

66-885-15447

COMINCO LTD.

EXPLORATION

WESTERN DISTRICT

NTS: 92 F/4E

ASSESSMENT REPORT

GEOLOGY ON THE

NICKEL 1,2,3, THE LORNE AND THE SUPER 1,2,3 CLAIMS

ALBERNI MINING DIVISION

LATITUDE: 49°<sup>13.2'</sup>~~12'~~, LONGITUDE: 125°37.7'

OWNER: P.C. BUCKLAND

OPERATOR: COMINCO LTD.

**GEOLOGICAL BRANCH  
ASSESSMENT REPORT**

**15,447**

P.C. LECOUEUR

**FILMED**

DECEMBER 1986

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19 December 1986

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**GEOLOGY ON THE**

**NICKEL 1, 2, 3, LORNE AND SUPER 1, 2, 3, CLAIMS**

**I. INTRODUCTION**

(a) Location and Access

The Nickel 1,2,3, the Lorne and the Super 1,2 and 3 form a group of adjacent claims on Deer Bay, Tofino Inlet, Vancouver Island (Figure 1). This property is about 25 km ENE of the town of Tofino, and may be reached by air (helicopter or floatplane) or by boat from Tofino or several other points along Tofino Inlet.

The ground is steep, heavily forested and ranges from sea level to 950 m. There are good exposures on the coastline and also in numerous bluffy outcrops inland especially at higher elevations.

(b) Property Definition and History

The property is shown on Figure 2, and details of the claims are given in Table 5.

**TABLE 5**

**DETAILS OF CLAIMS**

<u>CLAIM</u>	<u>UNITS</u>	<u>RECORD NO.</u>	<u>RECORDING DATE</u>
NICKEL 1	8	1048	October 24, 1980
2	4	1338	November 12, 1981
3	8	1339	November 12, 1981
LORNE	18	1341	November 12, 1981
SUPER 1	16	2150	May 10, 1984
2	16	2151	May 10, 1984
3	10	2152	May 10, 1984

Super 1,2,3 were grouped on May 7, 1985

Nickel 1,2,3 and Lorne were grouped October 3, 1983.

The Lorne, Super and Nickel claims were grouped May 8, 1986 (Tofino 86-1, N/G 1205).

The property has been explored intermittently since about 1898 and a number of showings of several types have received some work, mostly in the 1960's. These showings include Au quartz-veins, Mo-Cu skarns, and Ni-Cu-PGM mineralization in amphibolite. They are best described in the B.C. Dept. Mines Annual Report for 1963 (pp. 115-117) with additional information in the 1966 (p. 74) and 1967 (p. 75) BCDM Annual Reports and an undated open file BCDM 92F 14E by Stevenson.

The ground covered by the Nickel 1,2,3 and Lorne claims was owned by Lorne Hanson, a Tofino prospector, from the 1950's until his death in 1984 when they were acquired by his associate, P.C. Buckland of Vancouver. In 1984 Cominco (R.J. Sharp, I.M. Mason) examined the property and a brief geochemical, geological and geophysical program was carried out (See Assessment Report by I.M. Mason). The adjoining Super 1,2 and 3 claims were purchased by Buckland and the combined claims were optioned to Cominco in 1985.

Stevenson and later Eastwood (1963 BCDM Annual Report p. 116) reported that a small Ni-Cu mineralized zone, on the NW side of the inlet opposite Similar Island, contained platinum-group metals. This showing ("Tofino Nickel") and this style of mineralization have been the main focus of Cominco's work on the property in 1985 and 1986, prior to termination of the option agreement in June of 1986.

In 1985 the Cu-Ni-PGM showing was trenched and mapped and soil geochemistry was carried out on a grid in the vicinity of the showing (see Assessment Report by P.C. LeCouteur). In 1986 lines were cut on a grid centred on the main showing and EM, VLF and magnetic surveys were done (see Assessment Report by J.J. Lajoie). The work reported here includes prospecting and geological mapping on the geophysical grid and on some other parts of the property in April and June, 1986.

The line cutting costs for the grid are included here for assessment purposes.

(c) Summary of Work Done

Detailed mapping (scale approximately 1:1300) was done in the vicinity of the main Cu-Ni-PGM showing, mostly on the 3.1 km of cut line on the Nickel 1 and Super 1 claim. Some regional mapping was carried out (scale of 1:5000), mostly on logging roads on the Super 1 and 3 claims and coastline on Nickel 1, 3 and Lorne claims. These maps, together with analytical results, are included as Plate 1 and 2, Tables 1 to 4.

II. GEOLOGY

(a) Objective

The principal objective of the geological work was to map and prospect for amphibolite with similar mineralization to that at the main showing - either extensions of the known mineralized sill, similar parallel sills, or larger mineralized bodies of gabbroic or ultramafic rock. It has been suggested that, because the PGM-bearing Cu-Ni mineralization may have been emplaced as an immiscible liquid at the time of injection of the ultrabasic host, there is potential for size and continuity of mineralization.

(b) Results and Interpretations

(i) Regional Setting

Regional mapping by Muller and Carson (GSC Paper 68-50, 1968) indicates the property lies within a belt of rocks assigned to the Palaeozoic Sicker Group, or their metamorphosed equivalents. The metamorphism, thought to be coeval with emplacement of the Early to Late Jurassic Island Intrusives, resulted in a number of enigmatic gneiss units, collectively termed the "West Coast Crystalline Complex" by Muller and Carson. Most of the rocks on the property are part of this Complex. Three main lithologies are present: quartz-feldspar gneisses, metabasalts, and foliated quartz diorite (Plate 1).

(ii) Property Geology

Quartz-Feldspar Gneisses: These are poorly foliated, fine to medium grained quartzo-feldspathic gneisses, mostly mid to pale grey with lesser greenish grey and occasional dark green. Most outcrops weather a brownish colour, there are some rusty weathering bands and in places the rocks weather a distinctive white colour. The gneissic fabric is generally not well developed and is mainly due to wispy chlorite streaks and a faint lamination. In some coastal areas laminae weather differentially and outcrops have a ribbed appearance. Thin veins of quartz and epidote are sometimes present. Some pyritic (to 10%) rusty bands up to several metres wide were seen. Folding was seen rarely and both broad warps and tight folds are present. Occasionally small lenses, less than about a half metre long, were seen consisting of chalk-white feldspar and silvery muscovite. Apparently these are sweets that formed at the culmination of the regional metamorphism.

In some places on the mapped grid it was noted that gneisses were strongly magnetic, due to small dispersed grains of magnetite.

Most of the gneisses probably were derived from fine grained Sicker sandstone, with the greenish chloritic bands perhaps representing basic-intermediate tuffs.

In many outcrops the gneisses contain numerous thin dark grey-green foliated amphibolitic bands a few cm to 2 m thick that consist of about 70% amphibole and 30% plagioclase. In places these form swarms making up to 50% of an outcrop. Mostly they are subparallel to foliation of the host but local cross cutting and forking relations, combined with their mineralogy and composition indicates these were thin basaltic sills that have apparently shared the metamorphism of their host. Elsewhere (eg. see Brandon et al 1986, GSC Paper 86-1a p. 683) mafic intrusives are widespread in Sicker rocks and have been thought to be related to Triassic Karmutsen basalts. Another possibility in the Deer Bay area is that they are equivalents of the overlying metabasalts in the upper part of the Sicker Group.

Of particular note is a hornblende gabbro intruding the Sicker gneisses about 400 m SW of the main showing (Plate 2). This is apparently an elongate body about 350 x 100 m. It is mostly a massive medium-grained dark greenish grey rock consisting of brown amphibole (70%) and altered feldspar. Several variants

noted include dark green amphibolite with traces of mica, and a mottled gabbro in which large brown poikilitic hornblende encloses altered plagioclase in a matrix that includes altered plagioclase, 10% augite, 5% pyrite plus ilmenite and some secondary green amphibole. Although the feldspars are albitized and saussuritized and some secondary hornblende is present, the textures retain an igneous aspect and foliation is lacking. Several whole rock analyses are given in Table 2 (Plate 2). Minor amounts of chalcopyrite were seen and the rocks contain traces of Cu, Ni and Pd (see Plate 2, Table 3).

These rocks may be related to the Sicker metabasalts overlying the quartz-feldspar gneiss, they may be a plutonic phase of the Karmutsen volcanics, or else a basic phase of the Jurassic Island Intrusives. The relationship of the gabbro to the amphibolitic sills and the ultrabasic sill at the main showing are not known but a genetic connection is suspected.

Metabasalts: The second major rock type is a thick sequence of metabasalt, probably flows or pillow lavas for the most part. Because they lie between the gneisses and marbles at the head of Deer Bay that likely are equivalent to the Buttle Lake Limestone (the uppermost Sicker unit) these metabasalts are tentatively considered to be part of the upper Sicker section.

The metabasalts are dark green-grey, fine grained, massive structureless rocks. Green secondary amphibole is a major constituent, occasional relict feldspar phenocrysts are albitized, and calcite and epidote are present in the matrix and frequently in thin veins.

Tofino Inlet Pluton: The third major rock type in the area shown in Plate 1 is quartz-diorite of the Tofino Inlet Pluton, occurring to the south of the Nickel claims. This is a blocky massive unit of pale grey-white, medium to coarse grained quartz-diorite. The main constituent is saussuritized plagioclase (70%) with up to 20% quartz, 5-10% chlorite after biotite, and about 5% interstitial Kspar revealed by staining. The rock has a moderate to poor foliation and was originally considered part of the West Coast Complex by Muller and Carson but has since been reassigned to the Early to Late Jurassic Island Intrusives (Muller 1977 GSC Open File 463).

In a number of places thin (<1 m) pale coloured quartz dioritic and felsic dykes are present and at least some of these are probably related to the Tofino Inlet Pluton.

Younger dykes occasionally seen (Plate 1) include thin dolerites and andesites of uncertain affinity. Several dolerite dykes were seen cutting sheared Sicker gneiss and a few andesite dykes cut the Tofino Inlet Pluton rocks.

### (iii) Prospecting

The area of the cut grid was prospected and gneiss, amphibolite and gabbro with traces of pyrite or, less commonly, chalcopyrite were analyzed. Sample locations and results are shown in Table 3 and Plate 2. Traces (<200 ppm) of Cu and Ni were detected in several samples and higher values of Cu, Ni, and traces

of Pd were found in the gabbro unit. No mineralization of similar character to that at the main showing was found.

Several samples from the main showing with high Pd values previously reported simply as >10,000 ppm Pd were reanalyzed for the actual Pd value. Pt, Sb, As and Te (Table 4, Plate 2) were also analyzed for, as a palladium antimonio-telluride was identified at the main showing (see 1985 assessment report). Trenches at the main showing were briefly re-examined to determine the shape of the mineralized zone and to project its extension. The Cu-Ni-PGM mineralization (see 1985 Assessment Report) occurs in what is interpreted to be an amphibolitized ultrabasic rock, probably a dyke or sill. However, this is not a simple tabular igneous body, either because it was irregular to begin with or else has been distorted by deformation. In the upper part of the 10 x 30 m showing it appears to be a 1.5 to 2 m thick slab dipping SW at 50 to 60°. At the very top of the outcrop the mineralized amphibolite thins to 20 cm and at the lowest part of the showing the amphibolite occupies the centre 1.5 m wide portion of an upright U shape with gneiss enclosing the three sides. The showing may therefore be only an isolated elongate strip of mineralized, ultrabasic rock, partly disconnected from the remainder of some originally tabular sill that is below surface to the west, toward the gabbro body. It is also possible that the ultrabasic was irregular at the time of intrusion and perhaps early formed olivine, pyroxene and immiscible sulphide in the magma were gravitationally trapped in a pocket to give rise to mineralization that had not much greater extent than seen today. Several possibilities thus remain that can only be investigated further by more trenching on the showing or drilling between the showing and the gabbro. The geophysical work (see Assessment Report by J.J. Lajoie 1986) failed to show any magnetic, VLF, or EM anomalies on the grid and it appears there is no large mineralized body in this area that is conductive or magnetic.

Elsewhere on the property several pyritic rusty bands were seen in grey and green (chloritic) gneiss, but analyses of these (Plate 1) and also pyritic amphibolites showed no values of interest (Table 2, Plate 1). In one area (Plate 1) diorite with <1% molybdenite irregularly distributed was located. Similar molybdenite mineralization, mostly along fractures in Tofino Inlet Pluton rocks was also seen just off the area of Plate 2 along the logging road under construction on the east side of the inlet. A thin vein of stibnite, said by logging road builders to occur in the road cut in the area of R862625 on the saddle above the main showing, was searched for but not found.

### III. CONCLUSIONS

#### (i) Geology

Those parts of the property examined consist mainly of quartz feldspar gneiss derived from Sicker Group sediments, with a thick overlying sequence of metabasalts that probably also belong to the Sicker Group. The gneisses are intruded by numerous amphibolitic basic sills and, at the main showing, by an ultrabasic sill with Cu-Ni-PGM mineralization. Cutting the gneiss to the west of the showing is a hornblende gabbro. The relations between these various basic rocks and the ultrabasic body are not known. The gneiss is intruded south

of the property by a foliated quartz-diorite pluton that is thought to be an early phase of the Jurassic Island Intrusives. Some thin diorite dykes on the property may be related to this intrusive. A few late dolerite and andesite dykes were also seen.


(ii) Prospecting

Prospecting has located a number of rusty pyritic zones in the gneiss, traces of chalcopyrite in gabbro and amphibolite, and traces of molybdenite were found in quartz diorite. However, analyses show none of these to be of economic importance. No new showings of similar style to that at the main showing were found.

Reported by:

Authorized by:

  
P.C. LeCouteur  
Project Geologist

  
W.J. Wolfe  
Manager, Exploration  
- Western Canada

PCL/jd

Distribution: Mining Recorder  
Western District  
P.C. LeCouteur



APPENDIX "A"  
EXPENDITURES

Organization and supervision of line cutting was done between April 3 and 11 by P.C. LeCouteur and A.P. Roberts and geological work was carried out between June 6 and 13 by P.C. LeCouteur and I.J. Talbot.

			<u>Geology</u>	<u>Line Cutting</u>
<u>Wages</u>				
P.C. LeCouteur	13 days field, 4 days office	@ \$233 = \$3961	2796	1165
A.P. Roberts	5 days field,	@ 170 = 850		850
I.J. Talbot	8 days field,	@ 129 = 1032	1032	
3 Linecutters	5 days	@ 550 = 2750		2750
		<u>\$8593</u>		
<u>Accommodation</u>				
April 3-8 (PCL)	6 days @ \$28.00 = \$168.00			168
June 5 (PCL, IJT)	1 day @ 72.76 = 72.76		72.76	
April 7-10 (APR)	4 days @ 28.00 = 112.00			112
April 6-11 (Linecutters)	6 days @ 69.55 = 347.75			347.75
		<u>\$700.51</u>		
<u>Food</u>				
41 man days @ \$20.00/day = \$820.00			320	500
<u>Transportation</u>				
Boat rental - 14 days @ \$60.00	= \$840.00			
Truck rental - April 1-14	= 870.10		70.10	800
Truck rental - June 5-13	= 547.31		547.31	
Ferry, Vancouver to Nanaimo 3 @ \$23	= 69.00		46	23
Aircraft, Vancouver to Tofino 2 @ \$79.50	= 159.00			159
Taxis (4) April 7 and 9, total	= 106.00			106
Gas, truck and boat, April & June, total	= 591.63		291.63	300
	<u>\$3183.04</u>			
<u>Analyses</u>				
12 rocks for Au, Ag @ \$7.60	= 91.00		91	
24 rocks for Pt, Pd, Cu, Ni @ \$13.00	= 312.00		312	
40 rocks crushing, prep @ \$3.25	= 130.00		130	
5 rocks thin sectioned @ \$7.00	= 35.00		35	
	<u>\$568.00</u>			
<u>Incidental</u>				
Clinometers	= \$203.30			203.30
Bags and ties	= 22.25		22.25	
Pickets	= 77.14			77.14
Office supplies	= 12.83		12.83	
Telephone calls	= 36.87		36.87	
	<u>\$352.39</u>		<u>\$6235.75</u>	<u>\$7981.19</u>
			TOTAL = \$14,216.94	


APPENDIX "B"

STATEMENT OF AUTHOR'S QUALIFICATIONS

I, Peter C. LeCouteur of the District of North Vancouver in the Province of British Columbia, hereby certify:

1. THAT I am a Geologist residing at 4900 Skyline Drive, North Vancouver, British Columbia with a business address at 700-409 Granville Street, Vancouver, British Columbia.
2. THAT I graduated with a Ph.D. in Geology from the University of British Columbia in 1973.
3. THAT I have practised Geology with Cominco Ltd. from 1975 to the present.
4. THAT I am a Fellow of the Geological Association of Canada and a Professional Engineer (Geological, 1977) in the Association of Professional Engineers of British Columbia.

Signed:

  
Peter C. LeCouteur, P. Eng.  
Project Geologist  
Cominco Ltd.

17 December 1986

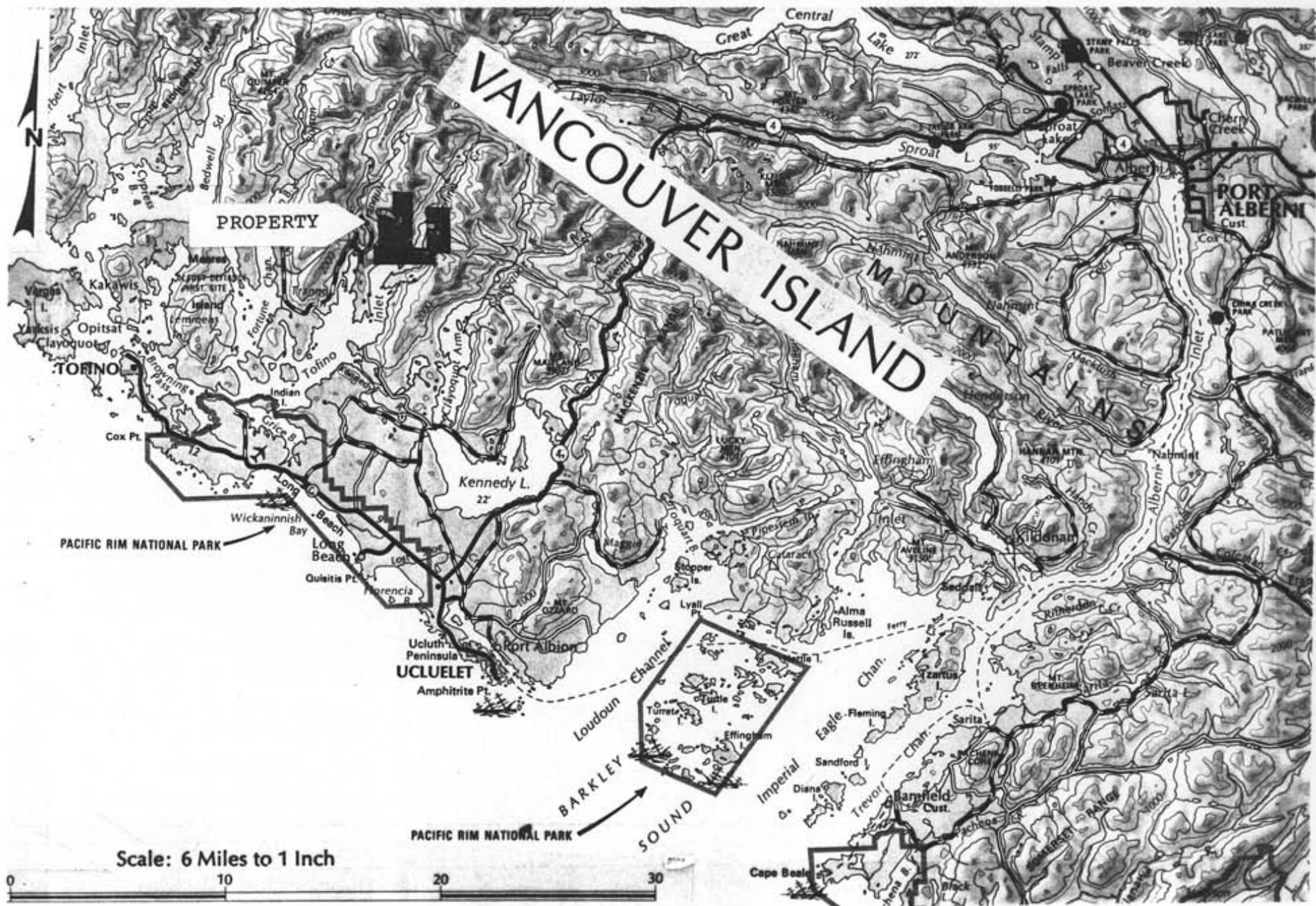
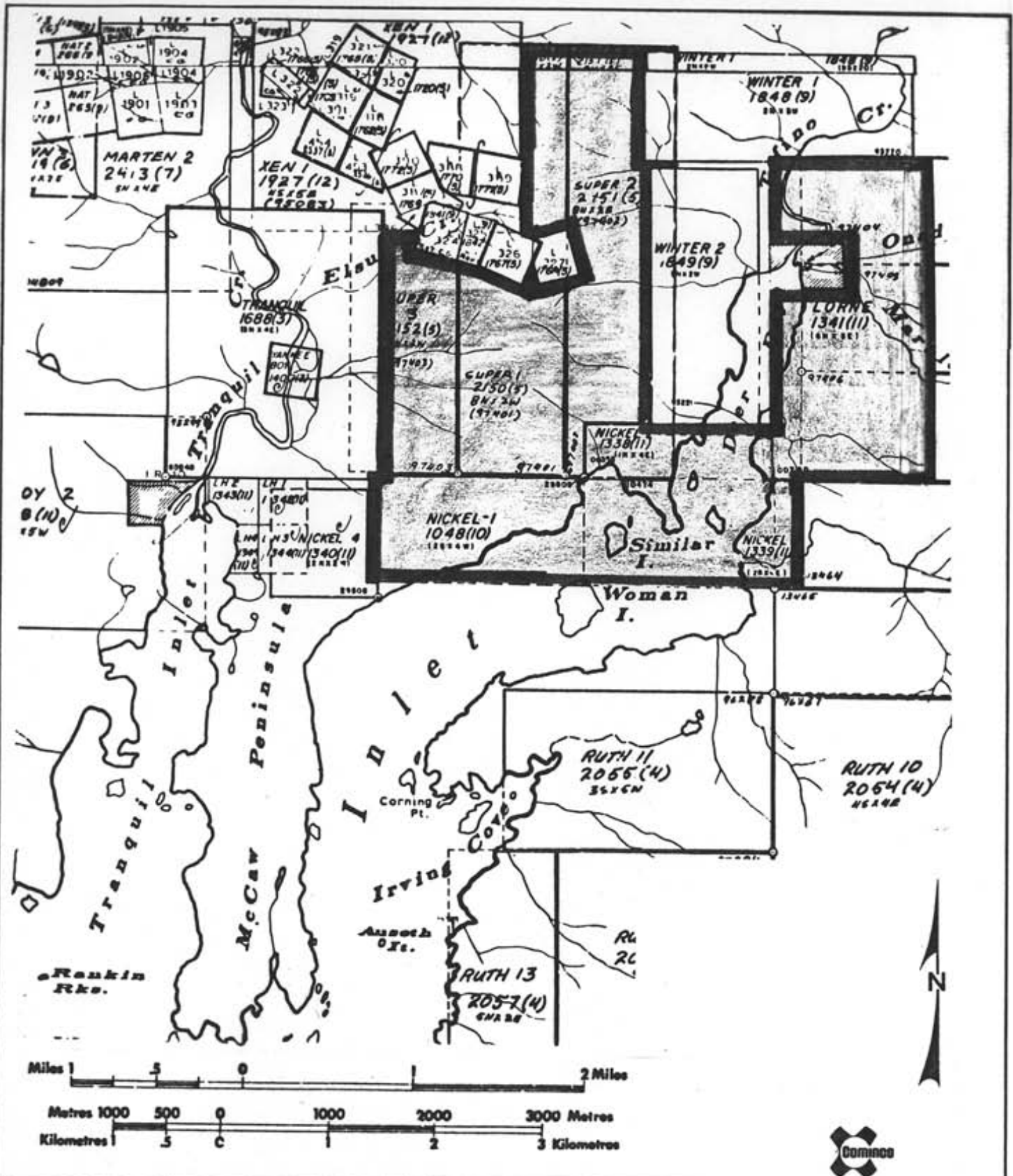


Fig 1. Location of property on Vancouver Island



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Revised by	Date	Revised by	Date

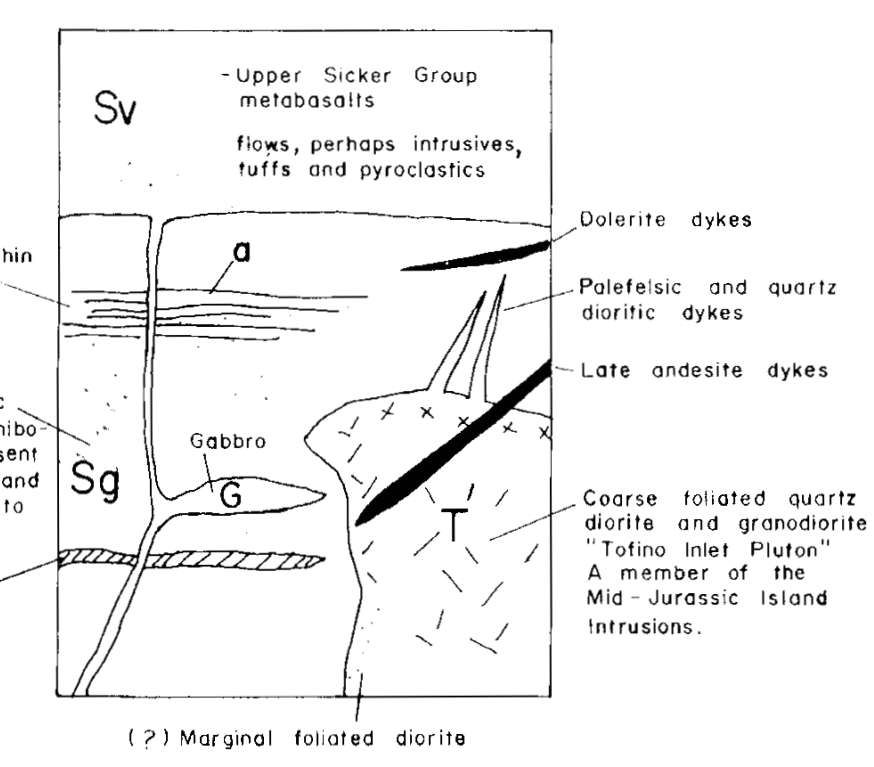
Figure 2. Location of claims  
Alberni MD. NTS 94F/4E

Scale: 1:50,000

Date: 15 Dec. 1985

Plate:

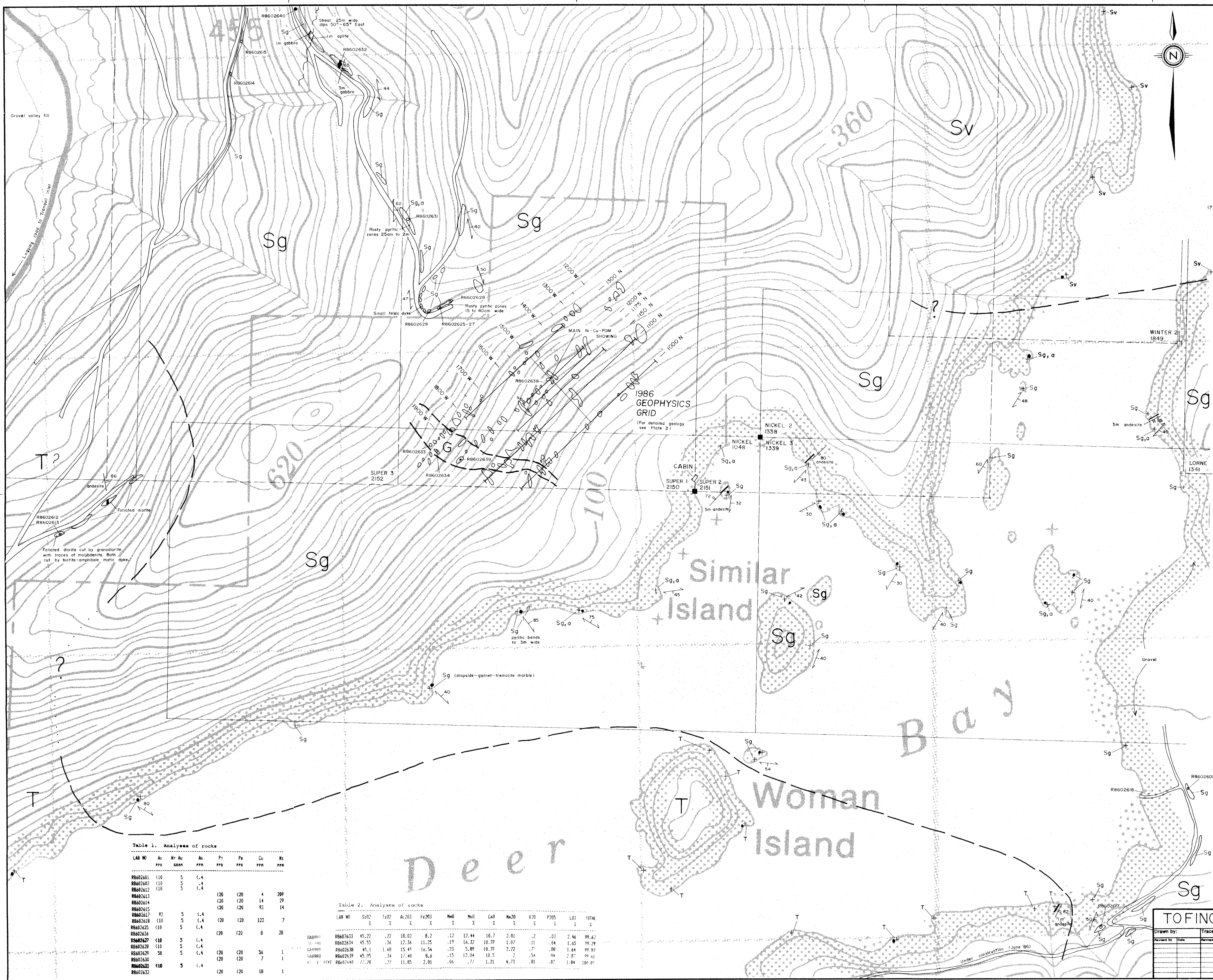
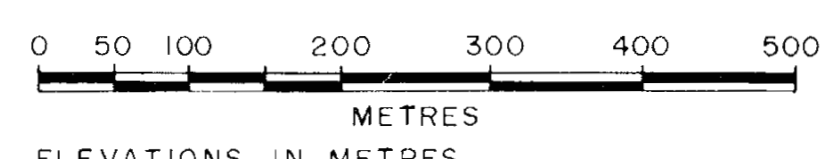
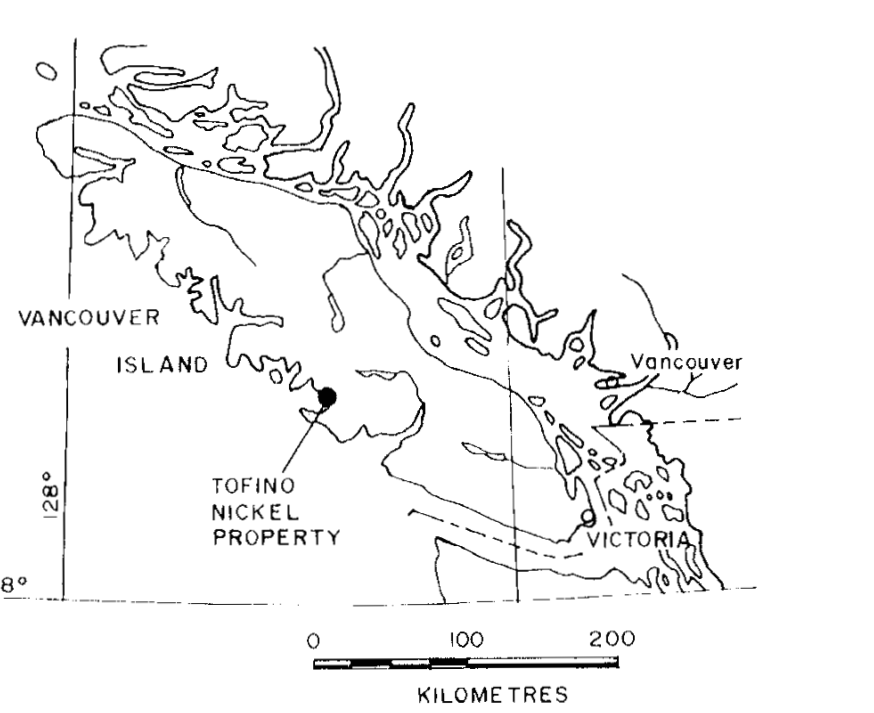




**KEY**

- - - Inferred lithological contact
- R8512345 Analyzed rock sample (see tables)
- + Location visited in area of near continuous outcrop
- Outcrop
- Boulder
- Location of thin section examined
- ↘ 50 Gneissic foliation
- ↘ 35 Attitude, thickness, composition of dykes
- Claim lines, established on topographic maps and air photos
- Legal corner post, actual location
- " " " " assumed location
- Logging roads

**LOCATION**



**Table 1. Analyses of rocks**

LAB NO	Au	Hr	Au	Ag	Pt	Pb	Cu	Ni
PPB	GRAN	PPB	PPB	PPB	PPB	PPB	PPB	PPB
R8602601	C10	5	C,4					
R8602602	C10	5	C,4					
R8602612	C10	5	C,4					
R8602613				C20	C20	4	209	
R8602614				C20	C20	14	29	
R8602615				C20	C20	93	14	
R8602617	92	5	C,4					
R8602618	C10	5	C,4	C20	C20	123	7	
R8602625	C10	5	C,4					
R8602626				C20	C20	9	28	
R8602627	C10	5	C,4					
R8602628	C10	5	C,4					
R8602629	58	5	C,4	C20	C20	56	1	
R8602630				C20	C20	7	1	
R8602631	C10	5	C,4					
R8602632				C20	C20	18	1	

**Table 2. Analyses of rocks**

LAB NO	SrO2	TiO2	Al2O3	Fe2O3	MnO	MgO	CaO	Na2O	K2O	P2O5	LOI	TOTAL
%	%	%	%	%	%	%	%	%	%	%	%	%
GABRO	R8602633	45.22	.22	16.02	8.2	.12	12.44	10.7	2.01	.2	.03	99.42
GABRO	R8602634	45.55	.36	12.36	11.25	.19	14.32	10.39	1.07	.11	.04	99.29
GABRO	R8602638	45.1	1.48	15.45	16.54	.23	5.89	10.39	2.72	.27	.06	99.97
GABRO	R8602639	45.95	.14	12.48	9.4	.15	12.94	10.5	2	.04	2.37	99.41
DIORITE	R8602640	72.28	.27	11.85	2.01	.06	.77	1.21	4.73	.81	.07	100.0

**TOFINO NICKEL**

Drawn by: \_\_\_\_\_ Traced by: \_\_\_\_\_

Checked by: \_\_\_\_\_ Date: \_\_\_\_\_

Scale: 1:5000 Date: DEC. 1986 Plate: 1

GEOLOGY OF PARTS OF NICKEL AND SUPER CLAIMS ALBERNI M.D., B.C.

NTS 92.F/4



Table 3. Analyses of rocks

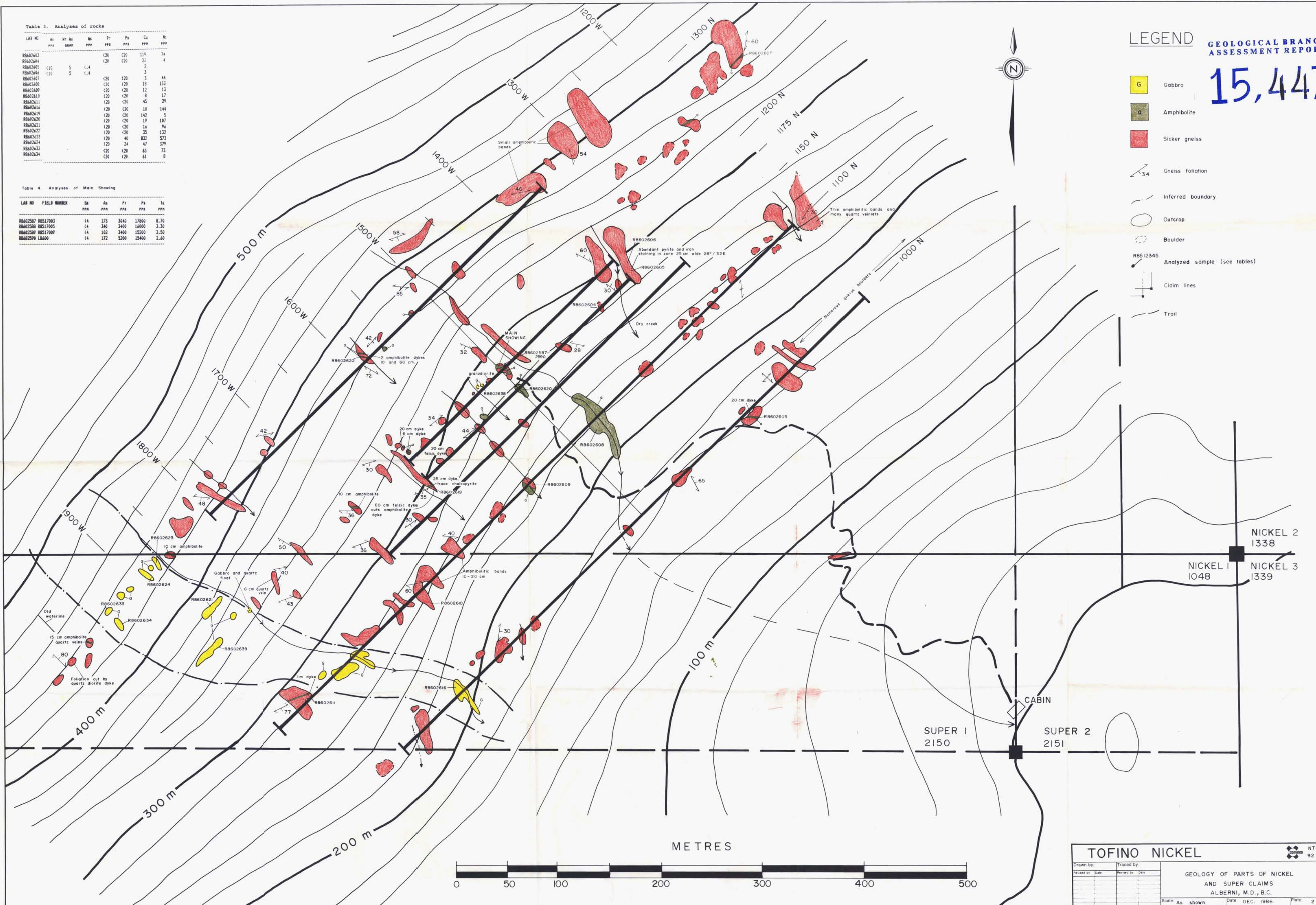
LAB NO	As	Pr	Pb	Cu	NI
PPM	PPM	PPM	PPM	PPM	PPM
RB602603		20	20	119	74
RB602604		20	20	22	4
RB602605	110	5	1.4		
RB602606	110	5	1.4		
RB602607		20	20	3	44
RB602608		20	20	18	133
RB602609		20	20	12	13
RB602610		20	20	8	17
RB602611		20	20	45	29
RB602612		20	20	10	144
RB602613		20	20	142	5
RB602614		20	20	19	107
RB602615		20	20	16	96
RB602616		20	20	35	132
RB602617		20	40	832	573
RB602618		20	24	47	379
RB602619		20	20	65	73
RB602620		20	20	61	8

Table 4. Analyses of Main Showing

LAB NO	FIELD NUMBER	Sr	As	Pr	Pb	Te
PPM	PPM	PPM	PPM	PPM	PPM	PPM
RB602587	R8517003	4	173	3400	17800	8.70
RB602588	R8517005	4	340	3400	16000	3.30
RB602589	R8517009	4	102	3400	15200	3.50
RB602590	L8600	4	172	5200	15400	2.60

15,447

- G Gabbro
- a Amphibolite
- Sicker gneiss
-  34 Gneiss foliation
-  Inferred boundary
-  Outcrop
-  Boulder
-  R8512345 Analyzed sample (see tables)
-  Claim lines
-  Trail



**TOFINO NICKEL**

Drawn by: \_\_\_\_\_ Traced by: \_\_\_\_\_

Revised by: \_\_\_\_\_ Date: \_\_\_\_\_

GEOLOGY OF PARTS OF NICKEL AND SUPER CLAIMS ALBERNI, M.D., B.C.

Scale: As shown. Date: DEC. 1986. Plate: 2

NTS 92 F/4