006986

REPORT ON GEOLOGY AND MINERAL POTENTIAL

OF KALAPPA PROPERTY

MEARES ISLAND

Alberni Mining Division
92 F / 4 W

Latitude 49°11.5'N Longitude 125°51.5'W

For

IRON RIVER RESOURCES LTD.
c/o 1057 Kilmer Road
North Vancouver
B.C.

By

K.E. NORTHCOTE AND ASSOCIATES LTD.
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August 7, 1984

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REPORT ON GEOLOGY AND MINERAL POTENTIAL OF KALAPPA PROPERTY, MEARES ISLAND ALBERNI MINING DIVISION

SUMMARY

The Kalappa property is located on Meares Island on the east side of Lemmens Inlet, 6 kilometres northeast of Tofino in the Alberni Mining Division NTS92F/4W, Latitude 49°11.5'N, Longitude 125°51.5'W. The property consists of 4 Crown Grant claims and 5 metric claims containing a total of 47 units. These claims are owned by Iron River Resources Ltd.

There are five adits on the Kalappa property which have a total of 430 metres of accessible drifting and crosscutting. The amount of raising and stoping is unknown because the rotted condition of the ladders prevented access for measurement. There are no buildings or mining and milling equipment on the property. Production was achieved in 1914 totalling 1,512 tons which returned 569 oz Au, 3,544 oz Ag. and 60,363 lbs Cu.

This report assessess potential for locating additional ore or new ore bodies in present workings and in peripheral vein-shear systems. A program for testing this potential is outlined. Fieldwork in support of this report was carried out in the periods May 10 to 14 and June 27 to July 3, 1984.

The Kalappa property is underlain by Westcoast Complex migmatite which is cut by an intrusive breccia possibly of explosive origin. This breccia, because of shallow depth of emplacement requirements and proximity to Tertiary plutons on the west side of Lemmens Inlet, is also thought to be of Tertiary age. It is noted that most gold-silver deposits on Vancouver Island are associated with Teriary plutons. The six (+) vein-shear systems carrying gold values on the Kalappa property are persistent structures which trend from about 140 to 170° with steep

northeasterly dips. Along strike they pinch and swell from nil to greater than a metre in width. They branch and rejoin, pass from strong siliceous quartz (and carbonate) veins into quartz-rich breccias, brecciated wall rock or strong shear zones filled with gouge with brecciated margins.

Mineralization underground and on surface occurs as disseminations in Westcoast Complex wall rocks, as disseminations ranging from weak to nearly massive in siliceous breccia zones (which may bear some relationship to Kalappa breccia), as disseminations and massive composite veins, commonly with quartz, and as friable ground up sulphides in gouge from sheared vein material. Gold and silver values appear to occur in steeply pitching ore zones associated with sulphides with barren sulphide zones between. The Kalappa breccia contains sparsely to moderately disseminated sulphides including arsenopyrite at least locally. Late partial to complete quartz infilling of crackle breccia in this body may also carry mineralization. Sulphide minerals are chiefly pyrite which is suspected to represent two or more generations. The next most abundant sulphides are pyrrhotite and locally arsenopyrite with lesser chalcopyrite and sphalerite. Preliminary mineralographic and scanning electron microscope studies have shown small grains of electrum in close association with chalcopyrite cutting arsenopyrite and as grains within arsenopyrite. Native bismuth is associated with galena in some samples with further association with gold, electrum and unidentified silver minerals.

Although it may be assumed that some or perhaps most of the better-grade accessible ore has been removed, potential exists for production of additional ore by developing above and below existing stopes which are not completely mined.

All known quartz-vein-shear systems striking about 140 to 170° located peripheral to the main workings produced significant gold values. A preliminary examination of aerial photographs clearly shows multiple

southeasterly to southerly trending linears which parallel known gold positive shear systems. Although none of these linears has been correlated with mineralized veins such correlation seems likely. Each of these vein-shear systems and/or linears can be considered a possible host for gold and silver-bearing ore bodies.

The apparent widths of material removed from stopes and the presence of 3 vein-shear systems within a 3 metre width at Pit 3 on the JIM claim suggests potential for additional vein-shear systems across significant mining widths.

A two stage program is recommended to measure potential of present workings for extensions to known ore bodies and for discovery of new ore bodies along strike or up and down dip of the vein-shear systems in the main workings and in other systems peripheral to them. Progression to Stage II is dependent on favourable results of Stage I and at the recommendation of an independent engineer. A further, progressive, Stage III is broadly outlined and would be subject to modification as results from the first two stages become available. Stage III would also be dependent upon favourable results from the first two stages and would also require the recommendation of an independent engineer. It is anticipated that this stage would include provision of access for mechanized equipment, bulk sampling and a major drilling program.

The estimated cost of Stages I and II is $300,000.00. The first phase of Stage III would require an additional $300,000.00.

ESTIMATED COSTS OF KALAPPA PROGRAM

STAGE I

Rehabilitation of Stopes	$ 10,000.00
Replace ladders Mining crew 2 men $200, $100 Lumber-utilize poles on site, pruchase rungs and cut 1X4 and pack to site.	
Geological mapping of adits and stopes	6,000.00
Scale 1:100, sampling adits and stopes	
Geochemical surveys (including grids) assays . .	15,000.00
Wages, supporting personnel	6,000.00
Surface Geological Mapping	9,000.00
Scale 1:1000, surface sampling	
Assays Underground and Surface	6,000.00
assume 300 samples at $20/	
Surveying	2,000.00
Mineralographic and Petrographic Studies	5,000.00
Scanning Electron Microscope, X-ray Diffraction	
Metallurgical Studies	5,000.00
Environmental Impact Studies	7,000.00
Road route, mine workings, mill site, leach pads, dock area etc.	
Board and Lodging	7,500.00
6 men x 30, 180 x 40, camp and food costs	
Travel	2,500.00
Boat 1500 Vehicles 1000	
Management Fees	8,000.00
Report	5,000.00
Contingencies	8,000.00
Total Stage I	$102,000.00

STAGE II Progression to Stage II is dependent upon favourable results from Stage I and the recommendation of an independent engineer.

Magnetometer and VLF-EM Survey including line cutting to establish local grids	$ 15,000.00
Fill-in geochemical surveys	5,000.00
Trenching, sampling, mapping Powder, drill rental.	5,000.00
Assays 200 x $20 geochemical and trenches	4,000.00
Environmental Impact Studies	10,000.00
Metallurgical Studies	10,000.00
Diamond drilling from surface estimated 2500 ft. @ $40/ft.	100,000.00
Board and lodging	10,000.00
Travel Vehicle, boat, helicopter support	10,000.00
Management Fees	8,000.00
Report	5,000.00
Contingencies 10%	16,000.00
Total Stage II	$198,000.00

STAGE III Progression to Stage III is dependent upon favourable results from Stages I and II and on the recommendation of an independent engineer.

It is estimated that $300,000. would be required for the first phase of Stage III which would provide access for mechanized equipment from the shoreline to main workings and some peripheral sites. It would provide for the first phase of a major drilling program, bulk sampling of existing workings and trenches and continuing feasibility and environmental studies.

Stage III, Phase I, estimated $300,000.00

REPORT ON GEOLOGY AND MINERAL POTENTIAL OF KALAPPA PROPERTY, MEARES ISLAND ALBERNI MINING DIVISION

INTRODUCTION

TERMS OF REFERENCE

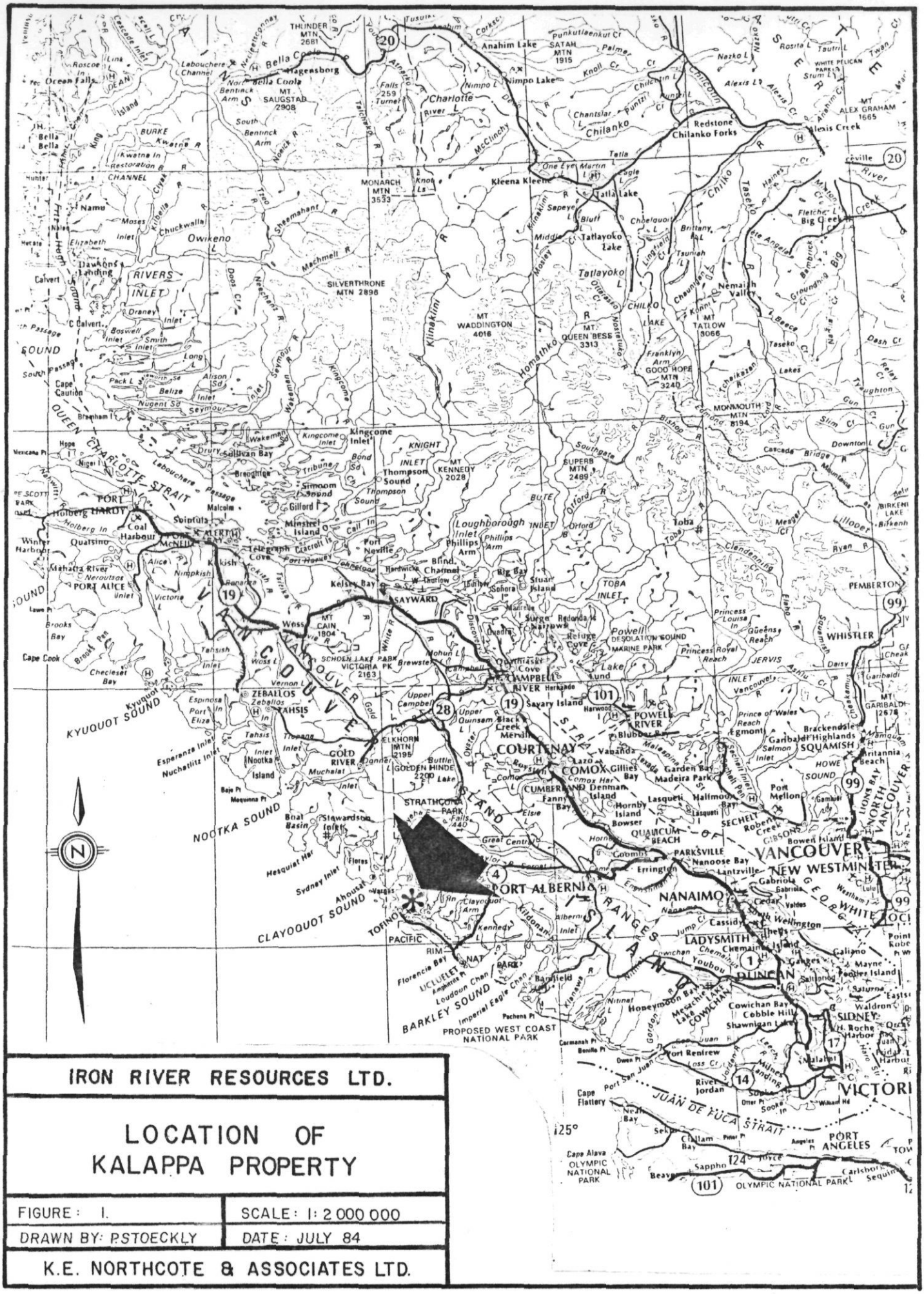
K.E. Northcote and Associates Ltd. were contracted by Iron River Resources Ltd. to carry out geological and sampling surveys on the Kalappa property. A report was requested summarizing previous work, the results of this program, the mineral potential of the property and, if the property is considered to be of merit, outline a program to test its potential.

This work was done during the periods May 10 to May 14 and June 27 to July 3, 1984 in company with Dan and Larry Berkshire, Ray Jones and B.K. Northcote.

LOCATION

The Kalappa property is located on Meares Island on the east side of Lemmens Inlet, 6 kilometres northeast of Tofino, on the west side of Vancouver Island in the Alberni Mining Division N.T.S. 92 F/4W, Latitude 49°11.5' N, Longitude 125°51.5' W. See Figure 1.

The property is accessible by boat or barge from Tofino. A cut trail following old mining trails and plank roads leads approximately 500 metres from the shoreline to the main workings at about 100 to 150 metres elevation. The closest major supply centre in addition to Tofino is Port Alberni which is 110 kilometres by paved highway to the east; or Nanaimo on the east side of Vancouver Island an additional 100 km from Port Alberni.



IRON RIVER RESOURCES LTD.	
LOCATION OF KALAPPA PROPERTY	
FIGURE: 1.	SCALE: 1: 2 000 000
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Elevations on the property range from sea level to 700 metres on the south end of DEFIANCE I claim. The topography is moderate to locally steep with interrupted parallel lines of low cliffs.

Portions of the claims area were logged in the early 1900's and are now covered by typical westcoast rain forest consisting of second growth coniferous, hemlock, cedar and fir with abundant fringing and interspersed deciduous maple and alder. Blowdown areas in some parts of the claims,and dense salal, and other undergrowth along the shoreline, in creek drainages and forest fringes make traversing extremely arduous and time consuming. Cut trails are necessary to provide access to areas of greatest interest.

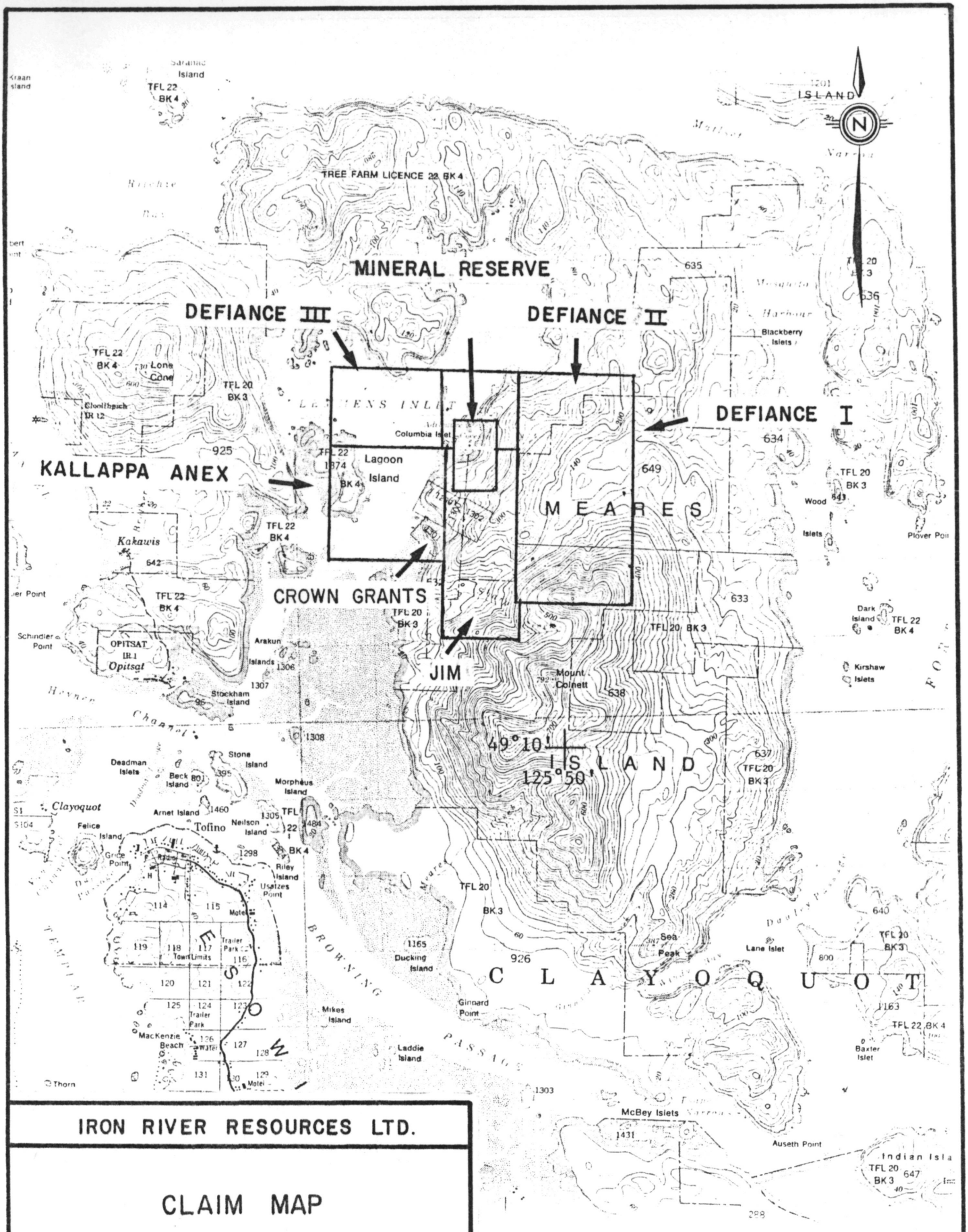
CLAIMS STATUS

The claims comprising the Kalappa property containing 4 Grown Grants and 5 metric claims of 47 units are listed on Table I and are shown on Figure 2.

TABLE I

KALAPPA PROPERTY

CLAIMS	UNITS	RECORD NO.	ANNIVERSARY DATE
KALAPPA	Crown Grant	Lot 1299	
SNINNICK FR	" "	Lot 1300	
JACK OF CLUBS	" "	Lot 1301	
GOLDEN GATE	" "	Lot 1302	
DEFIANCE I	18	2118 (4)	April 30, 1985
DEFIANCE II	4	2119 (4)	" " "
DEFIANCE III	6	2167 (5)	May 22, 1985
KALLAPPA ANEX	9	2168 (5)	" " "
JIM	10	439 (4)	April 12, 1986



IRON RIVER RESOURCES LTD.	
CLAIM MAP	
FIGURE: 2.	SCALE: 1:68000
DRAWN BY: P.STOECKLY	DATE: JULY 84
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Crown Grant status was reapplied for and obtained for KALAPPA, SNINNICK, JACK OF CLUBS, GOLDEN GATE by Messrs. K.D. and A.C. Farrell September 12, 1958 and have been retained as Crown Grants since that date. These Crown Grants are presently held by Iron River Resources Ltd.

DEFIANCE I, II and III and KALLAPPA ANEX are located claims staked and owned by Iron River Resources Ltd. and are contiguous with the Crown Grants. The JIM claim has been acquired by Iron River Resources Ltd by option from Meares Resources Inc. Legality of the claims and their maintenance in good standing is the responsibility of the registered owner.

MINING HISTORY OF THE KALAPPA PROPERTY

D. Berkshire, a principal of Iron River Resources, has thoroughly researched and compiled a history of the Kalappa property. His report for the company is reproduced in slightly abbreviated form here:

> The mining history of the Kalappa* property begins in the late 1890's with general exploration of the west coast of Vancouver Island. The area east and north of the present day Tofino had become focus of the attention of Mr. F. Jacobsen of Port Essington whose name appears in reference to a number of properties about this time. These properties included the Crow group, Good Hope group, Thelma group, Agnes group, Iron Cap group as well as the Kallapa. The Crow group was among the first to be recorded in the Alberni Mining Division.
>
> The Kalappa and the Iron Cap group are of principal interest to Iron River Resources Ltd. Both properties are located on Meares Island with the Kalappa claims centrally located within the Iron River Resources' present holdings.
>
> The Iron Cap claim is referred to in the 1898 Ministry of Mines Report while the Kalappa is first mentioned in 1900. Both properties were held by partnerships including Mr. Jacobsen. Mr, Jacobsen's partners in the Kallapa claim were Mr. J. Chesterman and Mr. Jensen. His partners in the Iron Cap claim are not known at this time. Both claims were gold prospects being developed concurrently.
>
> *Note: The Kalappa claim has been variously spelled "Kallappa", "Kalappa" and "Kallapa". In 1958 documentation it is spelled "Kalappa".

In 1897 considerable work was completed on the Iron Cap and the 1898 Minister of Mines Report records approximately 20 tons of ore was shipped to the Tacoma smelter. The MEMPR Minfile lists the following shipments for the Iron Cap:

Amount 17 tonnes, return: 933 gm Au, 809 gm Ag.
169 kg Cu.

This is equivalent to a grade of 1.60 oz/ton Au; 1.39 oz/ton Ag; 0.99% Cu.

In the 1900 development on both the Kalappa claim and the Iron Cap group were proceeding steadily. By 1903, work on the Iron Cap had apparently stopped and the Kalappa had become the focus of attention. High assays were being reported from it.

For the next ten years, little was reported and Mr. Jacobsen disappeared from the scene. Meanwhile, Mr. Chesterman had become the senior partner in the Kalappa claim and expanded the property to six claims.

The claims included in this group were the Kalappa, Golden Gate, Sninnik* Fraction, Jack of Clubs, Homatsa and the Syontl. Development was now concentrating on the Golden Gate.

In May of 1912, the claim group was bonded to a Vancouver syndicate headed by C.E. Cartwright, Civil Engineer, 601-8 Rogers Building, Vancouver, B.C. Frank E. Leach, of Cartwright, Matheson & Co., was designated manager. A crew of five men, under foreman Fred Melocke, worked for the rest of the year on these claims. This work consisted of 325 feet of drifting on the Golden Gate vein. A corduroy wagon road was also constructed from the mine workings to the wharf site.

Work continued steadily through 1913. The work consisted of finishing the road and building ore bunkers. Six hundred feet of new drifting and two hundred feet of raising were also reported. The ore bunkers had a capacity of 500 tons which would load directly onto steamers. It was also during 1913 that the first two shipments of ore were sent to the Tacoma smelter. It is thought that these shipments were derived from the number 2 stope of level two of the main workings. This information comes from a June 16, 1913 visit to the site by D.G. Forbes, M.E. whose report appeared in the 1914 Annual Report of the Minister of Mines for B.C.

*Sninnick is variously spelled "Sninnik" in early years and "Sninnick" on 1958 documentation.

By the end of 1913, the Kallapa Mining Company Ltd. had taken over the interests of C.E. Cartwright & Associates. The company was employing 16 to 20 men and had expressed major plans for the coming year. It was proposed to install air compressors and drills; to install a tramway from the lower workings to the wharf; and to begin regular shipments of 500 tons per month. It planned to steadily increase development and shipments until an output of 1,000 tons per month was reached. How many, if any, of these goals were reached is not known, for in 1914, the company ran into financial difficulties. The property was closed and reverted to Chesterman's possession.

However, five shipments of ore were made that year. The MEMPR Minfile records the following:

Production 1,512 tons, return 569 oz. Au
3,544 oz. Ag
60,363 lbs Cu

This is equivalent to a grade of .37 oz/ton Au; 2.3 oz/ton Ag; and 2% Cu.

In 1916, Mrs. E.A. Chesterman applied for and received Crown Grants (1917) on four claims of the group; Kalappa, Golden Gate, Sninnik Fraction, and Jack of Clubs. These claims later reverted to the Crown and were not redeemed until 1928. The property was described in the 1928 Minister of Mines Report as being in dilapidated condition.

Nothing was apparently done with the property and it again reverted to the Crown. It was not until 1956 that the property was again pursued when Mr. A.C. Farrell and his son, K.D. Farrell, both of Port Alberni, began prospecting and sampling the old workings. In 1956, Mr. A.C. Farrell sampled those ore shoots in the stopes that were accessable. He then applied to redeem the Crown Grants. He received the grants in 1958 in the name of his son, K.D. Farrell, and himself. Since the death of A.C. Farrell the claims are in the name of K.D. Farrell.

In November of 1968, Fort Reliance Minerals Ltd. optioned the Kalappa group and staked a large block of surrounding claims. In 1969, they carried out a geochemical stream sediment and soil sampling, geological mapping, and a propecting survey. This work was done under the general supervision of P.E. Hirst, P.Eng.

Adjacent areas on Meares Island received intermittent attention until the mid 1970's with a focus on the presence of nickel-copper sulphide zones. This had been prompted by Falconbridge by discovery in the 1960's of a large low grade copper-molybdenum deposit situated on Catface Mountain six miles to the north of the Kalappa.

With the advent of higher gold prices, the area has again become the focus of attention of a number of companies.

GEOLOGY

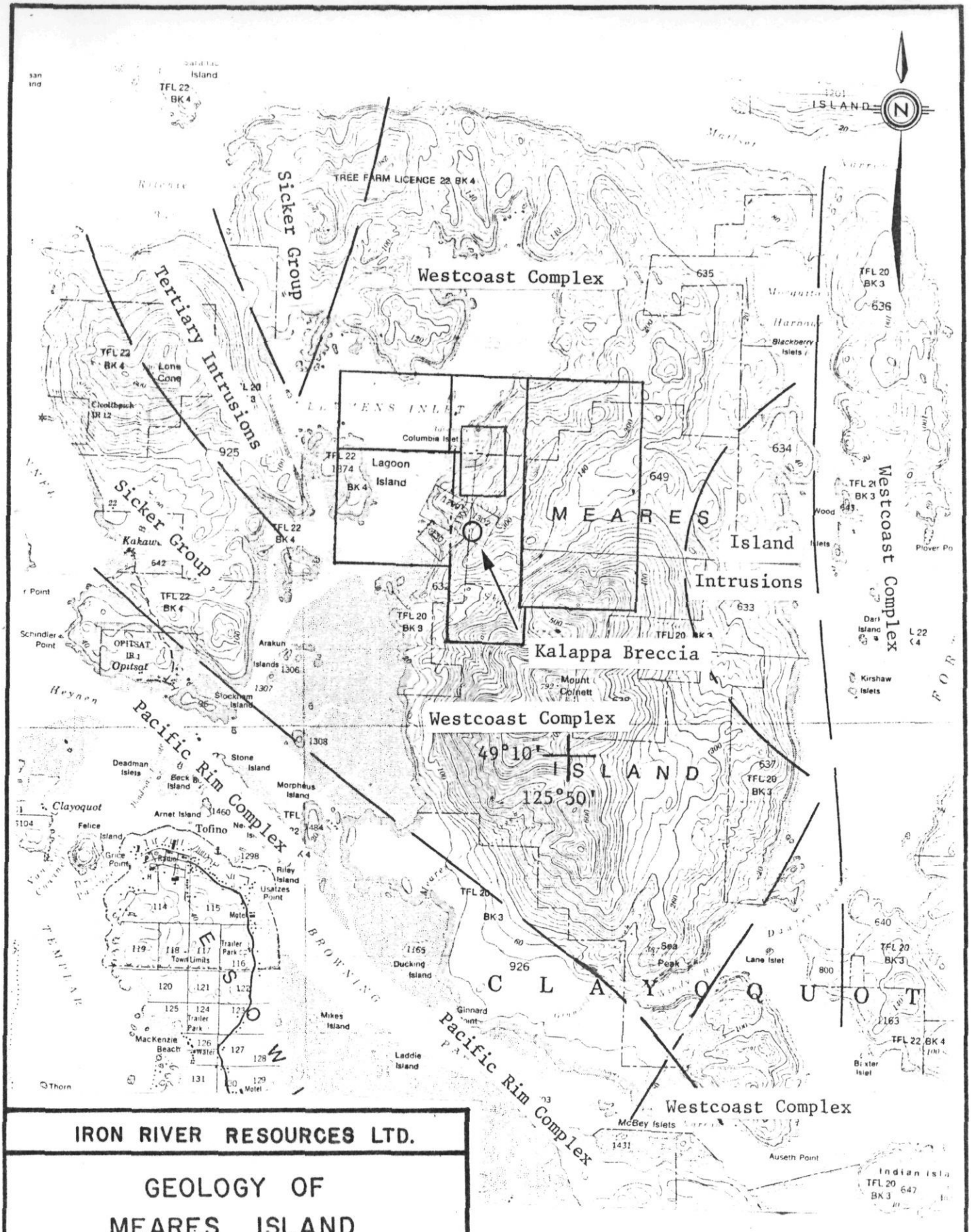
REGIONAL GEOLOGY

The general geology of the Meares Island area was mapped scale 1 to 250,000 by J.E. Muller (Muller and Carson, 1968 and Muller, 1977) Muller's maps show northwesterly trending fault blocks cut off and/or offset by northerly and northeasterly trending fault systems. The oldest rocks on Vancouver Island, Pennsylvanian and older Sicker Group, occur on and around Meares Island and have suggested gradational and fault contacts with migmatites, amphibolites and basic rocks of the Westcoast Crystalline Complex and related Island Intrusions. The westernmost margin of Vancouver Island at this point is underlain by fault blocks of Upper Jurassic and/or Lower Cretaceous Tofino Area Greywacke Unit* which are in fault contact on the northeast with older rocks. All of these units are intruded by or are in fault contact with small Tertiary plutons. See Figure 3.

GEOLOGY OF MEARES ISLAND

Muller's mapping shows the east half of Meares Island is underlain by Westcoast Complex migmatite in fault contact on the southwest with Upper Jurassic and/or Lower Cretaceous Tofino Area Greywacke Unit.

*Referred to as Pacific Rim Complex, Muller 1977.



IRON RIVER RESOURCES LTD.	
GEOLOGY OF MEARES ISLAND	
FIGURE: 3.	SCALE: 1:68 000
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A crescent shaped body of "Tofino Inlet Pluton" intrudes the complex on the east side of Meares Island. See Figure 3.

The west arm of Meares Island is composed of Sicker Group rocks cut by a northwest-southeast trending elongate granitic Tertiary pluton extending northwesterly into Catface peninsula.

Subsequent work by Muller in other areas of Vancouver Island, with some exchange of field observations with other workers and availability of isotopic age determinations, resulted in a much clearer understanding of interrelationships among Sicker, Karmutsen, Westcoast Complex amphibolites, migmatites, basic rocks and Island Intrusions. These interrelationships are discussed by Muller in his description of the geology of the Nootka Sound area. (Muller, Cameron and Northcote, 1981). The Westcoast Complex, amphibolite migmatite units, through evidence of field relationships and isotopic age determinations is almost certainly the result of varied degrees of anatexis or partial melting, mobilization and recrystallization of Sicker and/or Karmutsen rocks. Intensity of anatexis passed through amphibolitic to migmatite and basic phases of the Westcoast Complex culminating in Island Intrusions; all a part of the same "metamorphic" process which occurred during early Jurassic time. Hence the later designation of Tofino Inlet Pluton as Island Intrusion. See Figure 3.

Sicker volcanics on the west arm of Meares Island in the vicinity of Lone Cone Mountain are described in Assessment Report 4175 by P.T. McCullough and J.DeLeen, P.Eng. These rocks are andesitic volcanics and sediments which lie in northwest trending belts and are in contact with various lithologies of the Westcoast Complex including rock of olivine gabbro composion; finer grained varities of which are difficult to distinguish from Sicker. The andesite is dark green to black,

massive or porphyritic and in some exposures is layered. The sedimentary part of the sequence consisting of limestone lenses and quartzite is sporadic but occurs mainly on the east shore of Ritchie Bay and in Lemay Creek.

The homogenous Tofino Inlet Pluton on the east side of Meares Island may represent the culminating intensity of anatexis with development and migration of magma to form homogenous plutons.

The Sicker volcanics and Westcoast Complex are cut by an elongate body of seriate and porphritic Tertiary quartz diorite and dacite porphyry intrusives projecting southeasterly from Hecate Bay and Catface Mountain.

GEOLOGY OF KALAPPA PROPERTY

Good bedrock exposures as rocky prominences and cliffs occur in the area of the Crown Grants facilitating exploration in this area although outcrops are covered by thick moss growth that requires removal. Excellent exposures for observing rock textures and structures are found along the shoreline just below the highest tide level. The area outside the principal claims has not been examined so it is not known what percentage of this area has outcrop. It is expected that outcrops will be most prevalent on ridges and in deeper stream valleys with flatter areas covered by deep overburden supporting dense rain forest vegetation.

As anticipated, detailed geology of the property is of greater complexity than indicated on regional scale maps. Assessment reports filed with MEMPR indicate that the property is primarily underlain by Westcoast Complex migmatite but in addition contains a body of intrusive

breccia, possibly of explosive origin. See Figure 4.

WESTCOAST COMPLEX

The Westcoast Complex migmatite is described in detail by Muller in his Nootka Sound paper (Muller, Cameron, Northcote,1981). Varied degrees of anatexis (metamorphism) and mobilization of partial melts coupled with variations in original lithologic composition have resulted in a myriad of "clasts" of differing composition color, grain-size and texture. Mineralogy is fairly uniform and simple but there are wide differences in relative abundances of mineral varieties from one lithologic type to another and these range from amphibolite, gabbro and diorite to quartz diorite and granodiorite. In general there are the darker remnants of incompletely melted and assimilated metasediments and metavolcanics, termed melanosomes; in a matrix of lighter colored more completely melted differentiated, mobile phase of quartz diorite to granodiorite composition termed leucosomes. The leucosomes are analogous to the more mobile magmas forming Island Intrusions which migrated from the zone of anatexis or migmatization to form homogenous plutons.

In the past varied light and dark phases of the Westcoast Intrusions which would include granodiorite to gabbroic phases were considered to be a result of separate mobile intrusions whereas they now would appear to be deep seated segregations of melts and partial melts originating where they now occur. Island Intrusions represent a mobile differentiate magma arising from partial melting of older rocks in the migmatite zone.

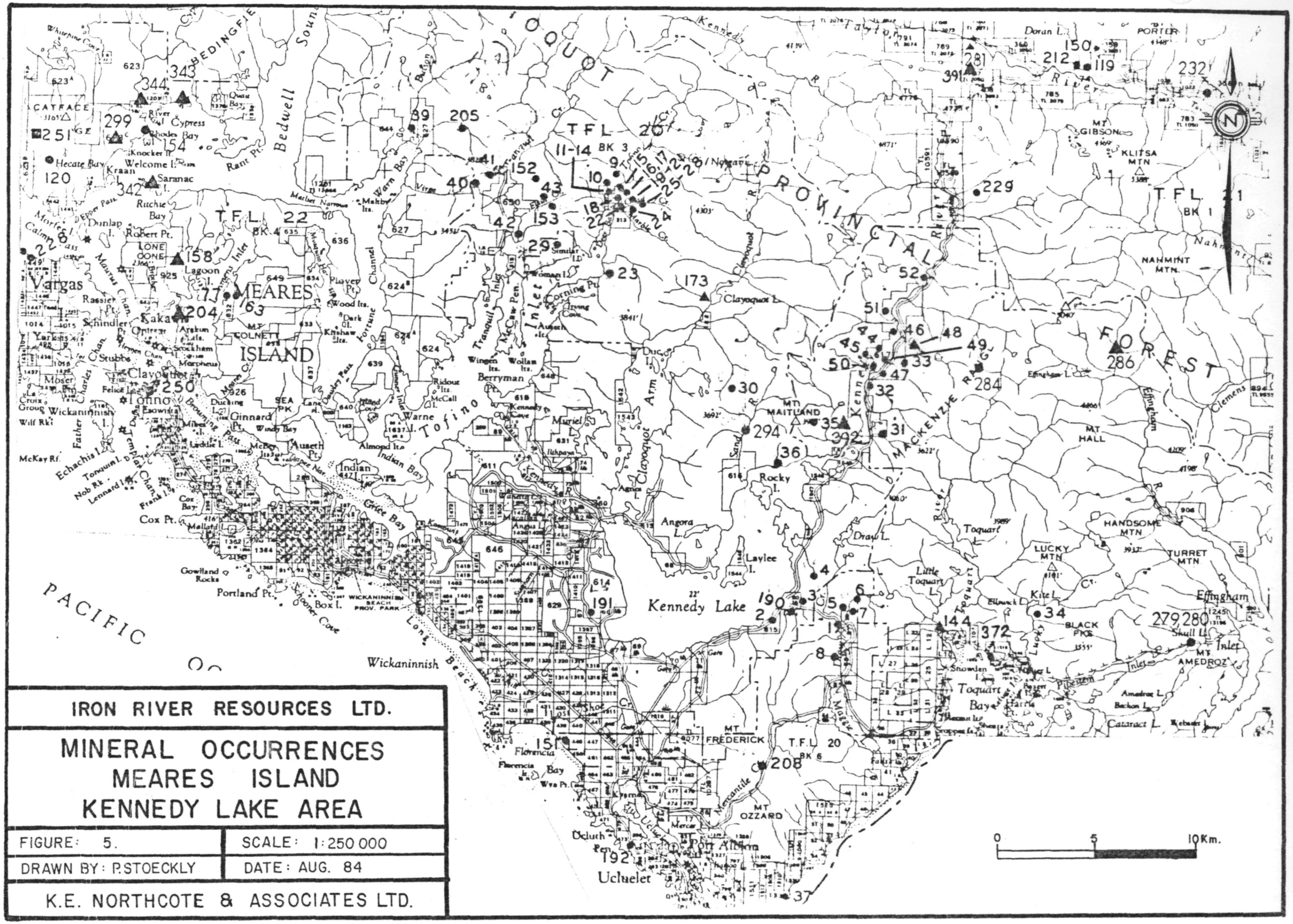
KALAPPA BRECCIA

Peter E. Hirst, P.Eng. in Assessment Report #2108 for the M.V. claims which in 1969 surrounded and overstaked the Kalappa Crown Grants describes the Kalappa breccia as a very distinctive oval-shaped breccia measuring 180 metres by 140 metres with poorly defined boundaries. Clasts within the breccia are extremely varied in composition, texture, and color including all the phases of Westcoast Complex as well as metavolcanic fragments, hornfels, dacite and scattered white quartz fragments. Fragment size ranges from less than a centimetre to greater than 3 metres. Hirst suggests that although the vertical extent of the breccia is unknown the diverse nature of the fragments, surficial grometry, with internal vuggy nature is indicative of an explosive origin. (Hirst, 1969). Disseminated sulphides including arsenopyrite and crackle systems of small open-space quartz veinlets were noted in several Kalappa breccia outcrops.

An explosive origin for the Kalappa breccia suggests that it is unrelated to the deep seated Westcoast Complex because shallow emplacement depths would be required to permit explosive brecciation. It is probably related to the southeasterly trending Tertiary plutons extending from Catface Peninsula at least to the west arm of Meares Island. Emplacement of the Tertiary plutons occurred after most of the units overlying the Westcoast Complex had been removed by erosion. The economic implications of Tertiary origin for plutons and breccias is discussed in the section on Mineral Potential.

STRUCTURE

There are six(+) known mineralized vein shear structures in the Kalappa area. These are persistent structures which trend between



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MINERAL OCCURRENCES MEARES ISLAND KENNEDY LAKE AREA

FIGURE: 5.	SCALE: 1:250 000
DRAWN BY: P.STOECKLY	DATE: AUG. 84

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140 and 170 degrees with steep northeasterly dips. Along strike they are widely varied and can be observed to pinch and swell from nil to greater than a metre in width. They branch and rejoin, pass from strong siliceous quartz (and carbonate) veins into quartz-rich breccias, brecciated wall rock or strong shear zones filled with gouge with brecciated margins.

MINERALIZATION

Mineralization underground and on surface occurs as disseminations in Westcoast Complex wall rock, as disseminations ranging from weak to nearly massive in siliceous breccia zones (which may bear some relationship to Kalappa breccia), as disseminations and massive composite veins commonly with quartz, and as friable ground up sulphides in gouge from sheared vein material. Gold and silver values appear to occur in steeply pitching ore zones associated with sulphides, with barren sulphide zones between.

The Kalappa breccia contains sparsely to moderately disseminated sulphides including arsenopyrite at least locally. Late partial to complete quartz infilling of crackle breccia in this body may also carry mineralization.

Sulphide minerals are chiefly pyrite which is suspected to represent two or more generations. The next most abundant sulphides are pyrrhotite and locally arsenopyrite with lesser chalcopyrite and sphalerite. Preliminary mineralographic studies have shown small grains of electrum in close association with chalcopyrite cutting arsenopyrite and as grains with arsenopyrite. Native bismuth is associated with galena in some samples with further association with gold, electrum and unidentified silver minerals. See Appendix B. Mineralography.

MINERAL POTENTIAL OF THE CATFACE-KENNEDY LAKE REGION

Table II lists the properties found in MEMPR Minfile (Revised 1983). This table indicates that mineral deposits of the Catface-Kennedy Lake

TABLE II

MEARES ISLAND - BEDWELL SOUND

Minfile No.	Property	Commodity	Type
92 F-77 & 163	KALAPPA	Au Ag Cu (Zn)	Vein shear systems
120	CATFACE	Cu Mo	Porphyry
154	GOOD HOPE	Cu Au Ag	Quartz veins
158-204	IRON CAP		
	LONE CONE	Au Ag Cu Ni Mo	Disseminated sulphides and in fractures
227	MN 2	Cu Zn	Veins
228	MN 22	Cu	Veins
250	TOFINO MOLYBDENITE	Mo Cu (Zn)	Veins
251	IRISHMAN CK	Cu	Veins
299	CYPRUS	Cu Mo	Quartz Veins
342	ISLAND CYPRUS CAT	Cu Au Mo	?
343	BAY CK	Cu	Scattered pyrite & pyrrhotite in quartzite
344	CATS EYE	Cu Ag	Quartz filled fractures
	WARN BAY - TRANQUIL INLET		
92 F- 29	TOFINO NICKLE	Ag Cu Ni Mo Fe Pb	Bands of dissemination in Westcoast Complex
39	MAPLE LEAF	Au Cu	4 Veins
40	GOLD FLAKE	Au Ag	Quartz Veins
41	FANDORA	Au Ag	4 Quartz Veins
42	YANKEE BAY	Au Ag	Quartz Veins
43	AMERICAN WONDER	Fe Cu	Skarn
152	B.C. WONDER (General James M)	Fe Cu	Skarn
153	B.C. WONDER (Iron Duke)	Fe Cu	Skarn
205	FREE GOLD	Au	Quartz Vein
	TOFINO INLET		
9	WHITE (Douglas)	Cu Fe	Skarn
10	FORMOST COPPER 3	Fe Cu	Skarn
15	HETTY GREEN	Mo Cu Fe	Skarn
16	HORSE HUMP	Cu	Limestone Skarn ?
17	[13]	Cu Fe	Skarn

TOFINO INLET (Continued)

TABLE II

Minfile No	Property	Commodity	Type
92 F-18	[14]	Fe	Quartz Vein
19	VELVET	Mo Cu	Skarn
20	[16]	Mo Cu	Skarn
21	[17]	Cu Fe	Skarn
22	JUMBO	Cu Mo	Limestone Skarn ?
23	TOFINO	Ag Cu	Composite Quartz vein
24	[19]	Fe	Massive magnetite cutting diorite/granodiorite
25	CROW	Fe Cu	Limestone skarn ?
26	[21,22]	Fe	Skarn
27	[23]	Fe	Massive magnetite-bearing pyrrhotite
28	[24]	Fe	Limestone Skarn ?

KENNEDY RIVER

92 F- 30	OK	Cu	Skarn ? Shear
31	LEORA (Sylvanite)	Au Ag	Quartz-carbonate veins
32	ROSE MARIE	Au	Quartz Veins
33	TOMMY K	Au Ag Cu	Quartz Veinlets
35	IRON MOUNTAIN	Fe	Skarn
36	WANDERER	Au	Quartz Veins
44	BEAR	Au	Quartz Vein
45	IRONSIDES	Fe	?
46	OLYMPIC (Titanic)	Au	Quartz Vein
47	JU JU	Cu Zn	Quartz Veins
48	GRANT	Au Ag	Quartz Veins
49	RUTH	Ag Cu (Au)	Quartz Vein
50	BESSIE B	Au	Quartz stringers
51	BLUE BIRD	Au Ag	Quartz Veins
52	GOLD QUEEN	Au	Quartz Veins
284	LD	Cu	Fracture Filling
294	HI	Cu Mo	?
392	NBD	Fe Cu	?

Region fall into four main categories which include:

(a) Porphyry copper-molybdenum deposits associated with Tertiary plutons and breccias

(b) Skarn iron-copper deposits associated with Jurassic (Island Intrusions) and/or Tertiary plutons at contacts with limestone or calcium-rich volcanics.

(c) Disseminated sulphides and fracture fillings in Westcoast Complex.

(d) Vein deposits, simple and complex, filled with quartz with or without carbonate, containing sulphides with varied gold and/or silver values. The gold-bearing veins are commonly related to or are in close proximity to Tertiary plutons. See Figure 5.

The Kalappa property, because of the presence of the inferred Tertiary breccia, provides a suitable environment for porphyry copper-molybdenum mineralization. In particular the environment is favourable for precious metal bearing veins associated with this high structural level intrusive breccia.

PRELIMINARY ASSESSMENT PROGRAM

The preliminary assessment program of surface and underground sampling of the Kalappa property was carried out in the periods May 10 to 14 and June 27 to July 3: 1984. See Figures 4,6,7 & 8.

UNDERGROUND

Five adits on the Kalappa property were made accessible by Iron River Resources personnel removing sloughed material blocking the entrances

of Adit 2 (Level 1) and Adit 5 and dewatering by trenching Adits 2,3, 4 and 5. There is a total of approximately 430 metres of drifting and crosscutting in the 5 adits excluding an unknown amount of raising and stoping. See figures 6,7 & 8.

MAIN WORKINGS

The lower level of the main workings consisting of three levels is located approximately 400 metres by trail from the shoreline of Lemmens Inlet. See Figure 6.

Ladders into the stopes have rotted or the nails holding the rungs in place have rusted through preventing access for sampling and accurate measurement of the stopes.

ADIT 2 (LEVEL I) Elevation approximately 100 metres

Level I, about 110 metres in length, does not appear to be extensively stoped but one chute and manway, extending for an estimated 12 metres, were put in place for possible production from this level.

ADIT 3 (LEVEL II) Elevation approximately 145 metres

Level II, in two branches, totals 170 metres; with 8 ore chutes and manways driven upwards towards Level III.

Ladders were constructed which provided access for sampling and rough measurement of a stope above chutes 5 and 6. This stope ranges in height from about 6 metres on the north, through a partially filled waste zone to a second section an estimated 10 metres above the floor of Level II. The length of the stoped area is approximately 25 metres.

It was possible to see an estimated 10 to 20 metres up most of the remaining manways but no accurate measurements were possible. Examination of the floor of Level III indicates that stoping of at least one of the Level II chutes broke through to the upper level.

ADIT 4 (LEVEL III) Elevation approximately 180 metres

Level III contains five ore chutes and manways providing access for stoping towards the surface. Access was achieved through a crawl hole from surface into the top of one of the stopes permitting sampling. Accurate measurement of the height of this stope can be achieved by surface and underground surveying. Estimated distances to the tops of the manways are approximately 10 or 12 metres.

PERIPHERAL WORKINGS

ADIT 1 Elevation approximately 60 metres

Adit 1 is 7 metres in length and is located 200 metres west of Level I of the main workings

ADIT 5 Elevation approximately 180 metres

Adit 5 is 30 metres in length and contains no ore chutes or manways. It is located approximately 120 metres east of the main workings.

SURFACE SAMPLING

A total of 13 surface samples were taken from widespread locations. See Figure 4. These include 5 vein systems, in addition to those of the main workings, either exposed in old trenches or newly discovered.

Three grab samples were taken of Kalappa breccia in attempt to confirm gold positive assays reported by earlier workers.

RESULTS

Table III is a list of 88 continuous chip samples (unless otherwise indicated) taken for assay from adits underground and from surface exposures. The table indicates widths, assay values and gives descriptions of what the samples represent. Samples from the two sampling periods are grouped according to location rather than being tabulated in numerical order.

UNDERGROUND

Adit 1 is driven on a vein-shear system which, out of 2 samples, produced ore gold positive value of 0.042 oz Au/ton and 0.34 Ag/ton over 0.1 metres.

Adits 2 (Level 1 of the main workings) from which 14 continuous chip samples were taken produced values ranging from 0.001 to 0.177 oz Au/ton and 0.01 to 0.26 oz Ag/ton. Five of the 14 samples gave values greater than 0.01 oz Au/ton over average widths of 0.3 metres.

Adit 3 (Level 2 of the main workings) from which 23 continuous chip samples were taken provided values ranging from 0.001 to 1.114 oz Au/ton and 0.01 to 6.47 oz Ag/ton. Sixteen of the 25 samples gave values greater than 0.01 oz Au/ton over average widths of 0.4 metres. The best values, from samples #7012, #7069 to #7071, extend for approximately 6 metres starting about 12 metres from the portal. These samples give a weighted average of 0.708 oz Au/ton over an average width of 0.42 metres. Two low samples occur between these values and #7072, 5 metres in from the portal, which gave 0.221 oz Au/ton over 0.3 metres.

TABLE III ASSAYS

SAMPLE NO.	WIDTH (metre)	AU OZ/T	AG OZ/T	AS%	DESCRIPTION
ADIT #1					
7028	0.1	.006	0.17		Vein-shear
7029	0.4	.042	0.34		Vein-shear
7030	-	.001	0.01		White "bull" quartz
ADIT #2 (Level #1)					
7037	0.30 (±.1)	.004	0.13		Centre of back well developed shear
7038	0.3	.003	0.01		Shear and gouge iron staining, quartz & calcite
7039	0.4	.002	0.27		Footwall shear, layered iron-stained gouge with quartz and/or carbonate
7040	0.3	.001	0.05		Sheared footwall, gouge, iron-stained
7041	0.5	.053	0.23		Iron-stained, brecciated shear
7042	0.3	.025	0.20	2.65	Gouge, shear, strong laminated
		.031	0.24	4.98	sulphides in gouge, heavily iron-stained
7043	0.3	.017	0.23	4.37	Gouge, sulphides, shear
7044	0.25	.008	0.05		Gouge and shear, some sulphides and iron-staining, alternating light layers
7045	1.0	.007	0.06		Hanging wall, gouge, breccia, iron-staining
7046	0.15	.177	0.26		Shear zone on left (west) wall
7047	0.25	.001	0.02		Footwall shear breccia zone Rest of back Westcoast Complex
7048	0.6	.008	0.14		Footwall breccia, iron-stained
7049	0.15	.012	0.17		Hanging wall gouge
7050	0.4	.003	0.01		Vein-shear

TABLE III (Continued)

SAMPLE NO	WIDTH (width)	AU oz/t	AG oz/t	CU %	PB %	ZN %	AS %	DESCRIPTION
ADIT #3 (Level #2)								
7001	0.5	.001 30ppb	.07	.118	.01	.07		Shear breccia, carbonate quartz
7002	0.4	.013	.06					Breccia, altered Westcoast Complex
7003	0.1	.005	.04					Sheared hanging wall and footwall
7004	0.3	.077 (.077)	.39	.221	.01	.04		Intensely sheared sulphide-rich, clay altered zone
7005	1.0	.017	.23	.150	.01	.08		Sheared breccia
7006	0.35	.060	.61					Vein, shear system
7007	1.0	.001	.02					Breccia
7008	0.3	.001	.01					Vein-shear system
7009	0.4	.042 1400ppb	.87	.875	.01	.12		Sulphide-rich, quartz-siliceous zone
7010	--	.001 (.001)	.05	.064	.01	.02		Pyritized waste rock
7011	--	.001	.01					Pyritized waste rock
7012	0.4	0.971	6.47	.185	.02	.02		Black gouge, finely divided sulphides
7013	0.5	.030	.10					Breccia containing some finely divided sulphide gouge
7014	0.5	.007	.12					Breccia. minor shear, rusty
7015	0.3	.026	.17					Fine breccia, iron-stained
7016	0.3	.001	.06					Vein-shear
7017	0.4	.001	.03					Vein-breccia-shear, iron stained
7018	0.4	.001	.01					Breccia, not stained
7065	0.2	.029	.24					Siliceous breccia and sulphides, sheared on the footwall
7066	0.35	.048	.12					Quartz, breccia, and sulphides, shear
7067	0.40	.012	.23					Gouge, shear zone
7068	0.10	.015	.08					Hanging wall, vein shear; gouge, layered by iron staining (H.W. side of 7012 not same structure)
7069	0.20	1.114	5.75				4.70	Black massive sulphides
7070	0.80	.620	3.09				4.55	Contains 0.1m of solid granular sulphides siliceous carbonate, brecciated
7071	0.30	.319	2.33				2.70	Shear gouge breccia with layers of massive sulphides

TABLE III (Continued)

SAMPLE NO	WIDTH (metre)	AU oz/t	AG oz/t	CU %	PB %	ZN %	AS %	DESCRIPTION
7072	0.30	.221	.36					Strong shear, quartz and carbonate. Iron-stained, layered, numerous country rock clasts
STOPE BETWEEN CHUTES 5 & 6								
7073	.35	.314	1.51				3.42	Lensoidal, pyrite, pyrrhotite (Greater than 1m wide at top of stope). Massive sulphides
7074	.35	.166	3.03				4.53	Quartz and massive sulphides
7075	.25	.589	2.36				0.18	Shear zone about 1.0m wide horse of country rock. Foot-wall is gouge and crushed sulphides in a shear
7076	.20	.222	.93				3.23	Hanging wall; gouge, clay, contains lensoids of crushed, granular sulphides
ADIT #4 (LEVEL #3)								
7019	.3	.007	.04					Vein, quartz breccia
7020	.3	.048	.36					Iron-stained breccia
7021	.15	.386	1.01	.605	.01	.16		Vein-shear
7022	1.0	.006 1000ppb	.12	.08	.01	.18		Left side, silicified breccia veins, sulphides
7023	1.0	.023 (.024) 1980ppb	.11	.091	.01	.03		Right side, silicified breccia, veins, sulphides
7024	--	.053 175ppb	.13	.058	.01	.06		Blasted material as for 7022,7023
7025	1.0	.001	.04					Siliceous,carbonate, iron-stained breccia
7026	0.4	.001	.06					Late gouge breccia, iron-stained
7027	0.4	.001	.07					Breccia, some iron staining
7051 (7020)	0.3	.304	1.09				8.63	Quartz and sulphides well developed veining, attempt to duplicate #7020
7052	.25	.293	1.01				8.47	Just before stope at chute 4
7053 (7021)	.18	.239	1.66				3.30	Sulphide and quartz-rich vein system. flanked on east by iron-stained breccia

TABLE III (Continued)

SAMPLE NO	WIDTH (metre)	AU oz/t	AG oz/t	CU %	PB %	ZN %	AS %	DESCRIPTION
7054	0.20	.017	.11					Breccia and quartz infilling pyrrhotite, pyrite, disseminated sulphides in country rock.
7055	0.4	.001	.12					Footwall breccia, iron-stained
7056	1.0	.001	.07					Hanging wall wall rock
7057	1.0	.006	.10					Silicified, mineralized, sulphide-rich country rock. Contains a small shear zone on a cross structure
7058	1.0	.009	.07					Chip samples across roof of silicified, mineralized brecciated country rock
7059 (7024)	1.0	.076	.33				4.94	Brecciated country rock silicified, mineralized pyrite, pyrrhotite
7060	0.2	.110	1.36					Quartz vein, breccia (1 m beyond 7058)
7061	0.2	.180	.23					Mainly breccia with footwall banded quartz and sulphides measures 2 to 3 cm.
7062	0.2	.246	.29				5.12	Strong quartz vein, strong sulphide layering locally
Top of stope driven from Level 3 Accessed from surface.								
7063	0.4	1.272	5.69				5.15	Footwall branch of massive sulphide vein, pyrite, pyrrhotite, chalcopyrite
7064	0.25	.494	2.80				0.15	Hanging wall branch of vein 7063. Approximately 1.5 metres country rock in between
ADIT #5								
7032	0.4	.001	.05	.028	.01	.47		Gouge and breccia
7033	1.2	.001	.05					Breccia, gouge and breccia (incl. 7032)

TABLE III (Continued)

SAMPLE NO	WIDTH (width)	AU oz/t	AG oz/t	CU %	PB %	ZN %	AS %	DESCRIPTION
7034	0.35	.093	.60					Vein, gouge, breccia iron-stained
7035	0.30	.001	.13					Shear, (breccia),"unstained"
7036	0.50	.001 (.001) +10,000ppb	1.01	.48	.02	3.32		Siliceous, breccia, abundant sulphides
SURFACE SAMPLES								
7077	0.15	.011	0.29				0.70	Cut #2 Quartz vein, brecciated, finely divided sulphides and/or mafics in clay gouge with quartz fragments
7078	0.5	.314	0.64				7.97	Cut #2. Westcoast Complex Siliceous shear zone. Near hanging wall there is 0.02 to 0.03 m of sulphides, largely arsenopyrite
7079	2.0	.009	0.34				0.25	Adit #6 Silicified vein system with localized sulphides near centre of system. There is about 0.30m of abundant sulphides, finely divided and black
7080	0.30	.135	2.60				0.12	Selected sample across approximately 0.3 metres of the sulphide zone at Adit #6
7081	0.30	.130	3.79				17.90	Pit above adit #6 Shear breccia, limonitic and jarositic
7082	0.25	.017	0.30				0.65	Trench #3 Vein on west side Random chip samples of mineralized rocks
7083	0.30	.276	1.88				14.70	Trench #3 Chip samples across 2nd vein (north of 7083) Sulphides including arseno-pyrite.
7084	0.30	.197	1.98				9.30	Trench #3 Chip samples across 2nd vein (north of 7083) Sulphides including arseno-pyrite

N

SNINNICK L 1300

KALAPPA L 1299

GOLDEN GATE L 1302

JACK OF CLUBS L 1301

100

200

300

ADIT 1

ADIT 2

ADIT 3

ADIT 4

ADIT 5

ADIT 6

140°

160°

80

RKH

7086

KALAPPA BRECCIA

87

144°

7077

7078

85

140°

7079

7080

7081

140°

7082 7083 7084 7085

70

170° - 176°

IRON RIVER RESOURCES LTD.	
GEOLOGY & SURFACE SAMPLE ASSAY MAP	
FIGURE: 4.	SCALE:
DRAWN BY: P. STOECKLY	DATE: JULY 84
K.E. NORTHCOTE & ASSOCIATES LTD.	

TABLE III (Continued)

SAMPLE NO	WIDTH (width)	AU oz/t	AG oz/t	CU %	PB %	ZN %	AS %	DESCRIPTION
7085	0.25	.059	.53				2.84	Trench #3 Chip samples across 3rd vein on east side of vein system. Sulphides including arsenopyrite
7086	0.25	.206	.30				7.84	RK-11, siliceous vein, arsenopyrite
7087	Float	.005	.03				0.05	RK-6, float from pit, mineralized breccia
7088	Float	.058	.35				0.20	RK-7 to 8, mineralized breccia
7090	Float	.009	.06				0.03	RK -10

ASSAYS REPORTED BY EARLIER WORKERS

1914 PRODUCTION

1512 tons returning 569 oz Au; 3544 oz Ag; 60,363 lbs Cu.

MEMPR ASSESSMENT REPORT #2108, P.E. Hirst P.Eng. November 1969

KALLAPPA BRECCIA

SAMPLE	WIDTH	CU%	ZN%	ASppm	AU oz/t	AG oz/t
3715	5'	0.04	0.05	38	.005	.16
3716	6'	0.01	0.05	10	Tr.	.04
3717	8'	0.07	0.05	400	,050	.24
3718	7'	0.01	0.05	10	Tr	.08
3719	8'	0.04	0.05	18	Tr	.14
3720	7'	0.08	0.20	1000	.035	.16
3722	12'	0.04	0.41	18	Tr	Tr
3723	12'	0.04	0.54	8	Tr	Tr
3724	10'	0.01	0.02	18	ND	Tr
3725	9.5'	0.01	0.01	38	Tr	Tr
3726	5'	0.01	0.01	18	ND	Tr
3727	7.4'	.008	.006?	10	ND	Tr
3728	15'	0.02	0.01	30	Tr	Tr
3729	7.5'?	0.06	0.08	6	ND	Tr
3730	6'	.009	.006	8	Tr	Tr

MEMPR ASSESSMENT REPORT #2108 (Continued)

SAMPLE	WIDTH	CU%	ZN%	AS ppm	AU oz/t	Ag oz/t
PERIPHERAL SYSTEMS						
3704	2'vein	Tr	0.06	11.2%	4.3	2.8
3705	12"pyrite	Tr	-	- -	Tr	Tr
3706	- - -	0.01	-	8	-	-
3707	- - -	Tr	-	7	-	-
3708	- - -	21	-	-	0.07	0.8
3709		4.3	-	-	Tr	4.7
3710		1.1	-	-	Tr	1.1
3711		Tr	-	7	Tr	Tr
3712		0.01	-	10	Tr	Tr
3713		0.01	-	4	Tr	0.1
3714		0.03	0.05	5	Tr	Tr
SAMPLING BY A.D. WILMOT P.Eng.			May 1973			
350 (TR4) Diorite	18"				0.001	0.03
351 (TR2)	14"				0.260	0.21
352 (TR1)	16"				0.400	2.56
	14"				0.480	2.52
ADIT (Grab)	J. Harquail.				4.3	2.8
361 (TR 10)	12"				0.216	?

Four samples taken from the stope above chutes 5 and 6 range from 0.166 to 0.589 oz. Au/ton across widths of 0.25 to 0.35 metres. These values are from opposite ends of the stope approximately 24 metres apart. A visual estimate of the width of the vein at the top of the stope is approximately 1.0 metres.

Adit #4 (Level 3 of the main workings) from which 21 chip samples were taken produced values ranging from 0.001 to 0.386 oz Au/ton and 0.04 to

1.36 oz Ag/ton. A cluster of samples 7020, 7051, 7021, 7052, 7053 gave a weighted average of 0.24 oz Au/ton over an average width of 0.25 metres.

Two samples taken from the top of a stope above adit 4 gave values 1.272 oz Au/ton across 0.4 metres and 0.494 oz Au/ton across 0.25 metres.

Adit #5 which has abundant near massive sulphides, pyrite, pyrrhotite, chalcopyrite and sphalerite in siliceous breccia at the face of the adit, (sample 7036), gave only 0.001 oz Au/ton in fire assays and fire assay checks, and 1.01 oz Ag/ton. A geochemical analysis for gold in this same sample produced more than 10,000 ppb Au or approximately 0.30 oz Au/ton. This discrepancy may be the result of nugget effect so further investigation of this zone is required. Sample 7034 gave a gold positive value of 0.093 oz Au/ton and 0.60 oz Ag/ton over 0.35 metres from a less obvious sulphide mineralized vein shear system in the adit.

SURFACE SAMPLING

Surface sampling of vein-shear systems gave encouraging results in that all are gold positive with values ranging from 0.009 across 2 metres; to 0.314 across 0.5 metres in Cut #2. See Figure 4. It is noted that two samples from within Kalappa breccia gave significant Au values. Sample 7086 from RK-11 siliceous arsenopyrite bearing vein 0.25 metres thick where sampled gave 0.206 oz Au/ton. A sample of float of Kalappa breccia from RK 7 to 8, bearing disseminated arsenopyrite, gave 0.058 oz Au/ton. Trench #3 on the JIM claim with at least 3 vein-shear systems within a 3 metre width, samples 7082 to 7085, considered in conjunction with apparent stoped widths in the main workings suggests potential for discovery of additional vein-shear systems of significant mining widths.

CONCLUSIONS

POTENTIAL OF VEIN SYSTEM IN MAIN WORKINGS

Ore grade material occurs in existing workings. Configuration of stopes suggests ore bodies extend over short horizontal distances with longer vertical extensions.

Although it may be assumed that some or perhaps most of the better-grade accessible ore has been removed some potential exists for production of additional ore by developing above and below existing stopes which are not completely mined.

Level I

(a) Potential of the volume above the manway and chute in Level I is not known. It appears that stoping is minimal at this location.

(b) The significance of sample No. 7046, (0.177 oz Au/ton) is that it may be the start of an ore body along strike from the face of Level I.

Level II

(c) The best grade ore may have been removed from stopes above chute 1 and 2 which appears to penetrate to Level III. There may, however, be ore grade material below Level II at this point.

(d) Additional potential may exist above the remaining chutes where not mined out, such as above chutes 5 and 6 where ore grade values were obtained and the vein system appears to widen at the top of this stope. Still further potential exists below the floor of Level II

beneath all of the stopes. All these areas require sampling.

(e) The ore grade values in the narrow vein-shear-gouge system 12 metres in from the portal may be the start of an ore body above or below Level II.

Level III

The stope penetrating almost to surface above chute 1 and/or 2 gave values of approximately 0.5 to greater than 1 oz. Au/ton over significant widths. Little additional potential exists in this ore body because of proximity to surface. Stoping from Level II appears to correspond to this ore body. Some potential exists, however, for discovery of new ore bodies deeper in the hillside southeasterly along strike.

When surveyed, the stopes which indicate significant mining widths will serve as models of size and shape of ore bodies that can be anticipated elsewhere in this and peripheral vein-shear systems.

POTENTIAL IN PERIPHERAL VEIN SYSTEMS

All known quartz-vein-shear systems striking 140 to 170° located peripheral to the main workings produced gold-positive values. The significance of this is that each of these veins can be considered a potential host for gold and silver ore bodies. The potential for discovery of additional vein shear systems containing segments of significant mining widths is supported by presence of at least 3 vein shear systems within a 3 metre interval at Trench #3 on the JIM claim.

A preliminary examination of air photographs BC 1070-109 and 110 clearly shows multiple southeasterly to southerly trending linears which parallel known mineralized gold-bearing shear systems. Although none of the linears have been correlated with mineralized veins such correlation seems likely. Virtually untested gold-positive vein-shear systems peripheral to or parallel to those of the main workings provide very significant potential for additional ore bodies.

Assay values for gold accompanying strong sulphide mineralization in siliceous breccias at the ends of Adits 5, 4(Level III),and 3(Level II) are low. It was thought that low gold values might be a result of close proximity to Kalappa breccia. It is noted, however, that sample 7046 from the face of Level I, 0.177 oz Au/ton and 0.26 oz Ag/ton, and gold positive samples 7086 and 7088 at 0.206 and 0.058 oz Au/ton respectively and Assessment Report 2108 at 0.050 and 0,0350 oz Au/ton from Kalappa breccia suggests gold-bearing potential possibly related to late crackle breccia quartz infilling.

MEMPR Assessment Report 2108 indicates As, Zn and Cu anomalies on Defiance I claim. These anomalies may be indicative of additional gold veins on the west side of the breccia.

MINERALOGRAPHIC STUDIES

Preliminary mineralographic and scanning electron microscope studies show small grains of electrum (-.01 to 0.1(+)mm) in association with chalcopyrite filling brecciated arsenopyrite and as grains in arsenopyrite. Native bismuth occurs with small amounts of anomalous purplish tinted galena (SEM) and is associated with minute grains of electrum and other silver bearing minerals, argentite (?). See Appendix B.

RECOMMENDATIONS

STAGE I

Stage I is designed to assess potential of present workings for extensions to known ore bodies and for discovery of new ore bodies along strike or up and down dip of the vein-shear systems in the main workings and in other systems peripheral to them.

It is recommended that:

(1) Existing adits, drifts and crosscuts be mapped scale 1:100 and fill-in sampling be done

(2) Ladders into existing stopes be rehabilitated to permit thorough geologic mapping and sampling, scale 1:100

(3) An accurate survey is required to establish spatial relationships, distance and elevation of all adits and known vein-shear systems on the property. These could be located on a topographic map prepared from air photographs.

(4) Trenching and sampling by blasting and hand mucking is required to extend and sample surficial vein-shear systems.

(5) Surficial geologic mapping scale 1:1000 of the property accompanied by prospecting and rock geochemistry is required on the principal crown grant claims and in areas of arsenic-zinc-copper soil geochemical anomalies (MEMPR Assessment Report No.2108)

(6) Mineralographic and petrographic study of vein-shear systems and Kalappa breccia.

(7) Environmental impact and metallurgical studies would be initiated in Stage I.

STAGE II

Stage II is designed to further delineate target areas. Progression to this stage is dependent upon satisfactory results from Stage I on the recommendation of an independent engineer.

(1) Magnetometer and VLF-EM survey on and off possible extensions of areas of interest resulting from Stage I.

(2) Fill-in geochemical surveys in areas of geologic mapping

(3) Trenching as in Stage I, geological mapping

(4) Initial diamond drilling from surface estimated 2500 feet.

(5) Environmental impact and metallurgical studies would continue during Stage II.

STAGE III Diamond Drilling and Bulk Sampling

Dependent upon favourable results from Stages I and II and upon recommendation of an independent engineer a third progressive stage is envisaged.

Initially, access for bulk sampling and diamond drilling equipment would be required. Because of steepness of terrain, rock outcrops and dense rainforest growth these costs will be high and the estimates provided herein are tentative. Closer approximation of costs will be possible as Stages I and II progress.

Stage III would involve an initial 4000 to 5000 feet of diamond drilling from surface and/or underground. A bulk sampling program underground and on surface would also be initiated utilizing mechanized equipment. Environmental impact and metallurgical studies would continue during this stage.

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CERTIFICATE

I, Kenneth E. Northcote of 2346 Ashton Road, R.R.#1, Agassiz B.C. do hereby certify that:

1] I have been practising as a professional geologist for a period of approximately 25 years for petroleum exploration companies, mining exploration and consulting companies, federal and provincial agencies.

2] I obtained a Ph.D. in geology from U.B.C. in 1968 and qualified for registration with the Association of Professional Engineers of B.C. in 1967.

3] This report is a result of work done personally on the Kalappa property during the periods May 10 to 14 and June 27 to July 3, 1984. Use was made of available pertinent published and unpublished maps and publications.

4] I have no interest either directly or indirectly in the properties or securities of Iron River Resources Ltd., not do I expect to receive any as a result of this report.

5] I consent to the use of this report in, or in connection with, a prospectus relating to the raising of funds.

Dated at Agassiz this day .

K.E. Northcote Ph.D.,P.Eng.

APPENDIX A

ASSAYS

MIN-EN Laboratories Ltd.

Specialists in Mineral Environments

705 WEST 15th STREET NORTH VANCOUVER, B.C. CANADA V7M 1T2

E:(604)980-5814 OR (604)988-4524 TELEX: 04-352828

CERTIFICATE OF ASSAY

COMPANY KEN NORTHCOTE & ASSOC. FILE 4-284R
PROJECT 84-4 84-7 DATE JUNE 1/84
ATTENTION KEN NORTHCOTE

We hereby certify that the following are assay results for samples submitted.

SAMPLE NUMBER	AU G/TONNE	AU OZ/TON	CU %	PB %	ZN %
7001			.118	.01	.07
7004	2.64	0.077	.221	.01	.04
7005			.150	.01	.08
7009			.875	.01	.12
7010	.01	0.001	.064	.01	.02
7012			.185	.02	.02
7021			.605	.01	.16
7022			.080	.01	.18
7023	.82	0.024	.091	.01	.03
7024			.058	.01	.06
[illegible]32			.028	.01	.47
7036	.02	0.001	.480	.02	3.32

Certified by _____

MIN-EN LABORATORIES LTD.

MIN-EN Laboratories Ltd.
Specialists in Mineral Environments
705 WEST 15th STREET NORTH VANCOUVER, B.C. CANADA V7M 1T2

PHONE: (604)980-5814 OR (604)988-4524 TELEX: 04-352828

CERTIFICATE OF ASSAY

COMPANY K E NORTHCOTE & ASSOC
PROJECT 84-4 & 84-7
ATTENTION K E NORTHCOTE

FILE 4-284
DATE MAY 25/84

We hereby certify that the following are assay results for samples submitted.

SAMPLE NUMBER	AG G/TONNE	AG OZ/TON	AU G/TONNE	AU OZ/TON
7001	2.3	0.07	.01	0.001
7002	1.9	0.06	.44	0.013
7003	1.5	0.04	.18	0.005
7004	13.4	0.39	2.64	0.077
7005	7.8	0.23	.58	0.017
7006	21.0	0.61	2.06	0.060
7007	0.8	0.02	.01	0.001
7008	0.1	0.01	.01	0.001
7009	29.8	0.87	1.45	0.042
7010	1.7	0.05	.01	0.001
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	222.0	6.47	33.30	0.971
7013	3.6	0.10	1.02	0.030
7014	4.3	0.12	.24	0.007
[illegible]	5.9	0.17	.90	0.026
7016	2.0	0.06	.01	0.001
[illegible]	1.2	0.03	.01	0.001
7018	0.4	0.01	.01	0.001
7019	1.3	0.04	.25	0.007
7020	12.4	0.36	1.63	0.048
7021	34.5	1.01	13.25	0.386
7022	4.1	0.12	.20	0.006
[illegible]	3.9	0.11	.80	0.023
7024	4.3	0.13	1.82	0.053
[illegible]	1.5	0.04	.01	0.001
7026	2.0	0.06	.01	0.001
7027	[illegible]	0.07	.01	0.001
[illegible]	[illegible]	[illegible]	.20	[illegible]
[illegible]	11.8	0.34	1.45	0.042
7030	0.1	0.01	.01	0.001

Certified by

MIN-EN LABORATORIES LTD.

MIN-EN Laboratories Ltd.
Specialists in Mineral Environments
705 WEST 15th STREET NORTH VANCOUVER, B.C. CANADA V7M 1T2

PHONE: (604)980-5814 OR (604)988-4524 TELEX: 04-352828

CERTIFICATE OF ASSAY

COMPANY K E NORTHCOTE & ASSOC
PROJECT 84-4 & 84-7
ATTENTION K E NORTHCOTE

FILE 4-284
DATE MAY 25/84

We hereby certify that the following are assay results for samples submitted.

SAMPLE NUMBER-	AG G/TONNE	AG OZ/TON	AU G/TONNE	AU OZ/TON
7032	1.8	0.05	.01	0.001
7033	1.7	0.05	.01	0.001
7034	20.6	0.60	3.20	0.093
7035	4.3	0.13	.02	0.001
7036	34.8	1.01	.05	0.001

Certified by

MIN-EN LABORATORIES LTD.

MIN-EN Laboratories Ltd.
Specialists in Mineral Environments
705 WEST 15th STREET NORTH VANCOUVER, B.C. CANADA V7M 1T2

E:(604)980-5814 OR (604)988-4524 TELEX: 04-352828

CERTIFICATE OF ASSAY

COMPANY: K.E. NORTHCOTE
PROJECT: 84-4
ATTENTION: K.E. NORTHCOTE

FILE:4-549/P1
DATE: JULY 17/84
TYPE: ROCK ASSAY

We hereby certify that the following are assay results for samples submitted.

SAMPLE NUMBER	AG G/TONNE	AG OZ/TON	AU G/TONNE	AU OZ/TON	AS %
7037	4.5	0.13	.13	0.004	
7038	0.4	0.01	.11	0.003	
7039	9.3	0.27	.06	0.002	
7040	1.6	0.05	.04	0.001	
7041	8.0	0.23	1.83	0.053	
7042	6.7	0.20	.86	0.025	2.65
7042-PET	8.1	0.24	1.06	0.031	4.98
7043	8.0	0.23	.59	0.017	4.37
7044	1.8	0.05	.26	0.008	
7045	1.9	0.06	.23	0.007	
7046	7.6	0.22	6.07	0.177	
7047	0.6	0.02	.04	0.001	
7048	4.8	0.14	.28	0.008	
7049	5.7	0.17	.42	0.012	
7050	0.5	0.01	.10	0.003	
7051	37.4	1.09	10.42	0.304	2.63
7052	34.6	1.01	10.05	0.293	1.47
7053	57.0	1.66	8.18	0.239	2.30
7054	3.7	0.11	.60	0.017	
7055	4.1	0.12	.04	0.001	
7056	2.3	0.07	.03	0.001	
7057	3.6	0.10	.19	0.006	
7058	2.3	0.07	.30	0.009	
7059	11.2	0.33	2.62	0.076	4.74
7060	60.0	1.75	3.77	0.110	
7061	7.9	0.23	5.15	0.150	
7062	10.0	0.29	8.43	0.246	5.11
7063	128.0	3.73	43.60	1.272	2.15
7064	70.0	2.04	16.95	0.494	.15
7065	7.3	0.21	.02	[illegible]	

Certified by [signature]

MIN-EN LABORATORIES LTD.

MIN-EN Laboratories Ltd.
Specialists in Mineral Environments
705 WEST 15th STREET NORTH VANCOUVER, B.C. CANADA V7M 1T2

(604)980-5814 OR (604)988-4524 TELEX: 04-352828

CERTIFICATE OF ASSAY

COMPANY: K.E. NORTHCOTE
PROJECT: 84-4
ATTENTION: K.E. NORTHCOTE

FILE: 4-549/P2
DATE: JULY 17/84
TYPE: ROCK ASSAY

We hereby certify that the following are assay results for samples submitted.

SAMPLE NUMBER	AG G/TONNE	AG OZ/TON	AU G/TONNE	AU OZ/TON	AS %
7066	4.1	0.12	1.63	0.048	
7067	6.0	0.23	.41	0.012	
7069	2.6	0.08	.52	0.015	
7069	197.0	5.75	38.20	1.114	4.70
7070	106.0	3.09	21.25	0.620	4.35
7071	79.8	2.33	10.95	0.319	2.70
7072	12.4	0.36	7.58	0.221	
7073	51.7	1.51	10.78	0.314	3.42
7074	104.0	3.03	5.68	0.166	4.55
7075	81.0	2.36	20.20	0.589	.18
[illegible]	24.3	0.70	7.62	0.222	3.27
7077	9.8	0.29	.33	0.011	.70
7078	22.1	0.64	10.75	0.314	7.97
7079	11.6	0.34	32	0.009	.25
7080	39.0	1.14	4.43	0.129	.12
7081	120.0	3.79	4.45	0.130	17.90
7082	19.2	0.56	.57	0.017	.41
7083	64.6	1.88	9.46	0.276	14.70
7084	68.0	1.98	5.74	0.167	8.30
7085	18.1	0.53	2.02	0.059	2.64
7086	10.3	0.30	7.05	0.206	7.94
7087	1.0	0.03	.15	0.005	.05
7088	11.3	0.33	1.99	0.058	.20
[illegible]	2.2	0.06	.82	0.024	.06

Certified by _____

MIN-EN LABORATORIES LTD.

Bondar-Clegg & Company Ltd.
130 Pemberton Ave.
North Vancouver, B.C.
Canada V7P 2R5
Phone: (604) 985-0681
Telex: 04-352667

BONDAR-CLEGG

Geochemical Lab Report

REPORT: 124-1097 | PROJECT: NONE GIVEN | PAGE 1

SAMPLE NUMBER	ELEMENT UNITS Au PPB	NOTES
R 9001	<5	
R 9002	380	
P 7001	30	
P 7002	1400	
P 7022	1000	
P 7023	1980	
P 7024	175	
P 7036	> 10000	

Bondar-Clegg & Con
764 Belfast Road
Ottawa, Ontario
Canada K1G 0Z5
Phone: (613) 237-3110
Telex: 053-4455

BONDAR-CLEGG

Geochemical Lab Report

REPORT: 114-1422/114-1432

PROJECT:

SAMPLE NUMBER	ELEMENT UNITS	Cu PPM	Pb PPM	Mo PPM	Co PPM	Ni PPM	Cr PPM	Mn PPM	Cd PPM	As PPM	Bi PPM	Fe PCT	As PPM	Zn PPM	V PPM	Te PPM	U PPM	W PPM	Sb PPM	Se PPM	Sn PPM	NOTES
7001		1131	65	<1	27	28	334	1829	6.0	2.0	<2	6.6	315	797	201	<10	<10	<10	<5	<5	18	
7009		8330	156	<1	186	17	654	358	19.0	25.0	76	15.1>	02000	1337	39	22	<10	<10	86	8	<10	
7022		781	59	<1	12	17	62	1122	21.0	2.6	5	6.2	1240	1897	163	<10	<10	<10	<5	<5	30	
7023		881	48	<1	31	22	87	1003	3.0	2.6	9	8.5>	02000	388	144	<10	<10	<10	10	5	45	
7024		595	81	<1	64	20	372	1274	6.0	3.0	27	8.5>	02000	687	158	14	<10	<10	41	5	27	
7036		4580	186	<1	27	62	244	1196	370.0	30.2	126	20.9>	02000>	20000	97	16	<10	<10	10	<5	<10	
9001		164	22	14	20	33	118	893	<1.0	<0.5	<2	4.4	10	98	166	<10	<10	12	5	<5	<10	
9002		931	3894	2	7	13	148	1020	63.0	10.0	4	2.3	5	863	66	<10	<10	<10	10	6	<10	

Bondar-Clegg & Company Ltd.
130 Pemberton Ave.
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Phone: (604) 985-0681
Telex: 04-352667

BONDAR-CLEGG

Certificate of Analysis

REPORT: 624-1097

PROJECT: NONE GIVEN PAGE 1

SAMPLE NUMBER	ELEMENT UNITS	Au OPT	NOTES
P 7036		0.007	

Registered Assayer, Province of British Columbia

APPENDIX B

KALAPPA PROPERTY

PRELIMINARY MINERALOGRAPHIC STUDY

K.E. NORTHCOTE AND ASSOCIATES LTD.

– Geological, Mineral Exploration and Mineral Land Use Consultants –

2346 ASHTON ROAD, R.R. 1, AGASSIZ, B.C. V0M 1A0 TELEPHONE (604) 796-2068

K.E. NORTHCOTE, Ph.D., P.ENG.

August 7, 1984

Mr. Dan Berkshire
Iron River Resources Ltd.
1910 Galerno Road
Campbell River, B.C

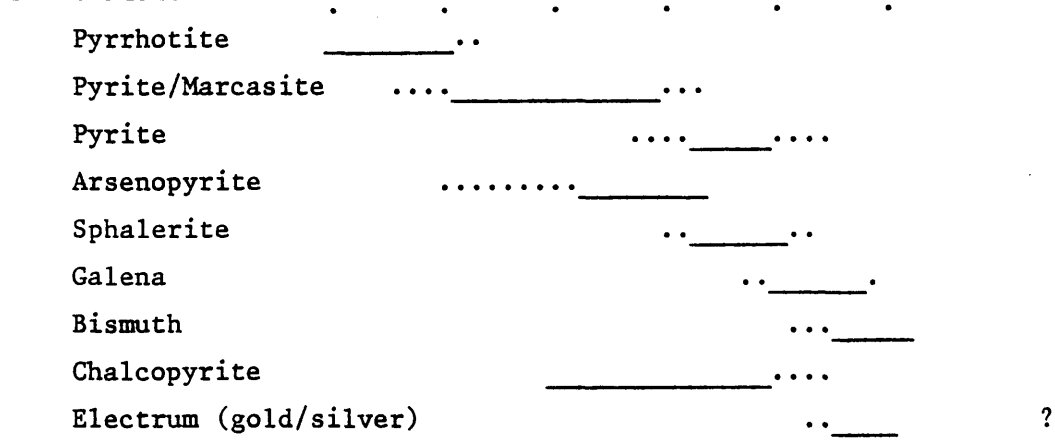
Dear Dan: Re. Kalappa Property Preliminary Mineralographic Study

The preliminary petrographic study included scanning electron microscope study of target areas in 5 of the 8 polished sections. Minerals identified include pyrrhotite, pyrite/marcasite, pyrite, arsenopyrite, sphalerite, chalcopyrite, galena, native bismuth, electrum, argentite?

Pyrrhotite is an early phase which shows alteration through an intense cleaved variety into aggregates of pyrite-marcasite forming filigree/ birdseye textures. A later euhedral/massive generation of pyrite cuts through most of the early and middle stage minerals including sphalerite and arsenopyrite. Chalcopyrite occurs as exsolution blebs in sphalerite and forms a matrix in brecciated sphalerite and arsenopyrite or cuts these minerals as veinlets. With these chalcopyrite veinlets are small composite grains of anomalous pale purplish galena (?) (SEM identification) associated with sphalerite and chalcopyrite native bismuth (-.01 to + .10mm) traces of tetrahedrite and with gangue. Some of these composite grains indicated Au and Ag by SEM analyses.

Although it is premature to state with certainty it appears that most of the gold and silver occurs in combination as electrum (-.01 to +0.1mm) with lesser silver as silver sulphides. The galena and tetrahedrite identified by SEM did not prove silver-bearing. Some gold and silver was detected by SEM in composite galena-bismuth-chalcopyrite-sphalerite-tetrahedrite (?), argentite (?) grains with gold and argentite too small for positive microscopic identification. Study of additional samples containing larger grains will probably resolve this problem. The larger electrum grains appear to occur in close association with chalcopyrite and arsenopyrite. Gold content however does not appear to have a direct correlation with amount of these minerals. A suggested antipathetic relationship between Au and Bi is not conclusive but this relationship will also become clearer with further assays for Bi and through mineral-graphic study.

PARAGENESIS



Preliminary Scanning Electron Microscope Analyses

Minerals confirmed

Galena-light purplish blue grey tint,

Pb, S, trace Te, No Ag was detected

Bismuth-silver white, rough polish

Bi

Tetrahedrite-light grey isotropic

Cu Fe Zn Sb S

Sphalerite

Chalcopyrite

Electrum- bright gold, isotropic, high reflectance

Au, Ag with higher Ag content than Au

Argentite (?)

Ag S

PETROGRAPHIC STUDY

84-K-7009 [115.5 metres from portal Adit 3 (Level III)]

Assays: 0.042 oz Au/ton; 0.87 oz Ag/ton; 0.875 % Cu; 0.01% Pb; 0.12% Zn.

Microscopic

Minerals Present

55% Pyrite; massive and minor subhedral/euhedral contains blebs of galena (?) (SEM) chalcopyrite

35% Arsenopyrite; massive, subhedral/euhedral. Contains blebs of chalcopyrite, pyrrhotite. Crackle breccia filled with chalcopyrite

-10% Chalcopyrite (-.01 to massive) irregular masses

Sphalerite blebs in pyrite and scattered free grains

--1% Galena (?) -.01 to 0.1mm light purplish grey Scanning electron microscope (SEM) gives Pb and S. Appears both isotropic (and apparently anisotropic) Requires further confirmation

Tr Bismuth- irregular grains, graphitic texture in galena(?)

-1% Pyrrhotite (-.01 to .05mm)

84-K-7036 [Face Adit #5]

Assays: .001 oz Au/ton; 1.01 oz Ag/ton; 0.480% Cu; 0.02% Pb; 3.32% Zn.

Microscopic

Minerals Present

25% Pyrrhotite; (-.01mm to massive), alteration through cleaved pyrrhotite to birdseye pyrite-marcasite mixture. Also as blebs in arsenopyrite.

35% Pyrite/marcasite, alteration of pyrrhotite dusty appearance, massive, subhedral, birdseye pyrite/marcasite, colloform, interstitial to arsenopyrite with chalcopyrite

5% Chalcopyrite (-.01 to massive), interstitial to arsenopyrite

84-K-7036 (Continued)

-5% Sphalerite (-.01 to 0.2mm) massive, narrow veinlets cutting pyrrhotite

30% Arsenopyrite, (0.01mm to massive) subhedral/euhedral, granular to massive with interstitial chalcopyrite

Tr. Galena (-.01 to .05mm) pale purplish blue tint, irregular interstitial to chalcopyrite. One grain shows exsolved bismuth (SEM analyses)

84-K-7080 [At Adit #6]

Assays 0.135 oz Au/ton; 2.60 oz Ag/ton; 0.12% As.

Microscopic

Minerals Present

15% Pyrrhotite; irregular massive, alteration through cleavage phase to pyrite/marcasite

50% Pyrite/marcasite; granular/birdseye texture

30% Sphalerite; massive groundmass, blebs of exsolved chalcopyrite, pyrrhotite in crystallographic orientations

-5% Complex composite grains

Bismuth; irregular grains associated with galena, pyrrhotite, chalcopyrite, sphalerite, tetrahedrite (?), native gold and silver.

Galena

Pyrrhotite
Chalcopyrite irregular grains
Sphalerite

Tetrahedrite
Native gold SEM identification
Native silver

The complex composite grains require combined petrographic, microprobe analyses. Extreme fine grained size and rapid oxidation will require special techniques and a larger number of polished sections. Gold and silver values appear to be associated with these complex grains.

84-K-7069 [Adit 3 (Level II) 13 metres from portal]

Assays 1.114 oz Au/ton; 5.75 oz Ag/ton; 4.70% As.

Microscopic

Minerals Present

40%	Pyrite/marcasite; -.01 to massive, fine granular colloform texture of marcasite. Contains blebs of sphalerite, chalcopyrite. Probably alteration product of pyrrhotite.
20%	Chalcopyrite; -.01 to massive, irregular masses.
-5%	Sphalerite; -.01 to + 1.0mm, irregular grains
-1%	Pyrrhotite; blebs in chalcopyrite
Tr	Galena; traces, irregular grains associated with bismuth
30%	Arsenopyrite; (-.01 to +1.0mm) subhedral/euhedral. Chalcopyrite pyrrhotite as blebs
-5%	Covellite; rimming chalcopyrite and in fractures
Tr	Tetrahedrite; SEM identification, medium grey, isotropic
Tr.to-1%	Bismuth; (-.01 to +0.1mm) cream silver color, rough polish cleavage, fine granular anisotropic (very weak). Rimmed by covellite in some places. Associated with sphalerite, tetrahedrite, galena.
Tr	Electrum; traces (.02mm) small grains

SEM confirmed, Au < Ag
Photo 84-D-13

NOTE-scattered small grains -.01mm too small to distinguish from bismuth isolated grains in chalcopyrite

84-K-7064 [Top of stope Level III]

Assays 0.494 oz Au/ton; 2.80 oz Ag/ton; 0.15% As.

84-K-7064 (Continued)

Microscopic

Minerals Present

40% Pyrrhotite; (-.01 to massive) altered to pyrite/marcasite mixture

30% Pyrite/marcasite;(-.01 to massive) dusty appearance birdseye texture

1% Arsenopyrite; (-.01 to 1.0mm) subhedral/euhedral

15% Chalcopyrite (-.01 to massive) irregular masses

10% Sphalerite (-.01 to massive) irregular grains and massive graphic intergrowth with pyrite, veined by marcasite (arsenopyrite ?)

-1% Galena (-.01 to 0.15mm) irregular shapes

Tr to -1% Bismuth (-.01 to .05mm) In veinlets in chalcopyrite associated with galena and sphalerite. As blebs associated with galena, tetrahedrite(?) and sphalerite

Tr Tetrahedrite (?) associated with bismuth

Tr Electrum (?)(-.01mm) high reflectance, isotropic

84-7081 [Pit above Adit #6]

Assays: 0.130 oz Au/ton, 3.79 oz Ag/ton, 17.9% As

Microscopic

Minerals Present

55% Arsenopyrite; (-.01 to massive)

15% Pyrite/marcasite; irregular massive dull dusty appearance and colloform structure

5% Pyrrhotite; blebs in arsenopyrite

20% Chalcopyrite (-.01 to massive) interstitial to arsenopyrite

84-7081 (Continued)

-5% Sphalerite; irregular grains

-5% Covellite coatings and flecks in gangue possible chalcocite

Electrum; Several grains (0.1mm),(.03mm),(.04mm) bright gold color poor polish, high reflectivity. Associated with chalcopyrite, arsenopyrite

These require confirmation by SEM and estimate of AuAg ratio

84-7083 [Pit #3]

Assays: 0.276 oz Au/ton; 1.88 oz Ag/ton; 14.70% As

Microscopic

Mineral Present

70% Arsenopyrite massive, brecciated, healed by chalcopyrite

15% Chalcopyrite; irregular masses and veins in arsenopyrite

10% Pyrite/marcasite; filigree texture/birdseye

-1% Pyrrhotite; as blebs in chalcopyrite and remnants in pyrite/marcasite

5% Sphalerite; irregular grains

Tr Chalcocite

Tr Electrum (0.01mm) irregular grains associated with chalcopyrite and minor sphalerite in veins with gangue in arsenopyrite.

Requires SEM confirmation because of minute grain sizes

84-7085 [Trench #3]

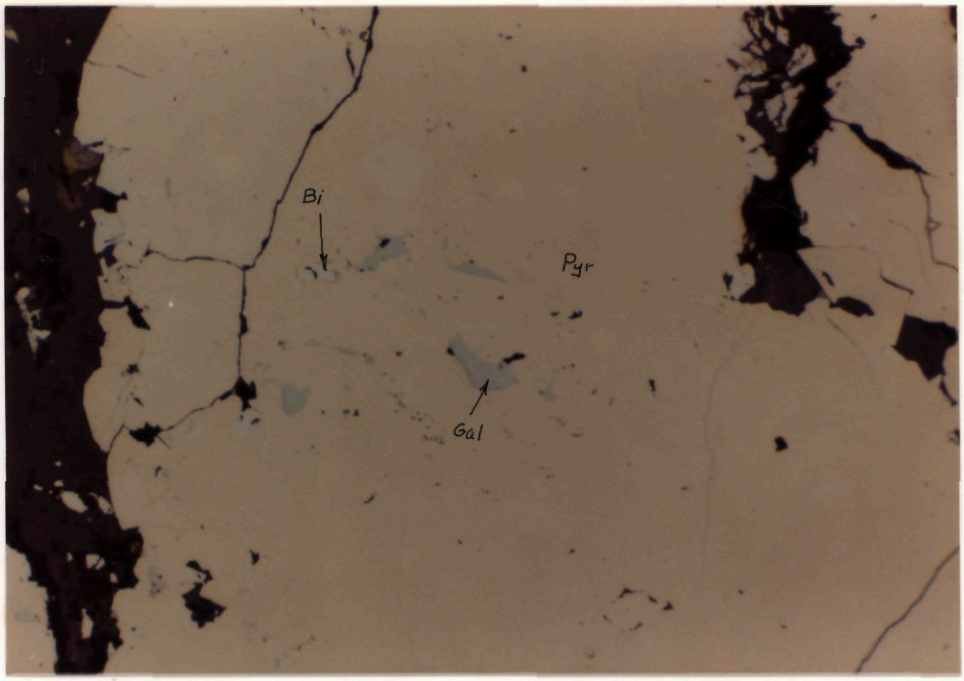
Assays 0.059 oz Au/ton; 0.53 oz Ag/ton, 2.84 % As

84-7085 (Continued)

Microscopic

Minerals Present

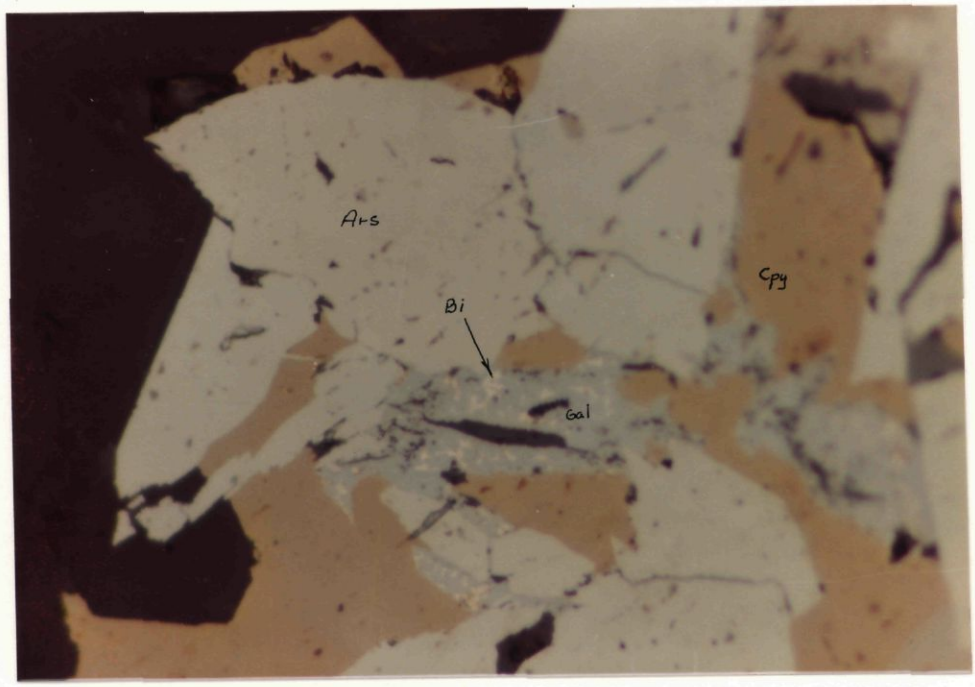
30%	Pyrrhotite; massive, through cleavage phase forming cores for pyrite/marcasite, alteration
50%	Pyrite/marcasite, birds-eye, colloform/filigree texture
10%	Chalcopyrite, massive irregular
-10%	Arsenopyrite (to 1.0mm) euhedral/subhedral
Tr	Galena (?) (0.01mm) in veinlets with chalcopyrite and traces sphalerite and with grain of bismuth (?) or electrum (?) Photo 84-E-10
	Electrum (?), Bismuth (?) (-.01mm) irregular grain in arsenopyrite with galena (?) and chalcopyrite



Scale 0.01mm

84-D-1 Sample 7009 X10 objective

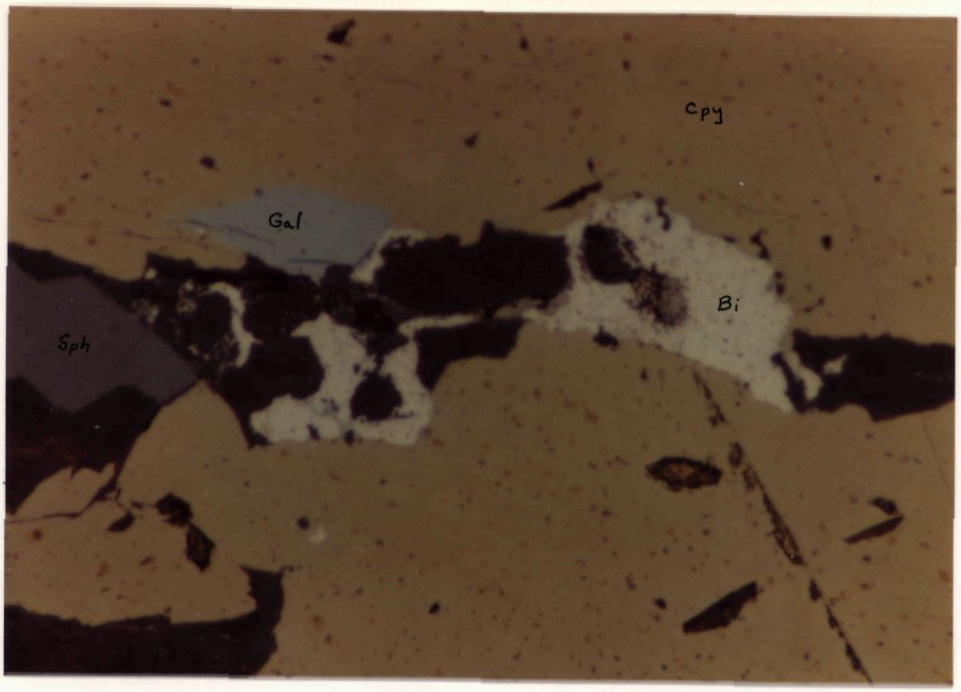
Pyrite, containing blebs galena (?) (purplish grey because of Te content) Traces of exsolution bismuth.



Scale 0.1mm

84-D-2 Sample 7036 X40 objective

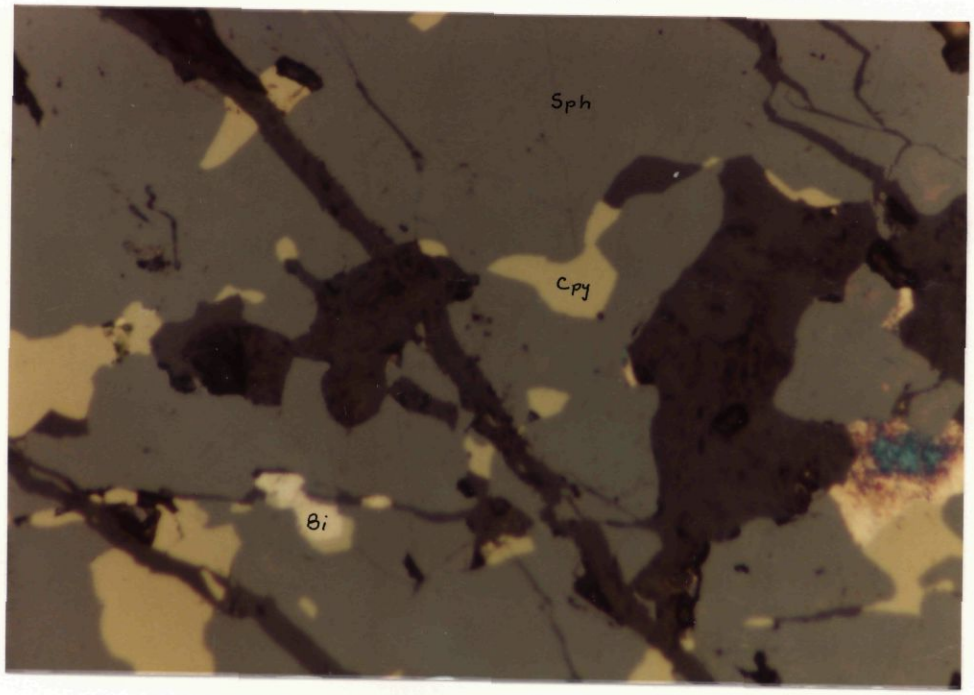
Galena, light purplish grey with exsolution of bismuth SEM analyses.



Scale 0.1mm

84-D-7 Sample 84-7064 X40 objective

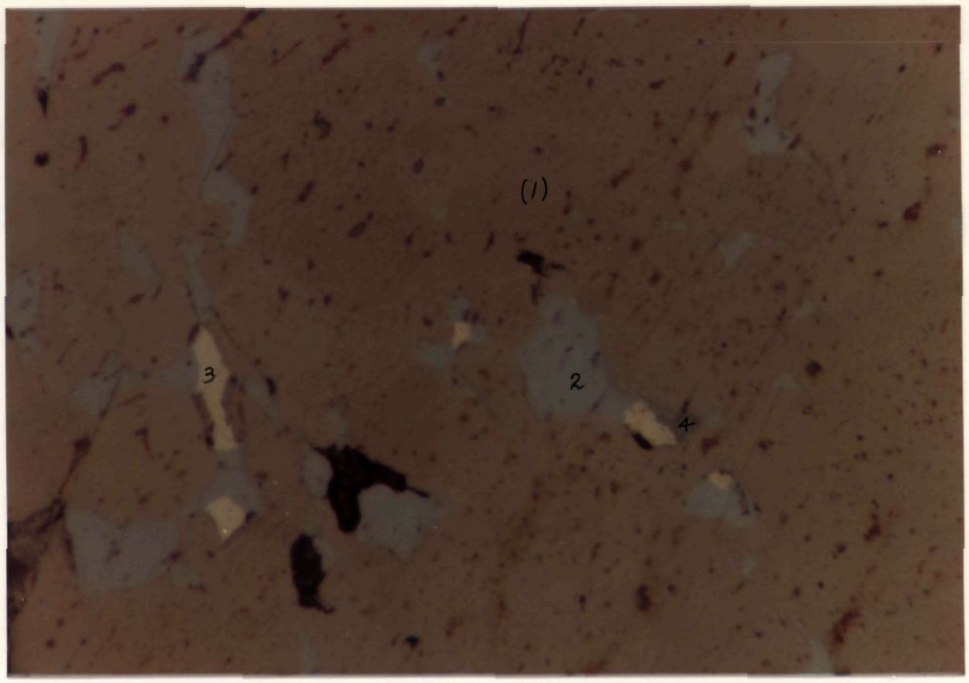
Chalcopyrite veined by sphalerite, galena, bismuth. [SEM analyses] trace tetrahedrite?



Scale 0.1mm

84-D-4 Sample 84-7064 X40 objective

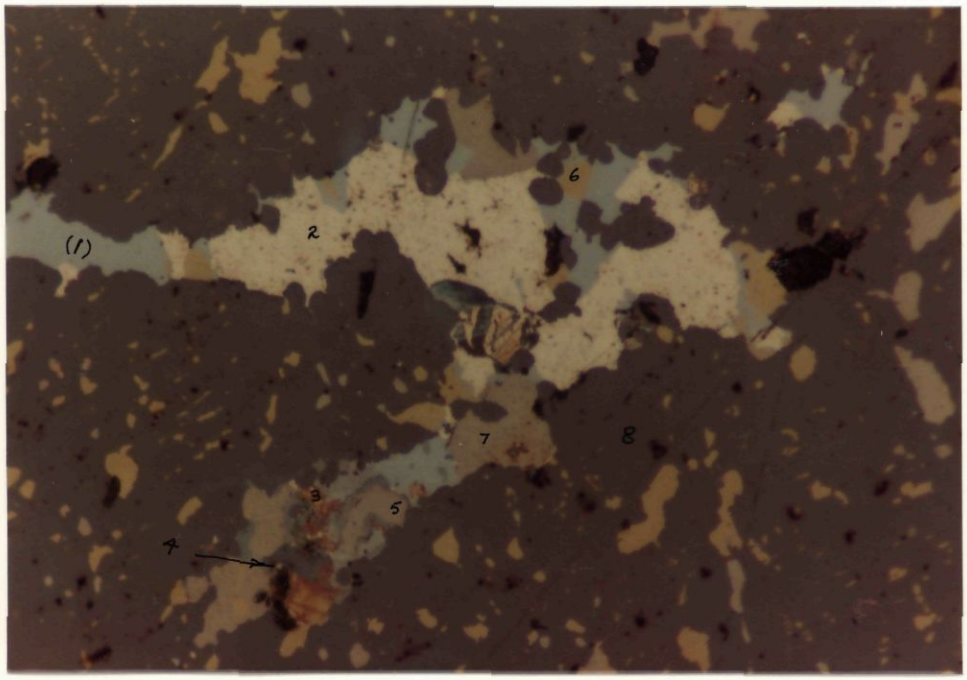
Sphalerite groundmass, blebs of chalcopyrite, bismuth



Scale 0.1mm

84-E-2 Sample 84-7080 40 X objective

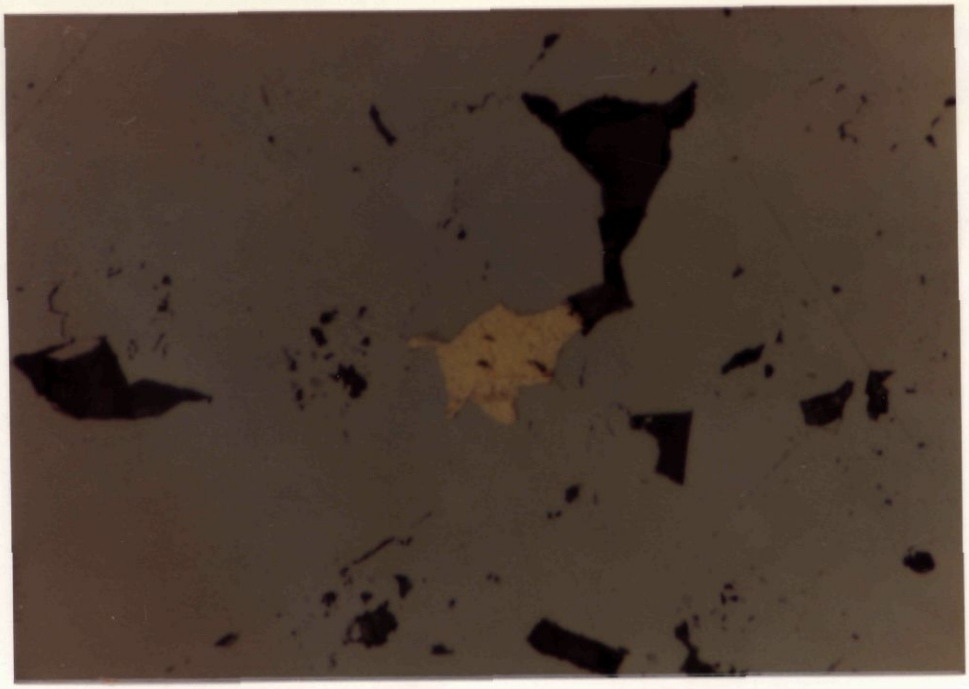
(1) Pyrrhotite groundmass: (2) galena(?) blue grey;
(3) bismuth cream white; (4) argentite grey



Scale 0.1mm

84-E-0 Sample 84-7080 40 X objective

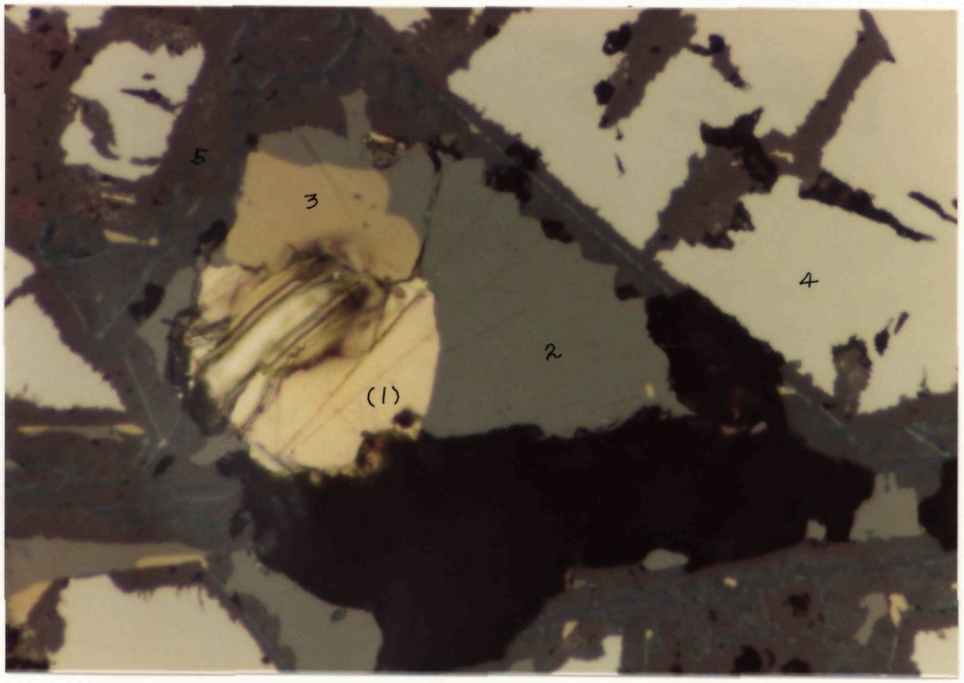
(1) Galena, blue; (2) bismuth, cream white; (3) native silver
(4) gold (5) tetrahedrite (6) chalcopyrite; (7) pyrrhotite,
(8) sphalerite
Note: gold and silver identified by SEM



Scale 0.1mm

84-E-6 Sample 84-7081 X40 objective

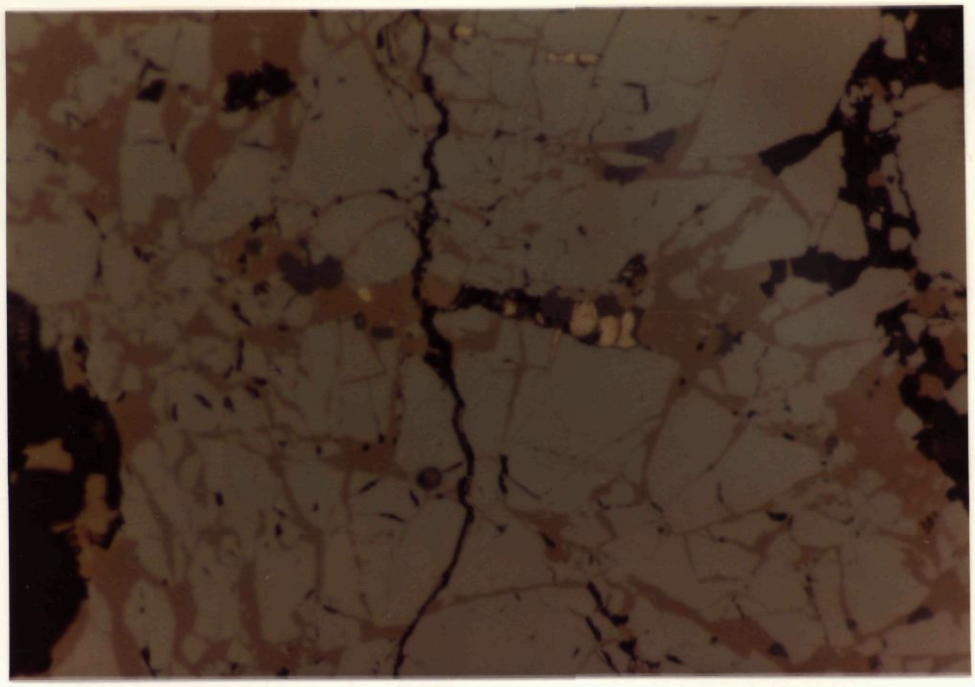
Irregular grain of gold in arsenopyrite groundmass
(Requires confirmation by SEM & estimate of Ag content)



Scale 0.1mm

84-E-5 Sample 84-7081 X40 objective

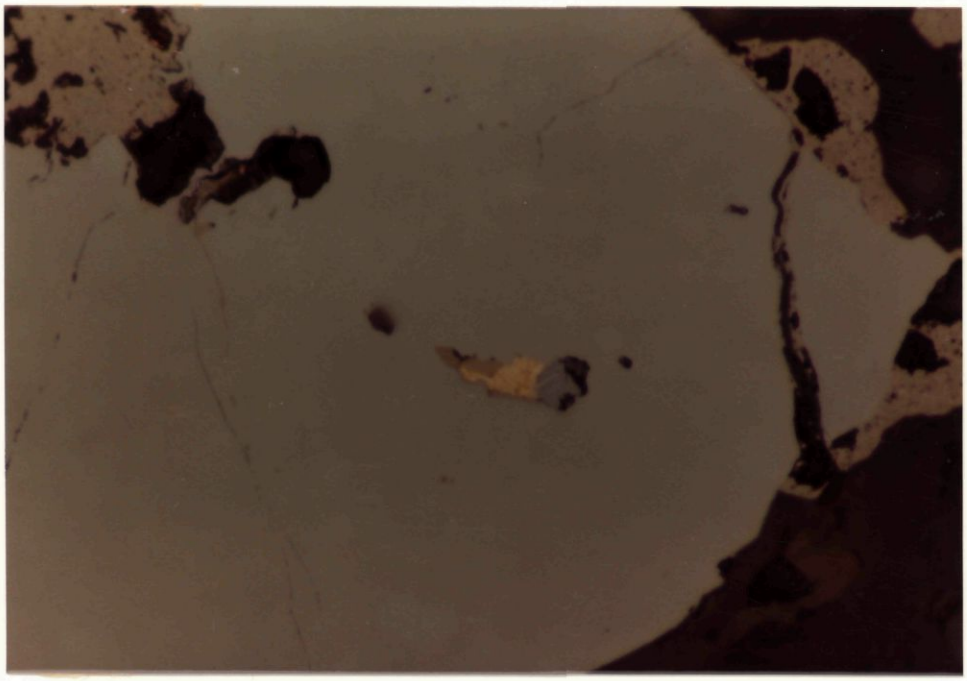
(1) Gold grain associated with (2) sphalerite (3) chalcopyrite in brecciated (4) arsenopyrite with rims of (5) covellite in gangue. Note sectile scratch in gold. Requires SEM confirmation and estimate of silver content.



Scale 0.1mm

84-E-7 Sample 84-7083 40X objective

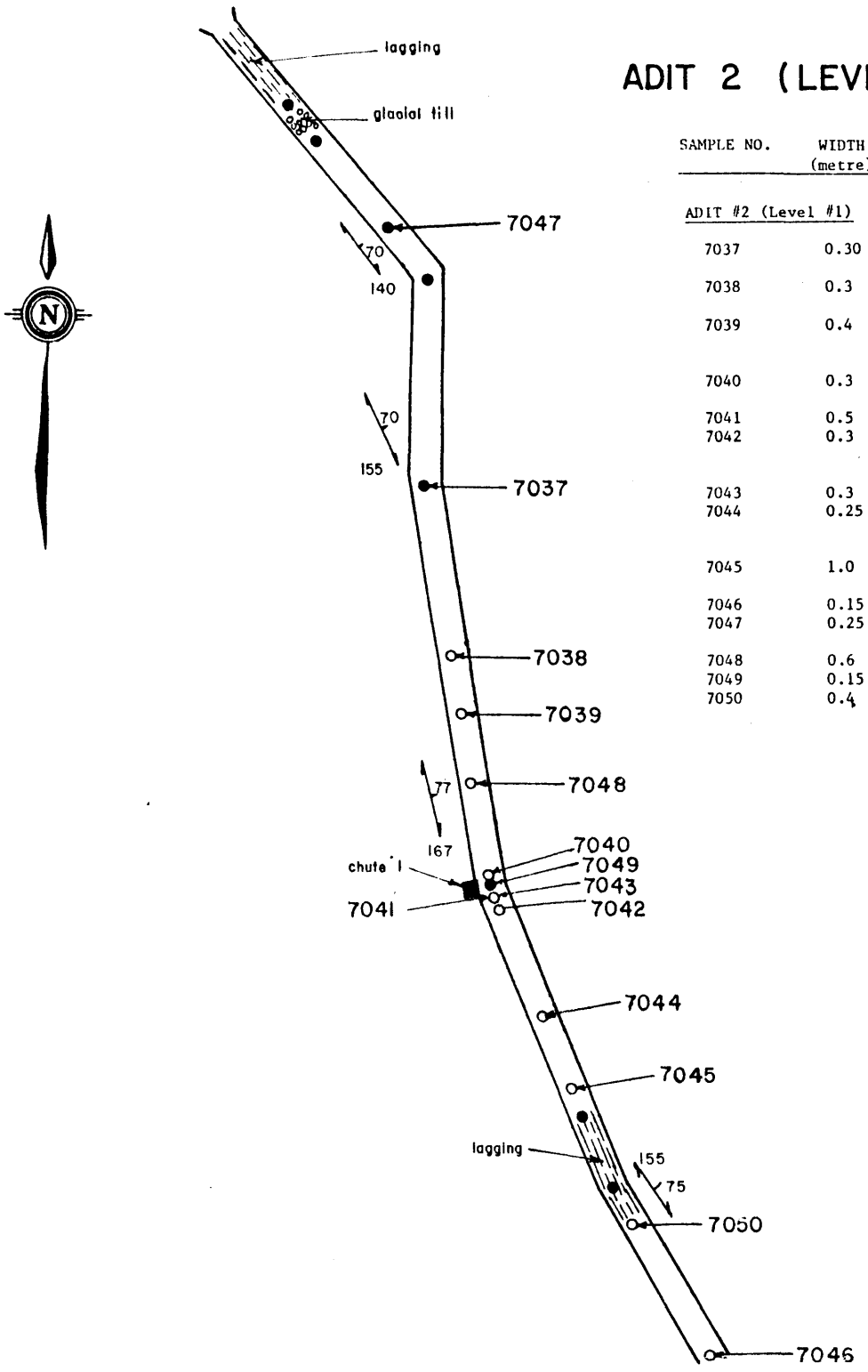
Electrum with chalcopyrite, minor sphalerite in brecciated arsenopyrite. Requires SEM confirmation and estimate of Ag content.



Scale 0.1mm

84-E-10 Sample 84-7085 40X objective

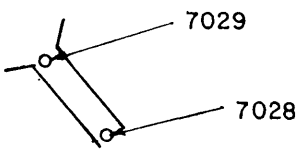
Small fleck bismuth or electrum associated with galena(?) and chalcopyrite in arsenopyrite



ADIT 2 (LEVEL I)

SAMPLE NO.	WIDTH (metre)	AU OZ/T	AG OZ/T	AS%	DESCRIPTION
ADIT #2 (Level #1)					
7037	0.30 (±.1)	.004	0.13		Centre of back well developed shear
7038	0.3	.003	0.01		Shear and gouge iron staining, quartz & calcite
7039	0.4	.002	0.27		Footwall shear, layered iron-stained gouge with quartz and/or carbonate
7040	0.3	.001	0.05		Sheared footwall, gouge, iron-stained
7041	0.5	.053	0.23		Iron-stained, brecciated shear
7042	0.3	.025	0.20	2.65	Gouge, shear, strong laminated
		.031	0.24	4.98	sulphides in gouge, heavily iron-stained
7043	0.3	.017	0.23	4.37	Gouge, sulphides, shear
7044	0.25	.008	0.05		Gouge and shear, some sulphide and iron-staining, alternating light layers
7045	1.0	.007	0.06		Hanging wall, gouge, breccia, iron-staining
7046	0.15	.177	0.26		Shear zone on left (west) wall
7047	0.25	.001	0.02		Footwall shear breccia zone Rest of back Westcoast Complex
7048	0.6	.008	0.14		Footwall breccia, iron-stained
7049	0.15	.012	0.17		Hanging wall gouge
7050	0.4	.003	0.01		Vein-shear

ADIT 1



ADIT #1				
7028	0.1	.006	0.17	Vein-shear
7029	0.4	.042	0.34	Vein-shear
7030	-	.001	0.01	White "bull" quartz

Scale: 5 0 10 m.

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UNDERGROUND SAMPLES

FIG. 6.	SCALE : 1:500
DRAWN BY: P. STOECKLY	DATE AUGUST 7, 1984

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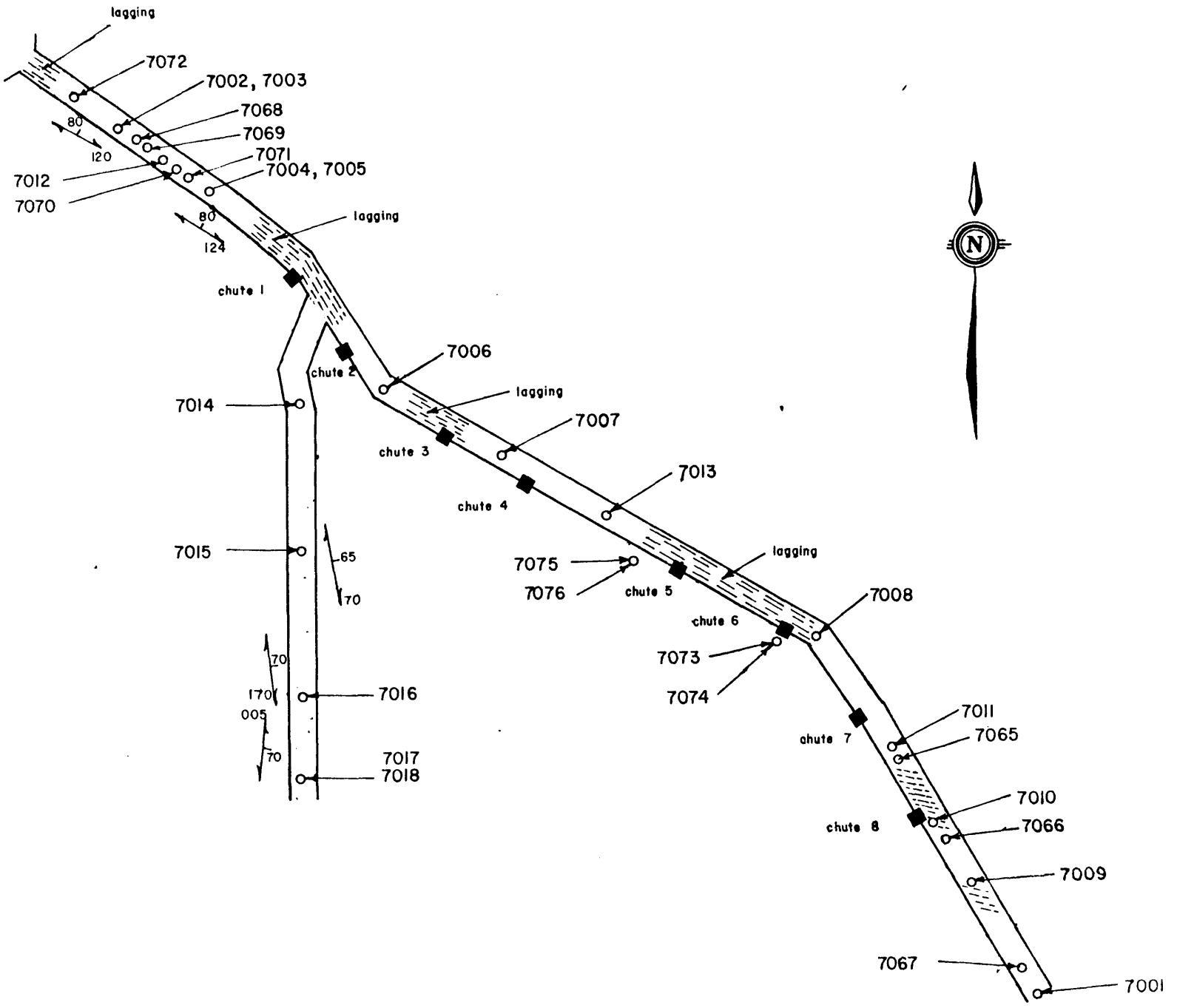
ADIT 3 (LEVEL II)



Scale 5 0 10m

SAMPLE NO	WIDTH (width)	AU oz/t	AG oz/t	CU %	PB %	ZN %	AS %	DESCRIPTION
ADIT #3 (Level #2)								
7001	0.5	.001 30ppb	.07	.118	.01	.07		Shear breccia, carbonate quartz
7002	0.4	.013	.06					Breccia, altered Westcoast Complex
7003	0.1	.005	.04					Sheared hanging wall and footwall
7004	0.3	.077 (.077)	.39	.221	.01	.04		Intensely sheared sulphide-rich, clay altered zone
7005	1.0	.017	.23	.150	.01	.08		Sheared breccia
7006	0.35	.060	.61					Vein, shear system
7007	1.0	.001	.02					Breccia
7008	0.3	.001	.01					Vein-shear system
7009	0.4	.042 1400ppb	.87	.875	.01	.12		Sulphide-rich, quartz-siliceous zone
7010	--	.001 (.001)	.05	.064	.01	.02		Pyritized waste rock
7011	--	.001	.01					Pyritized waste rock
7012	0.4	0.971	6.47	.185	.02	.02		Black gouge, finely divided sulphides
7013	0.5	.030	.10					Breccia containing some finely divided sulphide gouge
7014	0.5	.007	.12					Breccia. minor shear, rusty
7015	0.3	.026	.17					Fine breccia, iron-stained
7016	0.3	.001	.06					Vein-shear
7017	0.4	.001	.03					Vein-breccia-shear, iron stained
7018	0.4	.001	.01					Breccia, not stained
7065	0.2	.029	.24					Siliceous breccia and sulphi sheared on the footwall
7066	0.35	.048	.12					Quartz, breccia, and sulphide shear
7067	0.40	.012	.23					Gouge, shear zone
7068	0.10	.015	.08					Hanging wall, vein shear; gouge, layered by iron staini
								(H.W. side of 7012 not same structure)
7069	0.20	1.114	5.75				4.70	Black massive sulphides
7070	0.80	.620	3.09				4.55	Contains 0.1m of solid granular sulphides siliceous carbonate, brecciated
7071	0.30	.319	2.33				2.70	Shear gouge breccia with layers of massive sulphides
7072	0.30	.221	.36					Strong shear, quartz and carbonate. Iron-stained, layered, numerous country rock clasts
STOPE BETWEEN CHUTES 5 & 6								
7073	.35	.314	1.51				3.42	Lensoidal, pyrite, pyrrhotit (Greater than 1m wide at top of stope). Massive sulphides
7074	.35	.166	3.03				4.53	Quartz and massive sulphides
7075	.25	.589	2.36				0.18	Shear zone about 1.0m wide horse of country rock. Foot-wall is gouge and crushed sulphides in a shear
7076	.20	.222	.93				3.23	Hanging wall; gouge, clay, contains lensoids of crushed, granular sulphides

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UNDERGROUND SAMPLES

FIGURE: 7.	SCALE 1:500
DRAWN BY K.E.N.	DATE AUGUST 7, 1984

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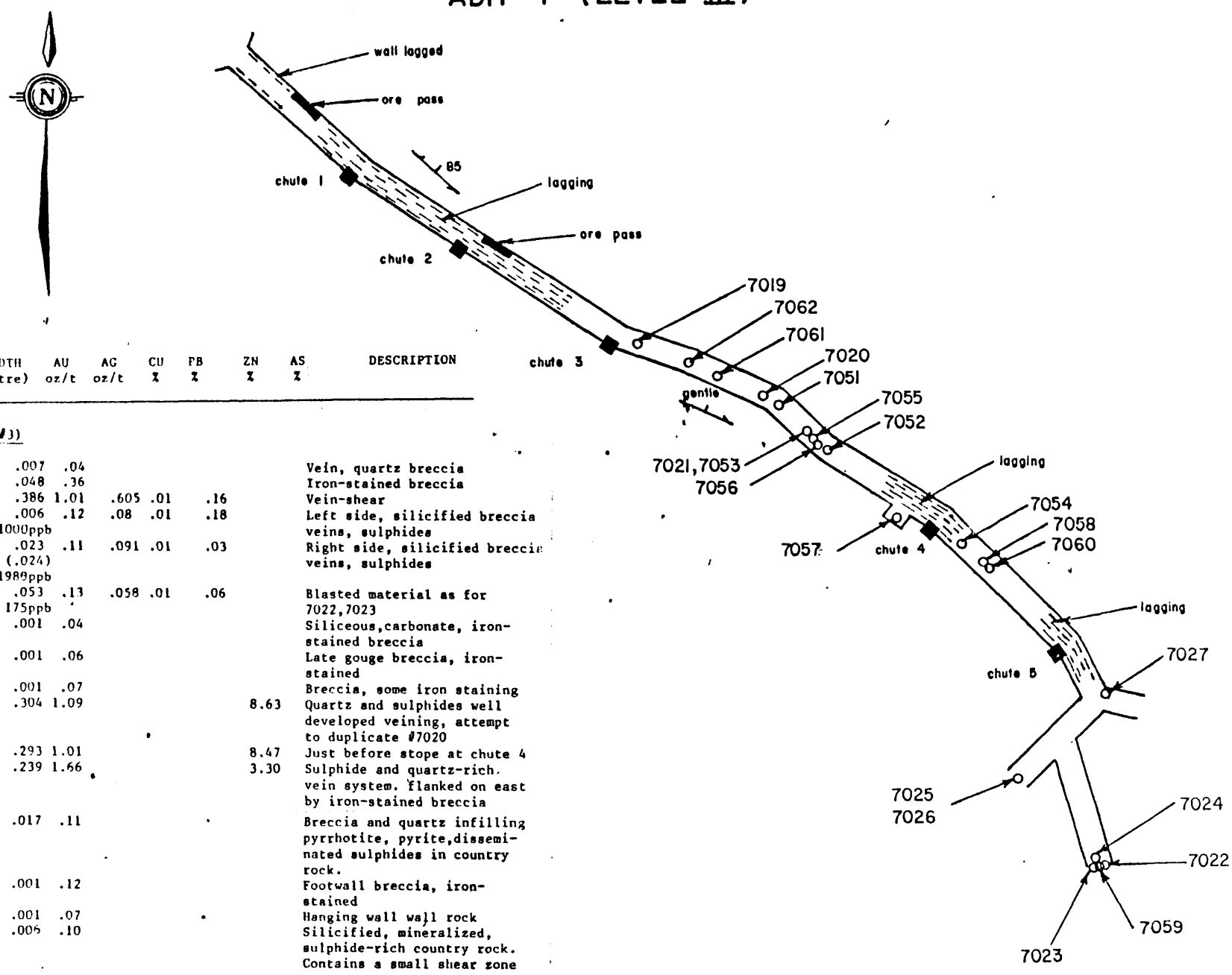
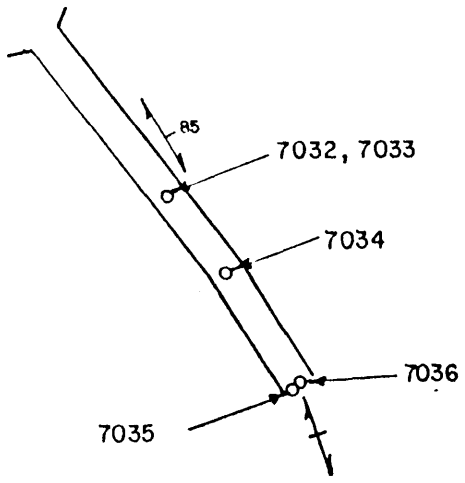
ADIT 4 (LEVEL III)



SAMPLE NO	WIDTH (metre)	AU oz/t	AG oz/t	CU %	PB %	ZN %	AS %	DESCRIPTION
ADIT #4 (LEVEL #3)								
7019	.3	.007	.04					Vein, quartz breccia
7020	.3	.048	.36					Iron-stained breccia
7021	.15	.386	1.01	.605	.01	.16		Vein-shear
7022	1.0	.006 1000ppb	.12	.08	.01	.18		Left side, silicified breccia veins, sulphides
7023	1.0	.023 (.024) 1989ppb	.11	.091	.01	.03		Right side, silicified breccia veins, sulphides
7024	--	.053 175ppb	.13	.058	.01	.06		Blasted material as for 7022,7023
7025	1.0	.001	.04					Siliceous,carbonate, iron-stained breccia
7026	0.4	.001	.06					Late gouge breccia, iron-stained
7027	0.4	.001	.07					Breccia, some iron staining
7051 (7020)	0.3	.304	1.09				8.63	Quartz and sulphides well developed veining, attempt to duplicate #7020
7052	.25	.293	1.01				8.47	Just before stope at chute 4
7053 (7021)	.18	.239	1.66				3.30	Sulphide and quartz-rich vein system. flanked on east by iron-stained breccia
7054	0.20	.017	.11					Breccia and quartz infilling pyrrhotite, pyrite,disseminated sulphides in country rock.
7055	0.4	.001	.12					Footwall breccia, iron-stained
7056	1.0	.001	.07					Hanging wall wall rock
7057	1.0	.006	.10					Silicified, mineralized, sulphide-rich country rock. Contains a small shear zone on a cross structure
7058	1.0	.009	.07					Chip samples across roof of silicified, mineralized brecciated country rock
7059 (7024)	1.0	.076	.33				4.94	Brecciated country rock silicified, mineralized pyrite, pyrrhotite
7060	0.2	.110	1.36					Quartz vein, breccia (1 m beyond 7058)
7061	0.2	.180	.23					Mainly breccia with footwall banded quartz and sulphides measures 2 to 3 cm.
7062	0.2	.246	.29				5.12	Strong quartz vein, strong sulphide layering locally
Top of stope driven from Level 3								
7063	0.4	1.272	5.69				5.15	Footwall branch of massive sulphide vein, pyrite, pyrrhotite, chalcopyrite
7064	0.25	.494	2.80				0.15	Hanging wall branch of vein 7063. Approximately 1.5 metre country rock in between

ADIT 5



SAMPLE NO	WIDTH (width)	AU oz/t	AG oz/t	CU %	PB %	ZN %	AS %	DESCRIPTION
ADIT #5								
7032	0.4	.001	.05	.028	.01	.47		Gouge and breccia
7033	1.2	.001	.05					Breccia, gouge and breccia (incl. 7032)
7034	0.35	.093	.60					Vein, gouge, breccia iron-stained
7035	0.30	.001	.13					Shear, (breccia),"unstained"
7036	0.50	.001 (.001) +10,000ppb	1.01	.48	.02	3.32		Siliceous, breccia, abundant sulphides

Scale 5 0 10m

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UNDERGROUND SAMPLES

FIGURE 8.	SCALE 1:500
DRAWN BY K.E.N.	DATE AUGUST 7, 1984

K.E. NORTHCOTE & ASSOCIATES LTD.