GEOLOGICAL REPORT

ON

WIGWAM GROUP MINERAL CLAIMS

including

(WIG, WAM and BAY)

Seymour Inlet, Vancouver Mining Division
NTS 92 M/2
Lat. 51° 09'00"N
Long. 126° 44'00"W

By

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For

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And

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Vananda, B.C.

April 2[illegible], 198[illegible]

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INTRODUCTION AND SUMMARY

The Wigwam Group Mineral Claims are located near the northwest extremity of Seymour Inlet, B.C., a narrow coastal mainland fiord 85 km east of the north tip of Vancouver Island in the Vancouver Mining Division. The property is of interest because the pyritic gabbro bedrock complex generates a very large and intense magnetic anomaly caused by unusually large amounts of titaniferous magnetite containing a small but significant vanadium content. In addition, a significant pyrite content prompted tests for the precious and platinum group minerals. Similar West Coast deposits have been the subject of investigation by the writer on numerous occassions. In addition, pyritic quartz veins related to dykes which cross a large and recently exposed portion of the host rock diorite offer a potential gold exploration target.

During the present study, the boundaries of included rock units were mapped (as allowable) in the field using data generated by an airborne magnetic survey as a guide to ground investigation, including 'fill-in' for numerous inaccessible, precipitous and/or snow-covered portions of the property.

The prime purpose of the initial investigation was to obtain and treat select mineralogical samples utilizing special heavy-media separation prior to analysis. Access problems prevented sampling of the highly magnetic 'core' and only marginal material or float was obtained. As a result of this work it was concluded that the pyritic gabbro sampled contained an elevated silver content but only 'average' titanium, vanadium, and platinum group metals. A description of economic vanadium deposits is included as the subject is lacking in B.C.'s technical literature.

The Seymour complex has been visited by the writer on several occasions, the most recently being April, 1983.

PROPERTY

The Wigwam Group, as per Figure 2/84, includes the following contiguous mineral claims, all located under the Modified Grid System and staked by K.H. Christensen on April 23, 1983:

1) "Wig" Mineral Claim - Record #1442 - 20 units.
2) "Wam" Mineral Claim - Record #1443 - 9 units.
3) "Bay" Mineral Claim - Record #1444 - 6 units.

The claims were consolidated for assessment purposes as the "Wigwam Group" on April 24, 1984, at which time assessment credit was applied-for which would put all claims in good standing until April 25, 1985, the anniversary of the 1983 day of recording.

The writer, who acts as agent for Mr. Christensen and the operators, Geddes Resources Limited, noted most of the posts, including all Legal Corner Posts, in the field and found them to be as recorded. A minor adjustment in the plotted location could be made showing the western boundary of the Bay M.C. to be east of, rather than west of, the small Indian Reserve shown. The eastern boundary of the reserve (recently surveyed) was clearly visible during staking, which was allowed-for accordingly.

LOCATION, ACCESS AND TOPOGRAPHY

The Wigwam Group of mineral claims is located immediately north of Rainbow Creek which drains into Wigwam Bay on the west coast of Seymour Inlet, a fiord on the mainland B.C. coast east of northern Vancouver Island (Figures 1 & 2/84).

Wigwam Bay is the uninhabited site of an early logging camp located 70 air kilometers northeast of Port Hardy on Vancouver Island (Lat. 51° 09'00"N, Long. 126° 44'00"W, N.T.S. 92 M/2). It is also the site of the small and unoccupied "Pepeece Indian Reserve #11".

Access is by way of helicopter, float plane or boat from Port Hardy, the nearest settlement of any size.

Overgrown logging roads extend up Rainbow Creek whose immediate and lower slopes have been logged, but the area is otherwise undeveloped.

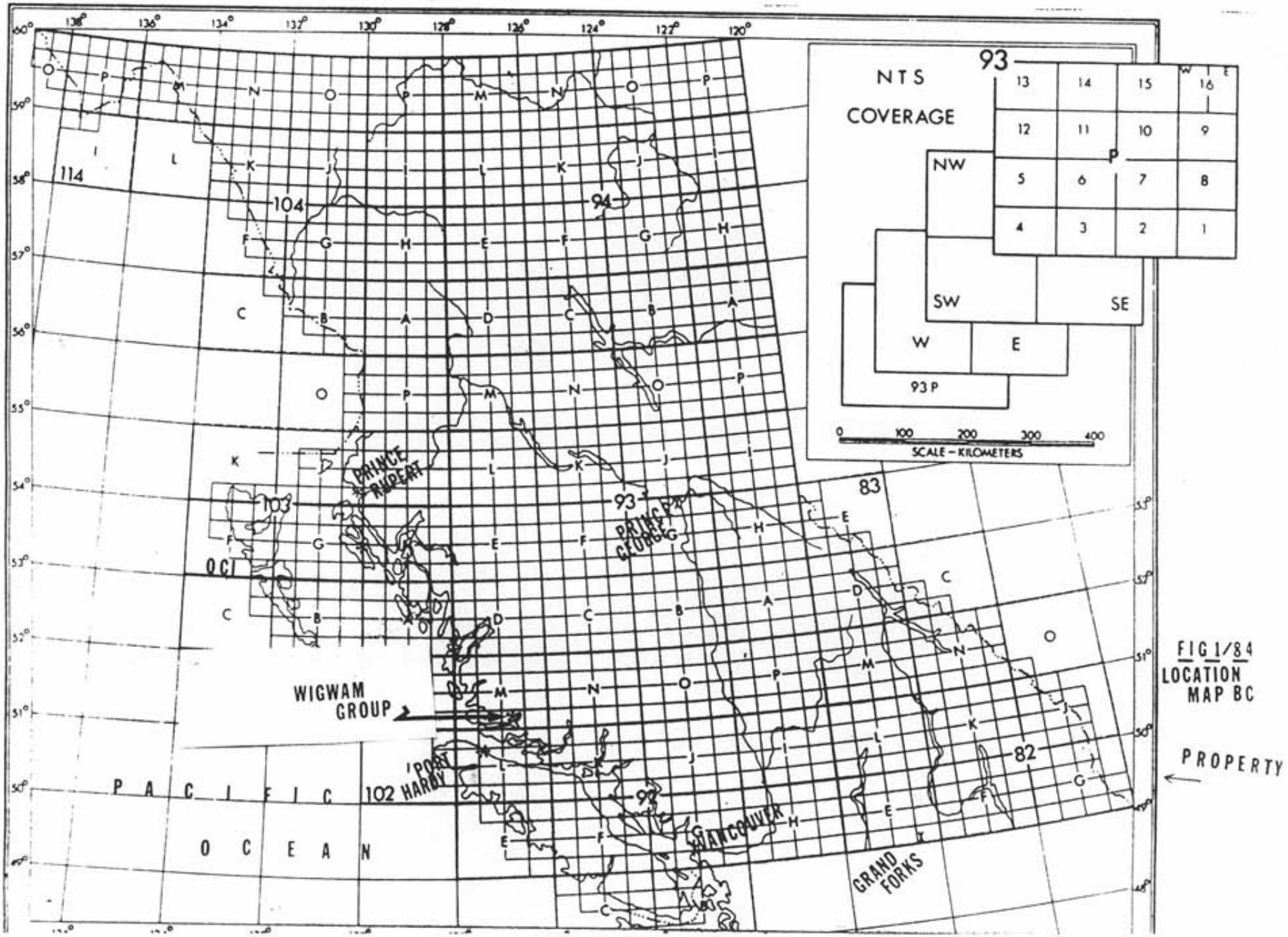


FIG 1/84
LOCATION MAP BC

Province of British Columbia
Ministry of Energy, Mines and Petroleum Resources

M 92M/2E

DATE OF MICROFILM: 83-08-18

Miles 1 .5 0 1 2 Miles

Metres 1000 500 0 1000 2000 3000 Metres

Kilometres 1 .5 0 1 2 3 Kilometres

...ERAL CLAIM
...AL CLAIM
CLAIM
...ER POST
& TAG NUMBER

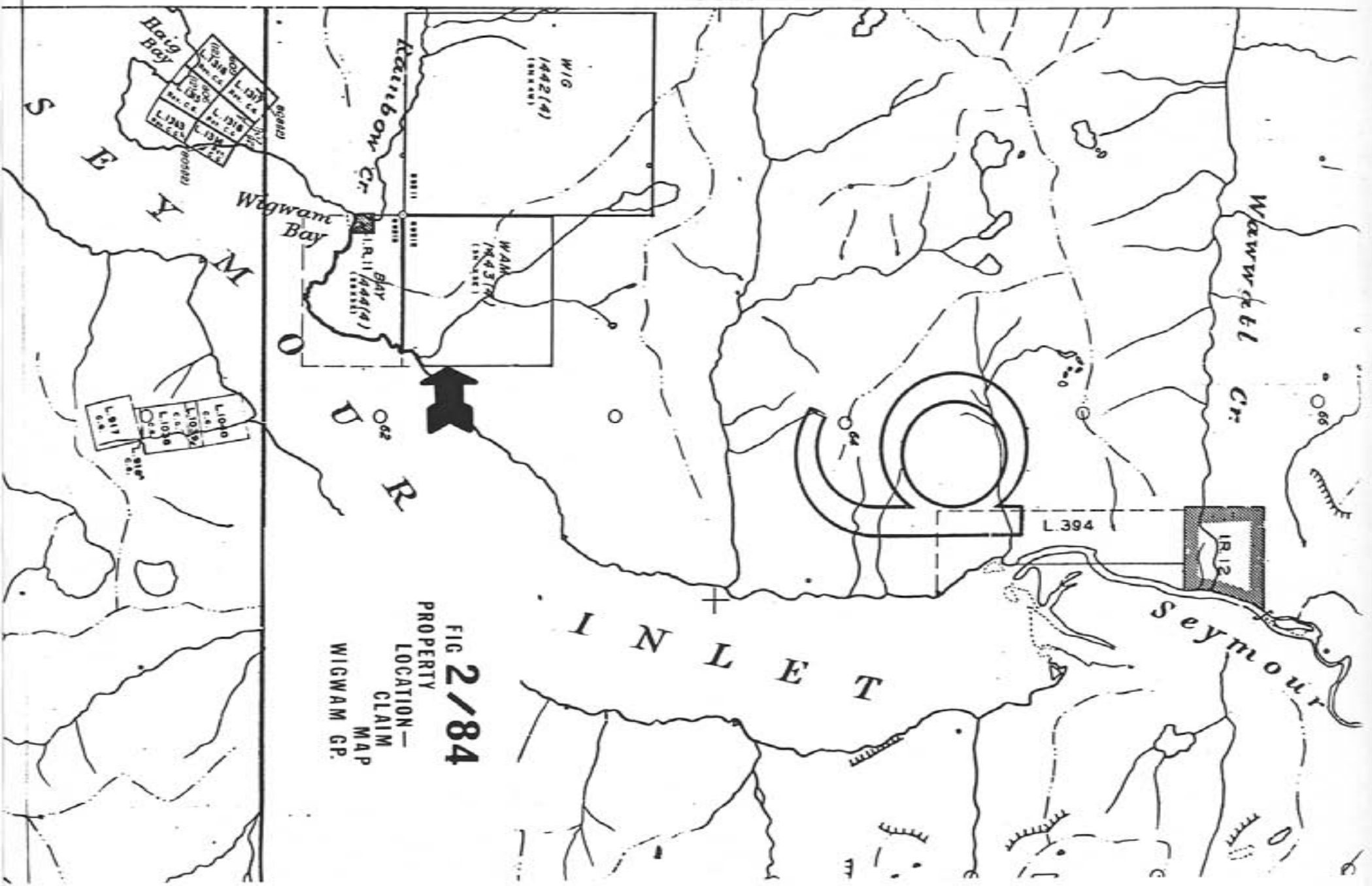


FIG 2/84
PROPERTY LOCATION—CLAIM MAP
WIGWAM GP.

Elevations within the Wigwam Group range from sea level to the 4,000 foot (1220 m) summit of an unnamed mountain due north of Wigwam Bay. Topography of the south slope is rugged and the area involved inaccessible without adequate precautions. The lower reaches are accessible, but with difficulty due to the second growth tangle resulting from earlier logging operations. The upper reaches are more easily traversed except for heavy seasonal snow accumulations which last until early summer. Snowslides and avalanche areas are common on the steep slopes and have contributed greatly to bedrock exposure, which amounts to about 30%.

The climate is typical "Inner Coast" with wet winters and moderate summers. Precipitation ranges to 50 inches, about 15% of which falls as snow at lower levels in the winter months. Average daily summer temperatures at the lower levels are about 65°F and winter temperatures about 35°F.

Sufficient water for mining purposes is available in nearby streams, and Seymour Inlet is fully navigable. Except for the mountain tops, all areas are tree or vegetation-covered.

HISTORY AND DEVELOPMENT

There are no records or physical evidence of serious exploration haven taken place in the Wigwam Group area, and very few published descriptions exist of any mineral-related activity within the Rivers Inlet map sheet.

Small magnetite bodies within calcareous schistose metasediments or metavolcanics, or within micaceous schists, occur near granodiorite or diorite contacts. These occurrences, known collectively as the "Haig Group", occur north of Haig Bay about 1.5 km south of Wigwam Bay, and are covered by 6 Crown grants. The occurrences were investigated early in the century as a potential source of iron ore and were best described by Clothier (1917) and Young et. al. (1926), as were similar occurrences directly across Seymour Inlet known as the "Alexander Group". Both were examined and air-mag flown by the writer in 1960, at which time a small quartz vein occurring along a strong fault structure, which controlled the Alexander Group mineralization, was investigated. Except for some placer activity in Seymour River to the north, no properties have been described in the area.

While conducting airborne iron exploration along coastal B.C. during the late 1950's and early 1960's, the writer noted an unusually strong and extensive magnetic anomaly north of Wigwam Bay. It was and still remains the largest "flux gate" magnetic anomaly noted by the writer during many years of work on the West Coast. The size and overall magnetic intensity were only exceeded at the multi-billion ton "Klukwan pyroxenite-amphibolite" deposit in S.E. Alaska which the writer had geologically mapped for Ventures Ltd. in 1953 and 1954.

Ground investigation by float-equipped aircraft was hampered by access problems, but some magnetic float was collected in Rainbow Creek. Assays confirmed that the magnetite was titaniferous and occurred within a gabbro complex similar to Klukwan. As the Wigwam occurrences lacked the huge (+500,000,000 tons) of readily mineable placer accumulation that Klukwan contained, the lode deposit was not further investigated as at that time the contained titanium was an objectionable impurity to all but some sophisticated electric furnaces. A technical breakthrough was achieved, but by that time large deposits of magnetite had been discovered in Australia and environmentalists had effectively put the large scale hydro-electric developments required on "hold" in S.E. Alaska. Plans for iron production from the titaniferous magnetites were abandoned and the deposits involved have received only scanty attention since, this mainly for their possible content of chromium or platinum group metals. However, as most coastal gabbro contains little, if any, olivine, (a generally required source mineral) they have not been considered good exploration bets for these metals. Except for an airborne magnetic survey and geological investigation, mainly of the few accessible contact areas, and some sample collection, no work has been done on the Wigwam Group.

REGIONAL GEOLOGY

An updated regional geological map of Seymour Arm may soon be published within the G.S.C. 4 mile (1:250,000) "Rivers Inlet" map sheet. Current descriptions (Figure 3/84) result from early work by Dawson (1889) and Graham (1908), and later G.S.C. personal as well as from local examinations by the B.C. Department of Mines, i.e. Clothier (1917). The writer had completed reconnaisance geological mapping (unpublished) of the north half of the sheet during mineral exploration activities in the mid 1960's, but work in the south half was limited to spot examinations and airborne surveys.

FIG 3/84
After GSC/79

MAP 1386A

FRASER RIVER

BRITISH COLUMBIA-WASHINGTON

1:1,000,000 GEOLOGICAL ATLAS

SHEET 92

GENERAL CO-ORDINATOR: R.J.W. DOUGLAS

Kilometres 25 0 25 50 75 Kilometres

Miles 20 0 20 40 Miles

The best regional geological map available, (Figure 3/84) the 1:1,000,000 scale "Fraser River" compilation (Roddick, Muller & Okulitch - 1979), assigns the Seymour Inlet area to the Coast Plutonic Complex, composed largely of granitic rocks believed to be Jurassic to Cretaceous in age. Included are quartz diorites, granodiorites, and diorites present as numerous northwesterly trending bodies containing innumerable roof pendants or septae of older rocks. The complex is described in general as 'migmatitic'. Most of the pendants are generally too limited in size to be shown on regional geological maps. Some contain lenses of marble or metasediments, including skarn or calc-silicates developed from the more reactive members. Because of wide scale 'amphibolite grade' metamorphism, the current G.S.C. workers are unwilling (as yet) to assign geological ages to the rocks, including those designated as 'granitoids'. Such is the uncertainty of "batholith-strewn" Coast Range interpretation that the senior G.S.C. author (Roddick, pers. comm.) "has yet to map a truly intrusive rock of sizeable dimensions".

A skarn-calcsilicate-limestone unit has been mapped by Young and Uglow (1926) 1.5 km south of the Wigwam area because of interest in small magnetite lenses contained within it. The exposure is limited to a 2000 foot wide band paralleling about 1 km of shoreline, but is of interest to the writer who has noticed a definite spacial relation between such relatively rare limestone occurrences on the inner B.C. Coast and the nearby presence of the unusually magnetic gabbro such as occurs on the Wigwam ground.

LOCAL GEOLOGY

The bedrock geology of the Wigwam Group has not been mapped in detail due to the inhospitable topography of most of the claim area of interest and the extensive snow cover present during the period available for examination. Funds were efficiently used to outline major rock units by their anomalous magnetic characteristics, airborne reconnaissance mapping, and ground investigations of at least the indicated contact areas. Although practically inaccessible during the mapping period, several steep slide areas have exposed sufficient bedrock within the treed or snow covered areas to allow major unit projection with a fair level of confidence.

Magnetic characteristics were determined using a simple but unusually effective method employed extensively during airborne magetic work by the writer in Western B.C. A hand-held M.F.I. fluxgate magnetometer was contour-flown in a Cessna Centurian aircraft along several dozen paralleling northwest and northeast lines using ± 150 foot ground clearance. Readings were manually noted on an air photo base. Relative values obtained are corrected for mechanically and directionally induced variations by direct observations, resulting in subtractions or additions, and values attributed to vertical or horizontal acceleration are discarded. The results, which are relative only, are useable where a 100 gamma variance is of no consequence. About 50 miles of such flying was done by a Langley-based aircraft over the Wigwam area.

ROCK DESCRIPTIONS

Megascopic descriptions of the rock units occurring within the Wigwam group as mapped are as follows:

a) Gabbro

The crystalline gabbro present occurs largely in vein or pegmatite-like clusters within dioritic or metamorphic rocks in the area. It consists of approximately 60% black hornblende plus pyroxenite and 40% plagioclase. Grain size of the largely euhedral hornblende can approach 3/4 inch in long dimension. The rock could probably be better described as a "pyroxenite-amphibolite".

The gabbro is younger than most(?) rocks it is directly associated with as numerous unaltered veinlets, ranging in grain size from fine to medium, cut the micaceous and somewhat schistose country-rock, generally penetrating along poorly developed planes of schistosity or paralleling lineal gneissic trends.

Very fine grained varieties are common as are masses of medium grained material, but if large expanses of coarse gabbro such as are common elsewhere on the West Coast (McDougall, 1984) are present, they are either snow covered or occupy inaccessible areas. Creek float suggests the nearby presence of some, however.

The magnetite occurs either as fine disseminated grains within the hornblende or as very small veinlets cutting the rock. In rare instances, small masses about 1/2" in

width occur. In the Wigwam area the maximum magnetite content noted was about 35% but the average is in the 5% to 10% range. The gabbro and the associated dioritic rocks are unusually pyritic with up to 3% fine grained disseminated pyrite evident.

The gabbro boundaries are shown on the accompanying geological map (Figure 4/84) based largely on magnetic qualities although other rocks included within the map unit may constitute up to ±30% of the total.

b) Diorite

The Wigwam diorite appears closely related to the gabbro but appears to be older and is often altered to a micaceous phyllite or schist lacking any obvious intrusive appearance. The mapped unit could probably better be described as a diorite-migmatite complex. The largely fine grained rock has undergone metamorphism and often appears gneissic or schistose. Highly micaceous or otherwise altered sedimentary remnants or inclusions are present within it. In the Wigwam area, much of the complex appears to have been intruded by gabbro. As mapped, low and medium magnetic subdivisions have been made, based largely on the proportion of (magnetic) gabbro included.

c) Quartz and Granodiorite

The quartz and granodiorites which bound the gabbro-diorite-migmatite complex are typical Coast Range intrusive(?) rocks. Age relations are unkown. They are generally medium grained and often contain a weak, northwesterly trending foliation. Inclusions are common. They are generally nonmagnetitic and only peripherally involved in the present study.

d) Volcanics

These rocks are probably the equivalent of the G.S.C. (1973) unit "iKVd (andesite, basalt, tuff)" mapped along strike several miles to the northwest of the Wigwam Group. The unit occurs only along and west of the extreme western edge of the Wig claim where its very low magnetics help distinguish it along an apparent fault contact with the magnetic diorites. Specimens representative of the unit, which appears as a dull gray, highly altered mass containing small carbonate segregations, have not been examined.

e) Metasediments

These rocks consist of brown or gray, fine grained, highly micaceous or schistose metasediments (or metavolanics??) containing occasional calcareous (crystalline limestone) lenses. They occur to the south of the Wigwam Group where they contain small lenses of non-titaniferous magnetite as described by Young (1926). Small altered inclusions noted within the diorite-gabbro-migmatite complex may consist of this rock type.

f) Dykes

A 300 meter-long dyke-like body, ranging in size from 1 to 10 metres, is evident near the western limits of the Wig claim where it is well exposed in a recent landslide area. It has not been examined in detail due to the terrain, but appears to represent a highly altered (siliceous, micaceous and hornfelsic) andesite dyke. It is accompanied by varying amounts of rusty weathering quartz, which has not been examined.

Structure

The dominant structure appears to consist of a number of highly altered intrusive complexes separated by east-west or northwesterly striking faults (Figure 4/84). The magnetic response of various rock units across these structural features, which are well depicted by local topographic depressions, is distinctly sharp. Attitudes appear steep. A weak northwesterly-trending foliation with steep dips is common within all rock units. Contact attitudes also appear steep.

No fracture or joint attitude appears dominant although within the quartz-diorite a system with a northwesterly strike appears slightly better developed than others.

ASSAYS AND RESERVES

Assays obtained from samples of the Wigwam titano-magnetite are included in Appendix "A".

As the most highly magnetic (assumably the highest grade) portion of the Wigwam deposit was not sampled due to a combination of heavy snow cover and inaccessible terrain, bulk samples of moderately magnetic material were upgraded by processing prior to analysis in order to increase senstivities and to determine concentration characteristics. This involved specialized heavy-media and magnetic separation using the C.F. Minerals Research Laboratory process which results in 17 separates, classified as to specific gravity, magnetism, and conductivity.

No "in place" grades were determined as experience has shown that many hundreds of samples would have to be processed before arriving at a meaningful average which would fall between 5% and 15% magnetite for most magnetically anomalous coastal gabbros. Recovery data for any given metallurgical process can be approximated from the results presented via the C.F. process, although allowance would have to be made for the specialized treatment accorded laboratory samples. The highest grade occuring in gabbro specimens larger than 5 pounds, which occurred as float at Wigwam, was 25% soluble iron or 35% magnetite.

The titanium (generally expressed as T_iO_2) occurs as bladed ilmenite ($FeTiO_2$) within the silicates or, more commonly, as exsolved ilmenite within magnetite (ilmeno or titano-magnetite). The vanadium, generally expressed as vanadium pentoxide (V_2O_5), occurs similarly, i.e. solid solution within titanomagnetite.

Magnetic concentrates from 3 bulk samples (#1-3 - Appendix A) contained between 0.16% and 0.33% V, or a maximum of 0.8% V_2O_5 in pure magnetite as per the ratio standard used in the industry (Appendix B). The maximum titanium ratio calculated for the samples was 5% T_iO_2 to 100% magnetite - this within the pyrite-rich portions. These concentrates assayed 6.5 ppm silver, somewhat higher than similar material from S.E. Alaska had returned. The gold content did not exceed 50 ppb, and the platinum-palladium content did not exceed 100 ppb, but the latter assay was higher than that obtained from the highly magnetic portion (i.e. 50 ppm). These results

suggest that the sulphides or non-magnetic 'conductors' present contain not only much of the silver and platinum but much of the titanium as well. I.C.P. analyses showed no unusually high concentrations of other elements within the portions analyzed.

No pyritic quartz vein samples were obtained.

Reserves of low grade material - i.e. 5%-10% magnetite estimate - are in the multi-billion ton category. (Klukwan reserves are calculated at 12 billion tons @ 12% Fe or 16.5% magnetite, but contain only minor vanadium within the titanomagnetite.)

CONCLUSIONS AND RECOMMENDATION

The pyritic magnetite-bearing gabbro-diorite-migmatite complex on the Wigwam claims contains values similar to the average for iron, titanium and vanadium found in magnetic coastal gabbros, but silver values within the sulphide-rich component are somewhat elevated. The values within the highly anomalous magnetic core have not been conclusively tested. A possibility exists that some of the intense magnetite properties possessed by the Wigwam complex may be due to polarity induced by metamorphism.

Recommendations are that:

1) The central magnetic core be explored and sampled during favourable weather conditions, preferrably in late July or August.

2) The dyke-related quartz vein system be prospected and sampled for possible precious metal content.

STATEMENT OF COSTS

Costs incurred in the 1983-84 investigation of the Wigwam Group mineral claims on Seymour Inlet are as follows:

1)	Transportation Costs - April 23rd-25th, 1983	
a)	Vancouver - Port Hardy - Vancouver 500 mi @ .35¢/mi = $175.00 plus ferries	$ 200.00
b)	Helicopter - Vancouver Island Hel.	729.00
c)	Travelling Expenses (lodging, etc.) 3 days @ $60/day	180.00
2)	Sample Treatment Charges - April 24th-May 20th, 1983	
a)	Examination, Preparation, Delivery Charges J.J. McDougall & Associates Ltd.	150.00
b)	C.F. Mineral Research Ltd., Kelowna Heavy Media Separations, etc. (3 samples)	200.00
3)	Report and Map Preparation	
a)	Mapping and Sampling Charges J.J. McDougall & Associates - April 23rd, 24th, 1983 2 days @ $350.00/day	700.00
b)	Report Preparation (Time) J.J. McDougall & Associates Ltd. - April 10th-23rd, 1984 12 hours @ $40/hour	480.00
c)	Expenses - typing, drafting, etc. April 10th-23rd, 1984 (incl. geol. map base $32.00)	140.00
Total		$ 2,989.00
		$(2,900.00)
(Airborne mag survey charges, as per report, not included)		
P.A.C. Application		$ 600.00
TOTAL		$ 3,500.00

STATEMENT OF QUALIFICATIONS

I, James J. McDougall, Do Hereby Certify:

1) That I am a consulting geologist with a business office at 7720 Sunnydene Road, Richmond, B.C. V6Y 1H1 and President of J.J. McDougall & Associates Ltd., Consulting Geologists.

2) That I am a graduate in geology of University of British Columbia (M.Sc. 1954).

3) That I am a Registered Professional Engineer (Geological) in good standing with the Association of Professional Engineers of the Province of British Columbia.

4) That I have practiced my profession as a geologist for the past thirty-three years.

Dated at Vancouver, B.C., this 24th day of April, 1984.

James J. McDougall, P. Eng.

REFERENCES

Brewer, W.M, (1919) B.C. Minister of Mines, Annual Report (1919) - P. 210.

Clothier, G.A. (1917) B.C. Minister of Mines, Annual Report (1917) - PP. 64-5.

Dawson, G.M. (1889) "The Mineral Wealth of B.C." - G.S.C. (1889) - PP. 101, 181.

Graham, R.P. (1908) - Geol. Survey of Can. Sum. Report (1908) - P. 40.

McDougall, J.J. (1984) "Geology of the Skarn M.C.", - B.C. Ministry of Mines and P.R., Assessment Report filed April, 1984.

Roddick, J.A., Muller, J.E., and Okulitch, E.V. (1979) Fraser River 1:1,000,000 Map Sheet, G.S.C. Map 1386A (1979).

Young, G.A. and Uglow W.L. (1926) The Iron Ores of Canada - Volume 1, Economic Geology Series #3 (1926) - PP. 55-62.

APPENDIX "A"

ASSAY RESULTS AND C.F. MINERAL RESEARCH LIMITED SEPARATION FLOW SHEETS

Sample #1

Fine grained pyritic magnetite-bearing gabbro - 3% pyrite.

a) #75211 - C.F. Lab - "Heavy, magnetic, conductive" portion combined with "heavy paramagnetic conductive" portion (ratio 3:10) - analyzed for Au, Ag, Pt, Pd and I.C.P. (multi element).

b) #75210 - "Heavy, magnetic" portion - analyzed for acid soluble Fe, V, T_iO_2.

Sample #2

Pyritic, medium grained magnetite-bearing diorite(?) - gabbro (3.0% pyrite).

c) #75213 - "Heavy, paramagnetic, conductive" portion - analyzed for Au, Ag, Pt, Pd, and I.C.P.

d) #75212 - "Heavy, magnetic" portion - analyzed for acid sol Fe, V, T_iO_2.

Sample #3

Coarse grained magnetite-bearing gabbro (0.5% pyrite).

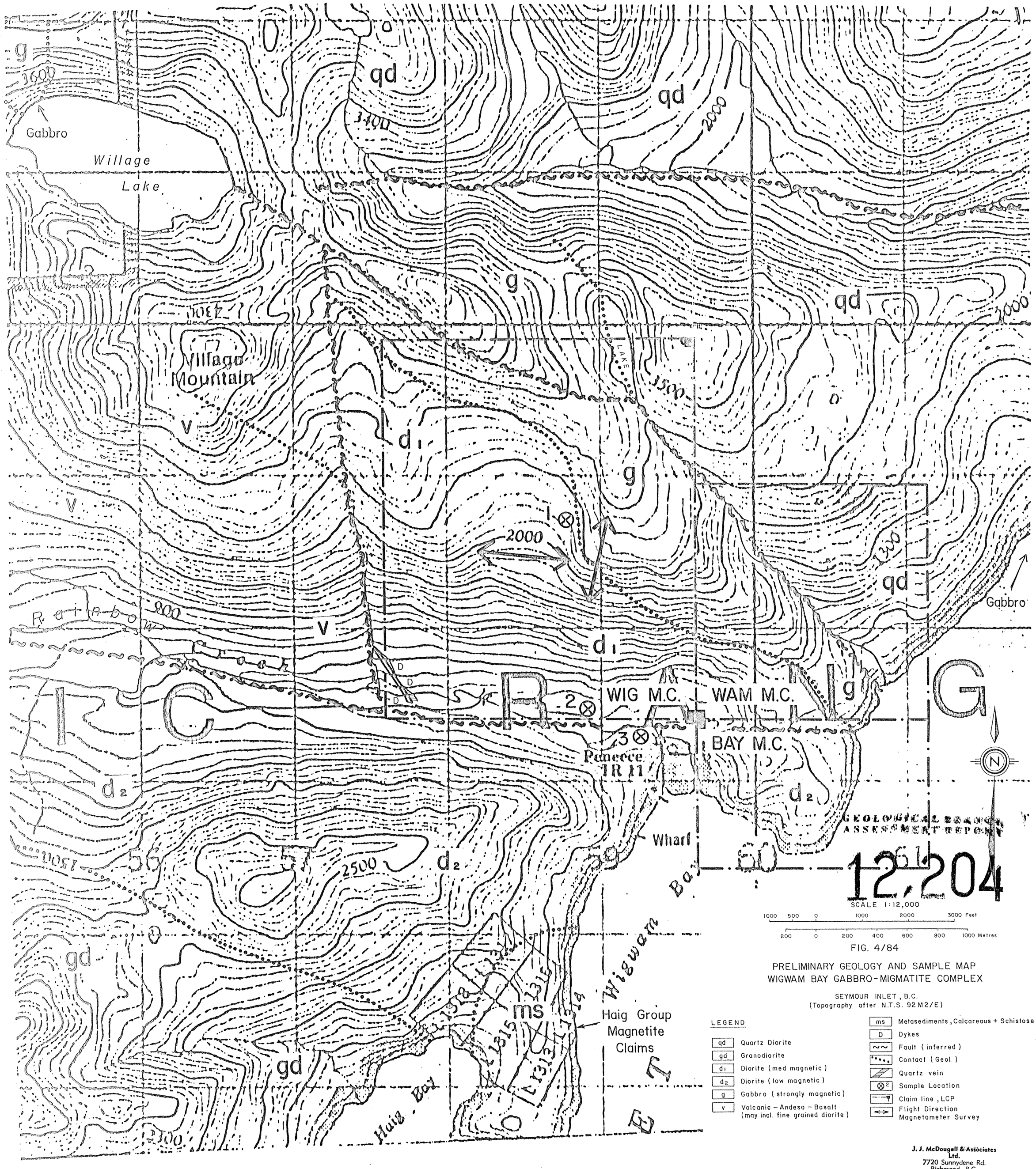
e) #75209 - "Heavy magnetic" portion - analyzed for acid sol Fe, V, T_iO_2 (results attached).

Samples #4

Magnetite-gabbro float (coarse grained) - Rainbow Creek, acid sol Fe - 25.0%, T_iO_2 - 0.42%.

Sample #5

As Sample #4, but medium grained - acid sol. Fe - 9.5%, Ni - Trace.



SCALE 1:12,000

1000 500 0 1000 2000 3000 Feet

200 0 200 400 600 800 1000 Metres

FIG. 4/84

PRELIMINARY GEOLOGY AND SAMPLE MAP
WIGWAM BAY GABBRO-MIGMATITE COMPLEX

SEYMOUR INLET, B.C.
(Topography after N.T.S. 92M2/E)

LEGEND

- qd — Quartz Diorite
- gd — Granodiorite
- d1 — Diorite (med magnetic)
- d2 — Diorite (low magnetic)
- g — Gabbro (strongly magnetic)
- v — Volcanic – Andeso – Basalt (may incl. fine grained diorite)
- ms — Metasediments, Calcareous + Schistose
- D — Dykes
- Fault (inferred)
- Contact (Geol.)
- Quartz vein
- ⊗² — Sample Location
- Claim line, LCP
- Flight Direction Magnetometer Survey

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april/84
JJM.