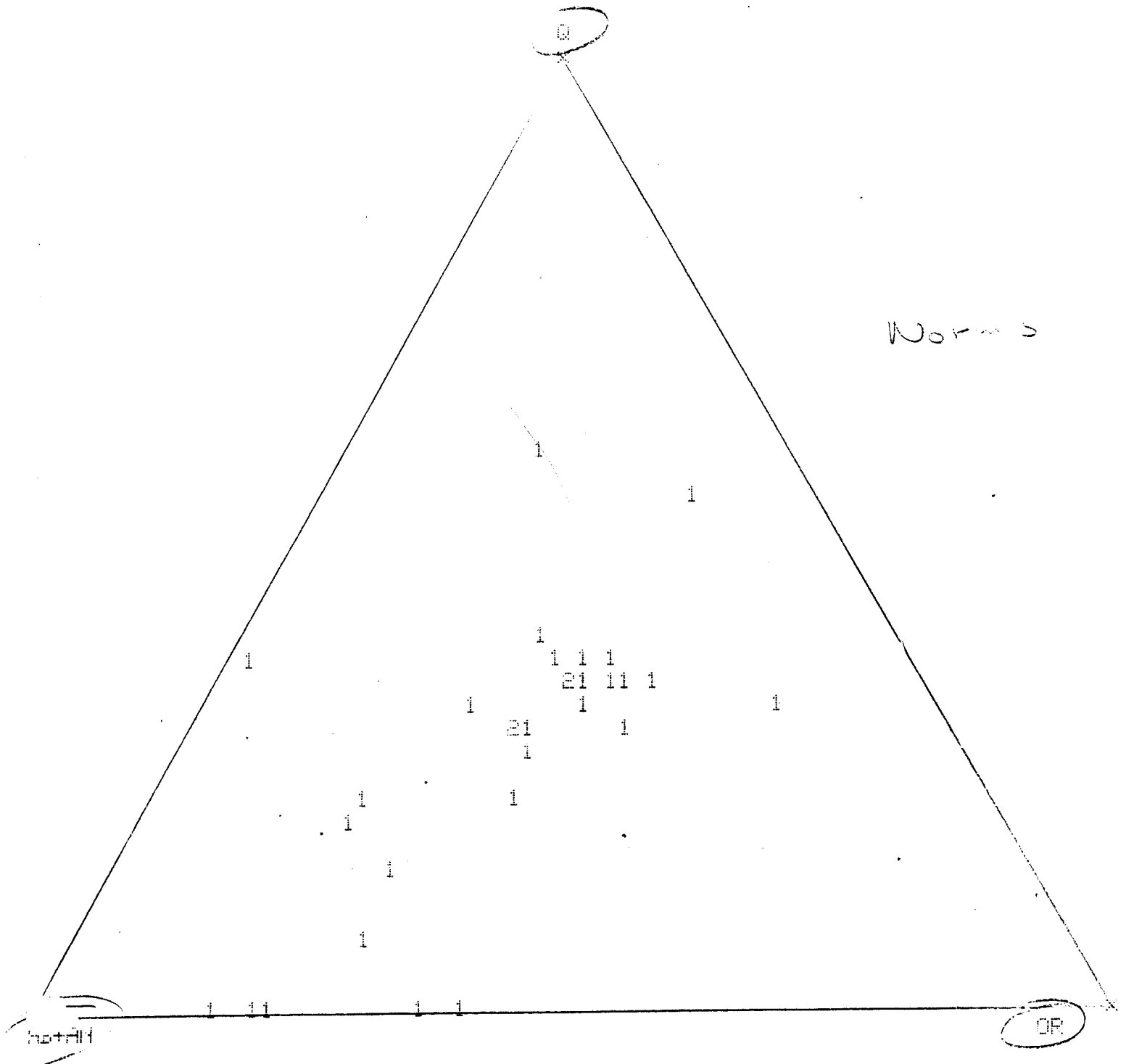
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     NE             NS             WO             EN             FS
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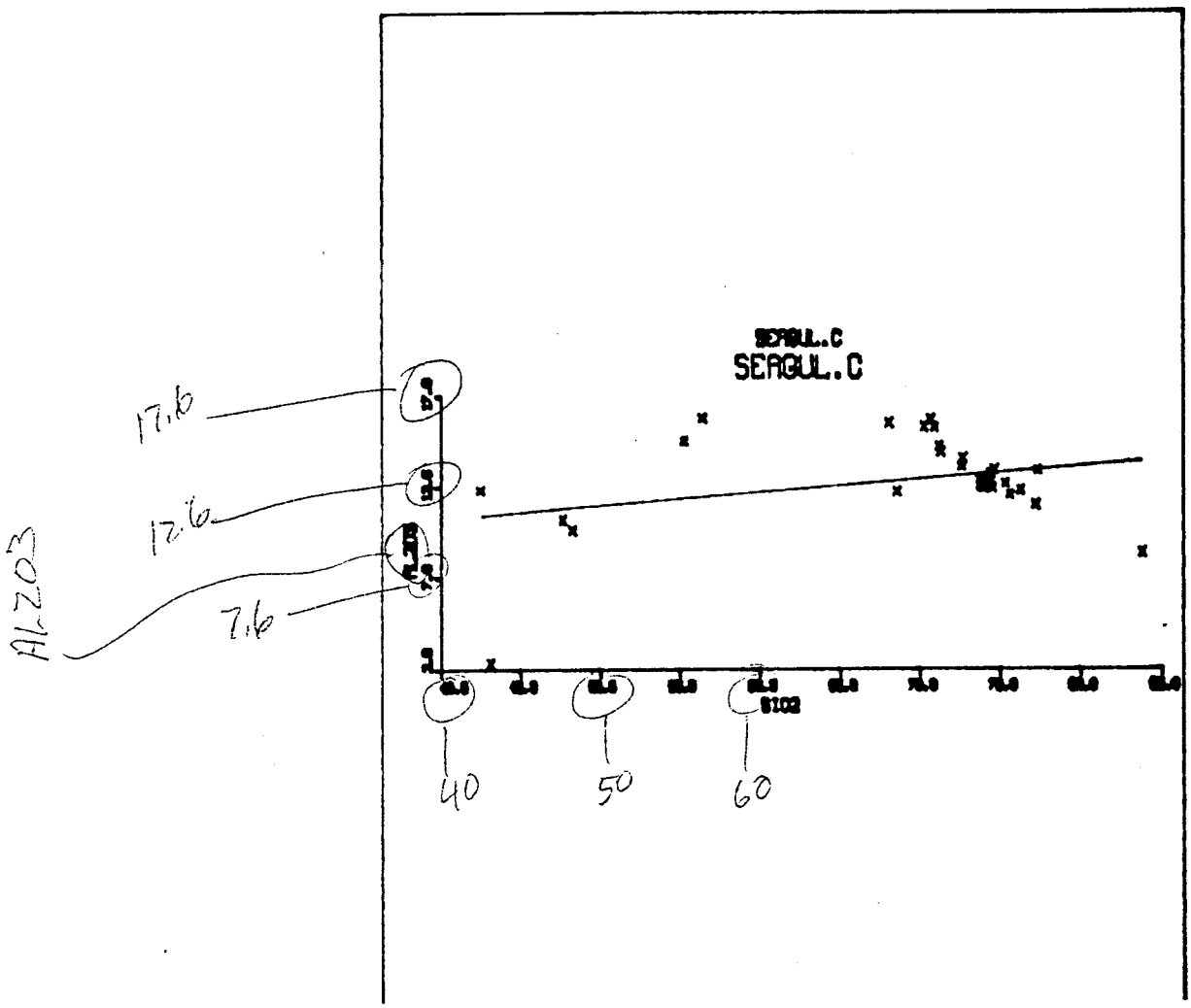
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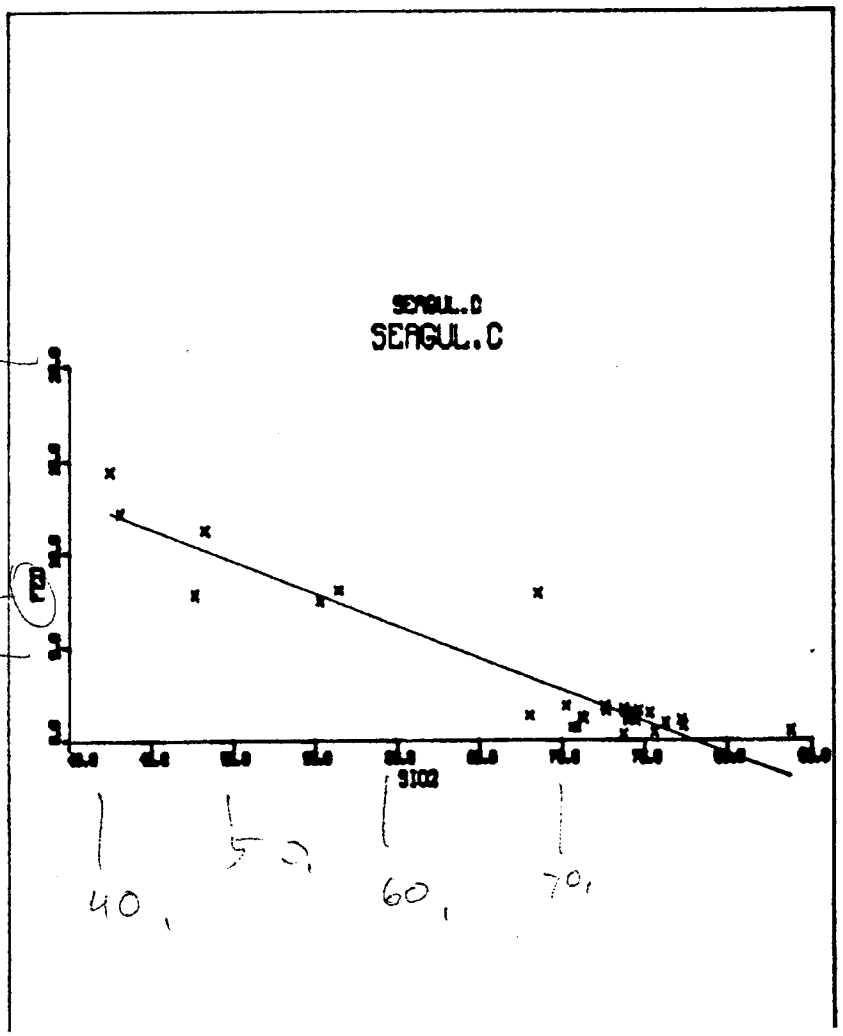



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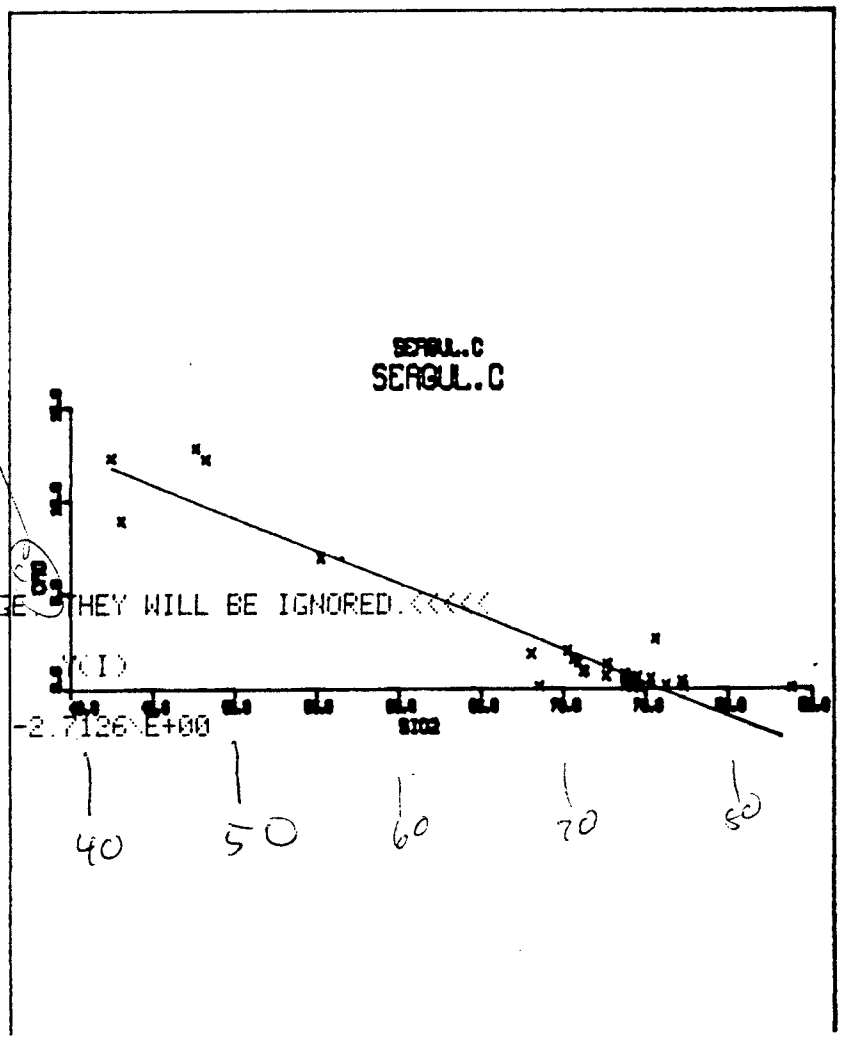
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SERGUL.C
SERGUL.C
17.6
12.6
7.6
AL203
40
50
60


SEAGUL.C
SEAGUL.C
FEO
SIO2
40.
50.
60.
70.

CAO
equal scale



CAO

5

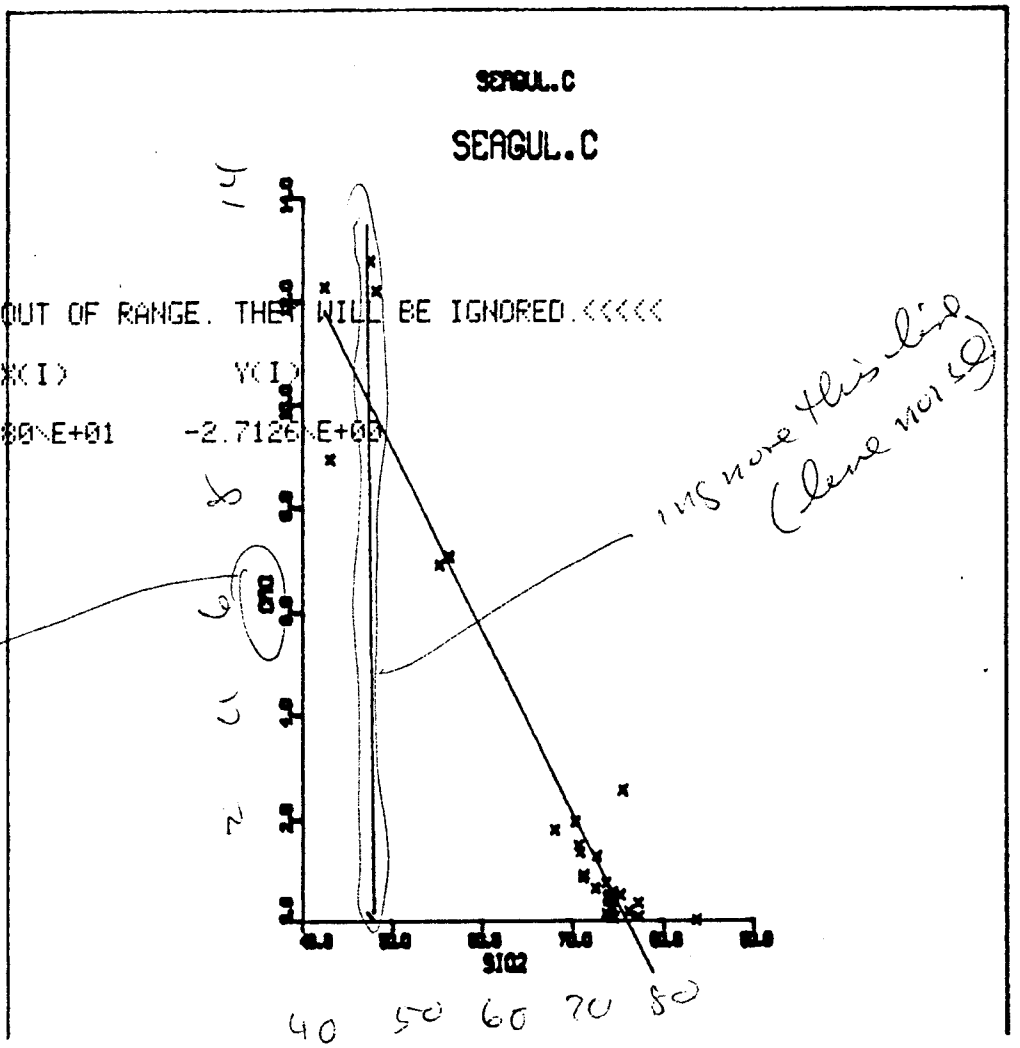
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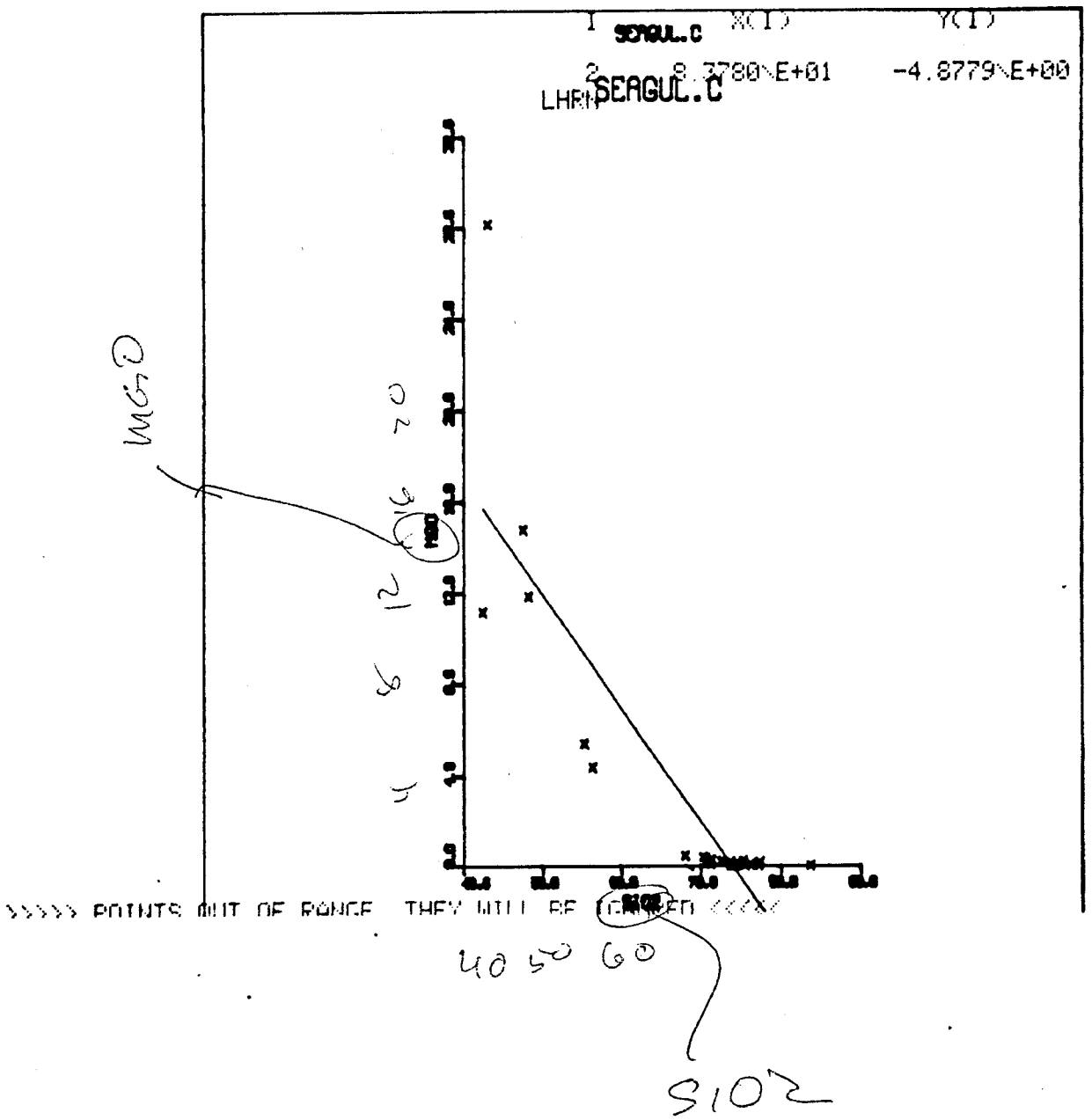
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D@JF

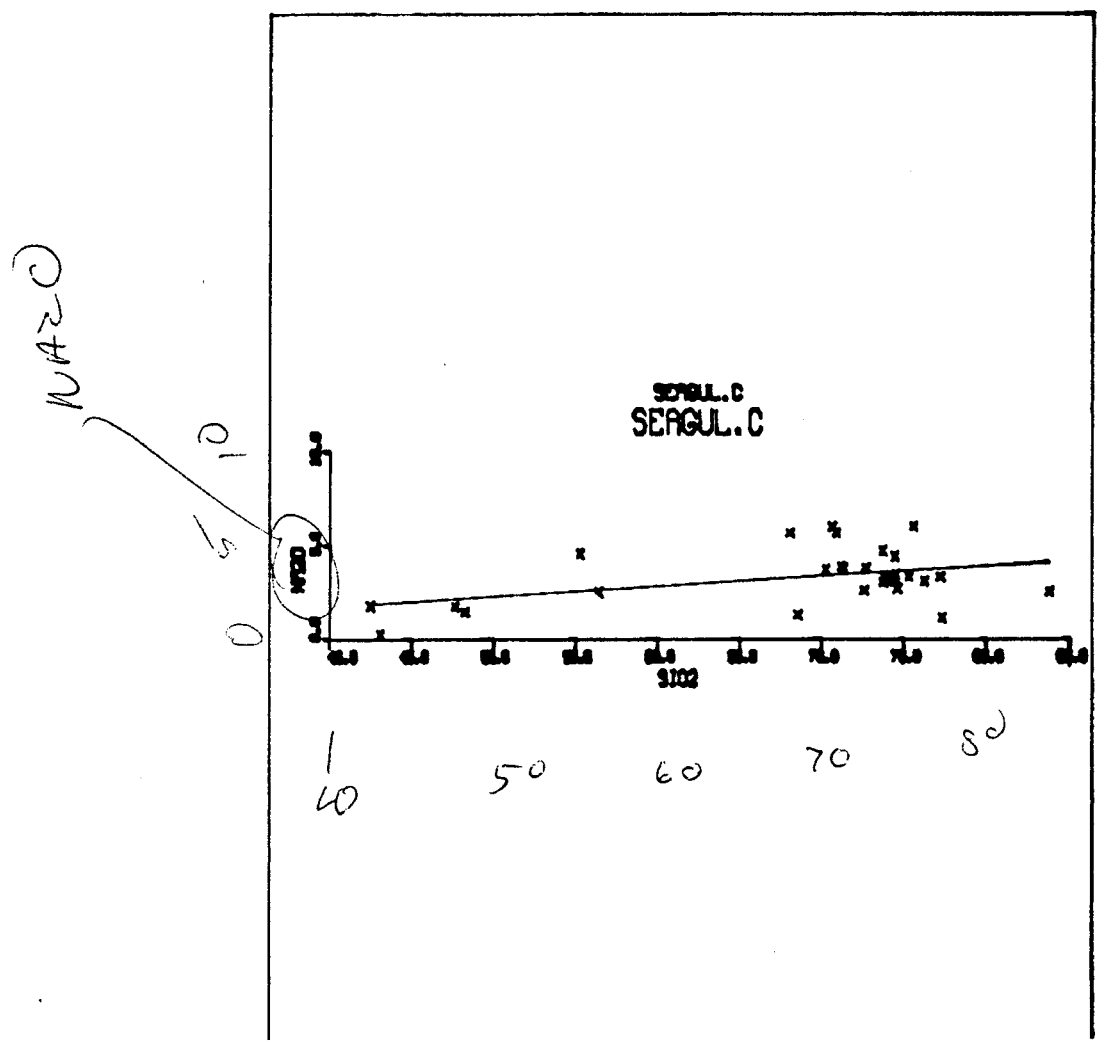
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SCALING



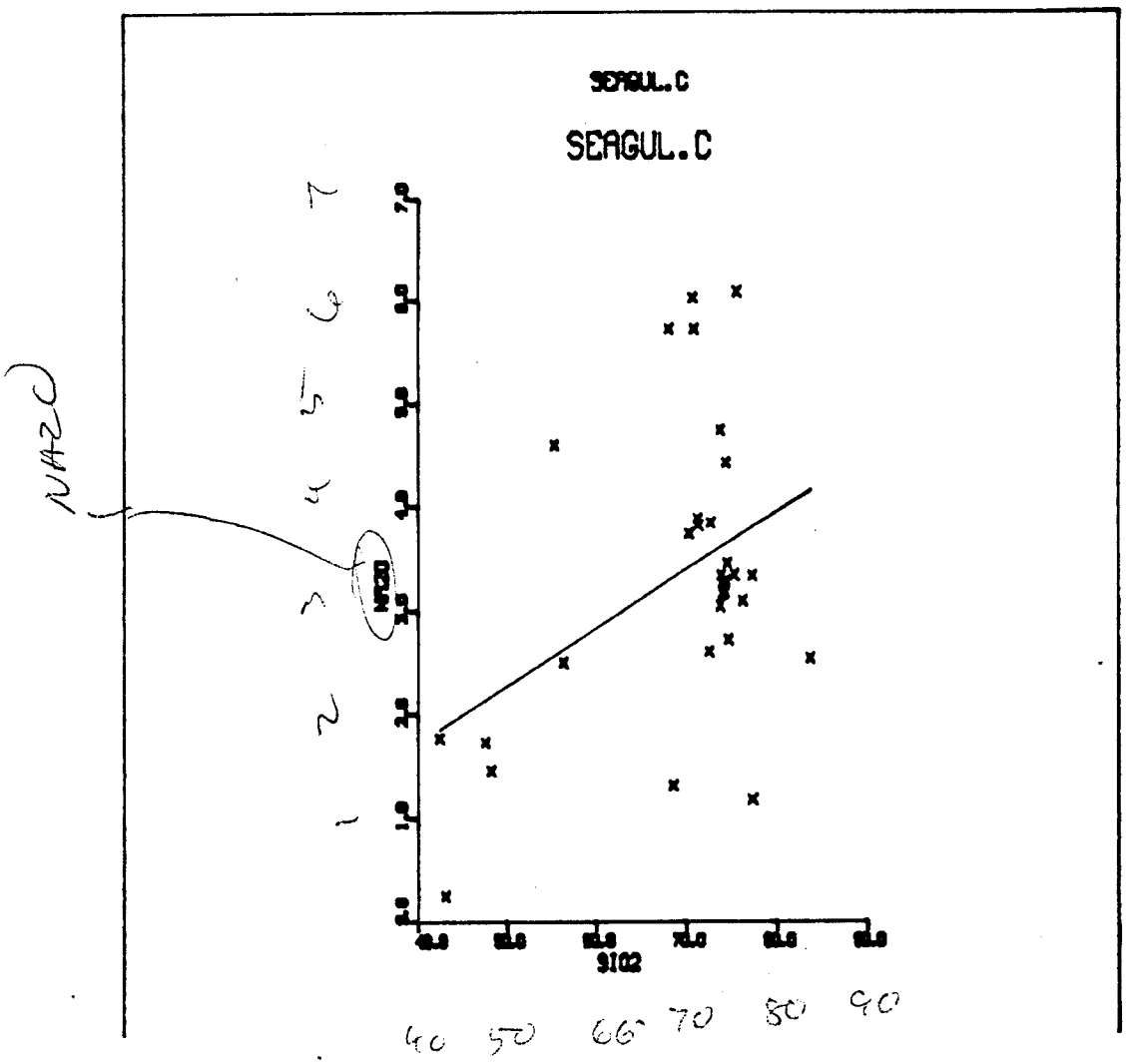
MGO
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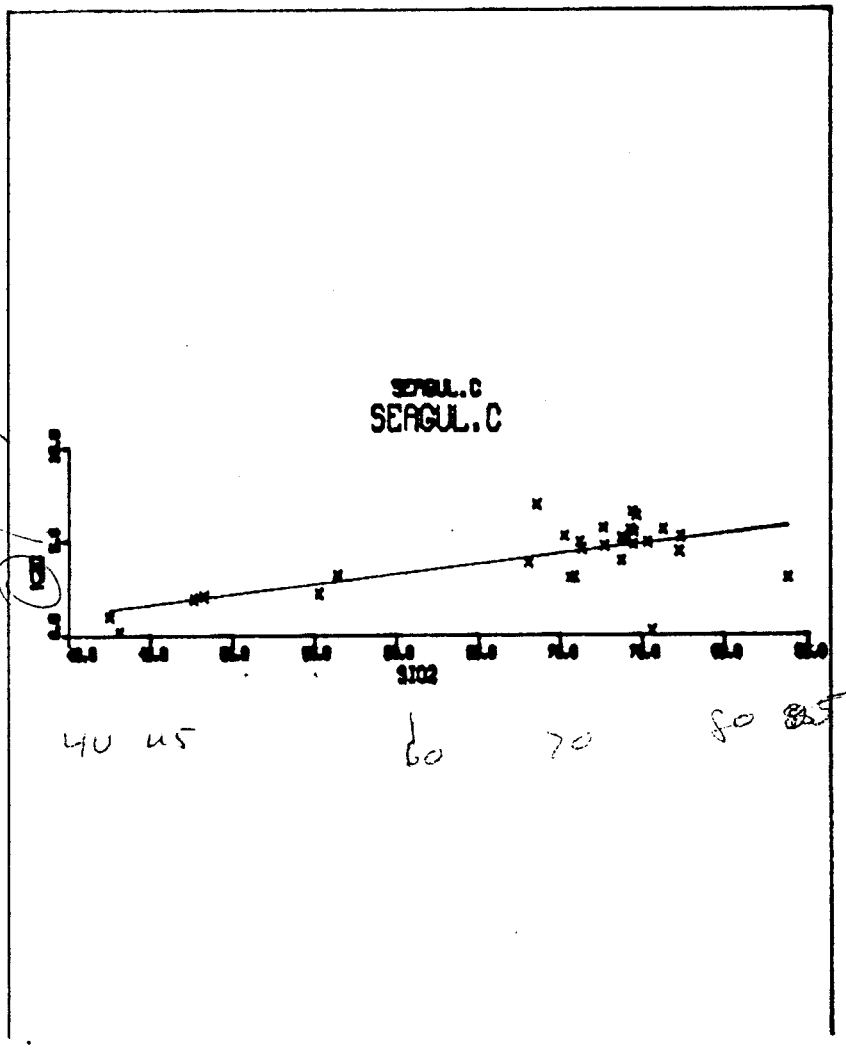
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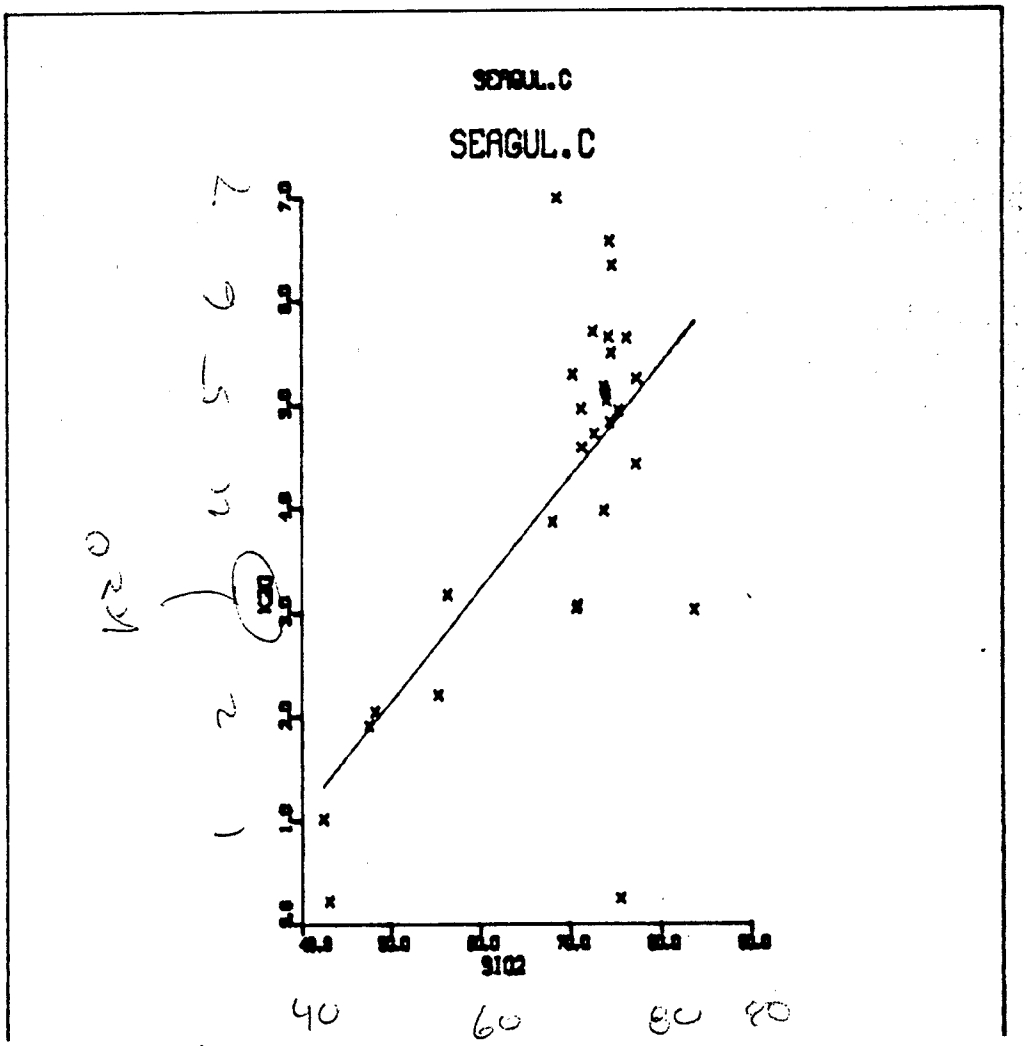
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non-linear scale



K2O
equal scaling

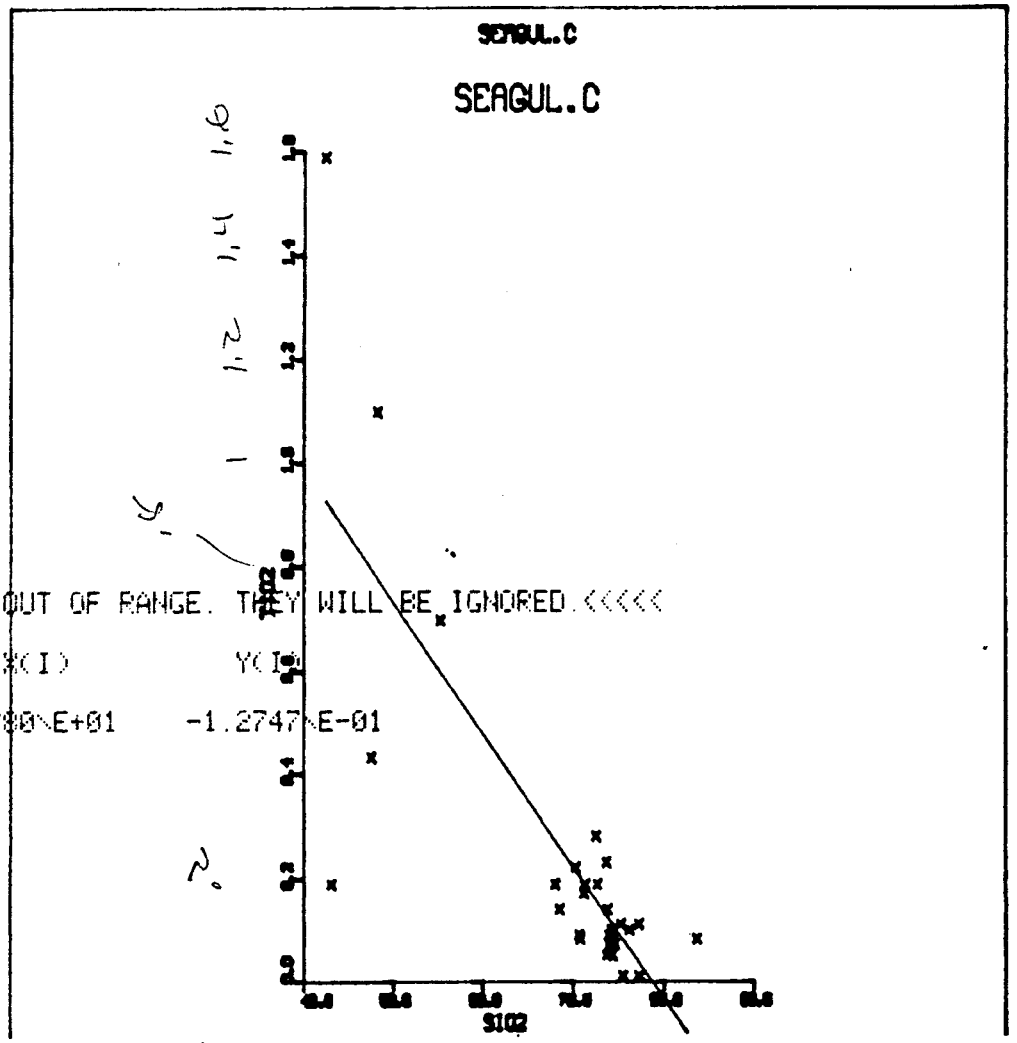


K2O
NONEQUAL SCALING



T102

nonequal scaling

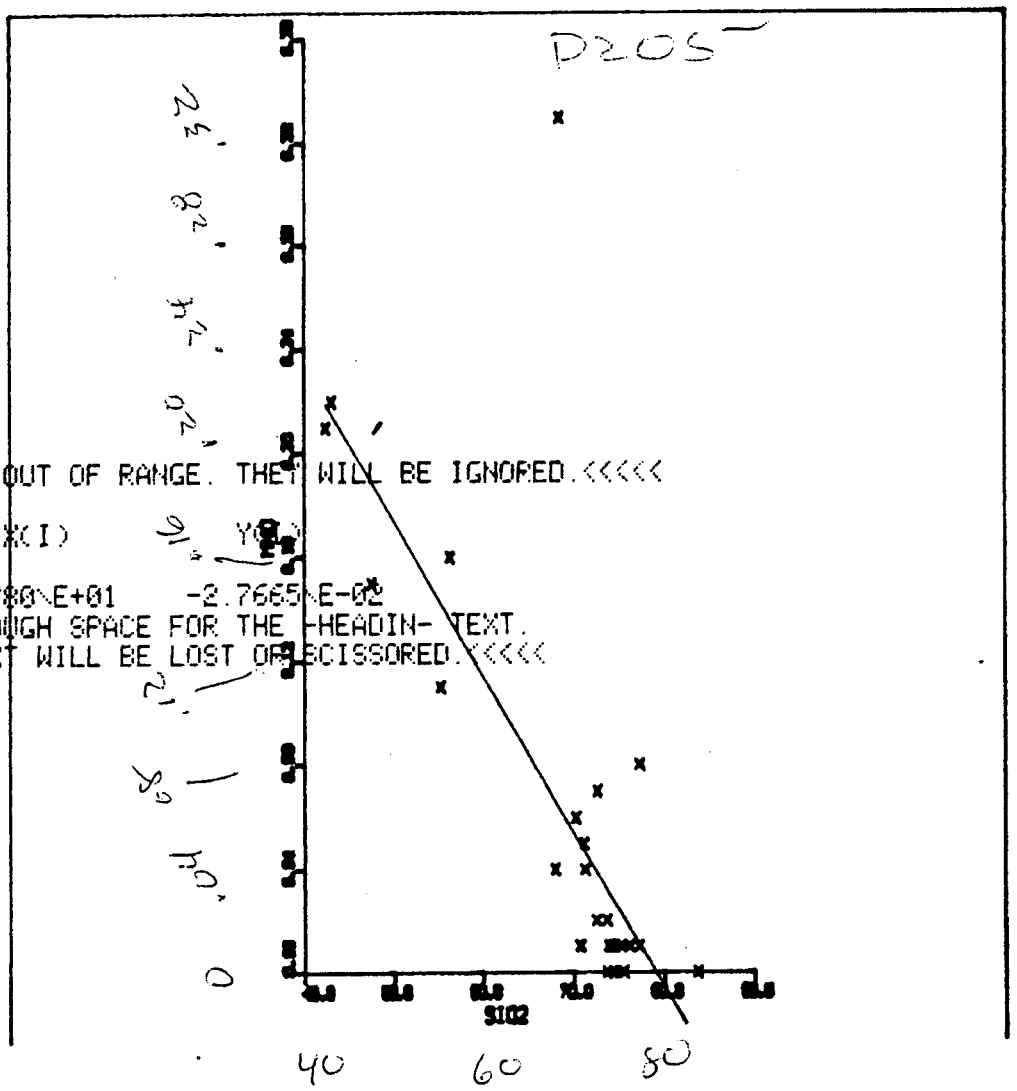


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HKNO

P2O5
non equal



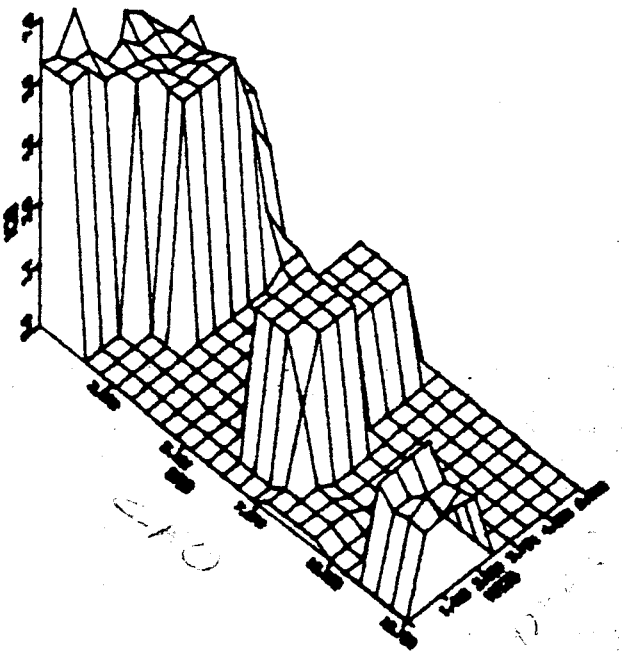
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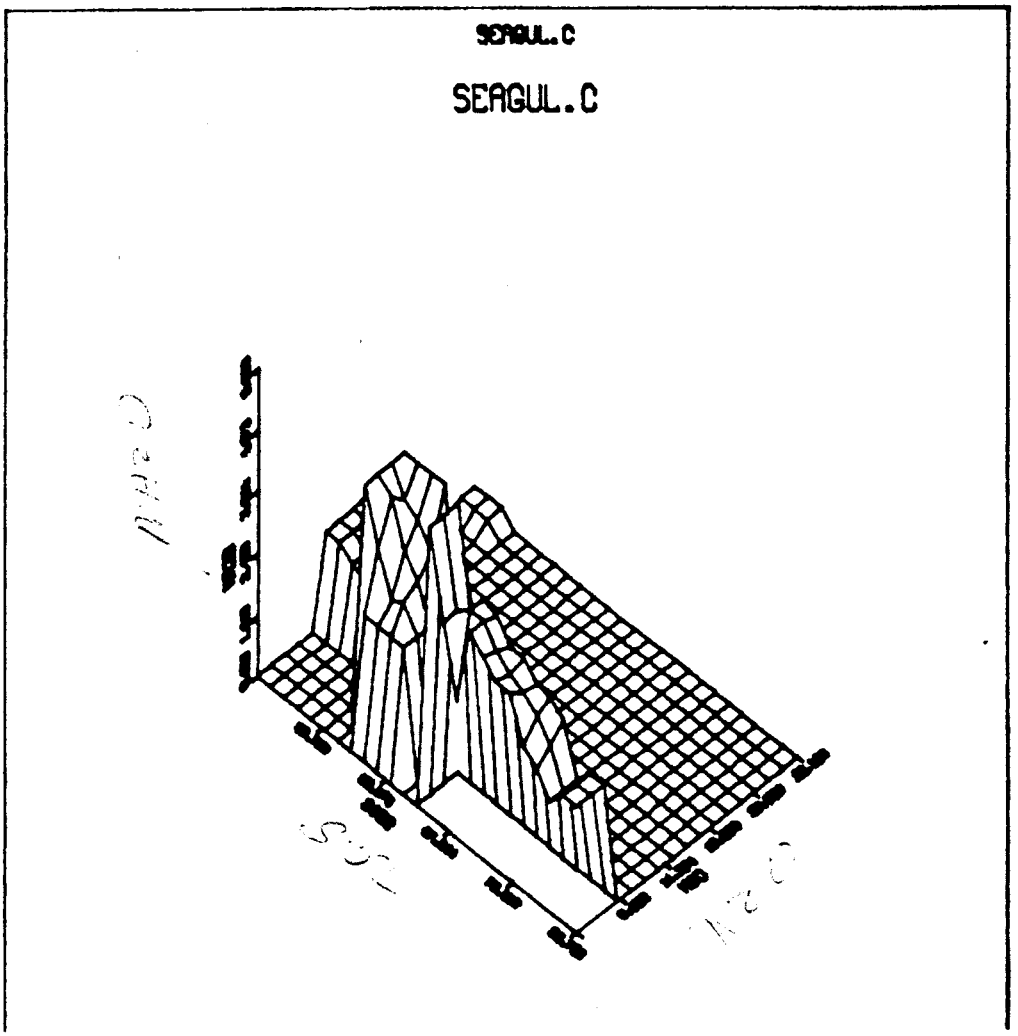
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MDS

SEAGUL.C

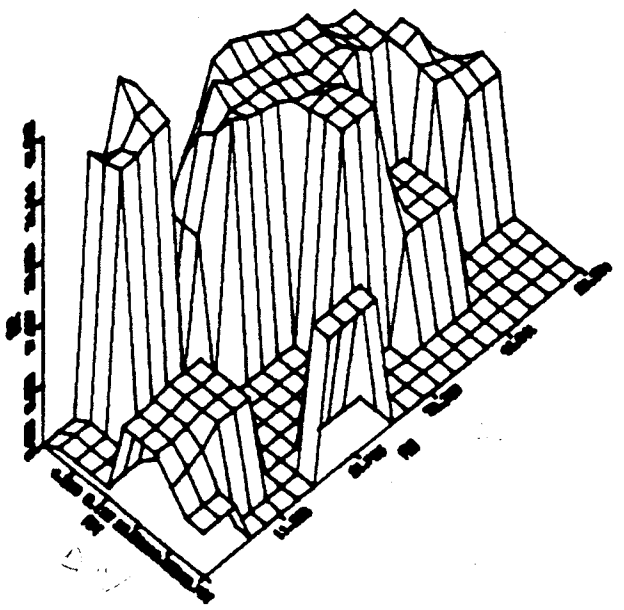


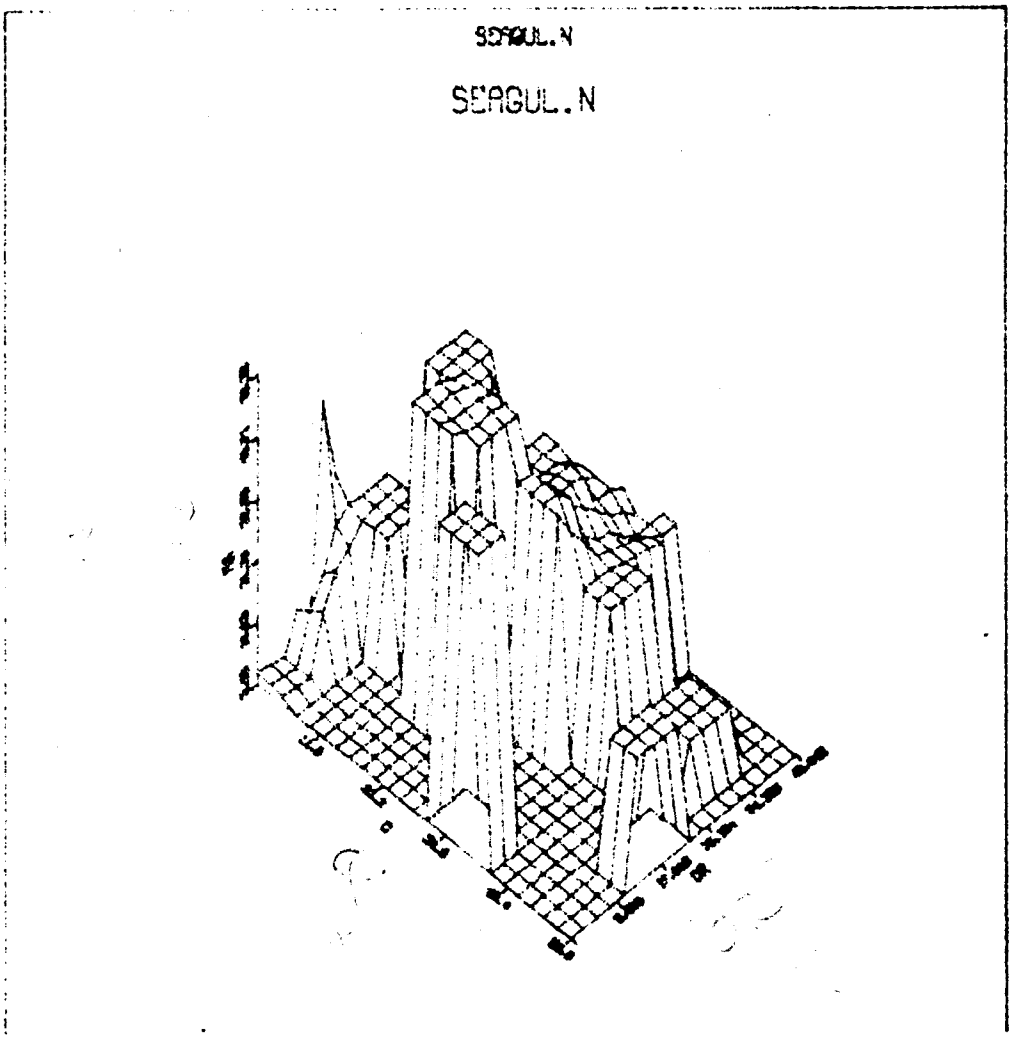
SEAGUL.C



SEAGUL.N

SEAGUL.N




SEAGUL.N
SEAGUL.N

Energy, Mines and Resources Canada
Science and Technology

Énergie, Mines et Ressources Canada
Science et Technologie

IDEC

F.M.S

11 December, 1979

Mr. F. Marshall Smith
Du Pont of Canada Exploration
Limited
Suite 102
1550 Alberni Street
VANCOUVER, British Columbia
V6G 1A5

Your file Votre référence

Our file Notre référence
510014

Dear Marshall,

Re: Seagull granite and tin

It was a great pleasure to hear you on the telephone discuss Seagull geology. Fascinatingly complex and far more so than I even remotely thought long ago in the early 1950's. It would give me great pleasure to learn some day that an economic deposit of tin had been outlined and development leading to a mine was about to begin. Many thanks for the invitation to visit your exploration activities. I would love to see the "old" area again but my chances of getting to the Yukon are exceedingly remote.

You expressed interest in the one locality where we identified some tiny cassiterite crystals. The descriptive notes of GSC Map 10-1960 included the sentence: "West of the headwaters of Seagull Creek, a tourmaline-fluorite-quartz vein cutting hornfels contains small cassiterite crystals." (This in effect corrected the same statement in the descriptive notes of the first and second editions, GSC Maps 55-21 and 22-1957, in which the locality was incorrectly stated as west of the headwaters of Partridge Creek.) The locality is marked on the enclosed copy of Map 10-1960.

The vein was first observed by the late Dr. J.A. Gower, my senior assistant for that summer, on August 1, 1951. That was the first season on the Wolf Lake project. We did not have a clear appreciation of the geology, and indeed in August we were just then working our way westwards towards the Seagull granite.

From that season's work, Jack Gower wrote a M.A.Sc. thesis "The Seagull Creek Batholith and its Metamorphic Aureole" (56 pages, 6 plates, 2 figures, 3 tables, 1 map) for University of British Columbia, April, 1952. He did a fair amount of mineralogical work on the boron-bearing minerals, and he described the vein on page 26 (xerox enclosed). You could probably borrow UBC's copy, but if you have trouble, I will make a xerox of my copy if you wish.

I discovered in Jack's field specimen of the vein, during subsequent office examinations, tiny "brown crystals between tourmaline from quartz-tourmaline-fluorite vein". The GSC x-ray diffraction laboratory identified cassiterite. Spectrographic analysis of a sample yielded to our laboratory (January 5, 1955) major: Si; minor: Fe, Al, Ca; Strong trace: Na, B, Sn, Mg;

Geological Survey of Canada
601 Booth Street
Ottawa Canada
K1A 0E8

Commission géologique du Canada
601, rue Booth
Ottawa Canada
K1A 0E8

...

trace: Mn, Ti; faint trace: Be, V, Cu, Zr, Sc; and not found: W, Mo, As. Judging from Jack's description of the vein in his thesis, you should not have any trouble finding it. I have not been there, but I would guess that it occurs on or very near the crest of the ridge. He was traversing south along the ridge at the time. Note that the locality is in hornfels, about a mile north of where the contact with the Seagull granite crosses the ridge.

I presume you have visited the pegmatite dyke in the Seagull granite where the late Jack Shields, a prospector, found a variety of minerals including topaz, fluorite, columbite and tourmaline about 1960. I have not seen the locality. A xerox of the description is enclosed (from GSC Paper 72-32, p. 33, Rocks and minerals for the Collector, by Ann P. Sabina). I understand that the locality is at about latitude 60°04'N, longitude 131°08½'.

I see that a thick package of data has just arrived in the mail from you. Many thanks.

Best wishes for an enjoyable Christmas.

Sincerely,

Bill

W.H. Poole

WHP/mmb
Enclosures (3)

Marshall: I scanned your petrographic descriptions and analyses, looked at the figures depicting the model of development, and marvelled at how much I missed. And then, this morning, I read (first time in 20 years!) my thesis description of the Seagull/Hake rocks and felt a little better. Perhaps I was not *that* far off! One mineral I expected to see in the petrographic descriptions, and did not, is arsenopyrite. I seem to remember that arsenopyrite was distributed as tiny and not so tiny crystals in the buff, light yellow to rusty brown-weathering alaskite, especially near quartz-tourmaline-fluorite aggregates and the like. I wondered as I read your work ~~whether~~ where arsenopyrite would fit into the sequence of processes, and whether it may have some value as a pathfinder/halo mineral to pneumatolytic processes associated with tin.

Some random thoughts

Bill.

One is at the crest of the ridge west of Seagull creek just south-west (WNW) of Camp 12. The vein strikes N 80° E and dips 80° south. The main part of it is about a foot wide but there are several branches over a total width of ten feet in which the country rock, normally a pale green quartzite, is bleached a creamy white. The walls are tight and rather irregular but reasonably straight. Black fibrous tourmaline crystal aggregates, growing at acute angles to the walls, constitute most of the vein filling. Disseminated among the crystals of these aggregates are abundant fluorite and calcite, and minor quartz, chalcopyrite, and pyrrhotite and cassiterite. Both purple and pale green fluorite were noted, in crystals up to 5 mm. across. A thin-section of part of the vein and wall contains tourmaline crystals up to 1 mm. long and 0.5 mm. across, which are pleochroic from colourless to blue-green. A measurement of the refractive indices gave e = 1.625, w = 1.66-. Associated vein quartz occurs in anhedral crystals up to 0.5 mm. diameter. The wallrock consists of very fine-grained quartz, tourmaline, calcite, sphene and black metallics.

The second occurrence of vein tourmaline is in the cirque west of the magnetite-pyrrhotite deposit at the head of the south fork of Swift river. ← Camp 12. at Camp 12. Veinlets trend roughly north-south and are less than an inch wide. Tourmaline and axinite occur together. The tourmaline is pleochroic in blues and browns. The wall rocks are light-coloured quartzites.

Bunches of tourmaline crystals occur in encrinal

GSC Paper 72-32, Hugh P. Sabina, Rocks and Minerals for the Collector.

Mile 733.0 Bridge over Seagull Creek.

Seagull Creek Occurrence

TOPAZ, FLUORITE, COLUMBITE, TOURMALINE

In pegmatite

Transparent crystals of topaz have been found in a pegmatite dyke on the north face of a 5,900-foot mountain on the east side of Seagull Creek. The crystals obtained were colourless, light blue, yellow, and reddish, and some were of gem quality. Specimens from this locality have been acquired by museums including the National Museum of Canada. Associated with the topaz are light green fluorite and crystals of black tourmaline and of black columbite. The deposit was a small one and is now thought to be exhausted. It was discovered and staked by the late Jack Shields in about 1960.

The locality is approximately 4 1/2 miles north of Mile 733.

Ref.: 114 p. 570.

Maps (T): 105 B/3 E Seagull Creek
105 B Wolf Lake
(G): 10-1960 Wolf Lake, Yukon Territory (1 inch to 4 miles)

Mile 738.4 Road-cut exposes shale and argillite traversed by white quartz veinlets. "Micro" crystals of pyrite and white and colourless gypsum occur along fracture surfaces of the rocks. A rusty powdery coating on the rocks is due to ankerite. Graphite has developed along planes in shear zones.

745 Swan Lake, a widening of Swift River, on left. Simpson Peak (7,130 feet), the highest peak of the northern Cassiars, is to the south of Swan Lake.

760 For the next 40 miles the Highway is within Yukon Plateau, an undulating upland area incised by deep interlocking valleys; the rounded hills reach elevations of up to 5,000 feet. Precambrian and/or Paleozoic limestone, quartzite, greenstone, gneiss, and schist outcrop in the vicinity of the Highway between Smart River and Mile 783, and for the next 12 miles the area is underlain by granitic rocks of Mesozoic age.
Ref.: 79 p. 6, 12.

803 Bridge over Nisutlin Bay.

804 Teslin (formerly Teslin Post). From here to Johnsons Crossing the Alaska Highway is sandwiched between Teslin Lake on the left side and the Big Salmon Range on the right. Teslin Lake is 60 miles long, 1 1/2 to 2 miles wide and 2,240 feet above sea level. The Big Salmon Range with elevations of about 6,500 feet

OCT 23 1979
F.M.S.
1919 10 23

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Branch of Alaskan Geology
1209 Orca Street
Anchorage, Alaska 99501

October 19, 1979

F. Marshall Smith
DuPont of Canada Exploration Limited
Suite 102, 1550 Alberni Street
Vancouver, BC Canada V6G 1A5

Dear Marshall:

A belated, but sincere, thank you for your kind hospitality and interest in showing me some of your prospects this summer. This was a busy time of the year for you and a priviledged opportunity for me. I have wanted to look at the Seagull granite for years.

You certainly have more detailed petrography than the enclosed 'scratch notes', but I am sending them for your possible interest. The modal analyses are 1000 point counts on stained slabs. The classification diagram is that recommended by the IUGS (Geotimes, October, 1973, p. 26). The thin section notes are only a first pass. If you would like any particulars on these specimens let me know for it will provide an excuse to do what I enjoy most--looking at 'tin' granites.

These are beautiful rocks! If I did not know their location--my only questions would be 1) is there any tin associated with them, and 2) if not, then, 'are you sure?' The absence of allanite and sphene is as significant as the presence of fluorite and tourmaline. I really would have liked to have seen and collected some of your 'altered' granites. Therein may lie the story.

All of the samples I collected at both prospects have been submitted for 30-element semiquant. spec. analyses and the granites for detail chemistry and RE's. The spec. analyses should be back in a couple of months and copies will be sent to you. By the time the chemistry is available I may be retired.

Again, to thank you for your time and interest. It is rewarding to discuss geology with people knowledgable in tin. Although I have not yet seen the program for the Spokane meetings--I hope to see you there.

Sincerely,

Bruce Reed

Enclosure

Volume percent

Sample	Quartz	K-spar	Plagioclase	Mafics	Other
65A	43.2	36.0	14.5	6.0	.3
65B	44.0	40.7	10.8	4.4	.1
65C	40.6	42.2	14.1	3.0	.1

65A 'Typical' sample of granite: biotite with minor muscovite granite, medium grained, seriate, subporphyritic with ovoid smokey quartz phenocrysts (0.5-1.0 cm) and euhedral to subhedral orthoclase crystals in a matrix of quartz, sodic plagioclase and interstitial K-feldspar. Accessory minerals include metamict zircon, relatively abundant late fluorite and rare tourmaline.

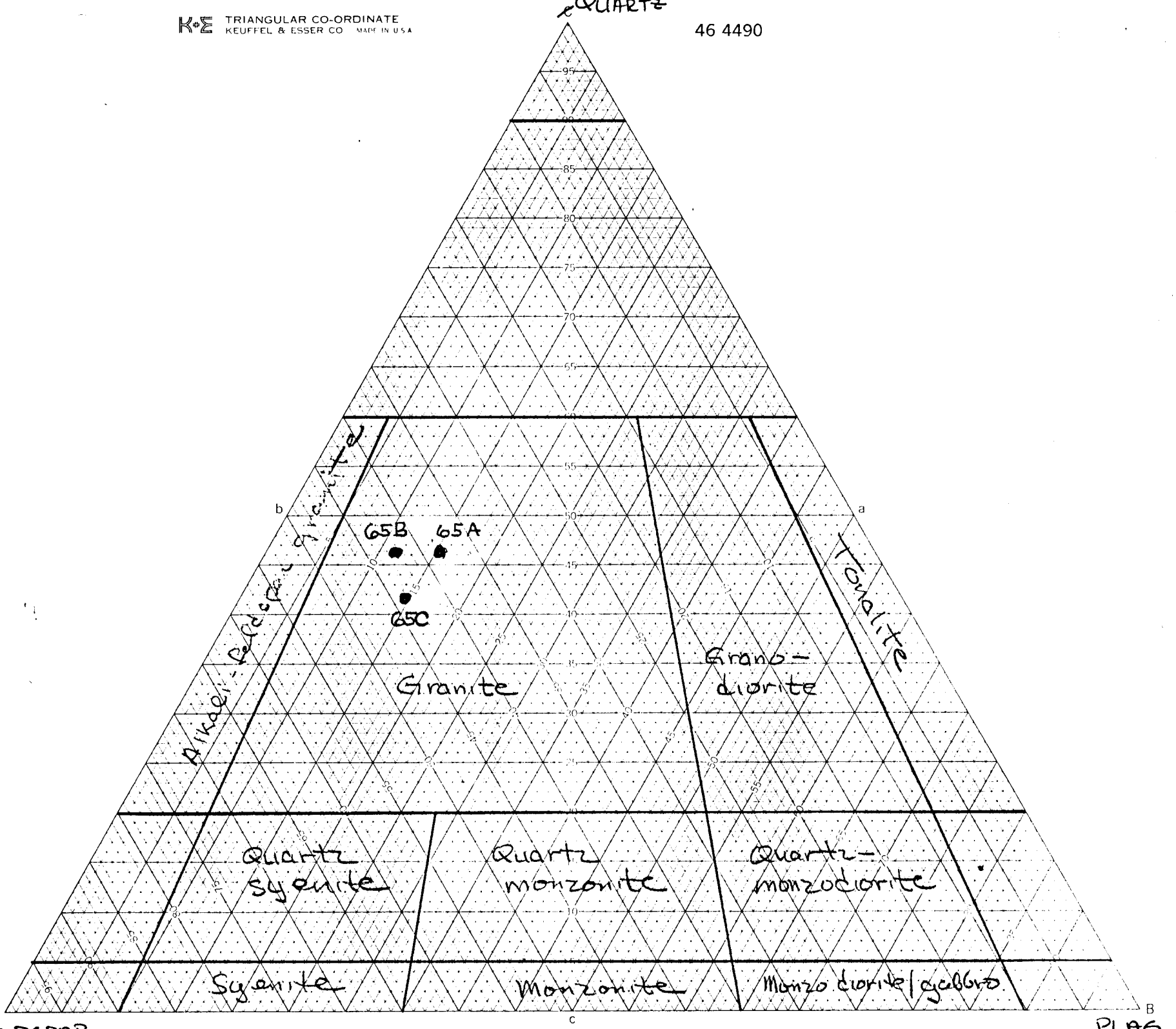
65B Sample of granite collected 2 feet from cassiterite-bearing fracture: medium to coarse grained, seriate, texture and mineralogy similar to 65A except that specimen is slightly coarser grained (4-8 mm), late fluorite is a common accessory, minor late tourmaline, primary muscovite is rare. Pleochroic haloes in biotite around zircon grains are common, biotite is slightly chloritized, sample shows no effects of alteration except for the 'normal' incipient nonuniform sericitic alteration of sodic plagioclase.

65C Float sample of granite: collected because it was relatively coarse grained (8-12 mm) and contains subhedral orthoclase crystals up to 2 cm in maximum dimension, major and accessory minerals identical to sample 65B.

Note: All of the specimens contain miarolytic cavities, a few small grains of what may be topaz were observed but are too small for positive identification.

K+E TRIANGULAR CO-ORDINATE
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 4490



DU PONT OF CANADA EXPLORATION LIMITED

REPORT OF GEOLOGICAL AND GEOCHEMICAL SURVEYS

on

DU PROJECT

by

G. Ditson and G. Mato

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

January 1980

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(G. Ditson, B. Goad, G. Mato and F. M. Smith, P. Eng.)

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SPECIFIC PROSPECT - DU CLAIMS (335-07)

1. LOCATION AND ACCESS

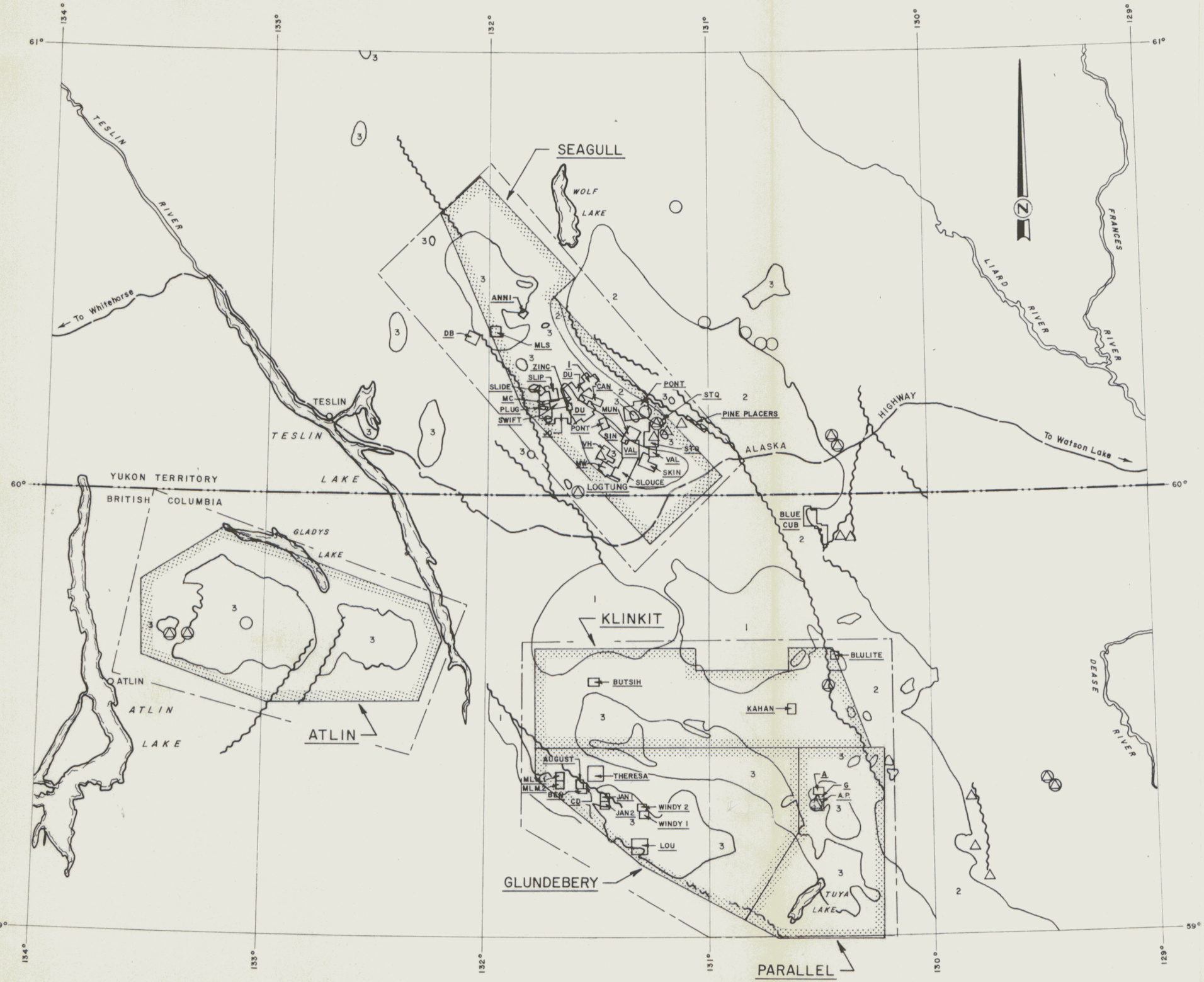
The large DU claim block covers a complex of ridges, aretes, cirques and stream/glaciated valleys. The claim group is centred on a northeast-trending 'U'-shaped valley crossing from Dorsey Lake in the southwest to a tributary of Ram Creek in the northeast. The southern portion of the claims cover the south-facing hillside above Dorsey Lake and Smart River. The northern portion covers the headwaters of an unnamed creek flowing into Morley River to the northwest. The claims are principally in 105-B-4, Watson Lake MD, Yukon. The central area of the group is at about $60^{\circ}12'$N and $131^{\circ}35'$W.

The claims are at present only accessible by helicopter from Swift River, Yukon, about 35 km to the southeast. Dorsey Lake, to the southwest, is usable by fixed-wing float aircraft for staging to the project area; a "winter" road to the west runs within 4 km of Dorsey Lake.

2. PHYSIOGRAPHY AND VEGETATION (Maps KL 78-57, 58, 59, 60, 61)

The southern portion of the claim block is the only part with thick vegetation, especially on the south and southwest-facing hillsides above Dorsey Lake. Black spruce covers all lower slopes in this area and the valley floor in the northwestern portion of the claims. Thick balsam, with almost impenetrable ground birch (2 to 3 m tall), cover the intermediate portions of the south-facing slope with scattered patches of ground birch with minor ground balsam covering the lower alpine areas and the cirque floors elsewhere on the claims. Alpine areas are restricted to patches of sedges and wild flowers with scattered areas of low ground birch.

The complex physiography can best be described as a plateau incised by several ages of cirque valleys, the youngest north-to-northeast-trending, with all southern slopes of subdued topography. The alpine areas are felsenmeer-covered in the plateau, southern slopes and bases of cliffs. Cirque headwalls consist of extremely steep to sheer faces.



LEGEND

- 3 — SEAGULL – TUYA – SURPRISE L. BATHOLITHS
- 2 — CASSIAR BATHOLITH
- } MID – LATE CRETACEOUS
- 1 — JURASSIC – CRETACEOUS BATHOLITHS
- TARGET AREA BOUNDARY
- CONTACT
- FAULT
- ROAD
- △ TIN SHOWING
- ○ TUNGSTEN SHOWING
- ◬ TIN – TUNGSTEN SHOWING
- AGREEMENT AREAS
- □ DU PONT – DUVAL CLAIMS
- □ CLAIMS HELD BY OTHERS

NOTE : PLACER OCCURENCES NOT SHOWN

- □ MAJOR TIN ANOMALIES OR ASSAYS
- □ GOOD TIN ANOMALIES OR ASSAYS
- □ MAJOR TUNGSTEN ANOMALIES OR ASSAYS
- □ MINOR ANOMALIES, SOME CLAIMS TO BE DROPPED IN 1979
- □ NO WORK TO BE APPLIED

DU PONT CANADA **EXPLORATION**

KLINKIT PROJECT
LOCATION & GENERAL GEOLOGY
BRITISH COLUMBIA & YUKON TERRITORY

1 : 1,000,000

KILOMETRES 20 10 0 10 20 30 40 KILOMETRES

SCALE

MILES 10 0 10 20 MILES

DATA BY : CBG & FMS	REVISED :	N.T.S. No.: 104 & 105
DATE : Mar. '78	May '78, 78 09 22	ACCT No.: 335 - 00
DRAWN BY : K.L.J.	Jun. '78, 79 05 15	
DATE : Mar. '78	78 07 10	DRWG. No.: KL.78-1

3. CLAIMS

The DU group consists of the following claims:

Claim name	Record Numbers	Date of Expiry
DU 1-136	YA28903 - YA29038	1980 01 10
DU 153-160	YA29055 - YA29062	1980 01 10
DU 161-167	YA34223 - YA34230	1980 01 10
DU 168 Fr.	YA34231	1980 01 10
DU 169-208	YA34232 - YA34270	1980 01 10
DU 210	YA34272	1980 01 10
DU 215-225	YA34277 - YA34287	1980 01 10
DU 232-238	YA34294 - YA34300	1980 01 10
DU 239 Fr.	YA34301	1980 01 10
DU 251-254	YA45141 - YA45144	1980 08 07
DU 300 Fr.	YA45693	1980 09 06

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

4. HISTORY

The DU claims (1-160) were located to cover the area of extremely anomalous tin in stream and side hill samples.

Cam Stephen located the CAN, JC etc. claims to cover skarn tungsten (tin) mineralization in the Sylvester sediments at or near the contact with the Seagull batholith. Welcome North staked the original SLIDE, SWIFT, MC claims to cover air-magnetic anomalies of unknown cause and gossans similar in colour to gossans on the DU claims. Welcome North analyzed a few rock samples collected by the stakers and came up with very anomalous tin values in altered sediments and intrusives.

Mineralization has been known to occur in the area since work in the late 1940's when Hudson Bay Mining & Smelting explored for massive sulphide/vein silver, lead and zinc to the west of the DU area. There has been no known physical exploration for mineralization on the DU claims but several ages of sample flags were noted in major creeks draining the property.

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 of 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.

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.

5.2 Intrusive Rocks

5.2.1 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 (Figure 1).

b. Porphyritic:

   i. PP3-4: quartz and feldspar phenocrysts in a groundmass of quartz, feldspar and biotite (Figure 2a)

   ii. Crowded porphyry (PP2): 20-40% quartz and feldspar phenocrysts are contained in a consistently fine-grained groundmass of quartz, feldspar and biotite (Figure 2b).

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

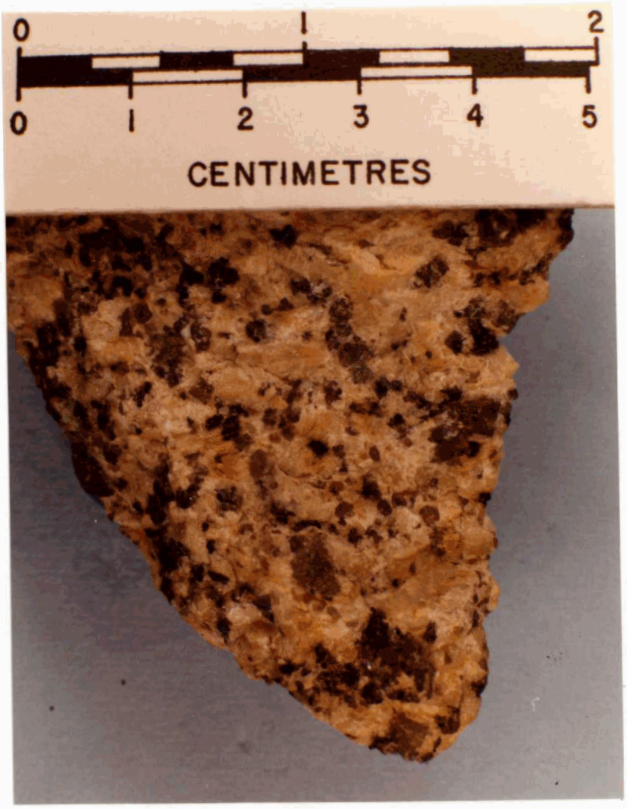


Figure 1. Seagull batholith: "typical" coarse-grained variety. Although generally described as equigranular, grain size is often variable and porphyritic varieties are not uncommon.



a.



b.

Figure 2. Seagull batholith: Porphyritic varieties.

a. PP3,4 has a fine- to medium-grained groundmass with rare to 10% phenocrysts

b. Crowded porphyry (PP2) is distinguished by its consistently fine-grained groundmass and high percentage of phenocrysts.

that the term seriate is used to imply a range of textures from aplitic to very coarse. Coarse-grained patches and bubbles contain crystals which approach pegmatitic dimensions (Figure 3).

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 sub-parallel to batholith contacts.

Rare aplitic rocks are normally dyke-like, cross-cutting coarse and porphyritic rocks. These fine-grained "dykes" are 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 indicate 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.

5.2.2 Pyroxene Dykes (PXDK)

Although the field name for these rocks has been "hornblende dykes", thin section examination



Figure 3. 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.

(T10C, Appendix, 1978 report) reveals that most of the mafic phenocrysts are actually pyroxene (diopside-augite series). Sample T10C is described as medium-grained, equigranular peralkaline granite (quartz 11%, K-feldspar 39%; plagioclase (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 activity.

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 KL 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 contain some of the hydrothermal alteration products described above.

5.3 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° to almost vertical (dominant dips are between 15° to 35°).

The stresses that caused regional structural trends must have produced other types of structures, (folds or thrust 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.

6. GEOCHEMISTRY (See APPENDIX A)

6.1 Map KL 79-49

Major tin anomalies have been located to the southeast of the "Plateau" zone and scattered anomalies occur in the area of the claim boundary between DU and SWIFT projects. Disregarding detailed sampling in the PLATEAU and ECCLES Ridge area (insert KL 79-51), a total of 1,054 samples were collected within the area of this map.

The style of mineralization causing these anomalies has not been located in these new zones nor can the significance of the zones be determined by the present sampling.

6.2 Map KL 79-51

A total of 468 samples were collected during a detailed topographic sampling programme in this portion of the DU claims. As noted on the map, the whole area is extremely anomalous in tin, with soils ranging from 2.2% (XRF) to below detection limit. The majority of values are in excess of 100 ppm Sn (XRF), with major tin-rich portions related to in-place tin mineralization noted on detail geological maps.

Only a small portion of the anomalous area has been geologically evaluated for tin mineralization.

6.3 Map KL 79-52

A total of 243 samples were collected and analyzed for tin in the DU south area. The zone of tin anomalies noted in 1978 has been further defined, but as yet no mineralization has been located in place.

The principal anomaly is in the south central portion of the map, to the south of mapping attempted this year.

7. 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 (Figure 4).

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.

7.1 ECCLES Ridge (Map KL 79-54)

Mineralization on Eccles ridge is in the roof of the Seagull batholith within 50 m below its contact with overlying pendant rocks. A vertical diabase dyke,

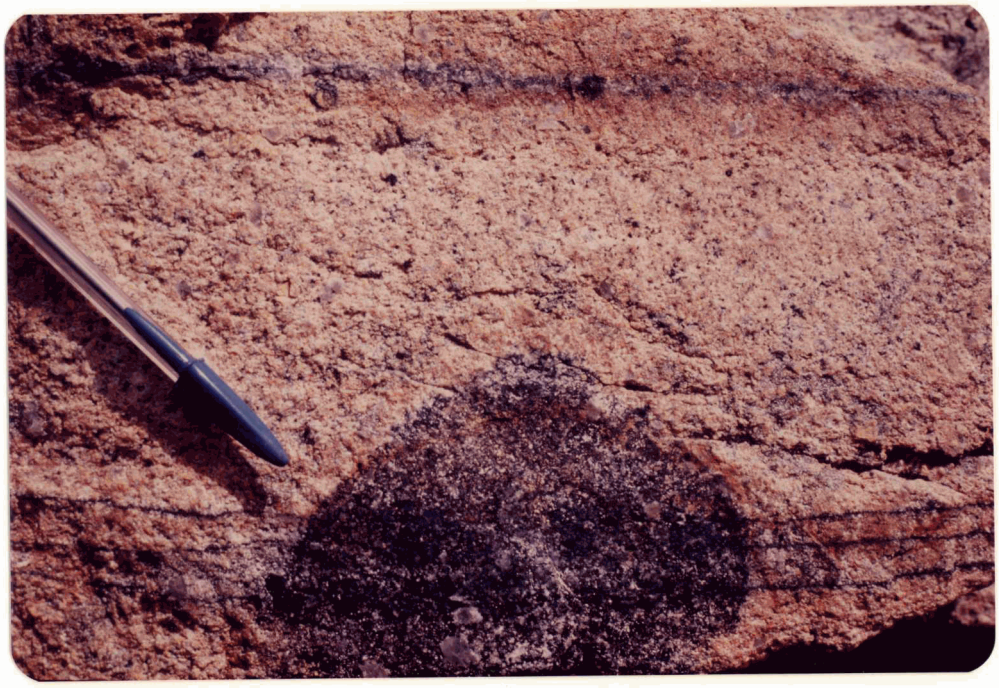


Figure 4. Sheeted quartz-tourmaline veins cross-cut a miarolitic cavity in the southeastern DU area (M-7-19-4).

striking N30E, cuts this contact as do late faults of similar attitudes. The porphyritic facies predominates, but in areas of strong alteration, textures have been modified to resemble aplite. Two types of mineralized veins have been mapped, the north vein and greisen veins (Figure 5).

7.1.1 North Vein

This is a continuous, apparently vertical structure that can be followed more than 120 m in an east-west direction. The zone is composed of one or two main quartz veins (4-6 cm) and a variable number of minor veins (0.5 to 1 cm), forming a parallel set that averages 30-50 cm.

Quartz forms large zoned crystals (0.3 to 1.5 cm) in the vein, in cockscomb-like textures indicative of open-space filling. Empty or kaolin-filled vugs are common.

Cassiterite has been found twice M-8-24-3, M-8-29-2). Crystals are euhedral, bipyramidal, dark brownish and generally large, from 0.1 to 1.5 cm. They have grown intermixed with quartz, preferentially in the central area of the vein.

Fluorite is present, normally accompanying cassiterite (M-8-24-3). Colours vary from violet to pale green and form large 0.5 - 1.5 cm crystals.

Pale brown sphalerite and galena are also present (M-8-9-3). They form crystals from 0.01 to 0.5 cm intermixed with quartz. The appearance of the vein where sulphides occur is slightly different from cassiterite-bearing areas. In sulphide-bearing portions, quartz forms smaller crystals and does not display cockscomb texture. Also, the vein itself has diffuse contacts with the wall-rock and the proportion of green alteration minerals is higher (30%?).

Except for ever-present quartz, the distribution of minerals in the vein is erratic. No overall grade sampling has been carried out, but visual estimation of specimens containing cassiterite indicate 5-7% tin.

A green clay alteration affects vein and host rock, producing an alteration halo between

a.



b.



Figure 5. Quartz veins on ECCLES Ridge.

a. The north vein (M-8-24-3) contains quartz, cassiterite and illite; enclosing granite contains pervasive illite and no biotite.

b. The greisen veins contain coarse (vuggy) quartz and fluorite and erratically distributed cassiterite. Anastomosing textures shown here (M-8-29-5) are rare, but this greisenized granite without biotite is the ubiquitous host rock.

2 and 10 m wide along and parallel to the vein. Green clay is present in the vein itself, and replaces everything except quartz in the host rock. It begins to form rims around plagioclase or K-feldspar phenocrysts, progressively replacing the whole crystal. Analysis of this green clay by XRF at U.B.C. has indicated an illitic composition.

7.1.2 Greisen Veins

These veins are characterized as parallel, subvertical, sheeted quartz veins with an E-W strike direction. Veins vary from 0.2 cm to 2 cm wide, affecting an area 6-7 m wide that can be followed for 50 m. Sometimes the distribution of veins (M-8-29-5) gives a stockwork-like appearance, but this is rare since they are usually parallel.

Quartz, fluorite, white mica and green clay are the gangue minerals of these veins. Quartz forms large crystals and cockscomb texture. Erratic fluorite occurs in large 0.2 to 1 cm crystals. Cassiterite is the only mineral of economic interest, present as small erratic pyramidal crystals in vugs (open-space filling). These pockets (vugs) can be more than 10 cm in diameter and are not regularly distributed along the vein.

Alteration envelopes accompanying veins are obvious in hand specimens because of the absence of biotite and the presence of an oxide coating. Thin section examination of the sample E-78-8-15-129 (Appendix, 1978 report) from the same area indicates a vein of cassiterite and plagioclase (An_{32}) with little alteration. Fluorite and K-feldspar co-exist in final growth textures and cassiterite appears to be interstitial.[1] There is partial sericite-clay alteration of K-feldspar and plagioclase which is most likely secondary and not related to mineralization. The presence of plagioclase with

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[1]The conclusion reached in the petrographic report is that fluorite probably replaces K-feldspar, but (although it is a rare occurrence) it is believed that the textures are, in fact, indicative of simultaneous crystallization of fluorite and K-feldspar.

an An_{32} composition, together with interstitial cassiterite, is anomalous when one considers that the cassiterite has been formed in a late magmatic-to-post-magmatic phase. More thin section studies are necessary to verify if this presumed late-magmatic enrichment of calcium is a generalized tendency for the Seagull batholith.

Green clay alteration is also present in greisen veins, although of minor intensity than in the north vein.

7.2 DU Plateau (Map KL 79-53)

Detail grid mapping of the DU Plateau has defined occurrences of tin-bearing veins in the upper portions of the Seagull batholith. Remnant sedimentary pendant rocks in the east and west corners of the grid are in approximate horizontal contact with underlying granite. Although mapping within the grid is not yet complete, it is believed that the majority of principal tin-bearing zones have been located.

7.2.1 Batholithic Rocks

Two major textural subdivisions of the batholith are distinguished, a coarse-grained variety and a finer-grained porphyritic variety. Coarse-grained rocks are generally equigranular, but may contain up to 30% fine or medium-grained material. Porphyritic rocks have rare to 30% coarse phenocrysts in a matrix of fine to medium-grained material; the absence of biotite has been noted in rare instances. Contacts between these two types are sometimes sharp, but often there is a gradual change through an intermediate medium-grained type. Spatial relations between coarse and porphyritic granite have not yet been determined with certainty, but preliminary evaluation suggests that porphyry forms a "rind" of variable thickness above the coarse-grained interior of the batholith.

Fracturing of granite is dominated by two fracture sets. The dominant set is parallel to veins, striking approximately east-west and dipping moderately to steeply south. The second set is oriented vertically, slightly east of north. The density of both fracture sets varies from rare to intense.

7.2.2 Veins

Tin-bearing (and tin-barren) veins are fracture-fillings which occupy east-west, south-dipping fractures.[2] In some places they can be seen to traverse from one fracture to another parallel one by way of a subordinate, non-parallel fracture.

Vein widths vary from 1 cm to 4 m (J-4), but are most commonly less than 1 m. Maximum strike length observed is 100 m, but many veins pinch and swell with such irregularity that they are difficult to trace.

Veins are generally intensely fractured zones with heavy, black manganese staining and various amounts of pervasive hematite and limonite (Figure 6). Quartz usually occupies the core, which may be as narrow as 1 cm, even though the accompanying intensely altered zone is much wider. Vuggy zones indicative of open-space filling, and parallel generations of quartz are common. Pervasive green (sericitic?) alteration of granite forms an irregular envelope around veins, but varies to such a great extent that it may be completely absent or as much as 1 m wide. Galena, sphalerite and pyrite are sometimes present, but their significance relative to tin mineralization has not yet been determined. Fluorite is present in trenched veins described below, but is rarely noted in other mapped veins. Cassiterite has not been identified in field specimens.

Extensive thin section work is planned in order to identify the exact nature of vein and alteration material. Thin section reports included in the 1978 DU report (esp. I and J) describe quartz-magnetite/hematite and biotite-tourmaline assemblages in veins from the Main Gossan which resemble Plateau vein alteration in hand specimen.

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[2]Open-space fracture coatings of cassiterite crystals were observed by F.M. Smith in one locality to occupy vertical north-south fractures, but these were not observed by geologists mapping the grid and will not be mentioned further.

a.



b.



Figure 6. Variations in intensity of alteration associated with veins on DU Plateau.

a. Gradation between unaltered granite (right) and weak green sericitic(?) alteration (left) which commonly accompanies veins. Limonite and manganese stains are also present.

b. Intense alteration associated with fracture surface (right) grades into weakly altered granite.

c.



Figure 6 (cont.): c. Vuggy-centred quartz/manganese/hematite vein in sharp contact with moderately altered granite.

Tin-bearing veins are distributed throughout the grid, but the greatest concentration of high assay values is just south of the lake. One vein (J-45,48) is 20 to 40 cm wide over 100 m; 2 hand specimens and a chip sample across the vein assayed 5.40% and 0.61% Sn, respectively. Two of the highest chip sample assays (J-42,, 1.40%; J-49, 1.52%) are also from veins in this immediate area.

7.2.3 Miscellaneous Features

Stockwork-type quartz veinlets within yellow (sericite-illite?) alteration zones were observed, but, as with similar occurrences throughout the Seagull batholith, do not appear to be directly associated with tin mineralization.

East-west microveinlets of quartz without apparent associated alteration are present throughout the Plateau grid. Those areas with a particularly noticeable density of these veinlets have been indicated.

7.3 DU Main Gossan

This is a large area of alteration situated in the north portion of the DU claims, within the Seagull batholith. The altered area outcrops along the north flank of a steep valley of northwest-southeast trend. Sedimentary rocks outcrop on the southern flank, extending southeastward more than 700 km along strike, with an approximate thickness of 300 m.

Rock-chip and geochemical surveys carried out during 1978 and 1979 have not yielded significant tin values. Thus, the area is considered to be a secondary target and no extensive field work has been done.

Tourmaline-quartz-green biotite and quartz-muscovite-illite are the two dominant types of veins related to the alteration. The first type of vein is the only one that contains metallic minerals, i.e., pyrite, sphalerite, galena, magnetite, ilmenite and secondary hematite. These minerals are present either in the vein or as irregular patches in the host rock. The latter vein type is usally accompanied by carbonates and sericite. Thin section descriptions (B, C, D, E, F, G, H, I, J; Appendix, 1978 report) show that greisenization,

silicification and tourmalization have been the main alteration processes affecting the original porphyritic granite, but no temporal relationships between these processes can be established at the moment.

If the hypothesis of zoned mineralization is confirmed by further work at DU Plateau and the north zone of MC Ridge, the DU Main Gossan would have to be checked by drilling because it would therefore have the largest potential of the entire KLINKIT area.

7.4 Black Granite

Black alteration has affected a large area of Seagull granite in the east portion of the DU claims. Outcrops of this type can be found along 400 m in a N70°W direction over a thickness of 200 m. The original rock was typical Seagull granite with both coarse and porphyritic facies intermixed. Thin section studies (S-7-31-2; Appendix II) describe an unidentified opaque black mineral forming 20 to 50% of the groundmass, occuring together with Ti-oxide and fine limonite. Its formation was accompanied by sericite alteration in plagioclase and K-feldspar. The opaque mineral was formed by partial replacement of the rock along fractures formed in the groundmass.

Further studies delineating the exact mineralogy and chemical composition of this extensive alteration zone may facilitate interpretation of the evolution of alteration facies within the Seagull batholith.

8. CONCLUSIONS AND RECOMMENDATIONS

The area between ECCLES Ridge and DU Plateau and on the Plateau itself require exploratory diamond drilling to determine the character and vertical extent of tin mineralization. DU Southeast requires detail sampling and minor trenching to evaluate greisen zones. DU Main Gossan area must be re-evaluated on the basis of results from 1979 and 1980 field work elsewhere on the DU claims. Ice Rink Pass (south of DU Plateau) must be detail mapped to develop data on zoning of mineralized areas on DU Plateau and ECCLES Ridge.

APPENDIX I

STATEMENT OF EXPENDITURES

January 1 - December 31, 1979

DU CLAIMS, YT

Casual Labour	$	273.10
Consultant Fees		901.24
Travel Expenses		2 277.34
Camp Expenses		8 503.33
Mapping, Gr. Surveys, Maps		16 409.19
Ground Clearing & Trenching		9 134.26
Freight, Hauling, Storage		1 259.37
Assaying		5 359.40
Salaries - Regular		6 288.16
Salaries - Temporary		12 775.27
Space Charges		110.22
Equipment Rental		3 304.65
Stationery & Supplies		137.70
Telephone		494.41
Auto Expenses		181.06
Repairs & Mtce (Excl. Auto)		37.09
Non Capital Equip. Purchases		1 014.29
Depreciation Expenses		1 459.50
TOTAL	$	69 919.58

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

DV-5 Quartz Monzonite Porphyry

main rock 80-85%

phenocrysts	25-30%
plagioclase	10
K-feldspar perthite	7-10
quartz	7-10
biotite	1
groundmass	70-75%
K-feldspar	25-30
plagioclase	20-25
quartz	20-25
biotite	3- 5
fluorite	1- 2
zircon	0.1
opaque	minor
hematite	minor
muscovite	trace

inclusions type A

phenocrysts	15-20%
K-feldspar	12-15
plagioclase	3- 5
quartz	3

groundmass
similar to main rock

inclusion type B

K-feldspar	50-55
plagioclase	25-30
quartz	15-20
biotite	2- 3
muscovite	2- 3

The main rock contains coarse zoned phenocrysts up to 7 mm across in a very fine grained (0.05-0.15 mm) groundmass.

Plagioclase phenocrysts commonly have 2 major zones. The core is subhedral to euhedral, and is marked by strong hematite-limonite alteration on fractures and patches where fracturing is intense. These are surrounded by coarse grained plagioclase, commonly in optical continuity with the core. The outer zones are fresh to slightly altered to hematite-limonite. Many outer zones contain very abundant rounded inclusions of quartz from 0.05-0.1 mm in size; the texture is poikilitic.

Perthitic K-feldspar forms coarse phenocrysts, with 5-15% exsolved plagioclase in irregular patches. Near borders of phenocrysts are abundant intergrown fine grained quartz and plagioclase grains, indicating that during final crystallization, K-feldspar grew on earlier phenocrysts in optical continuity, and enclosed quartz and plagioclase grains growing at the same time.

Biotite forms a few phenocrysts up to 1 mm across; they have smooth to ragged borders. Pleochroism is from light to dark reddish brown. Zircon forms tiny inclusions in biotite phenocrysts, surrounded by strongly pleochroic halos.

The groundmass consists of rounded quartz grains, anhedral plagioclase, and interstitial microcline, with lesser other minerals. Biotite forms scattered ragged grains; pleochroism is from light straw to dark greenish red-brown. Fluorite forms interstitial patches up to 0.3 mm across. Zircon forms a few euhedral grains from 0.03 to 0.1 mm long. Opaque forms scattered grains, some associated with fluorite and zircon. Muscovite occurs with biotite.

Type A inclusions differ from the main rock in that the groundmass is coarser (0.13-0.25 mm), and K-feldspar is more abundant. Borders with the main rock are sharp, but not readily discernible in hand sample.

Type B inclusion occurs in one corner of the section. It is a medium to coarse grained rock, with K-feldspar up to 1.5 mm across, plagioclase up to 1 mm long, and 15-20% finer grained (0.2-0.4 mm) plagioclase and quartz. Muscovite is more abundant than in the main rock, probably as an alteration of biotite.

2982 Strongly Altered Rock, Vein?

rock		vein	
quartz	35-45%	quartz	50-55%
carbonate(siderite)	35-45	plagioclase	35-40 (altered to
sericite	15-20	opaque	7-10 carbonate-
hematite-limonite	5- 7	cassiterite?	1 hematite-
opaque	minor	zircon	trace limonite)
polished block			
galena	2- 3	chalcopyrite	trace
marcasite-pyrite	1		

The rock and vein are strongly altered and few primary textures can be identified, especially in the rock.

Rock

Quartz forms irregular patches of interlocking grains (0.02-0.1 mm grain size) and a few coarser grains up to 0.5 mm. Locally fine grained (0.005-0.02 mm) recrystallized? quartz veinlets cut coarser quartz, but the veins do not continue into other minerals.

Carbonate, possibly siderite, with pervasive alteration to hematite-limonite forms fine grained patches of more irregular shape than quartz patches. The intensity of color increases near opaque grains.

Sericite forms scattered flakes and fibrous radiating aggregates in quartz, with average grain size 0.05 mm. In coarser carbonate, patches of fine grained sericite up to 1 mm across are present; grain size is 0.05-0.08 mm.

Some coarser carbonate, with only minor hematite-limonite occurs with coarse quartz; this may be a replacement patch in the rock.

Hematite-limonite is concentrated locally in irregular vein-like zones, commonly with minor opaque.

Vein?

Quartz is very coarse grained and interstitial to plagioclase. Plagioclase forms euhedral grains and clusters of grains. Most plagioclase is altered; scattered relics of plagioclase are surrounded by carbonate, while more intense alteration has produced very fine grained pseudomorphs of plagioclase consisting of carbonate and hematite-limonite. Whether all the carbonate-Fe oxide patches are after plagioclase is not certain, and is based on the shape of the pseudomorphs.

A few large patches consist of an intimate intergrowth of opaque, with intergrown quartz, carbonate, and minor hematite. Grain size is mainly 0.03-0.08 mm.

Near one end of the section is a grain 2 mm long of cassiterite? Properties include: very high relief, medium orange-brown color, coarse grain size, isotropic. The last property does not fit unless it is a basal section. Thus, identification as cassiterite is suspect.

One euhedral zircon grain 0.05 mm long occurs in quartz.

Polished Block

Galena forms irregular interstitial grains averaging 0.2 mm across in quartz. One patch is 0.8 mm across, and contains minor chalcopyrite intergrown with quartz along the galena grain border.

Marcasite and pyrite form a very fine grained intergrowth (0.01 mm grain size) in a few patches up to 0.2 mm across. Scattered grains also occur elsewhere in the section. One veinlet of marcasite is present.

Hematite is abundant in coarse patches and a few tiny veinlets.

S-7-31-2 Plagioclase-Quartz Porphyry

phenocrysts	40-45%	
plagioclase	20-25	
quartz	15-20	
groundmass	55-60	
plagioclase	20-25	
quartz	20-25	
opaque	10	
biotite	2- 3	(altered to sericite-Ti oxide)
limonite	1	
zircon	trace	

Plagioclase phenocrysts are from 1 to 5 mm in size; many consist of aggregates of several grains, some of which contain quartz grains. A few phenocrysts are fragments of grains; they have angular shapes resembling shards, and are elongated perpendicular to albite twins. (Normal plagioclase phenocrysts are elongated parallel to albite twins). Composition is An_7 (Michel-Levy method). Grains are slightly altered to sericite flakes (0.02-0.1 mm long); the cores of some grains contain abundant sericite.

The stained block suggests the presence of some K-feldspar phenocrysts; however, none was seen in thin section.

Quartz forms single grains and aggregates of several grains up to 5 mm across; aggregates are in parallel orientation, and are separated by thin zones of groundmass.

The groundmass consists of fine grained (0.05-0.08 mm) rounded quartz grains enclosed in poikilitic to interstitial plagioclase (0.1-0.5 mm); plagioclase has a dusty opaque-semiopaque alteration. A few grains of biotite up to 0.3 mm are present; these are completely altered to sericite with minor Ti-oxide and opaque. One zircon grain 0.1 mm long is present in the groundmass.

Cutting the groundmass are numerous irregular vein-like zones in which the rock has been pervasively altered with the formation of 20-50% opaque grains as ragged laths and irregular rounded grains from 0.02 to 0.05 mm in size. Associated with opaque is scattered patches of very fine grained limonite. A few coarser patches of opaque occur in one corner of the section; with them is a little Ti-oxide. Most probably opaque was formed by partial replacement of the rock along fractures formed in the groundmass. Locally opaque grains are superimposed on phenocrysts.

In one plagioclase phenocryst is a narrow kaolinite veinlet.

S-7-25-2 Plagioclase-(Quartz-Biotite) Porphyritic Dacite

phenocrysts	20%	
plagioclase	10-15	
quartz	3- 5	
biotite	3- 5	
hornblende	minor	
opaque	minor	
groundmass	80%	
spherules	50-55	(plagioclase and quartz)
plagioclase	7-10	
sericite	5- 7	
quartz	5- 7	
K-feldspar ?	3- 5	
biotite	2- 3	
opaque	1	
zircon, apatite	trace	

The rock consists of medium to coarse phenocrysts in a groundmass dominated by spherulitic intergrowths of plagioclase and quartz.

Plagioclase phenocrysts are subhedral to euhedral from 0.3 to 2 mm in size; they occur singly or in clusters of two or more grains. Compositional zonation is prominent in some and weak in others. Zoned crystals show two main zones, a core with composition at least as calcic as An_{35}, and a rim with composition at least as calcic as An_{25}. Both zones show compositional variation within single crystals. Phenocrysts are slightly to moderately altered to irregular patches of calcite; cores are much more strongly altered than rims. A few contain fine grained biotite, probably primary, and one is partly replaced by K-feldspar.

Quartz phenocrysts are from 0.2 to 1 mm in size; they are subhedral with strongly resorbed borders.

Biotite forms elongated to stubby laths from 0.3 to 1.5 mm in size; pleochroism is from medium to very dark brown.

One hornblende phenocryst is 0.5 mm across, equant, with no prominent cleavage; pleochroism is from light olive green to medium reddish brown.

One angular opaque grain 1.0 mm long is present.

Spherules are from 0.1 to 0.15 mm across and consist of very fine myrmekitic intergrowths of plagioclase and quartz, with plagioclase probably about twice as abundant as quartz.

Plagioclase forms scattered laths from 0.1 to 0.3 mm in length; these have ragged borders, but do not appear to be altered.

Sericite forms interstitial patches of very fine grained (0.01-0.02 mm) aggregates of randomly oriented flakes.

Quartz forms interstitial grains, some of which appear to be partial rims of spherules.

K-feldspar may be present in the groundmass, as suggested by the yellow color of the stained block. It also may occur in the spherules.

Biotite forms scattered laths from 0.02 to 0.05 mm in size; pleochroism is from pale to medium brownish green. Opaque forms scattered anhedral grains averaging 0.02 mm in size. Zircon forms a few anhedral grains up to 0.05 mm across in biotite phenocrysts, and euhedral prisms up to 0.05 mm long in the groundmass. Apatite forms a few scattered equant grains averaging 0.02-0.05 mm.

DU 3 wo/Bi Quartz Monzonite - Granodiorite

rock

perthitic K-feldspar	35%
plagioclase	35
quartz	25
sericite-muscovite	5
hematite	0.2
zircon, Ti-oxide	minor

The rock is generally medium grained (0.3-1 mm), with a few coarser grains up to 3 mm. Grains are irregular and interlocking; the texture is similar to DU Main Gossan.

Perthitic K-feldspar grains are up to 2 mm long, with irregular patches of plagioclase forming up to 25% of grains. Dusty alteration is much less intense than in DU Main Gossan.

Plagioclase forms irregular grains; composition by Michel-Levy method is An_8. Grains are mainly fresh to very slightly altered to coarse sericite flakes.

Quartz forms mainly rounded grains from 0.08 to 0.2 mm, with a few grains up to 3 mm across. No graphic intergrowths with K-feldspar were noted, but intergrowths of rounded quartz in feldspars are not much different than the graphic intergrowths of DU Main Gossan.

Muscovite forms pseudomorphs after biotite up to 0.5 mm in size; textures are similar to those of biotite in sample DU Main Gossan. Most muscovite grains contain inclusions of Ti-oxide.

Sericite forms flakes and radiating clusters of grain size 0.05 mm; these are scattered through the rock.

Hematite forms scattered clusters of grains averaging 0.03 mm in size. Zircon forms a few subhedral to euhedral grains up to 0.05 mm in size.

veins

Three types of veins cut the sample.

1) Quartz, minor sericite:

narrow, discontinuous early veins, recrystallized ? such that borders with rock are diffuse and some borders cut through single quartz grains, i.e., quartz in rock and in vein are in optical continuity and appear to be the same grain.

2) Quartz, plagioclase, minor sericite:

These are the prominent veins in the stained block, containing 80-85% quartz, 15-18% plagioclase, 1-2% sericite, and dusty semi-opaque (possibly Ti-oxide). Veins have diffuse borders with the rock, and are distinguished by composition, very fine grain size (0.01-0.05 mm) of most grains, and dusty sericite-Ti oxide. Some veins have coarser quartz and plagioclase up to 0.2 mm. Grains are strongly intergrown, and have the appearance of having been crushed; many plagioclase grains are very angular.

3) Hematite: late veins consisting of massive, very fine grained hematite, with halos stained with limonite cut the other veins and the rock. Some parallel earlier veins,and others are crosscutting. Limonitic halos are broad relative to the width of the veins.

DU MAIN GOSSAN Quartz Monzonite

perthitic K-feldspar	40%	
quartz	30	
plagioclase	25	
biotite	5	partly altered to muscovite, accessories
muscovite	1	
hematite-limonite	0.3	*Note: hand sample contains a pegmatitic patch with quartz-tourmaline
zircon, fluorite	0.1	
Ti-oxide	0.1	
kaolinite	minor	
epidote, hornblende?	trace	

The rock is mainly equigranular averaging 0.5-1 mm in grain size, with a few coarser K-feldspar grains.

Perthitic K-feldspar forms irregular anhedral grains with up to 25% exsolved plagioclase in coarse to fine patches in optical continuity within one grain. About 5% of the rock consists of a graphic intergrowth of round quartz grains 0.05-0.15 mm in size enclosed in K-feldspar, generally with only minor exsolved plagioclase. Quartz forms about 30% of the intergrowth.

Quartz forms irregular coarser grains from 0.3 to 2 mm in size, and rounded finer grains from 0.1 to 0.3 mm in size; the latter including those in the graphic intergrowths.

Plagioclase grains are anhedral, with a composition of An_{6-8} from the Michel-Levy method. Grains are fresh to slightly altered to sericite, with 10% of the plagioclase grains more strongly altered to sericite-biotite-fluorite. Patches and fracture fillings of limonite-hematite are abundant in some grains.

Biotite forms equant to ragged grains; the latter commonly are partly to completely altered to muscovite-Ti oxide-limonite, or to secondary biotite with light to medium green pleochroism. One grain contains minor secondary chlorite.

Hematite forms a few clusters of grains 0.5 to 1 mm in size with minor epidote and patches of limonitic kaolinite-sericite. These are along a thin fracture filled with hematite.

Zircon forms scattered euhedral grains in felsic minerals up to 0.08 mm long, and minor rounded grains in biotite with weakly developed pleochroic alteration halos.

Fluorite forms scattered grains up to 0.15mm across interstitial to quartz and feldspars, and as alteration of plagioclase as described above.

Kaolinite-sericite forms patches up to 0.5 mm across of fine grained felty aggregates, associated with hematite and secondary green biotite.

Epidote forms two small patches, one alone in plagioclase, and the other with fluorite and hematite-limonite.

Brown hornblende? occurs as a few tiny grains with fluorite and zircon.

S-7-31-7 Quartz Monzonite - Granodiorite

plagioclase	30-35%
K-feldspar	30-35
quartz	25-30
biotite	3- 5
muscovite	1- 2
apatite	1
tourmaline	0.2
zircon	minor
Mineral Y	trace

Note: one phenocryst of perthitic K-feldspar in hand sample 10 mm long.

The rock is mainly medium to coarse grained (average 1 mm), with a slightly interlocking mosaic texture, except for 5-7% graphic intergrowths of quartz and K-feldspar.

Plagioclase forms subhedral prismatic grains up to 2 mm long. Composition is An_8 by the Michel-Levy method. Alteration consists of scattered sericite flakes.

K-feldspar grains are mainly anhedral, with a wide range in size. Dusty alteration is common, and a few grains contain exsolution patches of plagioclase.

Quartz is mainly finer grained than feldspars (0.2-0.5 mm), but some coarser grains up to 1 mm occur, and a few phenocrysts up to 5 mm are present. Quartz grains ranging from 0.05 to 0.2 mm are intergrown graphically with coarser K-feldspar. Most quartz grains are slightly to moderately rounded.

Biotite forms ragged laths and interstitial grains up to 1 mm in size; pleochroism is from light straw to bright red brown. Inclusions of zircon up to 0.05 mm with strongly pleochroic halos are common.

Muscovite forms scattered irregular grains up to 0.2 mm across; some occur alone enclosed in feldspars or quartz, and others are in parallel intergrowths with biotite.

Apatite forms abundant irregular rounded to elongate grains up to 0.8 mm in size.

Tourmaline forms very irregular to skeletal grains intergrown with biotite or dusty K-feldspar. Grains occur in a small part of the section, and are up to 1 mm across. Color zones are present, and the mineral is slightly pleochroic; one composition has pleochroism from light to medium orange brown, while a less abundant phase has weak bluish green pleochroism.

Mineral Y forms a very fine grained patchy alteration? of plagioclase; patches are up to 0.1 mm across and have sharp outlines. The mineral has very low refractive indices (R.I. much less than quartz), a medium brown color, and low birefringence (interference color masked by mineral color). It may be a clay mineral - montmorillonite?.

An inclusion of a rock of similar composition but finer grained groundmass occurs in the center of the section. The inclusion is 2-3 mm across, and has diffuse borders with the rock. Grain size averages 0.2 to 0.5 mm.

E-78-8-15-129b Quartz Monzonite - Granodiorite

perthitic K-feldspar	30-33%
quartz	30-33
plagioclase	30-33
biotite	3- 5
limonite	0.5
fluorite	0.3
kaolinite	0.3
opaque	0.3
zircon	0.1
apatite, epidote	trace

The rock is mainly medium grained, with scattered coarser grains. Perthitic K-feldspar forms mainly interstitial irregular grains, with 0-5% exsolved plagioclase, mostly as irregular patches but locally as fine parallel lenses. Two grains 1.5 mm long are subhedral and show Carlsbad twinning. Many grains have moderate to abundant dusty alteration to opaque and semiopaque. Several grains have graphic intergrowths of quartz 0.1-0.3 mm in size.

Quartz forms irregular anhedral grains from 0.5 to 1 mm in size, with a few up to 3 mm. It also forms rounded grains in graphic intergrowths with K-feldspar.

Plagioclase forms equant to prismatic grains, locally up to 3 mm long. Grains are slightly to moderately altered to sericite-dusty opaque, semiopaque. A few grains are altered to coarser grained sericite and irregular patches of fluorite. Composition from Michel-Levy method is An8. Several grains have abundant myrmekitic intergrowths of very fine grained quartz.

Biotite forms irregular laths, in part interstitial. Pleochroism is from light straw to medium greenish brown. Many grains are partly altered to a second variety of biotite which has pleochroism from light straw to medium emerald green; alteration is patchy and partly controlled along cleavage directions.

Limonite forms on fractures and as a dusty alteration of perthite

Fluorite forms interstitial patches up to 0.8 mm across, some containing abundant opaque as patches and along cleavage. Fluorite also forms fine alteration patches in plagioclase.

Kaolinite forms a few patches with fluorite and minor epidote? One large patch, which probably was originally plagioclase, consists of felty fine grained kaolinite with coarser patches of limonite and grains of biotite, fluorite, sericite, and minor opaque. Limonite is abundant on the border of the patch.

Opaque forms coarse patchy replacement of a few plagioclase grains, in part associated with fluorite and/or kaolinite patches.

Zircon forms euhedral zoned grains up to 0.08 mm long in quartz, and sparse anhedral grains up to 0.05 mm across in biotite; the latter have strongly pleochroic halos.

Apatite forms one euhedral grain 0.05 mm across. Included in the apatite is a mineral grain 0.01 mm across with an hexagonal outline and greenish-brown color. It may be tourmaline.

Epidote forms a few grains in plagioclase, in part with opaque.

S-7-25-2 Quartz Monzonite

K-feldspar (perthitic)	30-35%
plagioclase	25-30
quartz	20-25
biotite	7-10
muscovite	5- 7
opaque	0.2
zircon	minor
apatite	minor
limonite	minor
Ti-oxide	trace

The sample is mainly an anhedral slightly interlocking intergrowth of feldspars and quartz, with scattered biotite and poikilitic muscovite. It contains an inclusion of coarse grained monzonite? 10 mm X 5 mm in size. Grain size is mainly 0.3 to 1 mm in the rock, and up to 5 mm in the coarse inclusion.

K-feldspar perthite forms anhedral to subhedral grains up to 1.5 mm long. Some show Carlsbad twins. Exsolution plagioclase is minor in fresh K-feldspar, consisting of tiny lenses and patches. Wher K-feldspar shows dusty alteration to semiopaque?, plagioclase exsolution patches are coarser and more abundant.

Plagioclase grains are zoned with more calcic cores and more sodic rims; zonation is similar to that in DU-5, but no compositions could be determined. Cores of grains are commonly slightly to moderately altered to sericite, dusty opaque, and in part to limonite. Limonite is most common on fractures. A few grains show oscillatory zones in the core.

Quartz grains have irregular shapes, mainly subangular.

Biotite forms irregular laths from 0.2 to 0.5 mm in size. Pleochroism is from light to dark brown or reddish brown.

Muscovite forms mainly as coarse poikilitic to skeletal grains as an alteration of the rock, especially feldspars. A few grains occur in parallel intergrowths with biotite.

Opaque forms scattered anhedral grains in quartz and feldspars, and subhedral grains in biotite; grain size is mainly 0.02-0.05 mm.

Zircon forms very fine (0.01-0.03 mm) anhedral grains in biotite with strongly pleochroic halos, and subhedral to euhedral grains up to 0.08 mm long in quartz and feldspars.

Apatite forms a few equant grains up to 0.08 mm across, and acicular grains up to 0.1 mm long.

Ti-oxide forms scattered tiny grains with biotite.

The coarse grained patch consists mainly of plagioclase and K-feldspar in about equal amounts. Grains are 2 to 5 mm in size. Quartz (5%) and biotite (2%) form interstitial grains about 0.3-0.5 mm in size.

DU-6 Altered Quartz Monzonite

perthitic K-feldspar	35-40%	
quartz	25-30%	
plagioclase	25-30%	(mostly altered)
biotite	5- 7	(completely altered to muscovite, Ti-oxide,
zircon	0.2	opaque)

The rock is strongly altered but the original texture is well preserved. The rock is a medium to locally coarse quartz monzonite with an irregular, interlocking texture.

Perthitic K-feldspar forms very irregular grains, in part interstitial to other minerals. Plagioclase formed up to 25% of the grains as ragged patches; it is completely altered to kaolinite-limonite. K-feldspar has a moderate to strong dusty alteration to opaque and semiopaque.

Plagioclase forms subhedral grains 0.5 to 1.5 mm in size. A few partly altered relic grains are preserved; most of these contain abundant patches of limonite. Most grains are altered as the third type described in DU 3 W/Bi: either completely to kaolinite, with or without limonite, or with a thin rim of albitiic plagioclase preserved around a core of kaolinite-limonite. Kaolinite is coarser here, averaging 0.025 mm. Locally it contains minor sericite.

Quartz forms mainly rounded to subrounded grains 0.3 to 1 mm in size, with a few coarse grains up to 4 mm. Locally finer grained quartz forms graphic intergrowths with perthitic K-feldspar.

Biotite forms ragged laths up to 1.5 mm in size. They are completely altered to ragged muscovite with intergrown limonite, Ti-oxide, and opaque. Original cleavage in biotite is not preserved.

Zircon forms scattered euhedral to subhedral grains and clusters in quartz and with muscovite.

The rock is cut by a wispy quartz-kaolinite vein, similar to the first type of vein in DU 3 wo/Bi. Quartz occurs where the vein cuts quartz grains, and kaolinite where the vein cuts feldspars.

DU 3 W/Bi Quartz Monzonite

perthitic K-feldspar	40%	
quartz	25	
plagioclase	20	
kaolinite-sericite	7-10	(after plagioclase)
biotite	5	(partly altered)
hematite	1- 2	
fluorite	0.1	
zircon	0.1	
tourmaline	trace	
Mineral X	trace	

The rock is an equigranular, medium grained (mainly 0.5-1.5 mm), irregular intergrowth, similar to DU Main Gossan.

Perthitic K-feldspar contains up to 40% exsolved plagioclase as in DU Main Gossan. K-feldspar is moderately to strongly altered by dusty semi-opaque and opaque grains. About 3-5% of the rock consists of graphic intergrowths of perthite and quartz as in DU Main Gossan.

Plagioclase is moderately to strongly altered in three main types of alteration which affect different grains. Some grains are altered to patches and flakes of sericite. Others contain sericite and kaolinite with lesser fluorite and minor limonite. Finally, some are completely altered to very fine aggregates of kaolinite-sericite, some of which are stained yellow by limonite. Several grains showing the last type of alteration have narrow rims of fresh plagioclase; these may represent original zoned plagioclase grains, whose more-calcic cores were completely replaced but whose sodic rims were unaffected.

Quartz texture is similar to DU Main Gossan; a few coarse grains are up to 2 mm across. Feldspars seem to be interstitial to quartz in parts of the section.

Biotite forms ragged grains, some of which are slightly to strongly altered. Primary biotite is pleochroic from light to dark brown. Altered biotite is lighter and greener, and commonly contains abundant very fine grained Ti-oxide.

Hematite-limonite forms fracture fillings and patches; some is after biotite, and some is with kaolinite-sericite after plagioclase. A large patch occurs in one corner of the section, associated with abundant hematite on fractures.

Fluorite forms scattered patches up to 0.5 mm across.

Zircon forms grains up to 0.1 mm long in feldspars, and a few subrounded grains averaging 0.05 mm long in biotite; the latter have strongly pleochroic halos.

Tourmaline forms two small grains 0.05 mm long; they are pleochroic from light yellow green to medium emerald green.

Mineral X forms a few grains in one biotite grain and one grain in plagioclase. It is semi-opaque with a very high relief. It may be Ti-oxide

DU-5 Porphyritic Quartz Monzonite

phenocrysts	25-30%	
K-feldspar perthite	18-20	
quartz	5- 7	
plagioclase	2- 3	
groundmass	70-75%	
K-feldspar perthite	25-30	
quartz	25-30	
plagioclase	15-20	
biotite	2- 3	(partly altered to muscovite, limonite, Ti-oxide)
zircon	minor	
Ti-oxide?	minor	

Perthitic K-feldspar forms coarse to very coarse (up to 15mm) phenocrysts; exsolved plagioclase forms 30-30% of the crystals as irregular to regular lenses and patches in optical continuity. On perthite-perthite grain borders commonly is a thin zone of fine grained plagioclase, possibly formed by exsolution. Outer zones of some perthite grains contain abundant graphic intergrowths with fine grained (0.02-0.2 mm) quartz. Carlsbad twins are common.

Quartz phenocrysts are up to 5 mm across. Most have slightly irregular borders intergrown with the groundmass.

Plagioclase phenocrysts are up to 2 mm long. Most grains are zoned. Cores are commonly moderately altered to sericite-kaolinite with or without limonite; in several coarse grains, the cores have been plucked from the section during preparation. Outside the cores two main zones exist; the inner zone has a composition grading from An_{19} to An_{15}, and the outer zone grades from An_{12} to An_8, with increasing sodic content towards the rims. (All compositions by Michel-Levy method). Some grains contain altered cores surrounded by thin sodic rims.

The groundmass is a medium grained (0.3-0.5 mm) intergrowth of quartz and feldspars, with scattered biotite grains. K-feldspar in the groundmass is perthitic, with irregular patches of exsolved plagioclase. Plagioclase grains are gradational to the phenocrysts in size and are similar in zonation patterns, except that zonation is not as pronounced. Biotite is pleochroic from light to dark brown. It forms ragged laths, many of which are partly to completely altered to muscovite-limonite-Ti-oxide. Muscovite does not pseudomorph biotite, but forms aggregates of fibrous subparallel grains. Limonite forms lenses along biotite cleavage planes and irregular patches, and Ti-oxide forms scattered clusters of very fine grains. Minor zircon grains up to 0.05 mm long occur with biotite. Ti-oxide forms a few isolated grains with biotite; these have very high relief and birefringence. Grain size is up to 0.3 mm. This appears to be the same mineral as Mineral X in DU 3 w/Bi.

This sample and Sample DV-5 are genetically related; the main difference is the coarser grain size of DU-5.

Reexamination of several samples

After discussion with Gwen Ditson about the possible presence of topaz in some of the samples, especially the "greisen" samples and dikes, the following rocks were reexamined:

E-78-8-8-108 (2 sections), S-7-29-20, SIN, (greisen and alteration samples)

S-7-25-2, G-78-7-29-17 (dikes)

Of these only E-78-8-8-108 contains topaz.

In the original report a few grains of muscovite with an unusual texture were described.

"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 innner grain, but not in optical continuity with the inner grain."

One grain of apatite was described as follows:

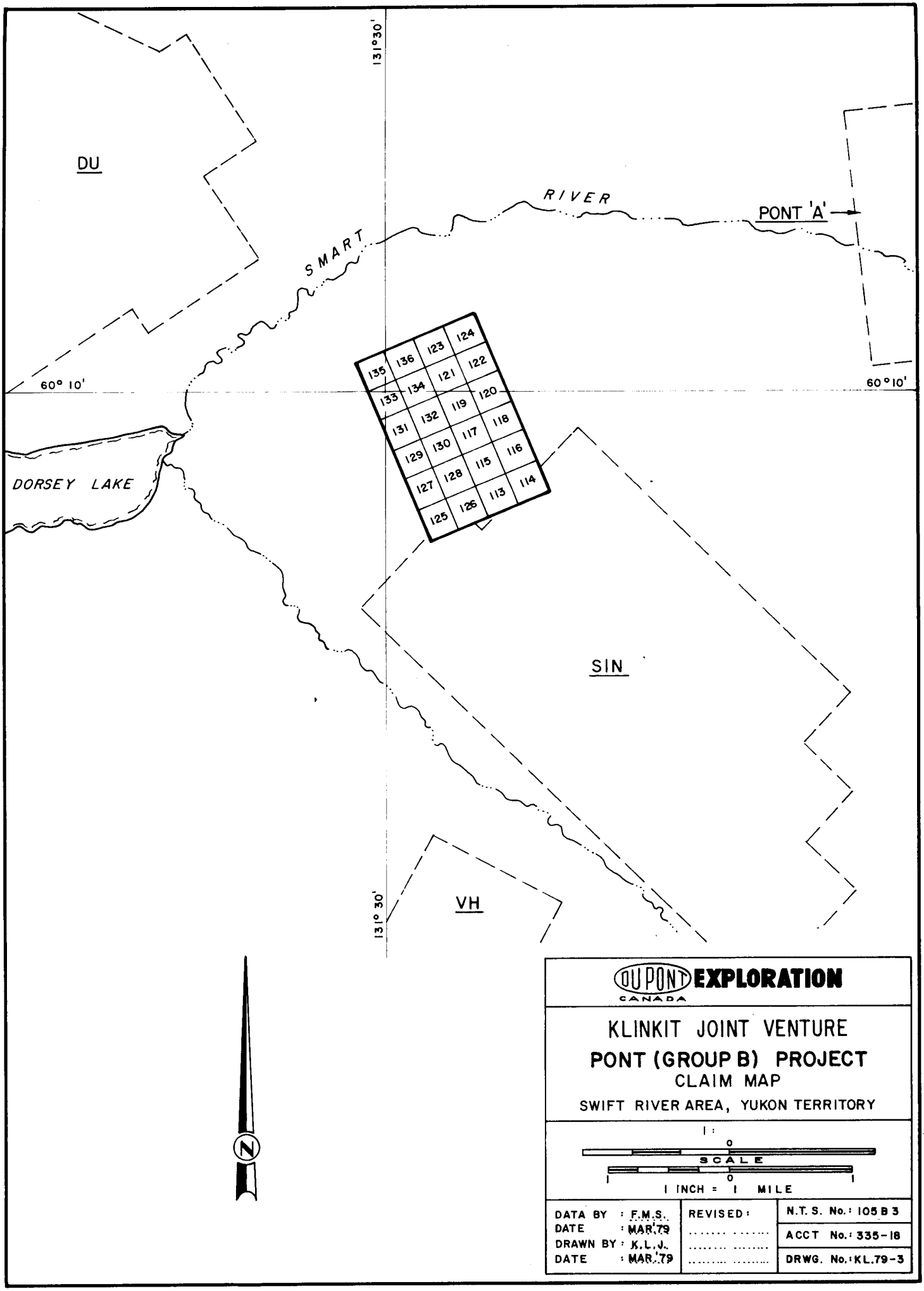
"Apatite forms one grain 1 mm long. It appears to be partly replaced by radiating clusters of very fine grained sericite, which has a light brown color in contrast to colorless muscovite adjacent to it."

These grains are now identified as topaz altered in part or completely to muscovite-sericite. They constitute about 1% of the rock. Grains are up to 1 mm long and anhedral in outline. The grain described previously as apatite is strongly corroded and replaced by sericite.

A second section of E-78-8-8-108 was made, but was not described previously, because it contained very little tourmaline. This sample, herein described as E-78-8-108, contains 3-5% topaz as irregular to rounded grains, commonly enclosed in thin rims of muscovite or as relic grains surrounded by coarse poikilitic muscovite. Grains are from 0.2 to 1 mm in size. Many occur in a large patch of quartz.

John Payne

John Payne,
May, 1979



DUPONT CANADA **EXPLORATION**

KLINKIT JOINT VENTURE

PONT (GROUP B) PROJECT

CLAIM MAP

SWIFT RIVER AREA, YUKON TERRITORY

1 : 0 SCALE 0 1

1 INCH = 1 MILE

DATA BY : F.M.S.	REVISED :	N.T.S. No. : 105 B 3
DATE : MAR.'79	....	
DRAWN BY : K.L.J.	....	ACCT No. : 335-18
DATE : MAR.'79	....	DRWG. No. : KL.79-3

DU PONT OF CANADA EXPLORATION LIMITED

REPORT OF GEOLOGICAL AND GEOCHEMICAL SURVEYS

on

SIN PROJECT

by

G. Ditson

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

January 1980

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APPENDIX B - Statement of Qualifications:

(G. Ditson, B. Goad, G. Mato and F. M. Smith, P. Eng.)

- List of Personnel

SPECIFIC PROSPECT - SIN CLAIMS (335-21)

1. LOCATION AND ACCESS

The SIN group is located on the north and east side of an unnamed creek flowing northwest into Dorsey Lake in the south central portion of the Seagull batholith, Dorsey Range, Cassiar Mountains. The claims are on sheet 105-B-3 at about 60°07'N and 131°26'W, Watson Lake MD, Yukon.

Access is only possible by helicopter from Swift River, Yukon, approximately 19 km to the southeast.

2. PHYSIOGRAPHY AND VEGETATION (Map KL 79-57)

The mountain peak, arete, cirque and valley area of the SIN claims includes two major cirques trending easterly into the unnamed creek flowing into Dorsey Lake to the northwest and one large cirque trending north to Smart River. The southern cirque is the lower portion of the VAL(B) claim area "SIN" cirque. Brock Cirque occupies the central portion of the claimed area.

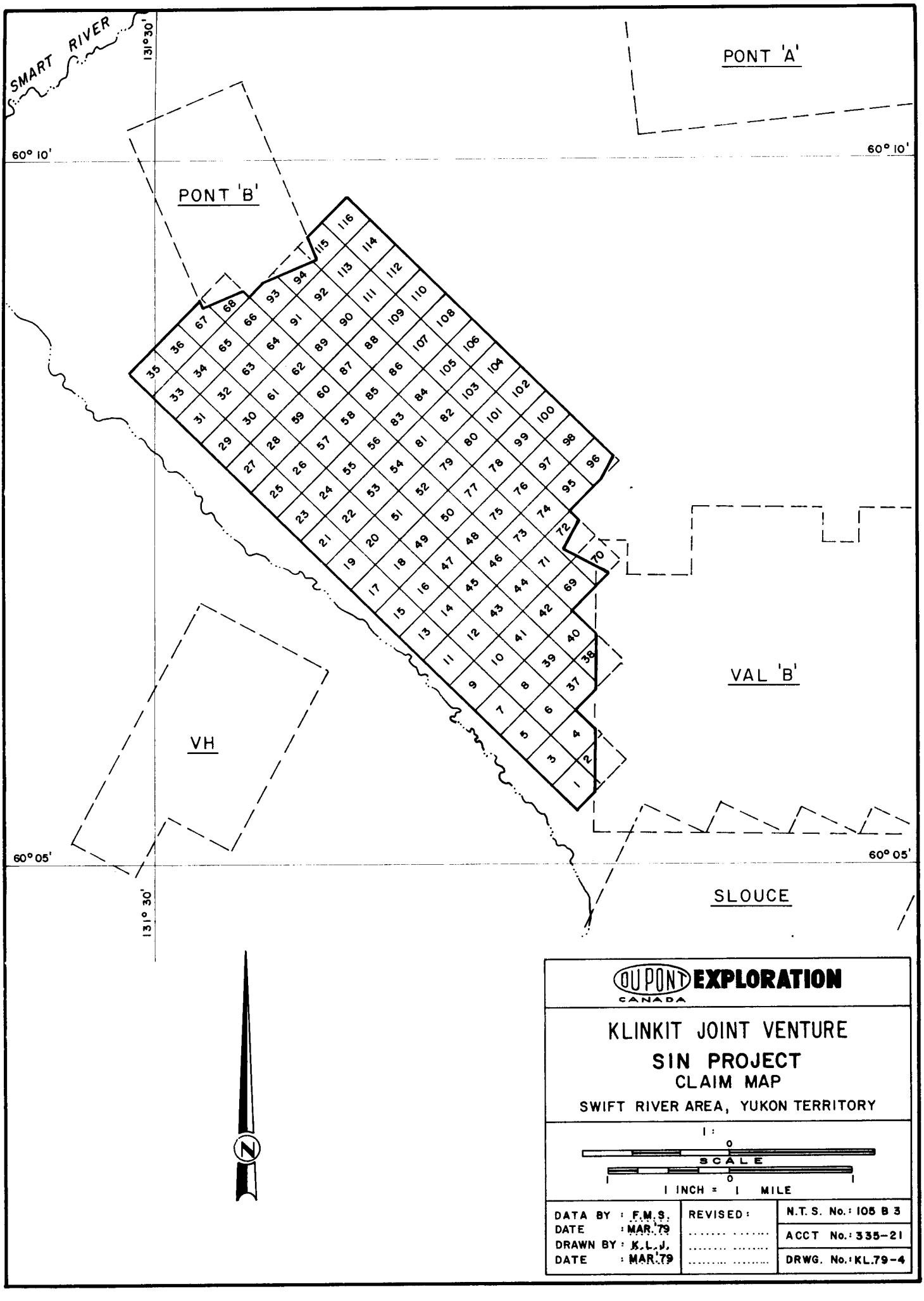
Vegetation on the southwest facing slopes of the main drainage consists of black spruce, balsam and ground birch. This changes upward to scattered ground balsam with thick ground birch and finally into alpine sedges with patches of low ground birch. All cirque floors are covered in alpine sedges and patches of ground birch. Most of the aretes, peaks and cirque walls and any northerly or easterly faces are bare of vegetation or have only minor patches of alpine meadows.

3. CLAIMS

The SIN group consists of the following claims:

Claims Name	Record Number	Expiry Date
SIN 1-116	YA33343 - YA33456	1980 01 10

All claims are recorded in Watson Lake, Yukon in the name of Du Pont of Canada Exploration Limited. The claims are optioned from Welcome North Mines Ltd. and McCrory Holdings (Yukon) Ltd. by Du Pont and form part of the Klinkit Joint Venture with Duval International Corporation.


SMART RIVER
131° 30'
60° 10'
PONT 'A'
PONT 'B'
VAL 'B'
VH
60° 05'
SLOUCE
N
DUPONT EXPLORATION
CANADA
KLINKIT JOINT VENTURE
SIN PROJECT
CLAIM MAP
SWIFT RIVER AREA, YUKON TERRITORY
1 : 0
SCALE
0 1
1 INCH = 1 MILE
DATA BY : F.M.S.
DATE : MAR.'79
DRAWN BY : K.L.J.
DATE : MAR.'79
REVISED :
N.T.S. No.: 105 B 3
ACCT No.: 335-21
DRWG. No.: KL.79-4

4. HISTORY

Welcome North Mines Ltd. and McCrory Holdings (Yukon) Ltd. located the SIN claims after the VAL(B) and PONT(B) groups were located. According to the principals of Welcome North, the claims were located on the basis of gossans similar in colour to the DU, VAL(B), PONT(B) and the small linear air-magnetic anomaly in the central portion of the claims.

There is no history of exploration work in the area of the SIN claims previous to the Klinkit regional programme. The joint venture considered the tin anomaly in SIN cirque drainage as derived from the VAL(B) roof pendant area and the weak-moderate tin anomaly in Brock cirque as too low a value to enlarge the PONT(B) group southward.

The SIN claims tie on to the MUN claims of the DC Syndicate in the extreme southeastern corner of the SIN claim block.

5. GEOLOGY

Three main rock units occur on the SIN claims: (1) sedimentary and volcanic rocks of the Sylvester group, (2) two large bodies of intrusive rock referred to as the Brock intrusions, and (3) the Seagull batholith.

5.1 Sylvester Group

Sylvester group rocks have been subdivided into mixed quartzite, limestone, argillite and chert (M2) and overlying argillaceous sedimentary, volcano-sedimentary and volcanic rocks (M3). Although deformation and facies changes within the Sylvester group often hinder definition of the nature of the sequence, the southwestern extension of the central ridge within the SIN claims reveals an undisturbed section which grossly resembles that of the PONT-B claims (Maps KL 79-56,57).

5.1.1 M2

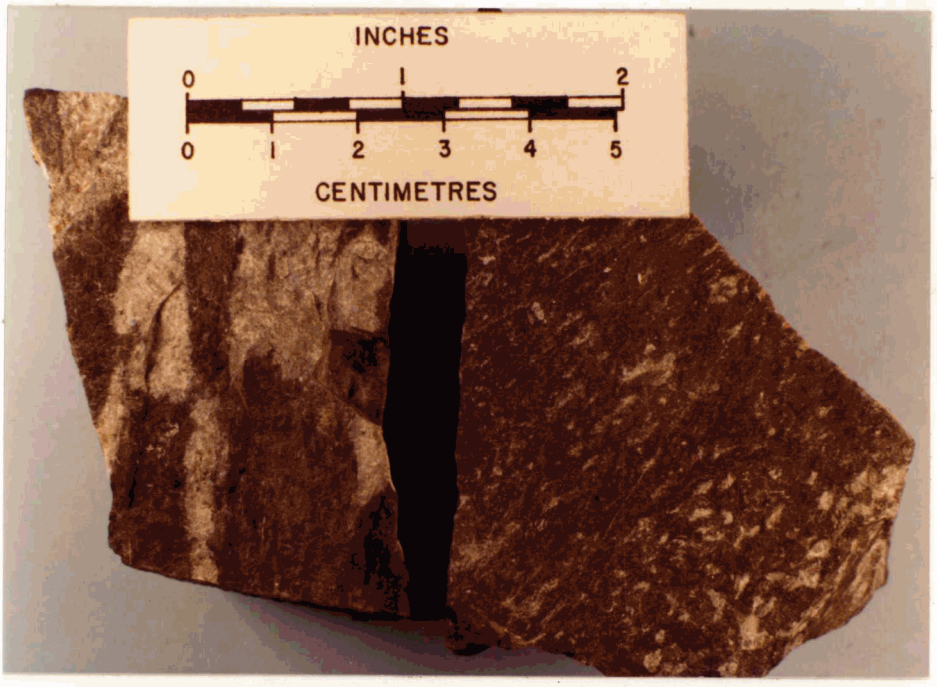
The lowermost portion of M2 is an interbedded mixture of quartzites whose colour varies from white to dark grey and whose texture and grain size varies from coarse sand to aphanitic crystalline. Amongst these variegated quartzites are fine, dark, argillaceous beds, minor chert, and bedded, light grey crystalline limestone. Interbeds vary in thickness from a few centimeters to tens of meters; on this particular ridge there are two limestone beds which are each about 10 m thick.

In the extreme northern corner of the SIN claims is a large outcrop of mixed limestone and skarn on strike with thick limestone units on the PONT(B) ridge. Thorough skarning has produced beds of nearly solid garnet crystals and a few vugs lined with garnet and magnetite. Wollastonite may be present in small patches of bluish-green cherty limestone; some fluorite (usually white, rarely purple) is present; massive diopside and actinolite sprays occur. Quartz crystals in vugs vary from clear to light green to coral-coloured. Garnets may be apple-green, red-brown, amber or black.

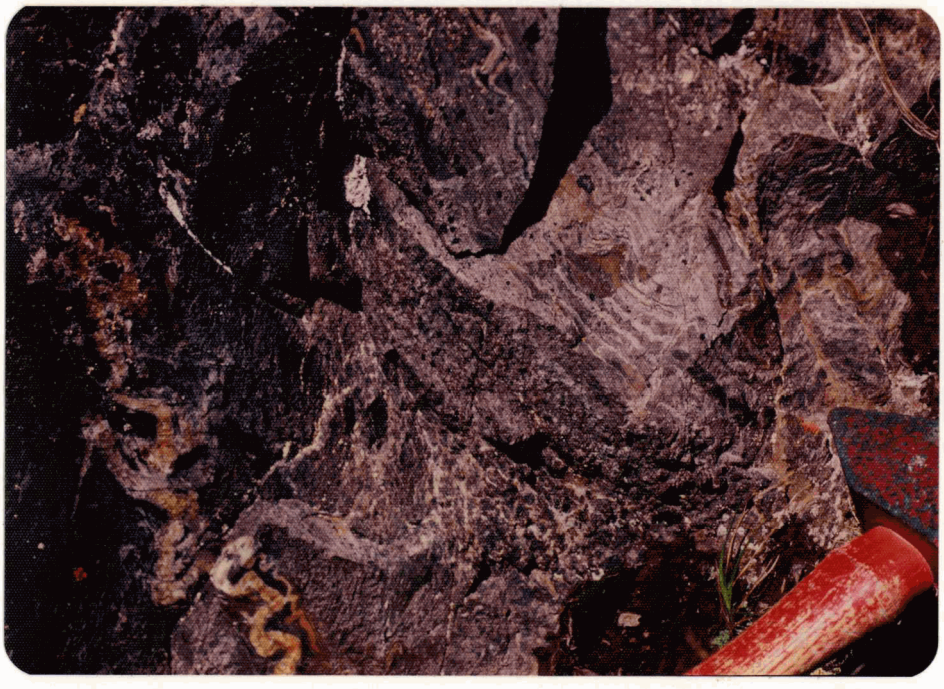
Overlying quartzites and limestones are highly gossanous, medium to dark grey, cherty argillites with visible pyrite as disseminations and rarely along narrow (about 1 mm) siliceous bands conformable to bedding. This sulphidic layer has been referred to as the "fahlband" or "sulphide schist" previously, 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.

5.1.2 M3

The sequence referred to as M3 varies on a small scale, but may be grossly described as a monotonous series of dark purplish grey/green argillites with pale green limy beds. These limy beds are often skarned to massive light red garnet and/or medium green epidote (sometimes vuggy) and/or crystalline calcite. They may be thin (1-5 mm), continuous or lensoidal bands, or thicker (2 cm) lenses of variable lengths (Figure 1a). In places these limy portions bear more resemblance to variably sized fragments, and it is not uncommon for argillite to contain small, broken fragments so that it more closely resembles a volcanowacke. The volcanic nature of this package is not everywhere in evidence, but in places hornblende phenocrysts are present in massive, medium to dark grey rocks which on weathered surface may be mistaken for the argillites in which they are intimately intermixed. Metamorphism of these hornblende volcanic



(a)



(b)

Figure 1. Upper Sylvester group (M3).

(a) Variable bedding character of typical M3. Light green carbonaceous layers in dark purplish grey or brown argillaceous quartzite vary from relatively thick irregular bands (left) through thin regular laminations (not shown) through small, whispy, en echelon lenses (right) which resemble flattened fragments.

(b) Folded argillaceous quartzites of M3. Deformation of sedimentary rocks was observed rarely and not examined in detail. This locality (D-6-25-89) is near flattened pillow volcanics in Brock cirque.

rocks has altered hornblende to biotite clusters which are commonly flattened, so that hand specimens in this case are best described as dark purplish grey, massive, conchoidally-fractured felsites with a foliation marked by aligned lenses of biotite.

Outcrops near the western nose of the Brock cirque intrusive body do not fall into the general description of M3 given above. Instead, laminated quartzitic argillite at D-6-25-89,90 is complexly isoclinally folded (Figure 1b), and below D-6-7-7 one can make out the outlines of pillow structures in volcanic rocks.

The contact between M2 and M3 in many places is marked only by the appearance or disappearance of quartzite and/or limestone amongst volcanic and argillaceous rocks. This is especially true along the north-south ridge north of the Brock Cirque landslide where station D-7-9-94 marks the first appearance of quartzite beds within the volcano-argillaceous sequence. Stations 95 and 96 on that same traverse intersect limestone and gossanous quartzite typical of M2.

5.2 Brock Intrusions (BR)

Plutonic rocks of the Brock intrusions intrude M2 and M3; small pods and narrow dykes of Brock are not uncommon in sedimentary rocks near the contact. The western nose of the eastern intrusion appears to be nearly flat-lying and sub-parallel to M3 bedding, but the eastern contacts of this body are nearly vertical. The western body also appears to have intruded along bedding, in contact with both M3 on the north and M2 on the south.

5.2.1 Character and Composition

Hand specimens of Brock have a granitic equigranular texture; crystals are usually 1-2 mm, but may be up to 1 cm (Figure 2). The dominant mineral is feldspar (commonly striated) and quartz may or may not be visible, so that specimens often resemble anorthosite. Mafic minerals, if present at all, have been completely altered to fine-grained constituents



Figure 2. Brock intrusion (BR). Variation in colour from green (left) to tan (right) is illustrated. Samples are medium-grained equigranular quartz monzonite whose mafic components have been completely altered to fine-grained constituents.

(epidote, chlorite, et.al.) which serve to vary the colour of the rock from light grey to light shades of green and brown. Near the nothern contact of the most northerly body (D-6-27-17, E-78-8-3-79) pyroxene phenocrysts are visible in laths less than or equal to 1 cm long which are aligned in one sample parallel to an aplitic (S3?; 2% skeletal hornblende) dyke. Thin section examination (E-78-8-3-79; Appendix I) reveals a small amount of hornblende (3-5%) phenocrysts up to 4 mm long in the Brock at this location. Some Brock dykes are feldspar porphyries with 20-40% white feldspar phenocrysts (1-5 mm; rarely 2 cm) in a light tan or grey, siliceous aphanitic groundmass. Compositionally, Brock should be classified as quartz monzonite/ granite; average compositions based on four thin sections are 18% quartz, 39% plagioclase and 33% K-feldspar.

Within the Brock intrusions are areas where a "bubble"-like texture is visible on weathered surfaces (Figure 3). Spheres or nodules 15-30 cm in diameter of roughly-weathering rock are "floating" in a matrix of "normally" more smoothly-weathering rock. Hand specimen examination of fresh surfaces of "bubble rocks" reveals the presence of relatively unaltered hornblende as an accessory mineral, and feldspars which are more opaque than the normally translucent plagioclase of "normal" rock.

5.2.2 Proposed Fault

The presence of the nearly horizontal east-west fault near the nose of the eastern intrusion is postulated on the following points (Figure 4):

1. Although rocks above and below the postulated fault are Brock, above the fault it is light grey with chloritic alteration on fractures and in veinlets, whereas below it is darker (tan or greenish) with tourmaline and/or fluorite-filled fracture sets and veinlets.

2. The proposed fault is along a line which marks a topographic break between well-exposed (90% outcrop) rocks above and relatively poorly-exposed (30% outcrop) rocks below.

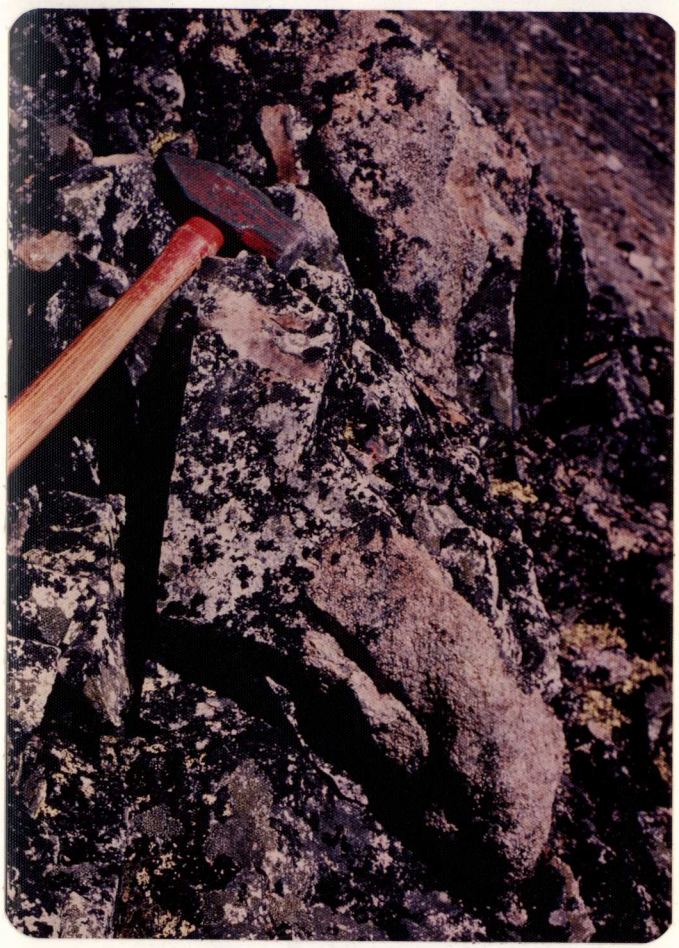


Figure 3. Bubble textures in the Brock intrusion, Brock cirque. Rough-weathering spheres and nodules are floating in normal smooth-weathering intrusive (D-6-25-102).

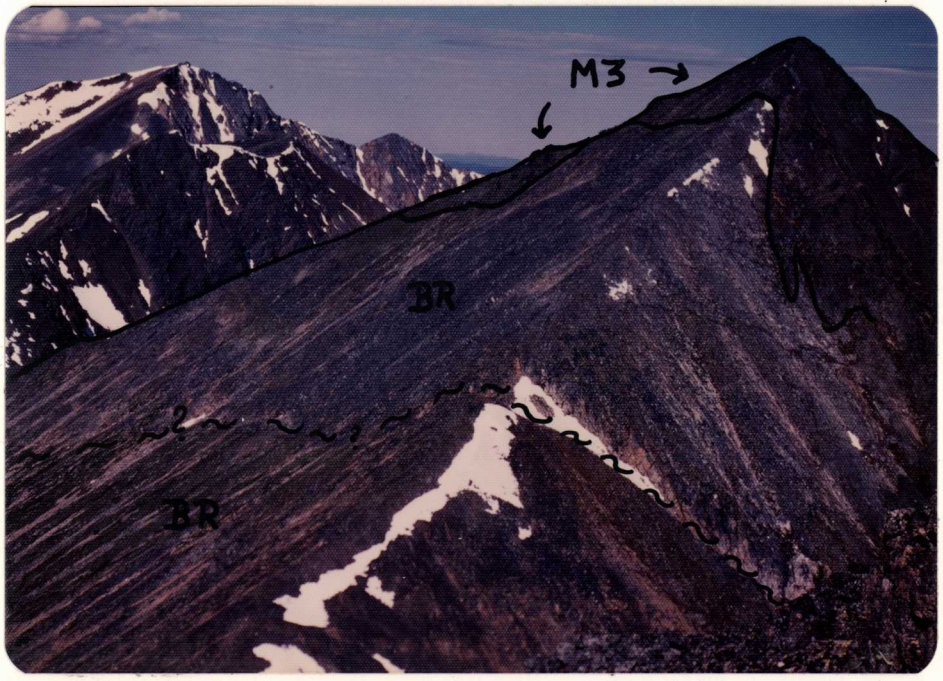


Figure 4. Proposed fault extension within the Brock intrusion, Brock cirque. Below this fault Brock is tan-coloured and contains quartz-tourmaline and fluorite microveinlets, whereas above Brock is light grey with chloritic fracture coatings and microveinlets. Tin-bearing float has been found where the fault intersects the ridge and on the slopes below the proposed extension.

3. The eastern end of this proposed fault intersects the ridge at a pronounced gulley which is part of a more easily-traced nearly vertical fault which offsets the Brock/M3 contact; perhaps the proposed fault is a splay or extension of the steeper fault.

4. As will be discussed later, all mineralized float and tin-rich Brock samples were collected below this proposed fault.

5.2.3 Origin

The origin of this unit, aside from its intrusive nature, is not well understood. As its 1978 name "endoskarn" implied, it is possible that this rock represents a phase of Seagull which has absorbed limy portions of the sedimentary sequence as it intruded as large dykes or sills, thereby acquiring a higher proportion of calcium feldspar and altering mafic minerals (specifically biotite) to fine chlorite and/or sericite. However, it is also possible that Brock is a pre-Seagull intrusive rock whose mafics were destroyed or altered during regional metamorphism and/or intrusion of the Seagull. Unfortunately, Brock contacts with Seagull were not seen in the field[1], but the close association between Brock and Sylvester rocks implies a pre-Seagull age.

5.2.4 Post-Brock Dykes

Within the Brock intrusions are many narrow (less than 1 m) dykes which may (i.e., were not noticed) or may not (i.e., are not present) intrude surrounding sedimentary rocks; they do not intrude the Seagull batholith. These dykes are generally aphanitic, massive, homogeneous, dark greenish grey, and may contain visible biotite or pyrite. One particular

---

[1]During the 1978 field season, this contact was seen to be sharp between coarse-grained Seagull and medium-grained Brock. A 3 m contact zone within Brock is slightly finer-grained than normal, bleached, recrystallized(?), containing sheeted vertical microveins of kaolinite, quartz, tourmaline, fluorite and very minor cassiterite.

oddball dyke (D-6-7-3) contains large pyroxene phenocrysts and small clots of actinolite which suggest moderate grades of post-endoskarn metamorphism. A thin section (J-78-7-22-10; Appendix I) of another dyke describes a phlogopitic pyroxene porphyry gabbro. Dyke attitudes are not consistent; when followed for any distance, a dyke may be seen to wind its way along various fracture zones of differing orientations.

5.3 Seagull Batholith (SG)

The Seagull batholith underlies all previously-described units; it underlies all valley floors on the SIN claims with the exception of the upper portions of Brock cirque. The pendant/batholith contact undulates between sub-horizontal to almost vertical.

5.3.1 Composition

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

5.3.2 Textures

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

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

2. Porphyritic[3] (PP 3; Figure 6): 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%); orange colour (fresh and weathered); outcrops sometimes gossaned; quartz phenocrysts most commonly dark grey or black.

Unfortunately, mapping in the SIN area is not sufficiently detailed within the Seagull batholith to be able to determine whether these textural subdivisions are, in fact, mappable, chronologically-differentiated phases of the batholith. Time did not permit close examination of the presumed contact between these phases at D-7-2-42-43,44 and the rusty area mapped there is a hastily estimated zone of either

1. fine-grained porphyry phase in contact with coarse-grained phase or

2. narrow fine-grained dyke within coarse phase.

Station D-6-20-67 marks the change from coarse Seagull into a finer-grained porphyritic border phase about 50 m wide, but this relationship was not noted elsewhere.

Thin section studies on rocks collected in 1978 (refer to Appendices in assessment reports for claim groups listed above) show no compositional variations between coarse-grained and porphyritic varieties. The two compositionally defined "phases" from thin section

---

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

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

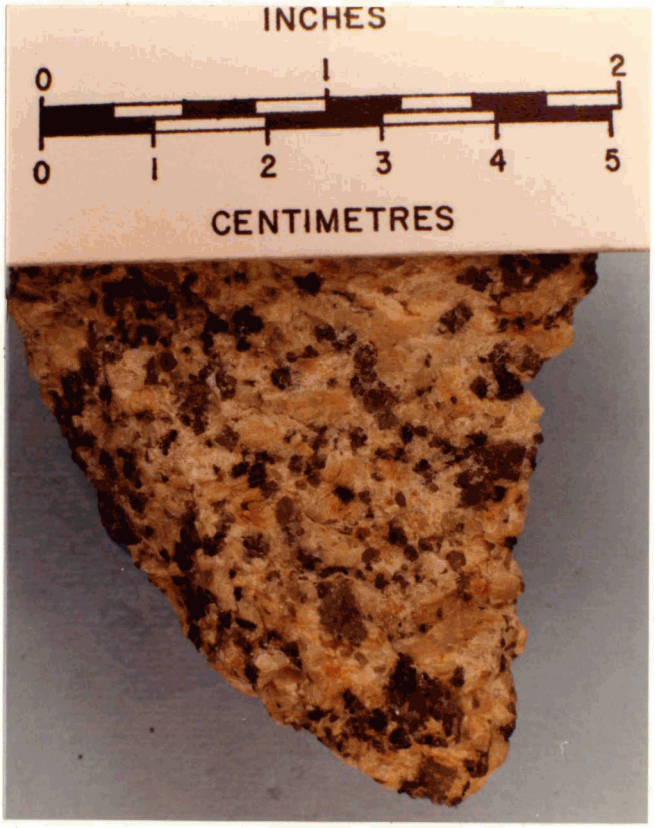


Figure 5. Seagull batholith: "typical" coarse-grained variety. Although generally described as equigranular, grain size is often variable, and porphyritic varieties are not uncommon.

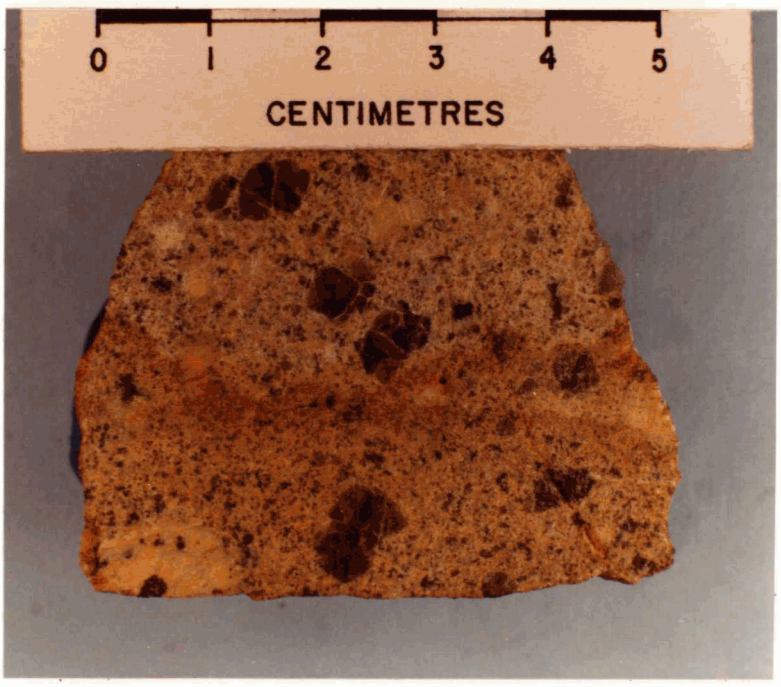


Figure 6. Seagull batholith: fine-grained porphyritic variety with large dark grey quartz phenocrysts (cut face).

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.

Aplite is present in the VAL-B claims as a "chill zone" or rind around a small quartzite pendant, but on the SIN claims aplite is present as light grey dykes and pods within coarse-grained, tan-coloured Seagull (D-7-15-40) and as a light grey/light tan pod within M3 (D-7-25-9).

No continuous pegmatite was seen; it is characteristically present only within the irregularly varied small-scale seriate textures restricted to a zone within 50 m of pendant contacts (Figure 7).

5.3.3 Limonitic vs. Grey Granitic Rocks

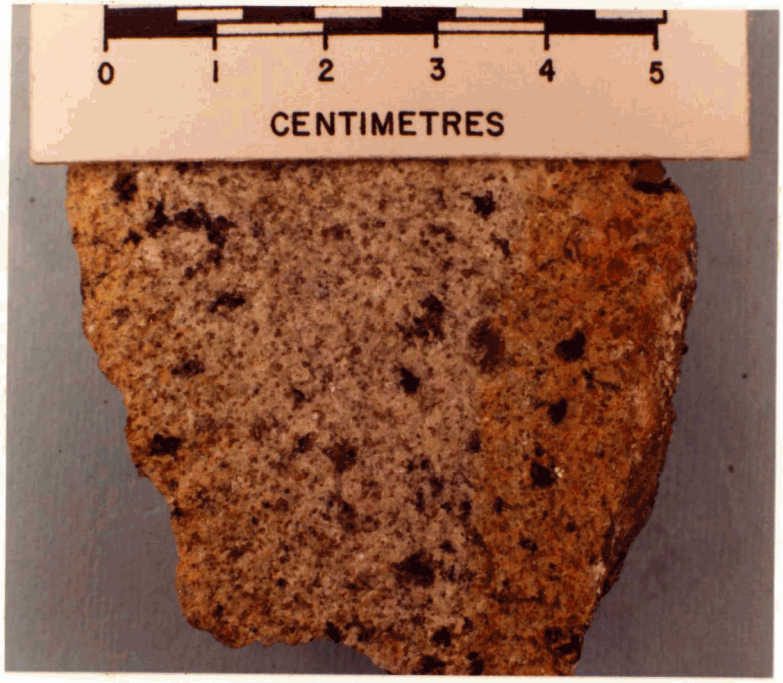
The colour of Seagull rocks has been used to differentiate "phases" also, grey (non-limonitic) varieties were referred to as MBFP in the past, while orange or tan-weathering (limonitic) varieties were referred to as Seagull. Large areas of Seagull have been noted elsewhere (i.e., PONT(B)) to not exhibit the more common orange colour (therefore MBFP according to the 1978 terminology), 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 the result of externally-controlled phenomenon (possibly fracturing), as some grey granitic rocks have a surficially-related orange rind which can only be attributed to weathering (Figure 8).

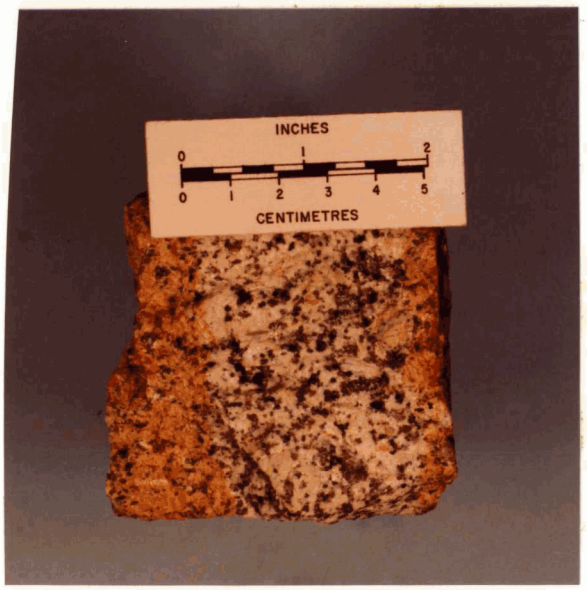
Within the SIN claims, grey granitic rocks are present at D-7-26-28 (with a limonitic weathering rind), D-7-25-9 (aplite pod; tan-coloured aplite is also present), D-7-15-40 (aplite



Figure 7. 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 are variable.



(a)



(b)

Figure 8. Limonitic weathering rind on (a) fine-grained porphyritic and (b) coarse-grained varieties of Seagull granite.

dykes and pods; some have limonitic rinds), D-6-24-86 (limonitic fracture envelopes), and D-6-24-83 (talus below a freshly-exposed cliff). A specimen from D-6-24-86 (Figure 8b) is particularly interesting because although limonitic (orange) granite occurs as envelopes around fracture surfaces, the contact between orange envelope and grey unaltered rock is visible on the weathered surface.

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.

5.3.4 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 9). Miarolitic cavities are predominantly spheroidal masses of varying sizes (average 5 cm) which rarely exhibit crystals formed by open-space filling. Dark, fine-grained textures are more common; thin section examination (G-78-8-5-11; Appendix I of VAL(B) report) reveals replacement textures in spheres composed of quartz, tourmaline, relict feldspars and some fluorite. 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 vary 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.



(a)



(b)

Figure 9. 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, VAL claims.
(b) A close-up of the same location illustrates the presence of a biotite-free envelope around veins.

5.3.5 Alteration Zones

Alteration zones within the batholith were noted specifically in three locations on the SIN claims, D-6-20-68, D-6-24-80,81 and D-6-24-82. At D-6-20-68, alteration occurs in a wide zone (about 10 m) parallel to the Seagull contact. Samples from this zone exhibit stockwork-like quartz veinlets about 1 mm wide, hairline tourmaline-filled fractures, white clayed feldspars, some limonite staining which may occur as dark brown envelopes about 5 mm wide near quartz veinlets, and/or pervasive pale green (illite, and/or sericite) alteration. Some manganese patches are also present. Seagull texture here is porphyritic (PP3) with phenocrysts up to 1 cm.

Stations D-6-24-80,81 are within a zone (also about 10 m) of siliceous alteration varying from quartz stockwork veining to complete silicification (Figure 10). Granitic rock within the zone is commonly pale yellow or green as a result of pervasive sericitic alteration. Thin section examination (SK 11; 1978 SKIN report) reveals intense quartz-sericite-muscovite alteration with possible addition of K_2O. Original granitic textures are destroyed.

Alteration at D-6-24-82 is characterized by black manganese staining and pervasive dark red hematite alteration of feldspars in nearby granitic rocks.

6. GEOCHEMISTRY

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

6.1 Reconnaissance Side-Hill Soil Sampling

Two side-hill soil lines totalling 74 samples were completed on the SIN claims during the 1979 field season. These lines were located around two north-facing cirque valleys north of Brock cirque (map KL 79-59) to help determine if the major anomalous zone of Brock cirque could be extended in that direction.



(a)



(b)

Figure 10. Yellow illite-sericite alteration zone in Seagull granite.
(a) Outcrop in Sin cirque (D-6-24-81) illustrates quartz stockwork veining accompanying yellow alteration.
(b) Hand specimen illustrates bright yellow colour, density of quartz veining, and destruction of mafics and feldspars.

Several spot anomalies are present, as is a series of moderately to exceptionally high values along the eastern half of the eastern line. Four moderately anomalous values are located either side of a vein or pod on the ridge common to both soil lines (D-7-25-13; map KL 79-58). This vein (described below) assayed 2.0% tin; soil values on the slopes below are 225-350 ppm tin. The highest value of 1850 ppm tin is located in a pronounced gulley coinciding with the Brock/M3 contact; the remaining anomalous values along this line traverse back and forth across the Seagull/M3 contact. Prospecting in this area failed to determine the source of the anomalies.

Samples from these side-hill traverses were also checked for tungsten and molybdenum. No major anomalous zones of either element were located, but three rather high tungsten values (55, 22 & 18 ppm) were obtained over 150 m on the east side of the western traverse.

6.2 Brock Cirque Grid Soil Sampling

The anomalous zone in the upper portions of Brock cirque was detail sampled on a grid of 146 samples taken at 50 m intervals along lines 100 m apart and perpendicular to slope. Tin values on this grid are nothing short of phenomenal, but several days of detailed prospecting and chip sampling failed to determine the exact nature of the anomaly. A discussion of mineralization (or lack of it) related to this anomaly is presented below.

Further west along the same ridge, several spot tin and tungsten anomalies (45, 82, 160 ppm Sn; 22, 29 ppm W) located on 1978 side-hill lines were followed up in 1979 by 116 samples collected on grid lines in the same manner as those of the major anomalous zone. Five tin values over 300 ppm are located below the Seagull/Sylvester group contact. The scattered nature of these values is not considered meritous of further work.

The small grouping of 12 samples in the eastern extremity of the cirque is follow-up to an anomalous value of 49 ppm tin from the 1978 programme. No subsequent prospecting was done in the vicinity, but a traverse along the ridge above these samples did not encounter tin mineralization.

Spotty tungsten anomalies located in Brock cirque in 1978 were not adequately followed-up in 1979. No analyses for the western end of the grid were produced, and the very few that were checked from the east end gave low values.

7. MINERALIZATION

The only mineralization located on the SIN claims in 1979 is within or near the Brock intrusion of Brock cirque.

7.1 Within the Brock Intrusion

Because high geochem values are spatially correlative with the Brock intrusion, it is possible that the tin content of this body is elevated much above normal (even higher than the Seagull batholith, if soil geochem is any measure) to produce anomalous soil geochemistry. In fact, two samples of the Brock intrusion contain between 0.003 and 0.12% tin (Table I) with no visible signs of unusual alteration. Micro-veinlets of tourmaline (?) are present in both samples, but many similar samples were analyzed and found to contain no appreciable tin. To verify the high tin background of the intrusion, several chip samples over intervals up to 100 m were taken and analyzed; of seven such samples, the highest value is 300 ppm.

A few altered portions of the intrusion also contain tin values. A rusty, pyritic sample analyzed 0.03-0.11%; a sample from a well-fractured zone with moderate manganese staining analyzed 0.005-0.06%; a sample containing disseminations and veins of quartz, tourmaline, fluorite and muscovite analyzed 0.70-1.1%. The latter sample encouraged further prospecting for similar zones of muscovite-fluorite alteration, and more were located, but even a "high-graded" chip sample from several heavily altered zones contained little or no tin.

Two types of vein material were located within the Brock intrusion. D-6-7-3 and D-7-31-50 are rock and chip samples (respectively) from a 1 m wide zone of quartz and tourmaline (sprays with needles about 1 cm long) and rare limonite and malachite. The exposed horizontal extent of this vein is less than 2 m. Although the rock sample analyzed 0.085% tin, the chip sample, taken continuously over 2 m across the width of the vein, contained only 500 ppm tin.

Three samples of vein material, collected as float, were analyzed and found to contain appreciable tin.

TABLE I. Analyses of rock specimens and chip samples collected in and near SIN claims during the 1979 field season.

Sample No.	Location(s)	Description[1]	Sn[2] XRF	Sn[2] MIN-EN	W
4200B	D-6-7-3	Brock - FU and QZ/TØ microveins	0.085%	120 p	
4202B	D-6-7-1	Brock	-		
4207B	D-6-20-68a	Seagull - PP, altered	350 p		
4208B	D-6-20-68b	Seagull - altered	-		
4209B	D-6-20-68c	Seagull - altered, fine, EQ	475 p		
4210B	D-6-20-68d	Seagull - altered, fine, green/brown	200 p		
4211B	D-6-20-69	Seagull - coarse, pegmatitic, FU	-		
4212B	D-6-25-88	Brock	-		
4213B	D-6-25-88	Basic dyke	175 p		
4214B	D-6-25-89	M3 - quartzitic argillite	-		
4215B	D-6-25-90	Brock	-		
4216B	D-6-25-91	Brock	-		
4217B	D-6-25-91	Basic dyke with BI	-		
4218B	D-6-25-92	Basic dyke with PY	-		
4219B	D-6-25-94	Brock	300 p		
4220B	D-6-25-94	Basic dyke with BI	120 p		
4221B	D-6-25-95	Skarn	-		
4222B	D-6-25-96	Brock	200 p		
4223B	D-6-25-97	Brock	475 p		
4224B	D-6-25-98	M3 - quartzitic argillite	-		
4225B	D-6-25-99	Brock	200 p		
4226B	D-6-25-100	Brock	-		
4227B	D-6-25-101a	Brock	175 p		
4228B	D-6-25-101b	Brock	325 p		
4229B	D-6-25-102a	Brock	95 p		
4230B	D-6-25-102b	Brock	450 p		
4231B	D-6-25-103	Brock	120 p		
4232B	D-6-25-103	Basic dyke	-		

Sample No.	Location(s)	Description	Sn XRF	Sn MIN-EN	W
4233B	D-6-25-104	Brock	-		
4234B	D-6-25-104	Basic dyke	-		
4235B	D-6-25-105	Brock	0.03%	0.003%	
4236B	D-6-24-80a	Seagull	175 p		
4237B	D-6-24-80b	Seagull - yellow (illite, QZ) alteration zone	95 p		
4238B	D-6-24-82		175 p		
4239B	D-6-24-82	Seagull - HE alteration zone	-		
4240B	D-6-24-82	Seagull - MN alteration zone	300 p		
(4241B)[3]	D-6-24-87	Seagull - yellow (illitic) alteration zone	-		
(4242B)	D-6-24-87	Seagull - TØ	250 p		
4243B	D-6-26-4	Brock	575 p		
4244B	D-6-26-9	Brock	675 p		
4245B	D-6-26-10	Brock	325 p		
4250B	D-6-27-22a	Brock	15 p		
4251B	D-6-27-22b	Basic dyke - HB and/or PX phenocrysts	-		
4252B	D-6-27-23	Brock	70 p		
4253B	D-6-27-24	Basic dyke	-		
4254B	D-6-27-25	Brock	-		
4255B	D-7-2-31	Seagull - SR	70 p		
4256B	D-7-2-33	M2 - pyritic white quartzite	40 p		
4257B	D-7-2-35	M2 - quartzite	95 p		
4258B	D-7-2-36	Brock dyke	300 p		
4259B	D-7-2-38	M2 - quartzite - PY	-		
4260B	D-7-2-40	Seagull - coarse	95 p		
4261B	D-7-2-42	Seagull - PP3	200 p		
4262B	D-7-2-44	Seagull - fine	200 p		
4279B	D-7-9-99a	VN - giant BI, MU	0.435%	0.65%	
4280B	D-7-9-99b	VN - FU in zone of brecciated argillite	2.0%	2.0%	
4281B	D-7-9-99c	VN - QZ, TØ	15 p		
4282B	D-7-10-1	Brock	175 p		
4283B	D-7-10-2	Brock	15 p		

Sample No.	Location(s)	Description	Sn XRF	Sn MIN-EN	W
4284B	D-7-10-3	Brock	95 p		
4285B	D-7-10-3a	Basic Dyke	-		
4286B	D-7-10-4	Brock	145 p		
4287B	D-7-10-4a	Basic Dyke	-		
4288B	D-7-10-5	Brock	-		
4289B	D-7-10-6	Brock	145 p		
4290B	D-7-10-6a	Skarn pod - SH, CP	145 p		
4291B	D-7-10-7	Brock - rusty, bleached	70 p		
4293B	D-7-10-8a	Brock	175 p		
4294B	D-7-10-8b	Brock	70 p		
4295B	D-7-10-8c	Basic dyke	-		
4296B	D-7-10-9	QZ vein	40 p		
4297B	D-7-10-10	Brock	120 p		
4298B	D-7-10-11	Brock	15 p		
6258A	D-7-15-30	Seagull - PP3, TØ microvein	-		
6259A	D-7-15-31	Seagull - PP3	-		
6260A	D-7-15-34	Brock - FU and TØ fracture fillings	-		
6261A	D-7-15-34	Brock	175 or 225 p		
6262A	D-7-15-37a	Brock - pod	-		
6263A	D-7-15-39	Seagull - aplitic	-		
6264A	D-7-15-39a	Vein - QZ, TØ	-		
6265A	D-7-15-40a	Seagull - EQ3	275 p		
6266A	D-7-15-42a	Seagull dyke	175 or 225 p		
*6311A	D-7-24-1	Brock	-		
*6312A	D-7-24-2	Brock	-		
*6313A	D-7-24-3	Brock	300 p		
(6314A)	D-7-24-3a	Vein - QZ, TØ, LI, MN	1.6%	0.95%	
(6315A)	D-7-24-3b	Basic dyke	-		
*6316A	D-7-24-4	Brock	-		
6317A	D-7-24-5	Brock - FU, QZ, TØ, MU microveins	1.10%	0.70%	

Sample No.	Location(s)	Description	Sn XRF	Sn MIN-EN	W
*6318A	D-7-24-6a	Brock	-		
6319A	D-7-24-6	Brock - PY	0.03%	0.11%	
*6320A	D-7-24-7	Brock	225 p		
6321A	D-7-25-8	Vein - QZ, AS, TØ, FU	-		0.17%
6322A	D-8-25-8	Vein - QZ, brown TØ	70 p or -		
6323A	D-7-25-8	M3 - argillite with brown microveins	-		
6324A	D-7-25-8	Vein - brown BI, QZ	-		
6325A	D-7-25-8	Vein - AS, QZ, TØ, FU	-		
6326A	D-7-25-11	M3 - brecciated, bleached	0.01%	0.12%	
6327A	D-7-25-12	M3 - bleached, silicified	200 p		
6328A	D-7-25-13	M3	15 p		
6329A	D-7-25-13a	M3	-		
6330A	D-7-25-13b	M3 - rusty	-		
6331A	D-7-25-14	M3 - skarned, sulphides	-		
6332A	D-7-25-15	Vein - AS, FU, TØ	15 p		
6333A	D-7-25-8	Seagull - EQ3	120 p		
6334A	D-7-25-9	Seagull - aplite, yellow, QZ/TØ	-		
6335A	D-7-25-9	Seagull - aplite?, AS, MS	-		
6336A	D-7-25-9	Seagull - EQ3, MØ (~0.1%) fracture fillings	95 p		
6337A	D-7-25-9	Seagull - aplite, MØ, TØ microveins	40 p		
6338A	D-7-25-10	M3 - partially granitized	-		
6339A	D-7-26-16	Brock	95 p		
6340A	D-7-26-18	Seagull - PP3	-		
6350A	D-7-29-34	M3 - QZ/TØ microveins	-		
6351A	D-7-29-35	M3 - FU microveins	-		
6352A	D-7-29-36	Seagull dyke - FU/TØ microveins	145 p		
6353A	D-7-29-37	Brock pod - QZ, LI, MN microveins	95 p		
6354A	D-7-29-38	M3 and Seagull intermixture	-		
6355A	D-7-29-39	M3 - gneissic, bleached	15 p		
(6356A)	D-7-29-40	M3	-		
(6357A)	D-7-29-41	M3 - QZ/TØ fracture fillings	-		

Sample No.	Location(s)	Description	Sn		W
			XRF	MIN-EN	
(6358A)	D-7-29-42	M3 - skarn bed	-		
6359A	D-7-29-43	M3	-		
6360A	D-7-29-44	M3	-		
6361A	D-7-29-45	M3 - QZ/FD pods	-		
(6362A)	D-7-29-46	M3	-		
6363A	D-7-29-47	M3	-		
6364A	D-7-29-48	M3	-		
(6365A)	D-7-29-48a	M2 - QZ/TØ microveins	-		
(6366A)	D-7-29-48b	M3 - TØ microveins	-		
(6367A)	D-7-29-48c	M2	-		
(6368A)	D-7-29-48d	Basic dyke	-		
6369A	D-6-7-2	Seagull - QZ/TØ microvein	425 p		
6370A	D-6-7-3	M3 - Seagull vein with FU	275 p		
6371A	D-6-7-3	Brock	-		
6372A	D-6-7-6	Brock	275 p		
*6373A	D-7-31-49	Vein - LI, MN	625 p		
6375A	D-7-31-49b	Brock	145 p		
*6376A	D-7-31-50	Vein - QZ, TØ	500 p		
*6377A	D-7-31-51	Brock - MS/FU zones	95 p		
(6378A)	D-7-31-52	Brock - TØ veins	0.085%	0.12%	
*6379A	D-7-31-52a	Brock - FU and TØ veins	70 p		
(6380A)	D-7-31-53	Brock - MN stained	-		
6381A	D-7-31-54	Brock	300 p		
6382A	D-7-31-55	Brock - MN stained	-		
6383A	D-7-31-56	Brock - MN stained	0.005%	0.06%	
(6167A)	unknown	VN? - QZ, LI, PY, MN	0.05%		
6168A	unknown	Brock	15 p		

Sample No.	Location(s)	Description	Sn XRF	Sn MIN-EN	W
The following analyses are from samples collected on the PONT(B) claims:					
4246B	D-6-27-17	Brock	-		
4247B	D-6-27-18a	Brock	-		
4248B	D-6-27-18b	HB/PX porphyry dyke	-		
4249B	D-6-27-19b	Brock	425 p		
4263B	D-7-7-45	Seagull	145 p		
4264B	D-7-7-47	Brock dyke	175 p		
4265B	D-7-7-48	Brock dyke	275 p		
4266B	D-7-7-52	Brock sill	120 p		
4267B	D-7-7-60	M3	-		
4268B	D-7-7-61b	Skarn - M2 - SL	-		
4269B	D-7-7-63	Seagull - seriate	40 p		
4270B	D-7-7-64	Seagull	-		
4271B	D-7-7-65	Seagull	-		
4299B	D-7-7-49	M3 - tuff	-		

[1]Abbreviations are defined in Geological Legend, Map KL 79-56.

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

[3]Float.

*Chip sample.

Values from 0.05% to 1.6% were obtained from samples composed of quartz and tourmaline (or a manganese mineral?) with limonite, minor pyrite, and considerable black manganese staining. As much of this float is present at D-7-31-50, in a fault zone gulley on the ridge, and also below the ridge and to the west (D-7-24-3a), it is believed that the fault proposed earlier to continue from the ridge gulley to the west is the site of vein-type localization of tin-rich fluids. Lack of continuous outcrop along the proposed fault zone does not enable verification of this hypothesis.

7.2 North of Brock Intrusion

7.2.1 Tin

Mineralization in the Sylvester group north of Brock cirque is limited to a pod or vein at D-7-25-13; brecciated rocks nearby at D-7-25-11 also contain tin values. The vein is about 0.75 m wide and does not appear to continue along strike to the west. Precipitous slopes and snow cover on the east side did not allow extension in that direction. On the ridge top, in-place mineralization with an assay value of 2.0% tin is contained in a brecciated zone of argillite which is bleached to light tan as fragments in a matrix of purple fluorite (Figure 11). Float of giant muscovite and/or biotite crystals found beside the vein analyzed 0.435% tin; float of quartz and tourmaline contained only 15 ppm tin.

Sylvester rocks north of this vein are sometimes similarly bleached and traversed by many dark veinlets, but very little fluorite was seen, and only one of several such samples returned values of 0.01-0.12% tin.

Several days of prospecting for similar mineralization in the Sylvester group along the same ridge and to the east in the area of anomalous geochemistry were unsuccessful.

7.2.2 Tungsten

One tungsten value of 0.17% (6321A) is located 650 m north of the Brock intrusion, in the Sylvester group. Within the zone delineated

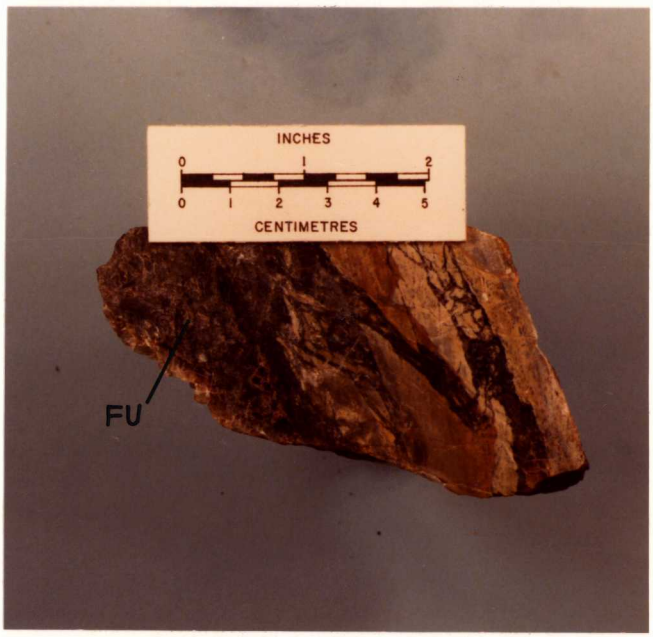


Figure 11. Tin-bearing fluorite pod in the Upper Sylvester group, north of Brock cirque. This sample of bleached argillite fragments in a matrix of coarse purple fluorite assayed 2.0% tin (D-7-9-99b).

on map KL 79-59, veins 0.5-5.0 cm wide are sub-parallel (100-120°, vertical), about 1 m apart. Vein minerals include arsenopyrite, brown tourmaline, quartz and minor fluorite. The presence of tungsten in arsenopyrite veins suggests some wolframite amongst brown tourmaline, as no fluorescing scheelite or powellite is present. One vein of quartz and brown biotite books up to 1 cm also contains an unidentified dark grey, metallic mineral whose hardness is greater than 6 and which lacks pronounced cleavage. A sample containing this mineral was analyzed for tin and found lacking (6324A).

8. CONCLUSIONS AND RECOMMENDATIONS

8.1 Within the Brock Intrusion

Anomalous geochemical values in Brock cirque have not yet been satisfactorily explained. Even the presence of the proposed vein-fault along the ridge cannot reasonably account for values up to 0.25% tin in soils. Assays of supposed vein material have only yielded a maximum of 1.6% tin, whereas on the VAL claims, veins with up to 9% tin rarely cause soil values to exceed 450 ppm. The absence of high tin values associated with the western Brock body, and the negligible results of chip sampling of the eastern intrusion suggest that tin values are not merely reflecting high background, but concentration through secondary processes. Clearly further prospecting of the entire anomalous area and trenching of the fault zone are required.

8.2 North of Brock Intrusion

The area north of the anomalous zone in Brock cirque is also meritous of further work.

8.2.1 A value of 1850 ppm tin from a soil sample collected at the M3/Brock contact requires closer examination, since preliminary findings were inadequate.

8.2.2 High tin values from soils collected just northwest of the large landslide also remain unexplained. Anomalous samples from this area should be reanalyzed by MIN-EN in order to confirm the presence of tin as cassiterite before further prospecting.

8.2.3 The nature of tin mineralization associated with the small brecciated fluorite vein-pod will be examined by thin section, but it is not believed that economic concentrations of this nature are likely to be located by further prospecting.

8.3 Sin Cirque

The source of anomalous soils derived from the southern ridge of SIN cirque in 1978 surveys was located in 1979. Since mineralization on this ridge may be wholly within the VAL claims, it has been discussed in the VAL report as "VAL north ridge."

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

E-78-8-3-79 Contact: Pyroxene Granodiorite and Aplite

The sample is of the contact zone between a coarse grained pyroxene granodiorite and a fine grained aplite; along the contact the aplite contains abundant perthitic K-feldspar, while away from the contact K-feldspar is rare. The contact is sharp.

Pyroxene Granodiorite

plagioclase	50%
pyroxene	20
K-feldspar perthite	10-15
quartz	10-15
hornblende	3- 5
sphene	1- 2
apatite?tourmaline?	0.2
hematite-opaque	minor
zircon, biotite	trace

phenocrysts: in hand sample up to 5 mm long and more abundant away from contact

Plagioclase forms subhedral grains 1 to 3 mm in length; they are concentrically zoned, but no composition could be determined because albite twins are poorly developed. R.I. is slightly less than quartz, suggesting oligoclase composition. The mineral is fresh.

Pyroxene forms subhedral to euhedral prismatic grains from 0.5 to 2 mm long; many grains are slightly poikilitic with inclusions of quartz and lesser hematite-opaque, apatite-tourmaline, and biotite. Pyroxene also forms finer grained ragged aggregates from 0.1-0.5 mm in grain size, and very fine grained overgrowths on some hornblende phenocrysts. The mineral is pale green in color and non-pleochroic.

K-feldspar and quartz form irregular grains interstitial to plagioclase and pyroxene. K-feldspar grains are perthitic with up to 20% exsolved plagioclase in irregular lenses. Grain size is up to 1 mm. Quartz commonly forms patches up to 0.8 mm of fine grained (0.1 mm) mosaics.

Hornblende forms scattered phenocrysts 3-4 mm long; pleochroism is from medium yellow-green to medium bluish green.

Sphene forms euhedral wedge shaped crystals mainly 0.05-0.1 mm in size, with a few up to 0.3 mm long. They are common in clusters near pyroxene grains.

Apatite-tourmaline? is the same mineral as in E-78-8-10-118, described there as tourmaline. It is colorless to light greenish grey, and forms euhedral hexagonal prisms up to 0.3 mm long.

Zircon forms one euhedral grain 0.04 mm long.

Aplite

	near contact	away from contact
plagioclase	45-50	65-70
K-feldspar perthite	20	minor
quartz	30	30
hornblende	2	2

Plagioclase forms a few phenocrysts 1-1.5 mm long, with a composition of An_{10}. Most of the rock is a fine grained (0.05-0.2 mm) aggregate of plagioclase and quartz. About 10% of the rock consists of a very fine grained aggregate (0.02-0.05 mm) of plagioclase and quartz. K-feldspar perthite forms phenocrysts up to 3 mm long in a zone about 4 mm wide along the contact with the granodiorite. It is abundant in the finer grained part of the rock here, but in the aplite further from the contact occurs only in the very fine grained patches. Hornblende forms irregular corroded to skeletal grains up to 0.2 mm in size.

S-7-29-18 Granodiorite - Quartz Monzonite

plagioclase	35-40%
K-feldspar (perthite)	35
quartz	20-25
opaque	1- 2
tourmaline	1
semiopaque	0.5- 1
biotite	0.5
calcite	0.5-.1
apatite, hematite	minor
zircon, epidote	trace

The rock is medium grained to coarse grained.

Plagioclase forms subhedral to anhedral, slightly zoned grains 0.5 to 1 mm in size. Alteration to fine grained patches of calcite is common but not intensive. Twins are not well developed.

K-feldspar forms grains from 0.5 to 2 mm in size; they are anhedral and in part interstitial to plagioclase. Dusty alteration to semiopaque and minor calcite is widespread. Most grains contain 10% plagioclase in irregular lenses and patches, probably of exsolution origin.

Grains of both feldspars are ragged and in part recrystallized to much finer grained aggregates or scattered individual grains.

Quartz forms patches averaging 1-2 mm in size, consisting of irregular interlocking aggregates of grains from 0.2 to 0.5 mm in size.

Opaque forms scattered grains with biotite, in quartz, and as a dusty replacement of feldspars. Semi-opaque has a similar occurrence. Both are mainly very fine grained.

Tourmaline forms in a few replacement patches with fine grained plagioclase-quartz intergrowths; tourmaline clusters are up to 0.15 mm in grain size and irregular to radiating in shape. Pleochroism is weak to moderate from pale yellow green to medium forest green.

Biotite forms a few aggregates of very fine grains (0.02-0.05 mm); some appear to be in vein-like zones. Pleochroism is from light straw to medium brown.

Calcite forms irregular patches with fine grained quartz and plagioclase, as discontinuous veinlets, and as replacement of plagioclase. Grains have very irregular outlines.

Apatite forms a few subhedral to euhedral grains from 0.05 to 0.15 mm in size.

Zircon forms one elongated prism 0.08 mm in length, associated with fine grained quartz, calcite, and hematite.

Hematite-limonite occurs with calcite in quartz-calcite veins.

Epidote forms a few discontinuous veinlets.

The rock is cut by discontinuous quartz veinlets, here and there containing minor calcite and hematite. Patches of fine grained quartz-plagioclase-semiopaque, and quartz-plagioclase tourmaline are probably of replacement origin.

SIN Quartz-Sericite-Muscovite Altered Rock

rock		vein	
quartz	70-75%	quartz	90-95%
sericite	20-25%	sericite	5-10
muscovite	5- 7%		
Ti-oxide	0.2		
limonite	0.2		
zircon	0.1		
epidote or tourmaline	trace		

The rock has been completely recrystallized, but a few relic textures can be identified.

Muscovite with scattered Ti-oxide on cleavage planes forms pseudomorphs after biotite.

In places aggregates of radiating sericite (0.02-0.05 mm grain size) pseudomorph original feldspars (1-1.5 mm grain size).

Elsewhere the rock consists of medium to coarse grained quartz, and irregular intergrowths of quartz and sericite. Locally sericite grains are up to 0.15 mm in size; coarser grains form patches or along vein-like zones.

Limonite is abundant locally with some sericite pseudomorphs after plagioclase or K-feldspar; it forms veins and pervasive stains in the sericite.

Zircon forms scattered subhedral to euhedral grains up to 0.1 mm in size.

One grain 0.1 mm long, with slight pleochroism from pale to light yellowish green occurs in quartz. It has no cleavage and an irregular outline. It is probably epidote or tourmaline.

The vein has sharp borders with the rock, and consists mainly of coarse grained quartz (1-2 mm) growing roughly perpendicular to the vein borders. Patches up to 1 mm across of extremely fine grained sericite (0.002-0.005 mm) are interstitial to quartz grains. Many quartz grains show irregular extinction, with either patches up to 0.1 mm with slightly different extinction positions, or wavy extinction.

The original rock could have been any of the plutonic phases which contain coarse grained minerals. Alteration is intense, destroying feldspars and mafic minerals, introducing quartz and possibly K_2O, and leaving only a few relic textures.

S-7-29-20 Greisen: Quartz-Plagioclase Rock, Fluorite-Tourmaline-Quartz Replacement

rock

plagioclase	55-60%
quartz	30-35
fluorite	7-10
kaolinite	1
tourmaline	1
sericite	0.5
zircon	minor
semiopaque	minor

replacement

Zone 1: fluorite, quartz, tourmaline

Zone 2: tourmaline, quartz

The rock has an irregular texture. Plagioclase grains range from subhedral, randomly oriented prismatic grains 0.15-0.3 mm in length, to equant to interstitial, anhedral grains 0.5 to 1 mm in size. Most are fresh, but contain patches and dusty alteration of fine grained semiopaque.

Quartz froms grains mainly 0.5 to 1.5 mm in size; these are interstitial to plagioclase grains.

Fluorite forms patches up to 2 mm across as replacements of the rock; most is colorless but local purple zones occur. Tourmaline occurs in one part of the rock with abundant fluorite and minor opaque.

Kaolinite forms fine grained (0.02 mm) patches interstitial to quartz and plagioclase, and locally associated with wispy sericite veinlets.

Sericite forms scattered patches of fibrous radiating crystals up to 0.05 mm long, and as a few wispy veinlets.

Zircon forms euhedral to subhedral grains averaging 0.05 mm.

The semiopaque mineral forms irregular patches and dusty alteration in plagioclase, and patches between grains of plagioclase.

replacement

The replacement minerals are zoned, although zones are not sharp. Nearest the rock, replacement consists of irregular poikilitic tourmaline and patches of fluorite which partly replace the rock.

Next comes a zone of coarse fluorite, with some intergrown quartz and tourmaline. This is the most concentrated zone of fluorite in the section. No original rock texture is preserved.

Further into the alteration zone is medium to very coarse grained tourmaline, with patches of coarse quartz and very little fluorite.

Tourmaline is weakly to strongly pleochroic; colors range from pale yellow-green to medium yellow-green, and to bright blue. Many crystals are zoned concentrically; some have many thin color zones while others have only a few. Typically the deepest pleochroic colors are in the cores of the crystals.

vein

The rock is cut by a coarse to medium grained vein of quartz (75%), and fluorite (25%), at the opposite end of the section from the tourmaline concentration.

E-78-8-10-118 Early Quartz Monzonite

K-feldspar perthite	40-45%
plagioclase	25-30
quartz	20
epidote	5- 7
chlorite	3
sphene	0.3
apatite, tourmaline, opaque	minor
fluorite	trace

veins

1) epidote-(chlorite)
2) quartz-kaolinite-(epidote-opaque) with epidote halo

The rock is coarse grained with a moderate amount of recrystallization to very fine grained patches and vein-like zones, giving the rock a ragged texture.

K-feldspar grains are up to 3 mm in size, and contain up to 20% exsolution plagioclase as ragged patchy intergrowths. Recrystallization is common to very fine grained aggregates. Dusty alteration ranges widely in intensity and appears unrelated to recrystallization.

Plagioclase is subhedral from 1 to 2 mm in grain size. Many crystals show strong concentric zoning, but development of albite twins is too irregular to allow composition determination. The R.I. is greater than that of quartz, suggesting an oligoclase-andesine composition. Many grains have the appearance of having been slightly deformed. Alteration is slight to locally strong to epidote, as scattered single grains or patches of very fine grained aggregates. Locally plagioclase appears to be replaced by K-feldspar. K-metasomatism would help explain why so much K-feldspar is present with intermediate composition plagioclase.

Quartz forms patches from 2 to 3 mm in size; these consist of intergrowths of anhedral medium to coarse grains commonly with undulatory extinction. A few patches consist of fine grained (0.05-0.1 mm) mosaics.

Epidote forms alteration of plagioclase, replacement patches with quartz,and veins. Replacement patches are mainly medium grained aggregates of epidote and quartz, with commonly lesser chlorite, opaque, and sphene.

Chlorite locally forms patchy alteration of plagioclase with epidote. It also forms scattered interstitial patches up to 0.3 mm across of radiating aggregates of grains.

Sphene forms rounded irregular aggregates of very fine grains, commonly with epidote and/or chlorite. Apatite forms grains up to 0.1 mm across, commonly with epidote. Tourmaline is colorless to light grey, commonly concentrically zoned, and forms euhedral crystals from 0.05 to 0.15 mm long. Opaque occurs mainly with epidote as single grains and clusters with grain size 0.02 mm. Fluorite forms a few small interstitial patches.

The rock is cut by a main vein composed of medium grained epidote with minor chlorite. The vein is variable in width and locally discontinuous. It has a weakly defined halo containing scattered epidote and chlorite and relatively free of K-feldspar.

A set of narrower veins consists mainly of very fine grained, irregular quartz, with lesser kaolinite, and in places epidote, opaque, and minor chlorite. Along much of the vein walls is very fine grained epidote. One vein grades into a patch of partly recrystallized rock, suggesting brecciation and recrystallization of rock during vein formation

J-78-7-22-10 Mafic Gabbro (Altered)

pyroxene phenocrysts	30-35%	
amphibole	30-35	some secondary
plagioclase	15-20	
biotite (phlogopite)	10-15	
chlorite	3- 5	
quartz, opaque	minor	

Pyroxene forms euhedral phenocrysts mainly from 1 to 2 mm in size, but with a few coarse grains up to 15 mm long. It is colorless in thin section, and medium green in hand sample. It is partly altered to amphibole; alteration ranges from thin overgrowths or alteration rims of amphibole to strongly altered grains with corroded cores of pyroxene enclosed in amphibole.

Amphibole forms subhedral grains 0.3 to 1 mm long; pleochroism is slight and the colors are pale olive green. Amphibole also forms alteration of pyroxene as described above, irregular ragged grains of secondary origin, and one patch 1 mm across of very fine grained fibrous to acicular grains.

Plagioclase forms interstitial grains from 0.2 to 1 mm in size; most are partly altered to very fine grained biotite-sericite and amphibole, particularly along grain boundaries.

Biotite forms a few coarse grains up to 2 mm long; pleochroism is from colorless to light brown; the mineral is probably better described as phlogopite. Some grains are partly to completely altered to colorless chlorite; alteration is cleavage controlled. Biotite-phlogopite also forms a fine grained secondary aggregate which pervasively replaces the rock.

Chlorite replaces biotite in some grains, and also forms interstitial patches of grains averaging 0.2 mm long.

Quartz forms a few interstitial grains 0.1-0.2 mm across.

Opaque forms scattered grains averaging 0.04 mm in size.

J-78-7-22-3 Tremolite-Plagioclase-Biotite Skarn

main rock	85-90%
tremolite	50-55%
plagioclase	25-30
biotite	15-20
opaque	0.5
semiopaque	0.2
epidote	0.1

coarse patches	10-15%
tremolite	85-90%
biotite	3- 5
opaque	2- 3
plagioclase	1
quartz	1

The main rock has a very ragged texture, while the coarse patches have a mosaic texture.

In the main rock, tremolite forms ragged prismatic grains, mainly from 0.2 to 0.5 mm in length, with a few up to 1 mm. Grains are randomly oriented and irregularly intergrown. Interstitial to tremolite are anhedral plagioclase grains 0.2 to 0.5 mm in size; these are moderately to strongly altered and recrystallized, so the original nature of the grains is obscured. Locally relic albite twins can be distinguished. Alteration of plagioclase is to fine grained biotite, possibly sericite, and dusty semiopaque-opaque.

Biotite forms patches up to 1 mm across of very fine grained (0.01 mm) anhedral flakes. Patches have diffuse borders and grade into rock with scattered small patches and flakes of biotite. Pleochroism is from pale straw to light brown. Biotite appears to be of secondary origin, and has a texture typical of biotite formed by contact metamorphism.

Opaque grains from 0.02 to 0.1 mm in size are scattered in the rock, commonly forming anhedral grains in biotite.

Very fine grained patches of semiopaque are scattered in the rock. Locally semiopaque forms a few subhedral to euhedral grains 0.02-0.05 mm across with diamond crosssections.

Epidote forms a few irregular grains from 0.05 to 0.1 mm across.

Near one end of the sample (about 1/3 of the sample), the rock contains patches and lenses of coarser grained aggregates. Patches are mainly from 2 to 5 mm in size, and have sharp rounded borders against the finer grained rock. A few lenses are up to 15 mm long.

Tremolite forms a mosaic aggregate of prismatic grains up to 2 mm long. Biotite forms scattered grains 0.1-0.3 mm in size, with slightly stronger pleochroism than that of fine grained biotite in the main rock. Opaque forms subhedral to irregular grains up to 0.1 mm across. Interstitial to tremolite are irregular grains of plagioclase and quartz; distinction between the two minerals is difficult because of the small grain size and scarcity of albite twins. Plagioclase grains are fresh, in contrast to those in the main rock.

The sample is cut by a thin epidote veinlet.

J-78-7-22-4 Andesite Porphyry

phenocrysts	45-50%	
hornblende	30-35	(partly altered to secondary amphibole, opaque, chlorite, Ti-oxide)
plagioclase	15-20	(strong overprint of secondary amphibole)
groundmass	50-55%	
plagioclase	25-30	
amphibole	10-15	(secondary)
opaque	7-10	
epidote	3- 5	
apatite ?	0.3	(or tourmaline)
quartz	minor	
fluorite, biotite	trace	

vein
quartz-amphibole

The rock is a moderately to strongly altered andesite porphyry; original texture is preserved but strongly camouflaged by secondary alteration.

Hornblende forms subhedral to euhedral prismatic phenocrysts up to 3 mm long and 0.7 mm across. Pleochroism is slight, with colors from medium yellow-green to medium green. Hornblende is altered in part to secondary amphibole, commonly pseudomorphic, and commonly containing coarse irregular inclusions of opaque; and in part to chlorite-Ti oxide with or without secondary amphibole and opaque. Quartz forms a minor part of some alteration assemblages.

Plagioclase phenocrysts are from 0.3 to 1 mm in size; their outlines are diffuse because of alteration and secondary overprint of amphibole. In places it is difficult to distinguish altered (and possibly partly recrystallized) plagioclase phenocrysts from finer plagioclase of the groundmass.

The groundmass is dominated by very fine grained (0.02-0.05 mm) strongly interlocking plagioclase and irregular laths and aggregates of amphibole. Opaque forms scattered grains 0.02-0.05 mm in size; most are subrounded to irregular in outline. Local coarser patches occur, some in groundmass and some in hornblende phenocrysts.

Epidote forms patches up to 2 mm across with lesser opaque and quartz; these patches are probably of replacement origin. One patch contains a few grains of bright red-brown biotite.

Apatite? forms euhedral grains about 0.03 mm across. They are colored light brownish-grey, and prismatic sections are length fast with parallel extinction. This mineral is probably the same as that described as tourmaline in sample E-78-8-10-118, in which colorless apatite also was present.

Two grains of fluorite 0.05 mm across with tiny apatite? inclusions occur with irregular opaque.

The rock is cut by a narrow quartz-amphibole vein.

APPENDIX III

Whole Rock and Trace Element Study

• CHEMICAL RESEARCH AND ANALYSIS
)NTRACT 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
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 _____

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) 625-1544
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/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 _____

CTA

• CHEMICAL RESEARCH AND ANALYSIS
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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 (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
S-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

DU PONT OF CANADA EXPLORATION LIMITED

REPORT OF GEOLOGICAL AND GEOCHEMICAL SURVEYS

on

SKIN PROJECT

by

B. Goad

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

January 1980

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(G. Ditson, B. Goad, G. Mato and F. M. Smith, P. Eng.)

- List of Personnel

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SPECIFIC PROSPECT - SKIN CLAIMS (335-09)

1. LOCATION AND ACCESS

The SKIN group covers the headwaters of two small creeks flowing easterly to Seagull Creek and the east wall of the valley at the headwaters of Goddart and Partridge Creeks. The SKIN group is on claim sheet 105-B03 at about 60°04'N and 131°17'W, Watson Lake MC, Yukon. The claims are in the south central portion of the Seagull Batholith, Dorsey Range, Cassiar Mountains.

Access is only possible by helicopter from Swift River, Yukon about 9 km southeast of the centre of the project area.

2. PHYSIOGRAPHY AND VEGETATION (Map KL 78-72)

The SKIN project area consists of an ESE trending pair of aretes terminating in the west against a northerly trending arete on the east side of the Partridge/Goddart Creek valley. The northern arete is part of the southern portion of the VAL(A) group with north facing slopes steep and south facing covered in felsenmeer at the angle of repose. The central ridge is broken into five small sub-cirques/ hanging valleys that face north with the two largest having tarns in the valley floors. These cirques have sheer walls facing north and northwest with subdued topography in all other directions. The south facing portion of the ridge (and almost all other areas) are felsenmeer covered of moderate to angle of repose slopes, with little if any outcrop. The valley floors have one principal and many tens of small creeks flowing into the Seagull Creek drainage.

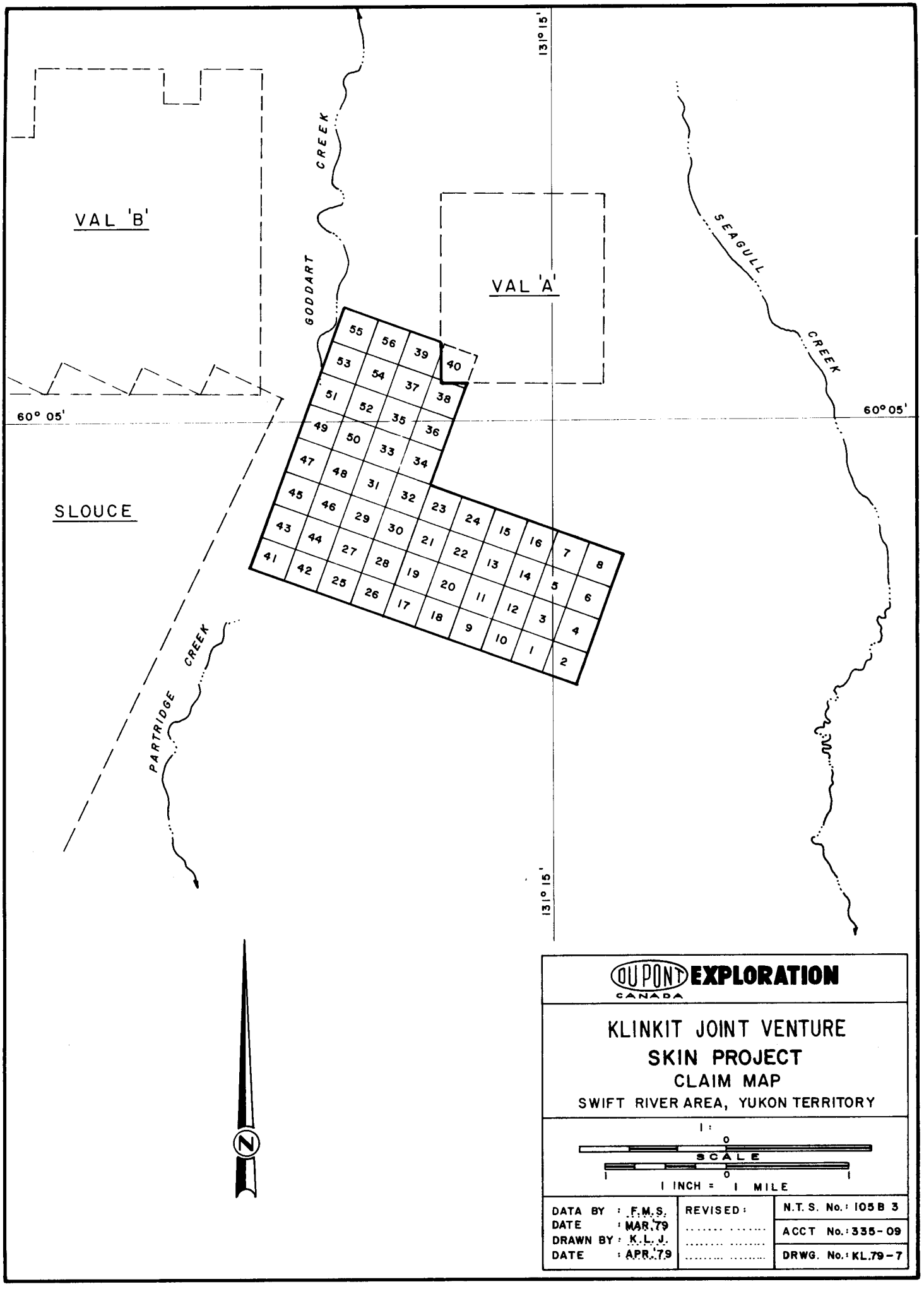
Vegetation is limited to minor alpine sedges, scattered low ground birch and wildflowers. The northern east draining creek has a few large patches of moderate ground birch and the lower levels of the west facing wall of Goddart and Partridge Creeks have mixed balsam and moderate ground birch. Most of the claimed area is without vegetation other than lichen.

3. CLAIMS

The SKIN group consists of the following claims:

Claim Name	Record Numbers	Expiry Date
SKIN 1-56	YA29215 - YA29270	1980 01 10

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


VAL 'B'
VAL 'A'
SLOUCE
GODDART CREEK
SEAGULL CREEK
PARTRIDGE CREEK
131° 15'
60° 05'
55 56 39 40
53 54 37 38
51 52 35 36
49 50 33 34
47 48 31 32 23 24 15 16 7 8
45 46 29 30 21 22 13 14 5 6
43 44 27 28 19 20 11 12 3 4
41 42 25 26 17 18 9 10 1 2
N
DUPONT CANADA EXPLORATION
KLINKIT JOINT VENTURE
SKIN PROJECT
CLAIM MAP
SWIFT RIVER AREA, YUKON TERRITORY
1 : 0
SCALE
1 0 1
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. : 335-09
DRWG. No. : KL.79-7

4. HISTORY

The SKIN claims were staked for two reasons:

(a) there are strong anomalies in Goddart and Partridge Creeks that appeared to relate to orange-red gossans (like the anomalous DU gossan) on the east wall of the common valley, and

(b) there is a prominant gossan that was only partly exposed in the eastern of the two small cirques in the central east trending arete.

As the VAL(A) group to the north was staked to cover a roof pendant, the SKIN group was located to cover the area between the VAL(A) and the prominant gossans. After locating the SKIN group, AMAX located the south extension of the STQ claims south to overlap the VAL(A) and the northwest corner of the SKIN group.

During the traverses, no old posts, sample flags or camps were noted in the area of the SKIN claims. To the best of our knowledge there have been no claims recorded in the area prior to the location of the SKIN group.

5. PROPERTY EVALUATION

5.1 General

The SKIN claim area was mapped and prospected between 1979 04 02-14 to check areas found (during 1978) to be anomalous with respect to Sn and W, and to study the alteration styles in the area and assess their potential for Sn mineralization.

5.2 Geology (Map KL 78-31 revised)

The whole claimed area is underlain by Seagull (or Hake) phase of the Seagull batholith with alteration zones as overprints on rather monotonous Cretaceous granite to quartz monzonite.

The Seagull phase consists of two distinct varieties which appear to occur together without any discernable contacts. The first is an equigranular potassic and sodic feldspar, quartz-rich rock with minor biotite and very minor accessory minerals. The second variety appears to be of the same composition, but is a "crowded porphyry". A groundmass of finer-grained feldspars and quartz is of the same composition as the medium to coarse feldspars and quartz , and constitutes only about 10 to 20% of rock volume.

The alteration types are:

(a) Proposed pneumatolitic fluorite (trace), arsenopyrite, quartz, lepidomelane (black, metallic biotite) zone.

(b) Quartz, clay arsenopyrite in gossanous zones adjacent to east-west trending quartz breccia dykes.

(c) Quartz (chaldecony (?)), muscovite, arsenopyrite, veins.

The first type appears to have no Sn or W associated with it and may be one in the same alteration as the quartz, clay, arsenopyrite gossans since the presence of fluorite and lepidomelane is extremely rare. This proposed alteration was noted in one locality only in the top of the east gossanous cirque of the central east-west ridge.

The second alteration type covers all other gossans in the SKIN claim group. These again appear to be Sn and W barren, and in most cases again related to the east-west trending quartz breccia dykes. The hosting quartz monzonite has been clayed progressively inward, over a distance of 1-10's of meters, toward the quartz breccia dykes. Immediately adjacent to these dykes, the quartz monzonite has been silicified and the feldspars have been totally clayed (illite) giving the rock a bright yellow colour.

The final alteration (quartz (chalcedony(?)), muscovite, arsenopyrite veins) do carry Sn mineralization; curiously however, not in all cases. Two localities bearing this alteration exist; both on the western north-south ridge and both are very poorly exposed (talus covered). The Sn barren veins are located on the west side of the high peak in the south-west corner of the SKIN claims. The Sn bearing veins are located on the low rounded section of the same ridge in the north-west corner of the SKIN claims. These veins randomly cut the quartz monzonite and their mineralogy consists of quartz, fine grained muscovite, arsenopyrite, pyrite, hematite and cassiterite. Two random samples analyzed averaged 0.3% Sn.

5.3 Geochemistry (Map KL 79-69)

A total of 285 soil samples were collected from this project area. Two traverse lines were run along the

anomalous western side of the western-most north-south ridge of the claim group. Two positions on the hill were sampled; one was along the top of the ridge while the other was half way down the hill. These samples were analyzed for Sn using X-Ray fluorescence.

The anomalous areas of Sn mineralization correspond to the area south of where the quartz (chalcedony(?)) veins occur. No reason for the high soil geochemistry can be observed in the rocks. The location where Sn mineralization is known to occur in the rocks has (for reasons unknown), very low Sn levels in the soil.

5.4 Mineralization

A total of 155 rock samples from within the SKIN claims were analyzed by XRF for tin. Three of these samples had significant Sn values:

Tag No.	Field No.	Sn (%)	Description of Samples
6911 A	B-7-10-63(c)	0.225	Qtz-sericite-aspy. vein in fresh Seagull.
4065 B	B-7-07-34-1	0.390	Qtz-sericite-aspy. vein in fresh Seagull.
4024 B	B-6-26-16(c)	0.435	Float: Silicified, clayed slightly tourmalinized (?) vein material (?)

The Sn mineralization is too fine grained to be recognized; however, cassiterite is suspected. Thin section studies planned for 1980 will attempt to confirm this.

6. CONCLUSIONS AND RECOMMENDATIONS

Two areas of anomalous Sn soil geochemistry require checking to determine the extent and source. The western ridge in the area of anomalous Sn soils should be trenched to remove the talus and expose fresh rock in order to assess the extent and grade of the mineralized quartz/(chalcedony(?)) veins.

The area on the central east-west ridge should be thoroughly prospected to locate the source of sample number B-6-26-16(C) in situ.

The SKIN claims should be retained for the above reasons until 1981 01 01 or such time as their economic potential has been assessed.

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

DU PONT OF CANADA EXPLORATION LIMITED

REPORT OF GEOLOGICAL AND GEOCHEMICAL SURVEYS

on

SLIP PROJECT

by

G. Ditson, G. Mato and

F. M. Smith, P. Eng.

January 1980

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Dwg. KL 79-67:	Sn Geochemistry (1:2 5000)	"
Dwg. KL 79-68:	Geology (1:2 500)	"

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APPENDIX B - Statement of Qualifications

(G. Ditson, B. Goad, G. Mato and F. M. Smith, P. Eng.)

- List of Personnel

SPECIFIC PROSPECT - SLIP CLAIMS (335-11)

1. LOCATION AND ACCESS

The SLIP group is located on a northwest trending ridge at the north end of the Seagull Batholith 38 km northwest of Swift River, Yukon. The claim group is on claim sheet 105-B-4 at about 60°06'N by 131°29'W.

Access is now only by helicopter from Swift River, Yukon but a good winter road is located to the south on the MC/SWIFT claims that connects through the LOGTUNG property to the Alaska Highway (about 45 km).

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

The claims cover a portion of a long north-west trending ridge where the ridge changes topography from an arete to the south east to felsenmeer-covered subdued topography to the north. In the centre of the group, a steep-walled east-west fault-controlled gulley cuts the ridge at the break of topographic styles.

Vegetation is limited to very minor grass, sedges and scattered clumps of ground birch.

3. CLAIMS

The SLIP project consists of the following claims:

Claim Name	Record Number	Date of Expiry
SLIP 1-4	YA29335-YA29338	1980 01 10
SLIP 9-13	YA29343-YA29347	1980 01 10
SLIP 17-26	YA44936-YA44945	1980 07 11
SLIP 27-50	YA44946-YA44968	1980 07 11

All claims are on claim sheet 105-B-4 in Watson Lake Mining District, Yukon and are recorded in the name of Du Pont of Canada Exploration Limited.

4. HISTORY

The claim group area probably has never been staked before but there has been considerable prospecting in the general area for massive sulphides during the mid to late 1960's and for skarn tungsten mineralization several times since 1968.

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 of 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.

5.2 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 thrust 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 SLIDE 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.

6. GEOCHEMISTRY

6.1 Map KL 79-44

A total of 284 samples were collected over the SLIP claims and analyzed for tin. These show an area of extemely anomalous tin in the northern portion of the claims with scattered and possibly linear values throughout of highly anomalous soils. Analysis by MIN-EN Labs indicated that most of the anomalous values are due to tin minerals other than cassiterite. The

exact nature and source of the anomalous soils has not been defined or located.

6.2 Map KL 79-67

The detail follow-up grid located the source of the tin anomalies in areas noted above involved collecting 863 samples. The magnitude of the anomalies was defined and the probable linear nature of some of the anomalies was indicated in the northern portion of the grid.

6.3 Map KL 79-45

The lead and zinc geochemical map shows major anomalies for both metals in the 210 sample sites.

The zinc values are controlled by both mechanical grain movement and hydromorphic dispersion (resulting in transported anomalies) especially in the south-east portion of the map. The lead anomalies probably have been partially moved down slope (i.e. northeast) but the slope is relatively gentle.

The zoning of the two metal anomalies indicates that there are two or three parallel zones striking north-west (parallel to bedding). Detail mapping, prospecting and location of mineralized float have still not satisfactorily explained the nature or source of the anomalous zones.

7. MINERALIZATION

7.1 Lead-Zinc

Two days of prospecting subsequent to 1:10 000 geologic mapping in the area of high Pb and Zn geochemistry (Map KL 79-45) did not uncover significant new information relative to the extent of the source. No in-place mineralization was located, but float (M-6-27-13 and D-8-25-34) and lightly heaved rubble (M-6-27-17) indicate the presence of a mineralized horizon similar to those present on the MC cirque floor (Figure 1). Honey-coloured sphalerite, less common galena, and rare chalcopyrite (only at M-6-27-17) occur in irregular bands or patches within a green matrix, the nature of which is unknown. Tuff, chalky chert and massive barite have also been reported as float. Initial observations emphasized close spatial relations with limestone (especially MC cirque floor, where sulphide horizons



Figure 1. Comparison of mineralized float on SLIP claims and outcropping mineralization in the SWIFT project area. (Mineralized material is incorrectly labelled SUHO in both photographs.)

(a) This boulder at M-6-27-13 contains up to 20% sphalerite in a dark green matrix rock which forms an irregular, cross-cutting contact with laminated quartzite (SLIP).

(b) Small limestone lenses amongst argillaceous quartzite in the SWIFT area (MC cirque floor) have had their upper portions completely altered to a green, sphalerite-rich skarn.

occur above erratic limestone lenses), and therefore it was suggested to be a skarned horizon (M-6-27-13)[1]. However, a horizon resembling foliated green pyroclastic occurs on the ridge above where mineralized float was found on SLIP. This horizon is stratigraphically above and in contact with the wide band of light grey limestone. Examination of hand specimens of mineralized material reveals fragmental textures in some cases and complete recrystallization in all. Subsequent thin section examination is planned.

Mineralized float on SLIP is not necessarily related to the particular fragmental layer described above, but perhaps (as in MC cirque floor) from lenses interbedded amongst laminated argillaceous quartzites below the large mapped band of limestone. Regardless of the nature of this horizon, its continuity and thickness are still unknown quantities, and the widespread distribution of anomalous soil values cannot be explained only as geochemical expressions of known localites.

7.2 Tin

Consistently anomalous XRF-determined tin values on the SLIP grid (Map KL 79-67) were followed-up by detailed geological mapping in the eastern portion of the grid. Unfortunately, outcrops are rare to non-existent eastward, and rubble does not indicate the presence of anything but phyllitic argillaceous quartzite. Minor metamorphically-produced quartz veining is present in siliceous varieties, but no indications of tin mineralization were encountered. It is presumed that the Seagull batholith is present at lower elevations east of mapped sedimentary rocks, but vegetation is so thick that the possibility of mapping any further east was not considered.

All XRF values of 0.005% or greater were checked against MIN-EN geochemical results. All such XRF values produced very low (4-18 ppm) geochemical results, indicative of silicate and/or sulphide tin.

---

[1] It is interesting to note that on the VAL claims, a skarn pod has been mapped as completely enclosed within a tightly folded limestone pendant within ultramafic rocks. Hand specimens of this skarn are identical to specimens of the mineralized horizon discussed here, except that sphalerite is not honey-coloured, but dark brown.

8. CONCLUSIONS AND RECOMMENDATIONS

The potential for massive sulphide mineralization must be examined by detailed careful prospection of anomalous areas. The tin geochemical anomalous areas require examination to determine the tin minerals and possible source. If the majority of tin anomalies are related to tin-sulphide minerals the soils/rocks must be re-examined for possible 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

LEGEND

CRETACEOUS OR TERTIARY

- SG — SEAGULL BATHOLITH
  - EQ2 (or 3,4,5,6) — overage 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

(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
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- 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 CLAIMS (APPROX. BDY)

FOR DETAIL SEE DRWG. No. 79-50

SWIFT CLAIMS (APPROX. BDY)

DU MAIN GOSSAN

ECCLES RIDGE

FOR DETAIL SEE DRWG. No. KL 79-54

DU PLATEAU

FOR DETAIL SEE DRWG. No. KL 79-53

THESE POINTS ARE GEOGRAPHICALY THE SAME BUT ARE DUPLICATED ON MOSAIC

DU SOUTH

THESE POINTS ARE GEOGRAPHICALLY THE SAME BUT ARE DUPLICATED ON MOSAIC

FOR DETAIL SEE DRWG. No. 79-52

DU CLAIMS (APPROX. BDY)

(SOUTHERN BDY POSITION UNKNOWN)

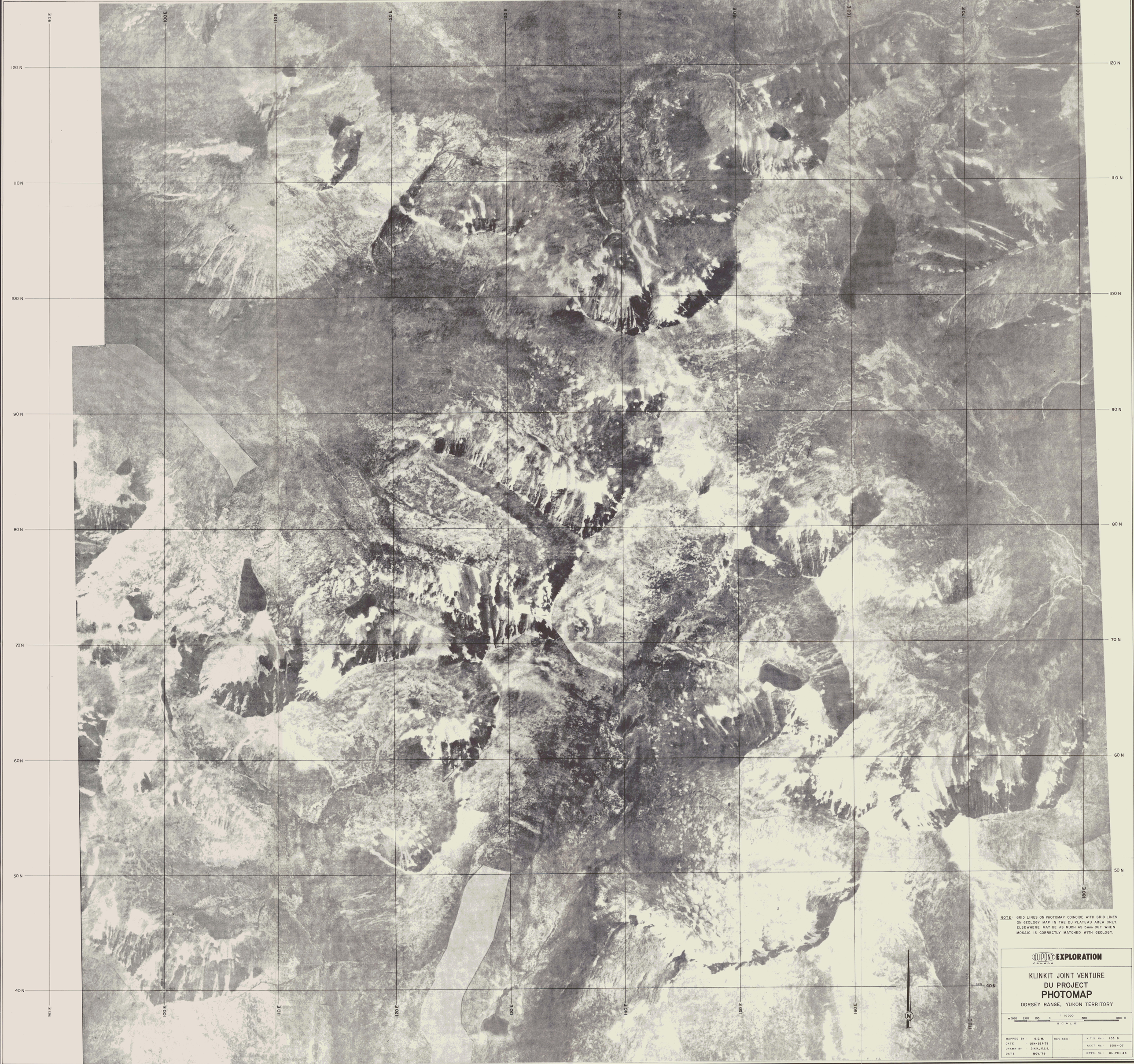
DU CLAIMS (APPROX. BDY)

DU PONT EXPLORATION CANADA

KLINKIT JOINT VENTURE
DU PROJECT
GEOLOGY
DORSEY RANGE, YUKON TERRITORY

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

MAPPED BY	G.D.M.	REVISED	N.T.S. No. 105 B
DATE	JUN-SEP '79		ACCT No. 335-07
DRAWN BY	C.M.K., K.L.J.		



NOTE: GRID LINES ON PHOTOMAP COINCIDE WITH GRID LINES ON GEOLOGY MAP IN THE DU PLATEAU AREA ONLY. ELSEWHERE MAY BE AS MUCH AS 5mm OUT WHEN MOSAIC IS CORRECTLY MATCHED WITH GEOLOGY.

DU PONT CANADA **EXPLORATION**

KLINKIT JOINT VENTURE
DU PROJECT
PHOTOMAP
DORSEY RANGE, YUKON TERRITORY

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

MAPPED BY:	G.D.M.	REVISED	N.T.S. No: 105 B
DATE:	JUN-SEP'79		ACCT No: 335-07
DRAWN BY:	C.M.K., K.L.J.		DRWG. No: KL.79-48
DATE	NOV.'79		

90 E 100 E 110 E 120 E 130 E 140 E

120 N 110 N 100 N 90 N 80 N 70 N 60 N 50 N

FOR DETAIL SEE INSET

DU CLAIMS (APPROX. BDY)

FOR DETAIL SEE DRWG. No. 79-51

SWIFT CLAIMS (APPROX. BDY)

(SOUTHERN BDY POSITION UNKNOWN)

DU CLAIMS (APPROX. BDY)

FOR DETAIL SEE DRWG. No. 79-52

DU CLAIMS (APPROX. BDY)

THESE POINTS ARE GEOGRAPHICALY THE SAME BUT ARE DUPLICATED ON MOSAIC

90 E 100 E 110 E 120 E 130 E 140 E 150 E 160 E 170 E 180 E

INSET

SCALE: 1 : 2500

LEGEND

○ 330 SOIL SAMPLE STATION WITH VALUE FOR Sn IN P.P.M.

○ 0.025% SOIL SAMPLE STATION WITH VALUE FOR Sn IN PERCENT

NOTE:
ALL VALUES DETERMINED BY XRF.

DU PONT CANADA **EXPLORATION**

KLINKIT JOINT VENTURE
DU PROJECT
Sn GEOCHEMISTRY
DORSEY RANGE, YUKON TERRITORY

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

MAPPED BY:	G.D.M.	REVISED:	N.T.S. No.: 105 B
DATE:	JUN-SEP '79		ACCT No.: 335-07
DRAWN BY:	C.H.K., K.L.A.		DRWG. No.: KL-79-49
DATE:	NOV. '79		

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
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  - LIMS — LIMESTONE
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  - 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
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- 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
AY	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
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SR	SERIATE
VC	VOLCANOCLASTIC
/D	DYKE
mc	MIAROLITIC CAVITIES
V	VEIN
<V	MICROVEIN
W/	WITH

DU PONT EXPLORATION CANADA

KLINKIT JOINT VENTURE
DU PROJECT
GEOLOGY
PLATEAU & ECCLES RIDGE
DORSEY RANGE, YUKON TERRITORY

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

MAPPED BY :	G.D.M.	REVISED :	N.T.S. No. : 105 B
DATE :	JUN - SEP '79		ACCT No. : 335-07
DRAWN BY :	C.H.K., K.L.J.		DRWG. No. : KL 79-50
DATE :	NOV. '79		

LEGEND

O 325 SOIL SAMPLE STATION WITH VALUE FOR Sn IN P.P.M.

O 0.005% SOIL SAMPLE STATION WITH VALUE FOR Sn IN PERCENT

NOTE:
ALL VALUES DETERMINED BY XRF.

DU PONT EXPLORATION
CANADA

KLINKIT JOINT VENTURE
DU PROJECT
Sn GEOCHEMISTRY
PLATEAU & ECCLES RIDGE
DORSEY RANGE, YUKON TERRITORY

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

MAPPED BY : G.D.M.	REVISED :	N.T.S. No. : 105 B
DATE : JUN.-SEP.'79		ACCT. No. : 335-07
DRAWN BY : C.H.K., K.L.J.		DRWG. No. : KL 79-51
DATE : NOV.'79		

LEGEND

CRETACEOUS OR TERTIARY

SG	SEAGULL BATHOLITH	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
	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	

JURASSIC – CRETACEOUS (?)

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M3	UPPER SYLVESTER GROUP	
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	SHAL	SHALE
	QZIT	QUARTZITE
	CONG	CONGLOMERATE
	CHRT	CHERT
	VOLC	VOLCANIC
	SKRN	SKARN
	SUHØ	SULFIDE HORIZON
	ARGZ	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
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- FAULT (showing direction of movement)
- ALTERATION AREA
- BEDDING – INCLINED, VERTICAL
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- 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
- QUARTZ EYES

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
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IL	ILLITE
LI	LIMONITE
MG	MAGNETITE
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MØ	MOLYBDENITE
MS	SERICITE
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QC	QUARTZ (CHERT)
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DESCRIPTORS

BLK	BLACK
EQ	EQUIGRANULAR
FEL	FELDSPATHIC
G$	GREISEN
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MSS	MASSIVE
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PG	PEGMATITIC
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SD	SEDIMENTARY
SIF	SILICIFIED
SR	SERIATE
VC	VOLCANOCLASTIC
/D	DYKE
mc	MIAROLITIC CAVITIES
V	VEIN
<V	MICROVEIN
W/	WITH

GEOCHEMICAL LEGEND

○ 225 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.

NOTE:
+ CLEAR OR LIGHT GREY QZ EYES IN GRANITE
• BLACK QZ EYES IN GRANITE

DU PONT EXPLORATION CANADA

KLINKIT JOINT VENTURE
DU PROJECT
GEOLOGY & GEOCHEMISTRY
DU SOUTH
DORSEY RANGE, YUKON TERRITORY

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

MAPPED BY	G.M.D.	REVISED	N.T.S. No. 105 B
DATE	JUN - SEP '79		ACCT. No. 335 - 07
DRAWN BY	C.H.K., K.L.J.		DRWG. No. KL. 79 - 52
DATE	NOV. '79		

Location	Sample Length of chips[1]	Hand Specimen(s)[2]	XRF[3]	Sn Min-En[4]
B-1	0.5 m		70 p	
B-2	0.5 m		-	
B-3	0.5 m		-	
B-4	0.5 m		0.065%	0.025% qc
B-5		X	0.76%	0.74% a
B-6		X	275 p	
D-1b		X	200 p	
D-2		Xg	300 p	
D-3		X	0.02%	0.065% qc
D-4		X	0.075%	0.035% qc
D-5		X	15 p	
D-6		X	-	
D-8		X	40 p	
D-10	1.0 m		-	
D-10	1.0 m		-	
D-10	1.0 m		70 p	
D-10	1.0 m		0.005%	0.0012% qc
D-10	1.0 m		-	
D-10	1.0 m		-	
D-10	1.0 m		40 p	
D-10	1.0 m		40 p	
D-10	1.0 m		120 p	
D-10	1.5 m		175 p	
D-10a		X	275 p	
D-10b		X	15 p	
D-10c		X	-	
D-13		X	70 p	
D-13	1.0 m		95 p	
D-15	1.0 m		145 p	
D-15	1.0 m		-	
D-15		X	0.015%	0.0095% qc
D-15		X	200 p	
D-15		X	145 p	
D-15		X	120 p	
D-16	1.0 m		295 p	
D-16		Xg	95 p	
D-17		X	40 p	
D-18		X	95 p	
D-18a		X	-	
D-19		Xf	200 p	
D-20		X	40 p	
D-21	1.0 m		-	
D-21	1.0 m		0.555%	0.51% a
D-21	1.0 m		-	
D-21		Xg	95 p	
D-22	1.0 m		600 p	
D-22		X	-	
D-23		Xf	120 p	
D-24	1.0 m		450 p	
D-24	1.0 m		120 p	
D-24	1.0 m[5]		25[6] p	
D-24a		X	-	
D-24b		X	-	
D-24c		X	100 p	
D-25	0.4 m[5]		350 p	
D-25		X	-	
D-26a		Xf	-	
D-26c		Xf	200 p	
D-26d		X	175 p	
D-27	1.0 m		-	
D-27	1.0 m		600 p	
D-27	1.0 m		-	
D-27	1.0 m		175 p	
D-27	1.0 m		70 p	
D-27	1.0 m		250 p	
D-27	1.0 m		-	
D-27	1.0 m		275 p	
D-27	1.0 m		-	
D-27	1.0 m		-	
D-27	1.0 m		-	
D-27		X	275 p	
D-27a		X	225 p	
D-27b		Xg	145 p	
D-28		Xg	-	
D-28a		X	-	
D-29		X	95 p	
D-30	1.0 m		120 p	
D-30	1.0 m		-	
D-30	1.0 m		-	
D-30	1.0 m		-	
D-30	1.0 m		200 p	
D-30	1.0 m		175 p	
D-30	1.0 m		-	
D-30	1.0 m		95 p	
D-30	1.0 m		300 p	
D-30	1.0 m		175 p	
D-30	1.0 m		-	
D-30		X	175 p	
D-30a		X	40 p	
D-31		X	95 p	
D-32		Xg	-	
D-33a		X	40 p	
D-33b		X	-	
D-33c		X	70 p	
D-34		X	250 p	
D-34		Xg	95 p	
D-35		X	-	
D-36		X	-	
D-37		X	0.07%	0.185% qc
D-37a		X	0.76%	0.96% a
D-38		X	225 p	
D-39		X	275 p	
D-40		X	-	
D-41		Xg	0.025%	0.072% qc
D-42a		X	40 p	
D-42b		X	-	
D-43a		X	1.55%	1.12% a
D-43b		X	-	
D-44		X	175 p	
D-44a		Xg	1.555%	1.37% a
D-45		X	300 p	
D-46		X	70 p	
D-47		X	-	
D-48		Xg	175 p	
D-49		X	-	
D-50		X	-	
D-51a		X	95 p	
D-51b		X	-	
D-51c		X	-	
D-51d		X	400 p	
D-52		X	-	
D-52b		X	175 p	
D-52c		X	-	
D-53	0.75 m		325 p	
GM-1		X	-	
GM-4a		X	-	
GM-4b		X	-	
GM-4c		X	-	
GM-5a		X	120 p	

Location	Sample Length of chips[1]	Hand Specimen(s)[2]	XRF[3]	Sn Min-En[4]
J-1	0.5 m		-	
J-2	0.5 m		350 p	
J-3	0.4 m		95 p	
J-4	1.0 m		0.005%	0.025% qc
J-4	1.0 m		625 p	
J-4	2.0 m		70 p	
J-5	0.5 m		0.30%	0.39% a
J-6		X	-	
J-7	0.6 m		-	
J-8		X	-	
J-9	0.6 m		70 p	
J-10		X	-	
J-11	0.5 m		225 p	
J-11	0.5 m		0.030%	0.0225% qc
J-12		X	225 p	
J-13		X	70 p	
J-14	1.5 m		145 p	
J-15		X	-	
J-16		X	-	
J-16		X	40 p	
J-17		X	-	
J-18	0.8 m		-	
J-19		X	-	
J-20		X	400 p	
J-21		X	500 p	
J-22		X	225 p	
J-23	0.6 m		225 p	
J-24		X	95 p	
J-25		X	120 p	
J-26	0.7 m		-	
J-27		X	350 p	
J-28		X	-	
J-29		X	-	
J-30		X	700 p	
J-31		X	120 p	
J-32	0.75 m		95 p	
J-33	1.0 m		550 p	
J-34		X	175 p	
J-35		X	-	
J-36	0.7 m		1.44%	1.26% a
J-37		X	475 p	
J-38		X	120 p	
J-39		X	0.06%	
J-40		X	425 p	
J-41		X	175 p	
J-42	1.2 m		1.73%	1.48% a
J-43		X	-	
J-44		X	175 p	
J-45		X	1.65%	1.48% a
J-46		X	1.93%	1.55% a
J-47	2.0 m		600 p	
J-48	0.7 m		0.76%	0.61% a
J-49	0.9 m		1.47%	1.52% a
J-50	0.75 m		0.90%	0.78% a
J-51	0.5 m		-	
J-52	2.35 m		95 p	
J-53	0.45 m		70 p	
J-54	0.8 m		-	
J-55		X	70 p	
J-56		X	-	
J-57		X	95 p	
J-58		X	-	
J-59		X	-	
J-60		X	425 p	
J-61		X	250 p	
J-62	0.4 m		475 p	
J-63	0.9 m		15 p	
J-64		X	95 p	
J-65		X	1.70%	1.63% a
J-66		X	-	
J-67		X	-	
J-68		X	120 p	
J-69	1.4 m		300 p	
J-70		X	1.38%	1.25% a
J-71	1.7 m		0.18%	0.45% a
J-72	0.3 m		-	
J-73		X	-	
J-74		X	0.08%	0.195% qc
J-75		X	70 p	
J-76		X	275 p	
J-77		X	70 p	
J-78		X	300 p	
J-79		X	95 p	
J-80		X	40 p	
J-81		X	0.15%	0.31% a
J-82		X	-	
J-83		X	-	
J-84		X	120 p	
J-85		X	145 p	
J-86		X	145 p	
J-87		X	300 p	
J-88		X	-	
J-89	0.6 m		-	
J-90	0.5 m		-	
J-91		X	-	
N-1	1.0 m		95 p	
N-5	1.0 m		120 p	
N-7	0.7 m		450 p	
N-8	1.2 m		225 p	

[1] Chip samples were taken across veins, i.e. perpendicular to strike.

[2] "g" indicates several grab samples from within vein; "f" indicates float material.

[3] "-" indicates below detection level; "p" indicates ppm.

[4] "a" indicates assayed value; "qc" indicates geochemical analysis.

[5] Chips taken along strike of vein.

[6] Chips in wall rock only.

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

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

3516 = average fine crystal size, average coarse crystal size, maximum crystal size
% coarse fraction
% scale
/ none
- << 10%
1 10%
2 20%
3 30%
4 40%
5 50%
6 60%
7 70%
8 80%
9 90%
+ >>90%

MISSISSIPPIAN (PENNSYLVANIAN?)

M2 LOWER SYLVESTER GROUP

ABBREVIATIONS

MINERALS

CT CASSITERITE
GL GALENA
IL ILLITE
MS SERICITE
PY PYRITE
QZ QUARTZ
SL SPHALERITE

DESCRIPTORS

EQ EQUIGRANULAR
mc MIAROLITIC CAVITIES
V VEIN
<V MICROVEIN

SYMBOLS

OUTCROP
GEOLOGIC CONTACT
FAULT (showing direction of movement)
FOLIATION - INCLINED, VERTICAL
VEIN - INCLINED, VERTICAL
AREA OF SMALL VEINS
CLAIM POST
ROCK SAMPLE LOCATION
CHIP SAMPLE LOCATION
5 x m FRACTURES PER METRE
TRENCH

(not mapped)

DU 105 DU 106 DU 107 DU 108

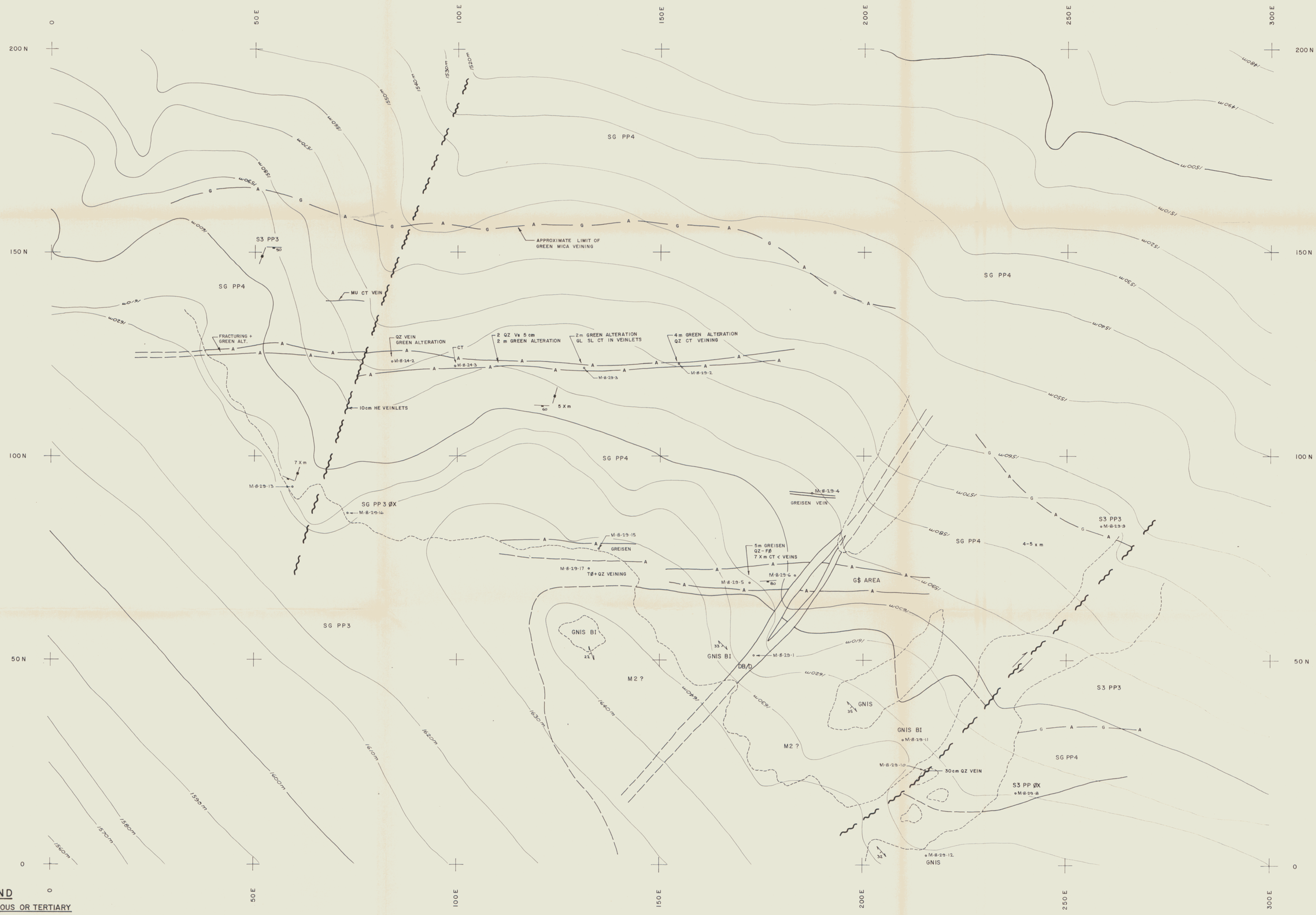
BASE LINE

DU PONT EXPLORATION CANADA

KLINKIT JOINT VENTURE
DU PROJECT
GEOLOGY
DU PLATEAU
DORSEY RANGE, YUKON TERRITORY

m 30 20 10 0 1:1000 30 60 m
SCALE

MAPPED BY : G.M.D.	REVISED :	N.T.S. No. :	105 B
DATE : JUN-SEP '79		ACCT No. :	335-07
DRAWN BY : C.M.K., K.L.K.			
DATE : NOV. '79		DRWG. No. :	KL 79-53



LEGEND

CRETACEOUS OR TERTIARY

- SG — SEAGULL BATHOLITH
  - EQ2 (or 3,4,5,6) — average crystal size
  - PP2 (or 3,4,5) — groundmass crystal size
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PERMIAN – MESOZOIC

- DIØR — DIORITE
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  - LIMS — LIMESTONE
  - MARL — MARL
  - SLAT — SLATE
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  - QZIT — QUARTZITE
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  - CHRT — CHERT
  - VOLC — VOLCANIC
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  - SUHØ — SULFIDE HORIZON
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AGE UNKNOWN

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

SYMBOLS

- EDGE OF TALUS
- OUTCROP
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- CONTACT APPROXIMATE
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- CONTACT GRADATIONAL
- FAULT (showing direction of movement)
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AS	ARSENOPYRITE
AX	AXINITE
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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

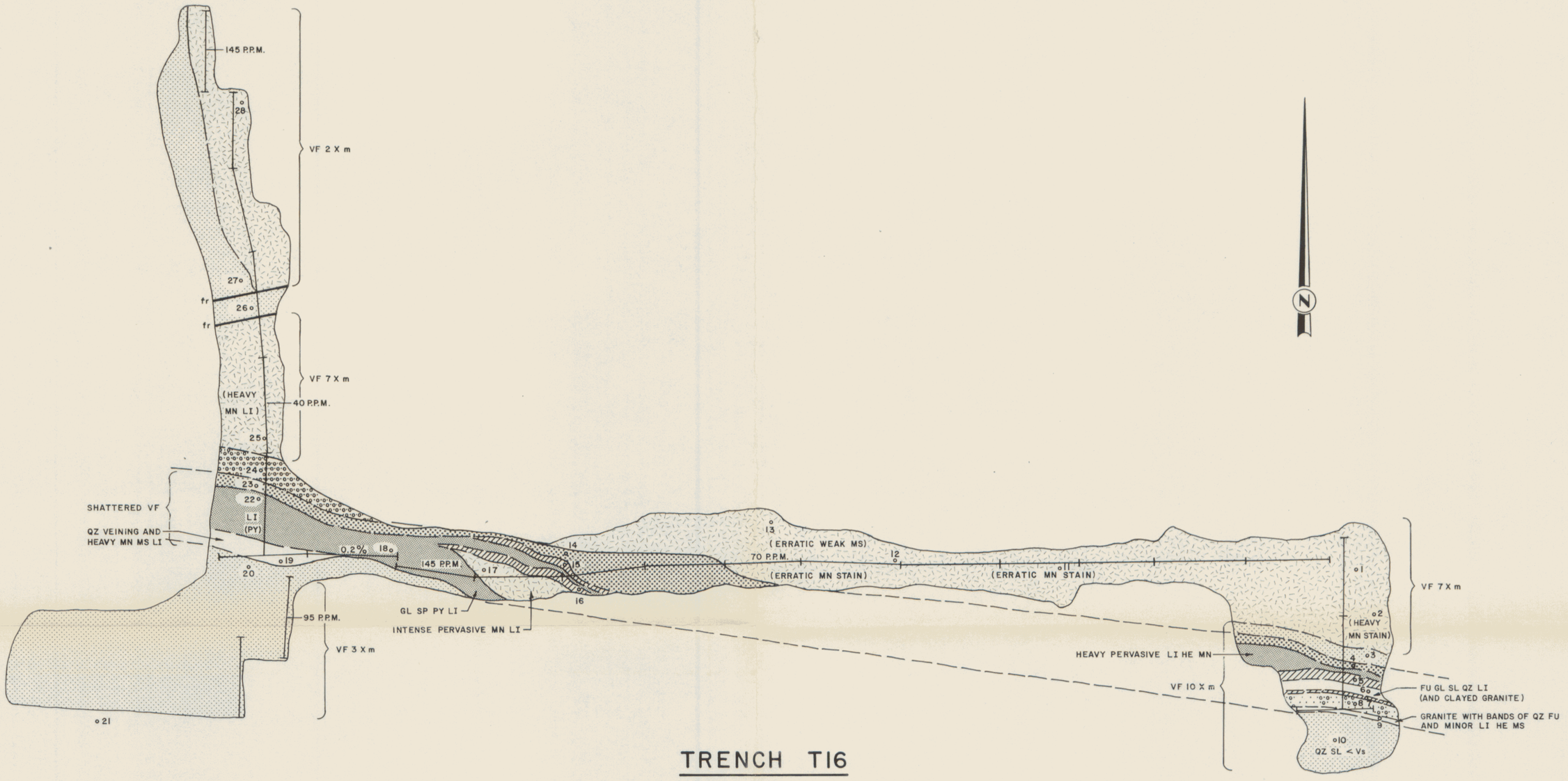
BLK	BLACK
EQ	EQUIGRANULAR
FEL	FELDSPATHIC
G$	GREISEN
GSD	GOSSANED
IB	INTERBEDDED
LIM	LIMY
MSS	MASSIVE
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DUPONT EXPLORATION CANADA

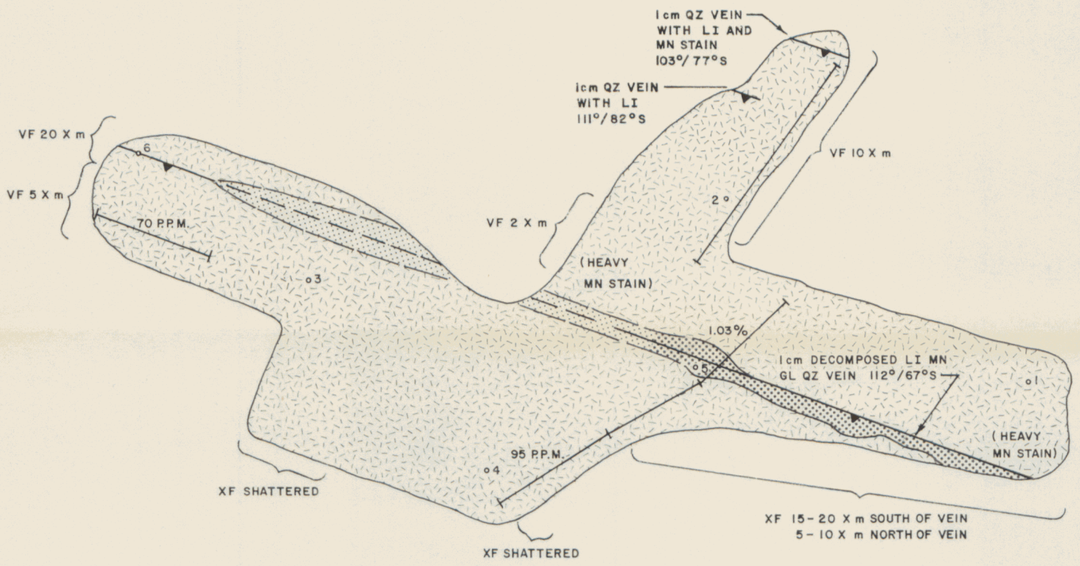
KLINKIT JOINT VENTURE
DU PROJECT
GEOLOGY
ECCLES RIDGE
DORSEY RANGE, YUKON TERRITORY

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

MAPPED BY	G.D.M.	REVISED	N.T.S. No. 105 B
DATE	JUN.-SEP.'79		ACCT No. 335-07
DRAWN BY	K.L.J.		DRWG. No. KL. 79-54
DATE	NOV.'79		



TRENCH T16



TRENCH T15

LEGEND

- QUARTZ VEINS
- LIMONITE 60-100%
- SERICITE ALTERATION - INTENSE
- SERICITE - ILLITE ALTERATION
- SERICITE ALTERATION
- GRANITE

FU	FLUORITE
GL	GALENA
HE	HEMATITE
LI	LIMONITE
MN	MANGANESE
MS	SERICITE
QZ	QUARTZ
SL	SPHALERITE

NOTE : TRENCHES ARE NOT PLACED IN CORRECT GEOGRAPHICAL RELATIONSHIP TO EACH OTHER ON THIS MAP. SEE DRWG No. KL. 79-53

SYMBOLS

- CONTACT OBSERVED
- CONTACT APPROXIMATE
- CONTACT ASSUMED
- VEIN
- fr — FRACTURE
- CHIP SAMPLE LOCATION (only Sn values above min. XRF detection level are plotted)
- 7 X m — DENOTES 7 FRACTURES PER METRE
- o5 — GEOLOGY / ROCK SAMPLE STATION
- XF — FRACTURED ZONE - cross fractures 13-20°/90°
- VF — FRACTURED ZONE - fractures approx. parallel to veins 110-115°, 60-75°S

DUPONT EXPLORATION CANADA

KLINKIT JOINT VENTURE

DU PROJECT

T15 & T16 TRENCH GEOLOGY

DU PLATEAU

DORSEY RANGE, YUKON TERRITORY

m 1.5 1.0 0.5 0 1:50 1.5 3.0 m

SCALE

MAPPED BY : G.M.D.	REVISED :	N.T.S. No. :	105 B
DATE : SEP. '79		ACCT No. :	335-07
DRAWN BY : K.L.J.		DRWG. No. :	KL. 79-55
DATE : DEC. '79			

PONT 'B' CLAIMS (APPROX. BDY)

SIN CLAIMS (APPROX. BDY)

SIN CLAIMS (APPROX. BDY)

VAL 'B' CLAIMS

FOR GEOCHEMISTRY SEE DRWG No. KL. 79-59

FOR GEOLOGY DETAIL SEE DRWG No. KL. 79-58

BROCK CIRQUE

Dorsey Creek

Landslide

10E 20E 30E 40E 50E 60E 70E 80E

130 N 120 N 110 N 100 N 90 N 80 N 70 N 60 N 50 N

LEGEND

CRETACEOUS OR TERTIARY

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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
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MG	MAGNETITE
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OX	OXIDES
PX	PYROXENE
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QT	QUARTZ & TOURMALINE
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DUPONT EXPLORATION CANADA

KLINKIT JOINT VENTURE
SIN & PONT(B) PROJECTS
GEOLOGY
DORSEY RANGE, YUKON TERRITORY

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

MAPPED BY	G.M.D.	REVISED	N.T.S. No.: 105 B
DATE	JUN-SEP'79		ACCT. No.: 335-21&18
DRAWN BY	C.H.K., K.L.J.		DRWG No.: KL-79-56
DATE	NOV.'79		

DUPONT CANADA **EXPLORATION**

KLINKIT JOINT VENTURE
SIN & PONT(B) PROJECTS
PHOTOMAP

DORSEY RANGE, YUKON TERRITORY

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

MAPPED BY	G.M.D.	REVISED	
DATE	JUN-SEP'79		
DRAWN BY	G.M.K.,K.L.J.		
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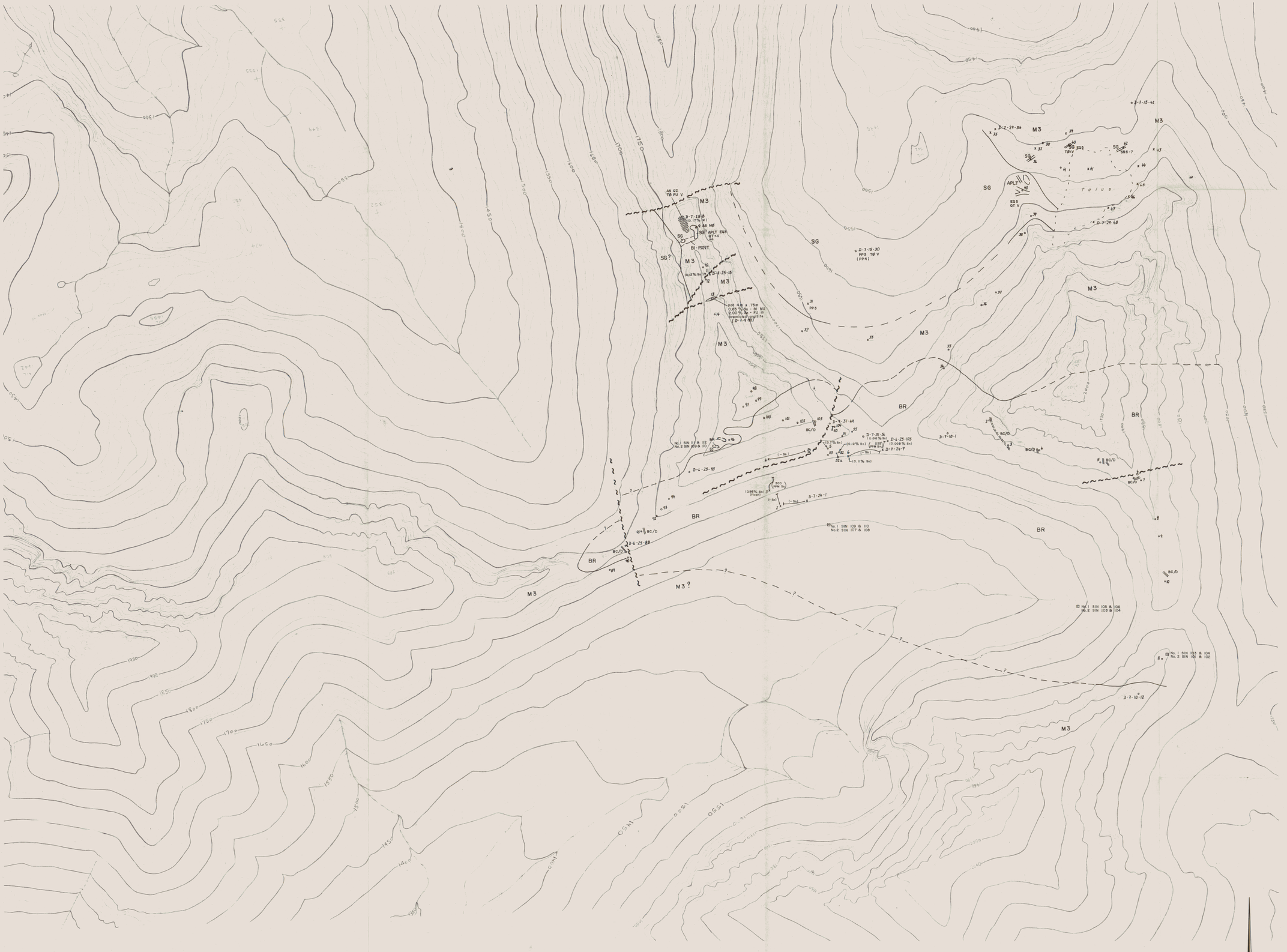
NTS No. 105 B
ACCT No. 335-21818
DRWG No. KL.79-57

REGISTRATION FOR SOUTH SHEET

REGISTRATION FOR SOUTH SHEET

80 E 70 E 60 E 50 E 40 E 30 E 20 E 10 E

50 N 60 N 70 N 80 N 90 N 100 N 110 N 120 N 130 N



NOTE:
Sn VALUES IN % ARE MIN-EN ASSAYS

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W/	WITH

DU PONT CANADA **EXPLORATION**

KLINKIT JOINT VENTURE
SIN PROJECT
GEOLOGY
DORSEY RANGE, YUKON TERRITORY

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

MAPPED BY:	G.M.D.	REVISED:	N.T.S. No.: 105 B
DATE:	JUN-JUL '79		ACCT No.: 335-21
DRAWN BY:	C.M.K., K.L.J.		DRWG. No.: KL 79-56
DATE:	NOV. '79		

LEGEND

SOIL SAMPLE STATION
WITH VALUES FOR Sn/W/Mo IN P.P.M.
(– INDICATES BELOW DETECTION LEVEL)

SOIL SAMPLE STATION
WITH VALUE FOR Sn IN PERCENT

NOTE:
ALL VALUES FOR Sn DETERMINED BY XRF

DU PONT EXPLORATION
CANADA

KLINKIT JOINT VENTURE
SIN PROJECT
Mo/Sn/W GEOCHEMISTRY
DORSEY RANGE, YUKON TERRITORY

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

MAPPED BY : G.M.D.	REVISED :	N.T.S. No. : 105 B
DATE : JUL. '79		ACCT No. : 335-21
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60N
50N
40N
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40E
50E
60E
70E
80E

PHOTO REGISTRATION

Area of QZ-MS-CT VEINS

QZ SUL VEIN

Area of barren QZ-MS-AS VEINS

Lake

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

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

DUPONT EXPLORATION CANADA

KLINKIT PROJECT
GEOLOGY
SKIN CLAIMS
SWIFT RIVER AREA, YUKON TERRITORY

m 300 200 100 0 1 : 10000 300 600 m
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. 335-9
DRAWN BY	K.L.J.		DRWG. No. KL.78-31
DATE	NOV. '78		


50N
40N
30N
20N
10N
10E
20E
30E
40E
50E
60E
70E
80E
PHOTO REGISTRATION
PHOTO REGISTRATION
PHOTO REGISTRATION
0
1000m
1:10,000
300
600 m
DUPONT EXPLORATION
CANADA
KLINKIT PROJECT
PHOTOMAP
SKIN CLAIMS
SWIFT RIVER AREA, YUKON TERRITORY
JUL.-AUG.'78
K.L.J.
SEPT. '78
105 B
335-9
KL.78-72

40 E
50 E
60 E
70 E
80 E
120 N
110 N
100 N
90 N

SLIP CLAIMS (APPROX. BDY)

SLIP CLAIMS (APPROX. BDY)

MC Creek

MC CLAIMS

LEGEND

44 Φ 132 — Pb / Zn — SOIL SAMPLE STATION WITH VALUES FOR Pb / Zn IN P.P.M.

N

DUPONT EXPLORATION CANADA

KLINKIT JOINT VENTURE
SLIP PROJECT
Pb / Zn GEOCHEMISTRY
DORSEY RANGE, YUKON TERRITORY

1 : 10 000

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		ACCT No. : 335 - 11
DRAWN BY : C.H.K., K.L.J.		DRWG. No. : KL.79 - 45
DATE : OCT. '79		

60N
50N
40N
30N
20N
10N
10E
20E
30E
40E
50E
60E
70E
80E

CLAIM GROUP BOUNDARY

N

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

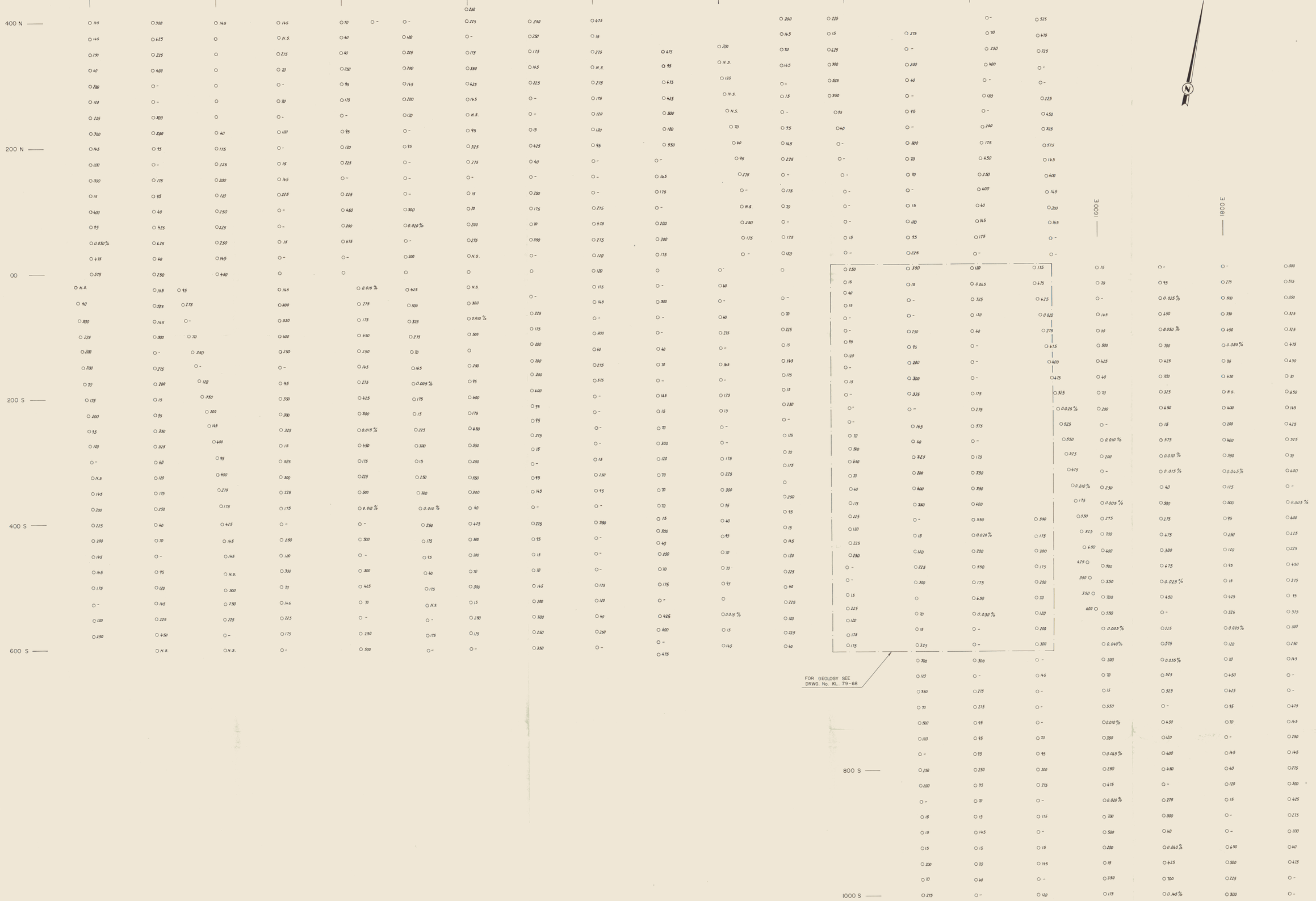
NOTE:
ALL VALUES DETERMINED BY XRF

DUPONT EXPLORATION CANADA

KLINKIT JOINT VENTURE
SKIN PROJECT
Sn GEOCHEMISTRY
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. : 335-9
DRAWN BY : K.L.J.		DRWG. No. : KL. 79-69
DATE : NOV. '79		



LEGEND

O 275 SOIL SAMPLE STATION WITH VALUE FOR Sn IN P.P.M. (- INDICATES BELOW DETECTION LEVEL)

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

NOTE:
ALL VALUES DETERMINED BY XRF.

DU PONT CANADA **EXPLORATION**

KLINKIT JOINT VENTURE
SLIP PROJECT
Sn GEOCHEMISTRY
DORSEY RANGE, YUKON TERRITORY

m 75 50 25 0 1:2500 75 150 m
SCALE

MAPPED BY : G.D.M.	REVISED :	N.T.S. No.: 105 B
DATE : JUN-SEP'79		ACCT No.: 336-11
DRAWN BY : C.M.K., K.L.J.		DRWG. No.: KL.79-67
DATE : NOV.'79.		

1200 E | 1300 E | 1400 E | 1500 E

BASE LINE

100 S

200 S

300 S

400 S

500 S

600 S

TALUS

TALUS

TALUS

65

70

X1

X2

X3

X4

X5

6

7

8

9

10

5474A
(approx. location)

X5475A

Creek

N

LEGEND

- OBSERVED OUTCROP OR SUBOUTCROP
- OBSERVED TALUS
- ESTIMATED TALUS
- 65 — ATTITUDE OF BEDDING
- X — GEOLOGY STATION
- X 5474A — SIDE-HILL SOIL SAMPLE NUMBER

NOTE : ALL ROCKS ARE M2 (QZAR, PHYL)

DUPONT CANADA **EXPLORATION**

KLINKIT JOINT VENTURE
SLIP PROJECT
GEOLOGY

DORSEY RANGE, YUKON TERRITORY

1 : 2 500

m 75 50 25 0 75 m

SCALE

MAPPED BY : G.M.D.	REVISED :	N.T.S. No. : 105 B
DATE : 79 08 23		ACCT No. : 335-11
DRAWN BY : K.L.J.		
DATE : 79 10 30		DRWG. No. : KL. 79-68