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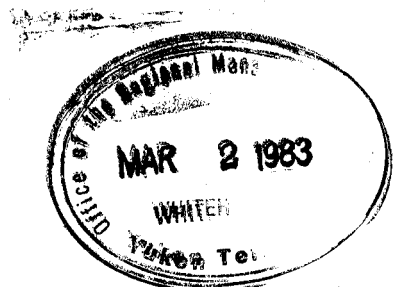
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WERNECKE JOINT VENTURE (WJV)
GEOLOGICAL AND GEOCHEMICAL REPORT
DEMON 1-8 CLAIMS
(YA76484-YA76491)



DECEMBER, 1982



Claim Sheet 106E/2
Latitude 65°11'N; Longitude 134°38'W

W.D. Eaton, B.A., B.Sc.
Work done between June 5 and August 11, 1982

091436

001436

This report has been examined by
the Geological Evaluation Unit
under Section 53 (4) Yukon Quartz
Mining Act and is allowed as
required for work in the amount
of \$ 7,000.

P. Watson

for Regional Manager, Exploration and
Geological Services for Commissioner
of Yukon Territory.

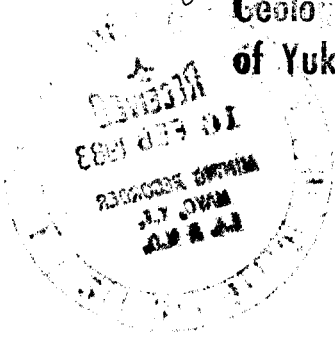


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INTRODUCTION

The Demon 1-8 claims were staked by WJV on January 13, 1982 to cover the Gremlin copper-cobalt occurrence formerly held by Cyprus Anvil Mining Corp. as the Gremlin claims. Exploration in 1982 consisted of detailed mapping and chip sampling with emphasis toward identification of the mode of the occurrence, its grade and extent, and possible precious metal zoning.

PROPERTY, LOCATION AND ACCESS

The Demon property consists of eight contiguous mineral claims recorded in the Mayo Mining District as follows:

<u>Claim Name</u>	<u>Grant Numbers</u>	<u>Expiry Date</u>
Demon 1-8	YA76484-YA76491	13 January, 1983

The claims lie on the southeastern edge of a large block of claims held by Pan Ocean Oil Limited, as illustrated on Figure WJV82-D1 on the following page.

The property is located at latitude 65°11'N and longitude 134°38'W within NTS claim sheet 106E/2, 188 km northeast of Mayo. The closest lake suitable for a fixed-wing aircraft is Kiwi Lake, 3 km to the north, while the closest bush airstrip is on the Bear River, 45 km to the south. Access in 1982 was by Bell 206B helicopter from the WJV basecamp on the Igor property, 18 km to the south.

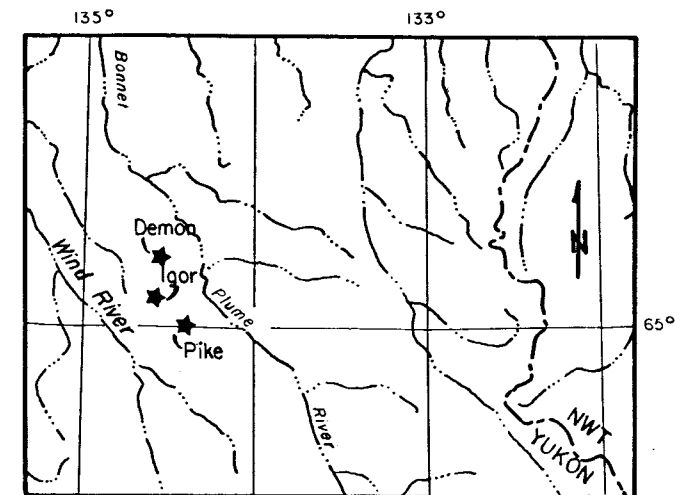
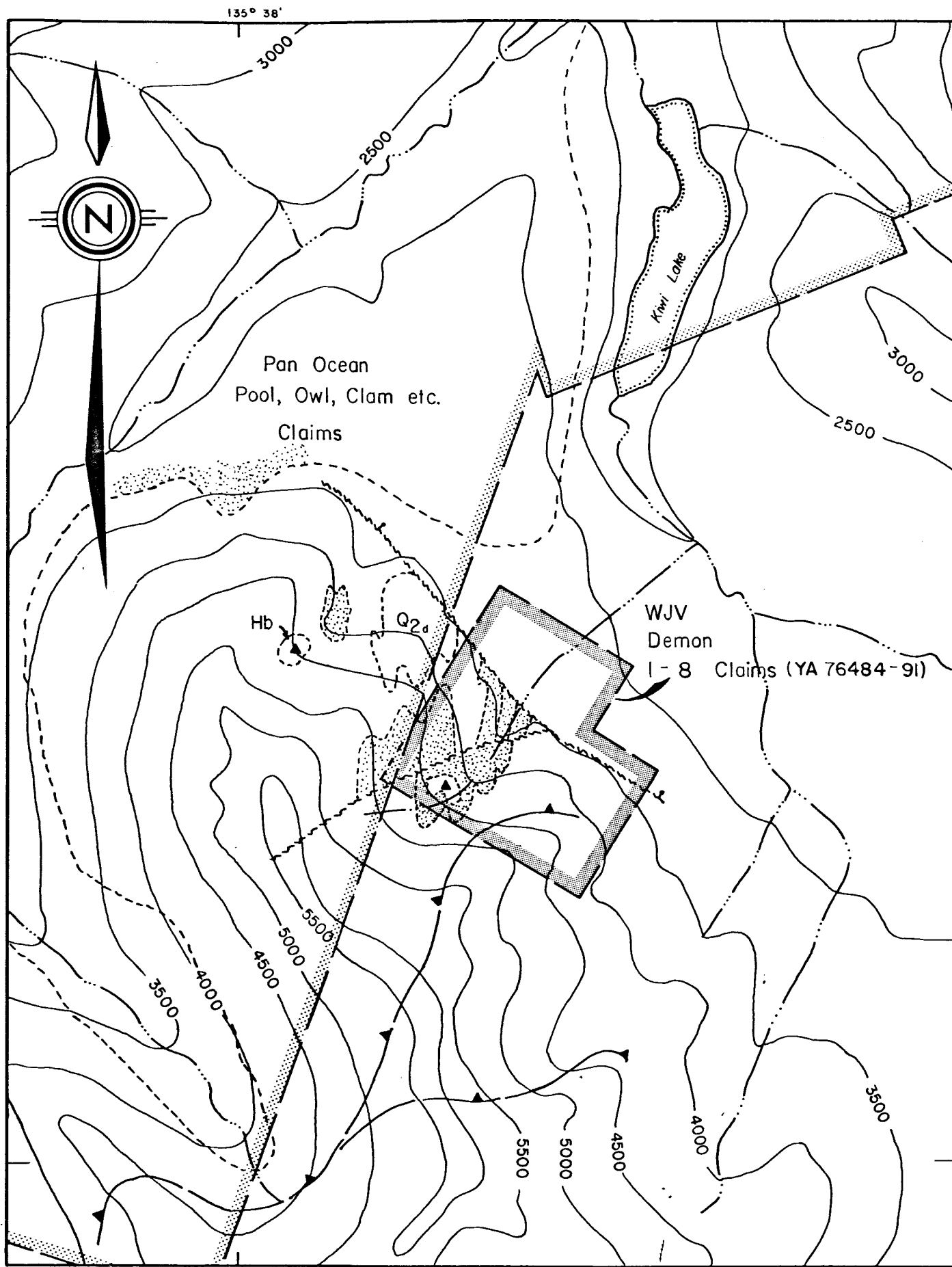
HISTORY

The Gremlin 1-10 claims were staked by Cyprus Anvil Mining Corp. in August, 1975 to cover copper mineralization discovered while following up an anomalous copper value obtained from a stream sediment sample collected during a reconnaissance program exploring for Mississippi valley-type lead-zinc deposits. A small program of geological mapping, prospecting and soil and chip sampling was done later that year. In 1976 the occurrence was mapped in greater detail and contour-controlled soil sampling was conducted over a 70 sq km area peripheral to the claims. The 1976 assessment report for this work concluded that the Gremlin is probably a syngenetic massive sulphide occurrence. The contour sampling outlined several areas of anomalous lead and zinc values some 3 to 4 km north and west of the Gremlin property but no copper values comparable to those on Gremlin were obtained. Additional follow-up work including mapping, magnetic surveys, hand trenching and prospecting on geochemical anomalies peripheral to the claim block was proposed in the 1976 report but was not done and the claims were allowed to lapse in December, 1981.

GEOLOGY

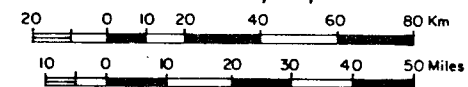
General

Figure WJV82-D1 on the previous page shows the general geology of the property, while Figure WJV82-D2 in the pocket illustrates results of detailed mapping and sampling of the Gremlin occurrence itself. The claims overlie a folded and thrust-repeated sequence of Quartet Group sedimentary rocks that are cut by small heteroclast breccia bodies and a few mafic to ultramafic dykes.



LOCATION MAP

SCALE - 1:2,000,000



LEGEND

- Hb Heteroclast breccia.
- Q₂ & Q_{2d} Siltstones and dolomites.
- Q₁ Siltstones, cherts and dolomites.
- Fault.
- Geological contact.

Figure WJV82DI

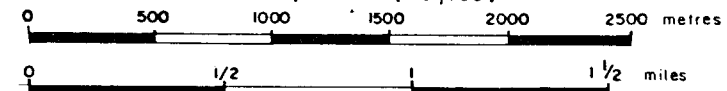
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GEOLOGY

Demon Property

Wernecke Joint Venture

SCALE - 1 Inch = 1/2 Mile (1:31,680)



Geomorphology

The Gremlin occurrence is exposed at an elevation of 960 m on the lower slopes of an east-facing 25° to 30° sloping hillside. Outcrop is limited to a creek canyon cut through 10 to 20 m of talus and glacial terraces and 20 to 30 m of bedrock as shown in Plate D1 on the following page. An outwash fan has developed at the mouth of the canyon and partially extends onto a wide north-trending valley floored by glacial debris and numerous small lakes, the largest of which is Kiwi Lake. Although the creek drains a cirque, its lower reaches are dry in late summer. Vegetation in the area includes alder and scrub spruce on the valley floor, giving way to grasses above 1050 m and lichens at elevations above 1200 m.

Stratigraphy

Stratigraphic sequences found in the Demon area represents the middle portion of the Wernecke Supergroup. The claims themselves are centered on a 1 km in diameter window of Quartet Group Q₁ formation strata which host the Gremlin occurrence. This formation is overlain by a thick sequence of Quartet Group Q₂ formation siltstones. Mapping of the Gremlin occurrence has identified five subdivisions within the Q₁, two of which have not been identified beyond the window. These subdivisions are described below.

(1) Footwall siltstone consists of dark grey to black, often gossanous, mudstones, claystones, siltstones and phyllites. Chloritoid porphyroblasts are common in the phyllites and their distribution appears to be controlled by the alumina content of the primary sediments. The base of this subdivision is not exposed.



PLATE D1: GREMLIN OCCURRENCE, GEOMORPHOLOGY



PLATE D2: GREMLIN OCCURRENCE, COMPOSITIONAL BANDING
IN SIDERITE LENS

(2) Chert-dolomite includes up to 75 m of orange weathering, dolomitic siltstones and mudstones interbedded with pale brown weathering carbonate, chert and quartzite horizons. The dolomite weathers recessively giving a distinctive ribbed appearance in outcrop. Anhydrite and/or gypsum crystals or pseudomorphs are common, as are irregularly spaced (up to five fractures per metre) quartz-carbonate veins. Two stockwork zones of closer spaced, quartz-carbonate veins are present near the western edge of the window. It is not known if these stockworks extend into the underlying footwall siltstones. Chemical analysis of "dolomite" in this subdivision proximal to the Gremlin occurrence has shown that it is actually siderite (36.5% Fe, 4.7% Mg and 0.6% Ca) but samples collected from the same horizon some 3 km to the west are dolomite (3.9% Fe, 9.8% Mg and 19.2% Ca).

(3) Siliceous argillite-chert is restricted to the Gremlin window, averages 5 m thick and exhibits lateral zonation. Proximal to the stockworks it has sharp contacts and contains banded cherts and lenses of massive chert interbedded with silicified mudstones and dolomites. Distally it has gradational contacts and consists of bleached and silicified mudstones with relict sedimentary textures preserved. Patches of coarse-grained biotite (phlogopite?) and chlorite occur throughout and the quartz-carbonate stockworks and veins are better developed than in the chert-dolomite.

(4) Siderite occurs in two lenses, up to 9 m thick, of dark brown weathering, coarse-grained siderite with minor chert and ferroan dolomite. Although recrystallization has destroyed primary textures, compositional banding is present and may mimic bedding, as illustrated on Plate D2 following page 76 . The siderite is the principal mineralized horizon, is confined to this window, and is described in greater detail in the mineralization section. Chemically this siderite is nearly identical to those on the underlying chert-dolomite (44.3% Fe, 5.4% Mg and 0.5% Ca).

(5) Hanging wall siltstone abruptly overlies the siderite lenses and consists of black, carbonaceous mudstones, siltstones and fine sandstones which are less gossanous than the footwall siltstones. These rocks are moderately folded and exhibit axial planar cleavage. Locally they grade into phyllites containing chloritoid porphyroblasts.

Structure

Four phases of deformation have been identified. The earliest are small scale east to northeast-trending recumbent folds which have been largely obscured by subsequent events. The second and dominant deformation is represented by a northeast-trending anticline that is overturned to the southeast. This structure is slightly distorted by open, northeast-trending folds and east-trending regional warping.

A number of small normal faults cut the mineralized strata. The largest exhibits a 150 m oblique slip displacement but most underwent little or no movement. A large north-trending high-angle fault is located immediately east of the Gremlin occurrence and an even larger northwest-trending structure (the Bonnet Plume Fault) lies under glacial till some 2 km further to the east. South-dipping thrust faults are common in the Kiwi Lake area but none have been recognized on the Demon claims.

MINERALIZATION

General

There are two main types of mineralization on the Demon property:

- (1) stratabound, vein and stockwork chalcopryrite, pyrite and minor cobaltite associated with Q₁ formation sedimentary rocks (Gremlin occurrence); and,
- (2) widely disseminated chalcopryrite, specular hematite and pyrite occurring in heteroclast breccia bodies.

Gremlin Occurrence

Figure WJV82-D3 on the following page is a diagrammatic section illustrating general geometry and metal distribution of the Gremlin occurrence. Copper-cobalt mineralization is best developed in the siderite unit, while pyrite is the dominant sulphide in the underlying strata, veins and stockworks. Total sulphide content and ratio of chalcopryrite to pyrite generally increases up section from the footwall siltstone to the siderite unit, but decreases sharply in the hanging wall siltstone.

The siderite unit includes two almost massive siderite lenses one metre apart which contain coarse (recrystallized?) chalcopryrite with pyrite and minor cobaltite. The lower lens, shown on Plate D3 on the following page, pinches and swells and ranges in thickness from 1 to 9 m. It can be traced in outcrop over a strike length of 800 m and is open to the south and east, but appears to pinch out to the north and west. The upper lens averages 1 m thick, has a strike length of 150 m, and is open to the south. The stockworks and most veins observed in the underlying rocks are truncated along the base of the lower lens and are best developed near its western end.

..... Pb: Cu

----- Zn: Cu

_____ Co: Cu

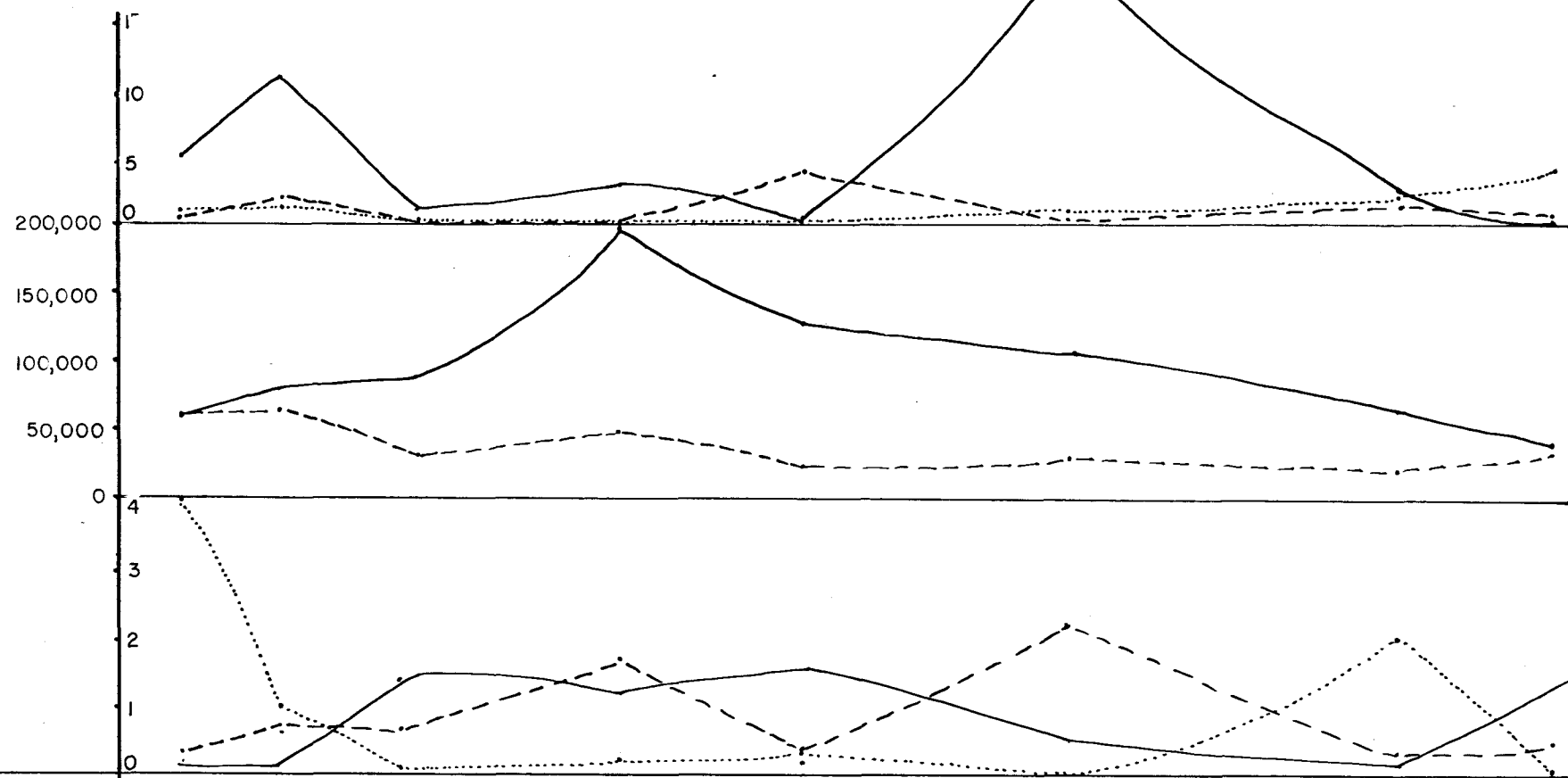
----- Ag: Cu

_____ Au: Cu

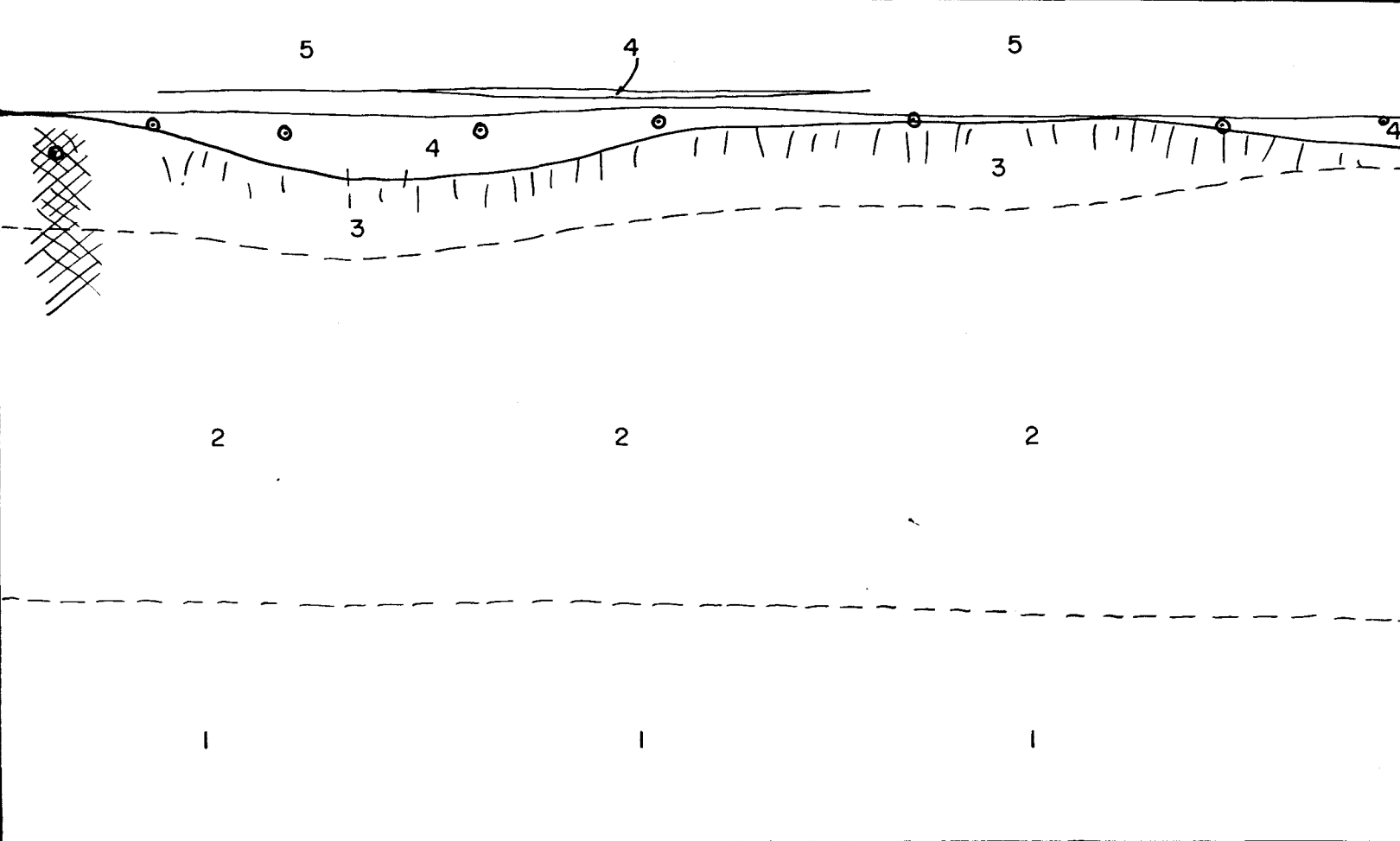
..... % Py

----- lb/ton Co x 2

_____ % Cu



Cp: Py	Total sulphide	Mode of occurrence.
1:30	<1%	Fine disseminations and laminae.
3:1	2-10%	Blebs, lenses, bands and disseminations.
1:2	3-5%	Disseminations, fracture fillings and stockwork zones
1:1	1%	Disseminations with minor stockworks.
1:30	1%	Disseminations and laminae



LEGEND

- 5 Hanging wall siltstone.
- 4 Siderite
- 3 Siliceous argillite/chert.
- 2 Chert dolomite.
- 1 Footwall siltstone.
- Stockwork
- Veins
- Sample location.

Figure WJV82-D3.

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SCHEMATIC SECTION DEMON PROPERTY WERNECKE JOINT VENTURE.

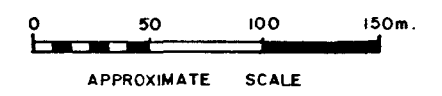




PLATE D3: GREMLIN OCCURRENCE, LOWER MASSIVE
SIDERITE LENS



PLATE D4: GREMLIN OCCURRENCE, BANDING OF SULPHIDES

Sulphides in the siderite unit occur as irregular massive pods up to 20 cm in diameter, as elongate bands paralleling bedding in the surrounding strata (see Plate D4 on the preceding page), and as disseminations within narrow dolomite bands. Limonite is the most abundant secondary mineral but malachite and erythrite are also present.

Seven 10 kg channel samples taken along the southeast limb of the lower lens returned a weighted average of 2.24% Cu, 492 ppm Co, 7.7 ppm Ag, 186 ppb Au, 199 ppm Zn and 330 ppm Pb over an average width of 1.4 m and a strike length of 500 m. Significantly, the highest copper (3.85% Cu over 1.0 m), silver (11.2 ppm Ag over 1.0 m), and gold (396 ppb Au over 1.0 m) values were obtained in areas where the lens is thickest. The gold and silver have a strong positive correlation with copper, suggesting that they are in the chalcopyrite. Cobalt assays range up to 1.1 lb/ton Co and it appears that most is in cobaltite, as cobalt concentrations are inversely proportional to both copper assays and visually estimated pyrite abundance. The highest lead assay (1200 ppm Pb) was obtained from the sample taken farthest from the stockwork zone and lead-to-copper ratios show a gradual increase as distance from the stockwork increases. Zinc analyses produced generally low values (maximum 673 ppm Zn) and erratic metal ratios; however, there is a weak trend toward higher values distal to the stockworks. No lead or zinc minerals have been identified.

Only one chip sample was taken from the upper lens and this returned 1.44% Cu, 188 ppm Co, 4.8 ppm Ag, 131 ppb Au, 42 ppm Zn and 89 ppm Pb over a width of 0.8 m.

The stockworks and veins are gossanous and best developed in the siliceous argillite-chert and chert-dolomite units. Limits of the stockworks are difficult to define as they grade into less-fractured wallrock, but the zones of intense

fracturing are at least 20 m in diameter. Veins of massive pyrite up to 10 cm wide occur within the stockworks and the zones as a whole contain an average of 30 percent pyrite. Veins in the country rocks typically contain only 2 to 10 percent pyrite. Minor chalcopyrite occurs with the pyrite but rarely exceeds 2 percent of the rock. Two chip samples from the stockworks returned 0.16% and 0.57% Cu with low cobalt, gold, silver, lead and zinc values. Quartz, dolomite and siderite are the main gangue minerals. Although alteration envelopes around veins are rare, the most southerly of the two stockworks is intensely bleached and exhibits pervasive argillic alteration.

Breccia-Related Mineralization

Breccia rocks on the Demon property typically contain 3 to 20 percent disseminated platy specular hematite, trace to 2 percent pyrite and trace to 0.5 percent chalcopyrite. However, no zones of anomalous radioactivity or significant concentrations of sulphides have been discovered. Although a breccia body is located within 500 m of the Gremlin occurrence, it exhibits only a 10 to 20 m wide alteration halo and crosscuts strata which overlie the mineralized horizons.

DISCUSSION AND CONCLUSIONS

Although the mineralized lenses exposed at the Gremlin occurrence are too narrow and low grade to be of direct economic interest, there is potential for increased widths and higher grades downdip or along strike. WJV mapping has shown that the siderite lenses have irregular thickness and that the highest copper contents occur where the lenses are thickest, suggesting that the metalliferous brines ponded in shallow basins after being exhaled from the stockwork zones. One of the characteristics of sedimentary exhalite deposits is that they are subject to rapid increases in thickness and grade over short lateral distances. Furthermore, if this occurrence was the vent zone for bedded pyrite associated with Q_1 shales and anomalous lead-zinc geochemistry 3 km to the north, the mineralized lenses may grade laterally from copper-cobalt to lead-zinc.

The mineralogy of the Gremlin occurrence is encouraging in that cobalt occurs as cobaltite, rather than as a minor component of pyrite, and that the precious metals are closely linked to copper suggesting that they would be recoverable in a copper concentrate.

The Gremlin occurrence has several similarities to the Hart River occurrence (see Appendix IV) 105 km to the west. Both contain abundant copper with precious metal values and occur as lensoid bodies underlain by stockwork zones and intensely silicified footwalls. Unlike Gremlin, Hart River exhibits finely laminated sulphides, is capped by a concordant chert-pyrite horizon, and contains significant Zn (3.6%), Pb (0.9%), and sulphosalts. Gremlin also shares certain characteristics with the Mt. Isa copper deposit including the underlying stockwork zone, the presence of evaporite mineral-bearing chert-dolomite horizons below the mineralization, the lensoid shape, and the apparent displacement of copper mineralization from associated(?) lead-zinc mineralization.

Respectfully submitted,

ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

A handwritten signature in black ink, appearing to read "W. Douglas Eaton". The signature is written in a cursive style with a large initial "W" and a distinct "Eaton" ending.

W. Douglas Eaton, B.A., B.Sc.

/mc

APPENDICES

APPENDIX I - STATEMENT OF QUALIFICATIONS

STATEMENT OF QUALIFICATIONS

I, W. Douglas Eaton, geologist, with business addresses in Whitehorse, Yukon Territory and Vancouver, British Columbia, and residential address in Burnaby, British Columbia, do hereby declare:

1. I graduated from the University of British Columbia in 1980 with a B.Sc. and am currently enrolled in a M.Sc. majoring in Geological Sciences.
2. From 1971 to the present, I have been actively engaged in mineral exploration in British Columbia and Yukon Territory and on June 1, 1981, became a partner in Archer, Cathro & Associates (1981) Limited.
3. I have personally participated in or supervised the field work reported herein and have interpreted all data resulting from this work.



W. Douglas Eaton, B.A., B.Sc.

APPENDIX II - PERSONNEL

<u>Name</u>	<u>Address</u>	<u>Position</u>
D. Eaton	6108 Burns Street, Burnaby, B.C.	Geologist
D. Heberlein	2202 Stephens Street, Vancouver, B.C.	Geologist
B. Sinclair	314-10229 149th Street, Surrey, B.C.	Student Assistant

APPENDIX III - ANALYTICAL TECHNIQUES

PREPARATION

All soil samples were dried and sieved through an ASTM 35 mesh screen (0.50 mm). The minus 35 mesh fraction was then pulverized and homogenized in a ring grinder to approximately minus 100 mesh (0.15 mm). For drill core and grab and chip rock samples, the entire sample was crushed and split. A sub-sample was then pulverized in a ring grinder to approximately minus 100 mesh.

ANALYTICAL TECHNIQUES

Gold was analyzed by a "combo technique" consisting of a fire assay followed by neutron activation, while copper, cobalt, zinc, lead and silver were all analyzed using a perchloric-nitric acid extraction followed by atomic absorption spectrometry.

APPENDIX IV - HART RIVER PAPER (Morin, 1978)

By
J.A. Morin

INTRODUCTION

In 1966, a conspicuous orange red gossan south of Hart River in the Wernecke Mountains was prospected and staked. The gossan is developed over a stratiform massive sulphide body of Proterozoic age. Subsequent to the discovery of the deposit, Hart River Mines Limited conducted a geological evaluation which included trenching, geological mapping, soil geochemical, magnetic and electromagnetic surveys and surface diamond drilling - all of which culminated in the driving of an adit in 1969 and 1970 and in extensive underground diamond drilling. Due to financial constraints, all work was discontinued in 1971, at which time a deposit of 0.5 to 0.6 million tons grading 0.04 oz/ton Au, 1.45 oz/ton Ag, 1.45% Cu, 0.87% Pb and 3.65% Zn had been proven.

This is a preliminary report which summarizes results gathered from four weeks of field work during summer 1977 and 1978. A more comprehensive report is planned for publication at a later date.

LOCATION AND ACCESS

The Hart River deposit is located in the Wernecke Mountains at latitude 64°43'N, longitude 136°50'W. It is situated 20 km south of the Hart River on the east side of one of its northerly draining tributaries, 120 km northwest of Mayo and 140 km northeast of Dawson. Access is provided by helicopter, though an airstrip 2 km north of the deposit is serviceable by STOL aircraft. A 103 km winter road connects the property to Mile 49 on the Dempster Highway.

PREVIOUS GEOLOGICAL INVESTIGATIONS

The first regional geological map of the area was provided by L.H. Green of the Geological Survey of Canada (Green, 1972). He considered the deposit to lie within his Unit 1 assemblage of fine grained clastic sedimentary rocks and dolomite. Subsequent to his work in the area, regional mapping by S.L. Blusson (Personal Communication, 1978) and local mapping by the author has agreed with Green's interpretation and placed the deposit in an argillaceous facies of the Gillespie Lake Group.

Several unpublished company geological reports have been written on the Hart River deposit. The most complete of these are by Usher and Macdonald (1968) and Guardia (1971). In addition, a BSc thesis concerning the geology and petrology of the deposit has been written (Olsson, 1973).

GENERAL GEOLOGY

In this portion of the Wernecke Mountains, an east-southeast trending sequence of Proterozoic rocks is exposed in a window surrounded by much younger rocks of Lower Paleozoic age. The lenticular window is up to 80 km long and 32 km wide, and consists of two Proterozoic rock packages separated from each other by an angular unconformity - the younger Pinguicula Group and the older Wernecke Supergroup (Delaney, 1978). Numerous sills and dykes of diabase occur within the Wernecke Supergroup assemblage.

Wernecke Supergroup

The Wernecke Supergroup here consists of a thick succession of argillite, argillaceous dolomite and dolomite which is highly folded and deformed. The argillite sequence outcrops along the north side of the window where its thickness is up to 2,400 m. It consists of typically black, thinly bedded, well cleaved argillite with minor interbedded dolomite.

Structurally overlying the argillite is the Gillespie Lake Group, here represented by flaggy orange weathering argillaceous dolomite that is up to 900 m thick. Minor thin argillite units are interbedded with the dolomite. Of note, are the voluminous diabase dykes and sills which have metamorphosed the adjacent country rock: dolomite to a serpentine-calcite ± talc assemblage and argillite to hornfels. The massive sulphide deposit is situated where the Gillespie Lake Group exhibits a facies change from dolomite to calcareous argillite and black argillite. It is not certain whether the argillaceous facies is stratigraphically near the base or the top of the Group. However, a lead isotope age of 1238 ± 21 Ma (Cumming-Richardson model) or 1288 ± 85 Ma (Stacey-Kramers model) was determined for layered galena from the massive sulphide body (W.D. Sinclair, 1978, Personal Communication).

Pinguicula Group

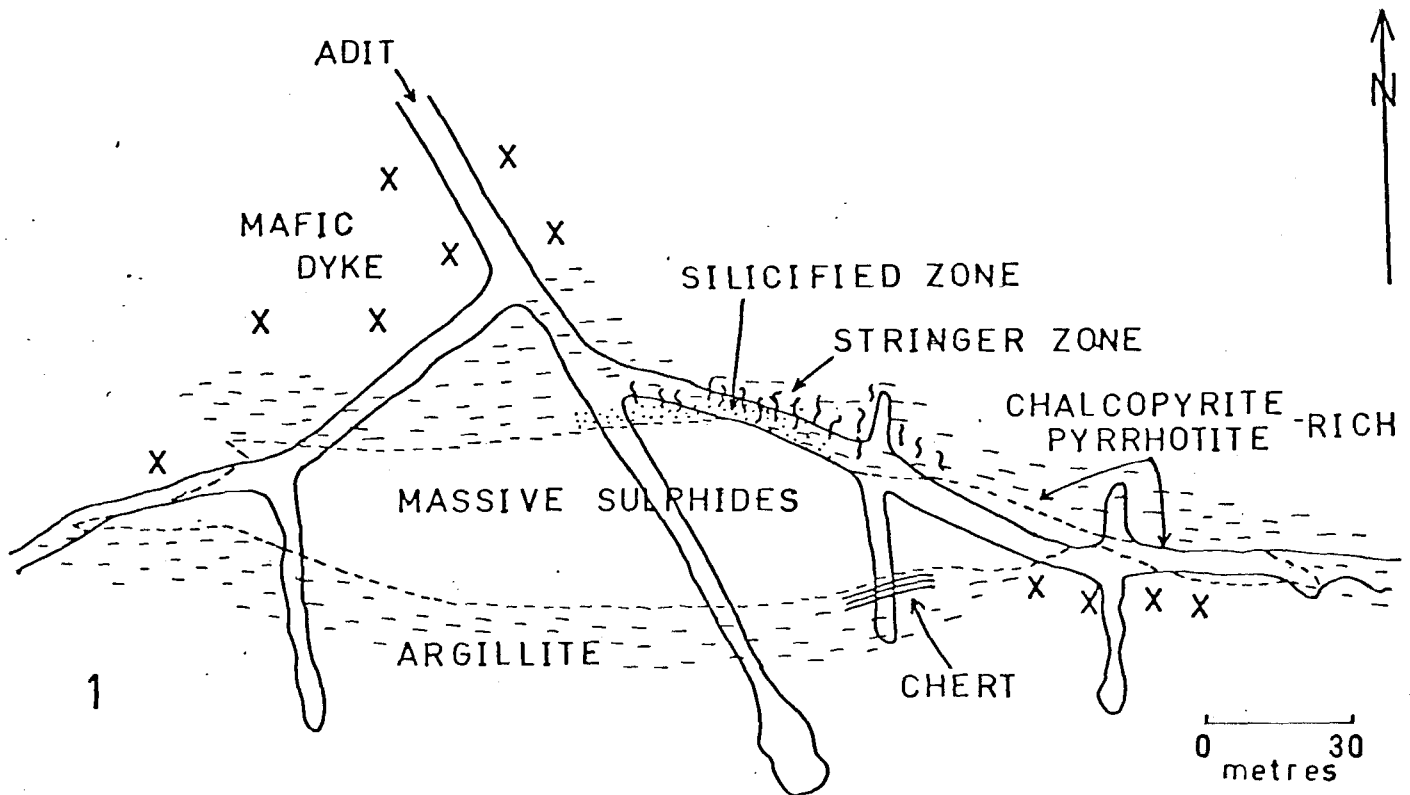
The Pinguicula Group is represented here by a moderately dipping southward facing homoclinal sequence that lies above an angular unconformity cut into the Wernecke Supergroup. It consists of mainly volcanic rocks at the base, carbonate rocks in the middle and clastic rocks near the top.

In the vicinity of the massive sulphide deposit, several basalt flows with thin intercalated black argillite horizons occur at the base of the Group. The basalt is dark green, fine-grained, locally porphyritic, and heavily fractured. Dark green to black chlorite forms thin seams along these fractures. Columnar jointing is present in the lowermost flow, immediately above the argillite contact. Pillow structure is common in the upper portion of the topmost flow and consists of gently undulating, tubular masses of dark green basalt with surface bread-crust texture and tension gashes along the top of each pillow. In cross section, the basalt pillows display the typical teardrop shape and indicate the direction of tops is up. A mafic tuff unit, green and maroon argillite, and a thick unit of flaggy, thick-bedded, orange-weathering fine grained dolomite immediately overlie the topmost flow in succession. Grey dolomite and limestone cap the orange dolomite and are overlain in succession by a dominantly clastic sequence consisting of black and maroon argillite, orange dolomite, hematitic argillite (maroon at base) and white to grey massive quartzose sandstone, hematitic and maroon coloured at the base. Unconformably capping the quartzite is a thick unit of pale grey fetid Paleozoic limestone.

MINERALIZATION

The massive sulphide body is completely enclosed in black argillite of the Gillespie Lake Group. It has the shape of a vertical to moderately dipping southward facing tabular pod and has been traced from an elevation of 4,150 feet to 3,700 feet. At the 3,880 foot adit level, it is a lens in plan with major

HART RIVER - SCHEMATIC GEOLOGY OF 3880 LEVEL



and minor axial dimensions of 124 m and 19 m respectively. On its north side (footwall), it is marked by a zone of silicified argillite and a stockwork of quartz-carbonate (dolomite?) - chalcopyrite veinlets and on the south side (hangingwall) by a concordant layered chert-pyrite horizon.

Pyrite and pyrrhotite are the most common sulphide minerals and along with minor amounts of sphalerite, chalcopyrite, galena and rare tetrahedrite, form about 90% of the massive sulphide. The latter four are commonly interstitial, the gangue being made up by white dolomite, quartz, calcite and chert. Sulphide layering is common and consists of thin layers ranging from less than 1 mm to 1 cm thick. Pyrite is the main layered sulphide, but locally alternating layers of chalcopyrite and pyrrhotite, galena-sphalerite and pyrite, pyrite and sphalerite occur. Pyrite most commonly occurs as coarse, rounded, framboid-like aggregates of fine grained material with a matrix infilling of dolomite-quartz-calcite. Syndimentary intraformational breccia is present consisting of brecciated sulphide layers, chert and argillite.

A crude metal zonation occurs within the deposit - lead and zinc are concentrated in the central and western portion, and copper-gold in the eastern portion. The distribution of the iron sulphides is

such that pyrite is commonest in the central and western portions and pyrrhotite in the eastern portion of the deposit.

ORIGIN.

The deposit is interpreted to be syndimentary with proximal exhalative features. Evidence for this interpretation is the following:

- 1) sulphide layering conformable with interlayered chert and argillite;
- 2) syndimentary breccias containing sulphide clasts in a chert or argillite matrix and chert and argillite clasts in a sulphide matrix;
- 3) a vein stockwork below and within a silicified footwall which may indicate the feeder channelway and associated alteration zone respectively;
- 4) a crude zonation with strong chalcopyrite-pyrrhotite segregation in the eastern portion of the deposit.

ACKNOWLEDGMENTS

The author gratefully acknowledges logistical support and cooperation of Jed Chinnek, Cordilleran Engineering. Accommodation at the Hart River Mines site was provided by Alec Briden, North Hart Resources, from whom much confidential data on the property has been acquired. Stimulating discussions about the geology of the Hart River Mines deposit were had with numerous geologists and particular contributions were made by S.L. Blusson, W. Goodfellow and P. Friske. The lead isotope age was calculated by W.D. Sinclair of the Geological Survey of Canada, Ottawa.

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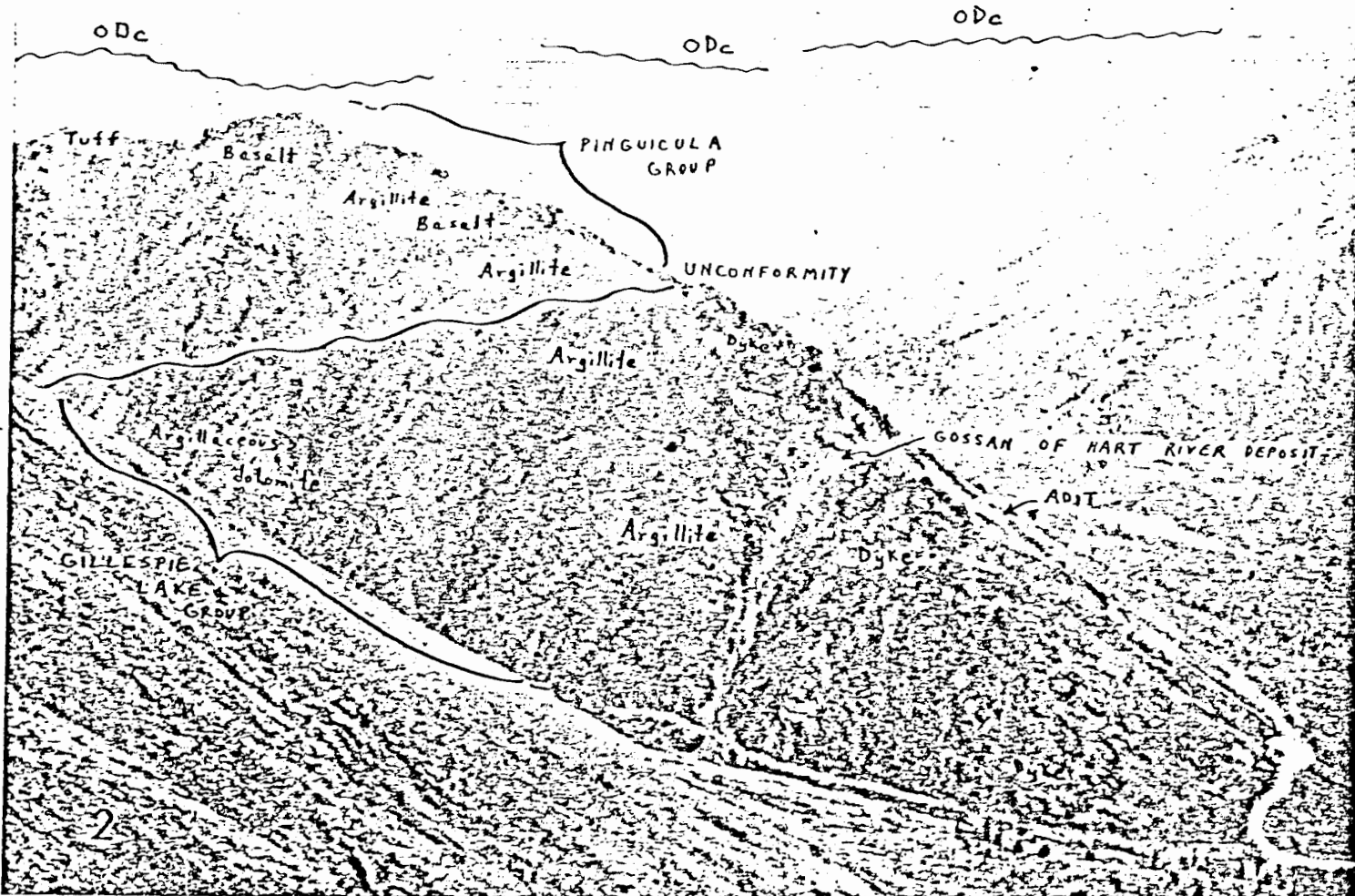
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1971: Report on MARK group claims, Hart River, Yukon Territory; confidential unpublished report for Hart River Mines Limited., 34 pp.

Olsson, W.J.
1973: The geology and petrology of the MARK claims, Hart River Mines Limited, Yukon Territory; unpublished BSc thesis, Queen's University, 33 pp.

Sinclair, W.D.
1978: Personal Communication.

Usher, J.L. and Macdonald, A.S.
1968: The geology of Hart River Mines, Yukon Territory; confidential unpublished report for Hart River Mines Limited, 34 pp.



The general vicinity of the Hart River deposit, looking southwest, where Paleozoic carbonates (ODc) flank the window of Proterozoic rocks.

ARCHER, CATHRO

& ASSOCIATES LIMITED

CONSULTING GEOLOGICAL ENGINEERS

VANCOUVER, B.C. (604) 688-2568

Box 4127, WHITEHORSE, Y.T. Y1A 3S9 (403) 667-4415

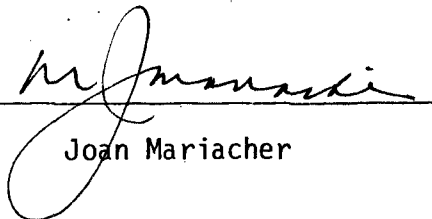
1016 - 510 WEST HASTINGS STREET
VANCOUVER, B.C. V6B 1L8



AFFIDAVIT

I, Joan Mariacher, of Vancouver, B.C. make oath and say:

That to the best of my knowledge the attached Statement of Expenditures for exploration work on the Demon 1-8 mineral claims on Claim Sheet 106E/2 is accurate.


Joan Mariacher

Sworn before me at Vancouver, B.C.

this 7th day of

January, 1983



Notary, Yukon Territory

Statement of Expenditures
Geological Mapping and Geochemistry
Demon 1-8 claims
January 7, 1983

Labour

D. Eaton - June 5, plus 2 days report preparation - total 3 days at \$260/day	\$ 780.00	
D. Heberlein - June 5-7, 26, August 5-8 and 11 - total 9 days at \$200/day	1,800.00	
B. Sinclair - August 5-8 - total 4 days at \$107/day	<u>428.00</u>	\$3,008.00

Expenses

Helicopter - Century Helicopters contract Bell 206B - 4.4 hours at \$400/hr	1,760.00	
Helicopter fuel - 4.4 hours at 25 gal/hr at \$5/gal delivered to site	500.00	
Geochemistry - 14 samples analyzed for Au, Ag, Cu, Co, Pb and Zn at Chemex Labs at \$18.40/each	257.60	
Room and board - 14 mandays at \$45/day	<u>630.00</u>	<u>3,197.60</u>
		<u>\$6,205.60</u>



In Account With

Project - WEARNECKE JOINT VENTURE
Date -- JUNE 30, 1982

		Total
MANAGEMENT		
JUNE		3000.00
LABOUR		
Supervisory		
Field		
1 ✓ D. Eaton - 18/30 JUNE @ 3400	2040.00	
✓ D. Heberlein - June 1-30 @ 2600	2600.00	
✓ H. Oiy - June 1-30 @ 2400	2400.00	
✓ S. Shalansky - June 1-30 @ 1400	1400.00	
✓ B. Sinclair - June 1-30 1700	1700.00	
✓ D. Staniforth - June 1-30 @ 1767	1767.00	
	11,907.00	
	plus 50 %	5,953.5
Casual		
S. BECKMANN - JUNE 1-14 @ 124/d } from Clinton	1736.00	
T. CARLSON - JUNE 1-14 @ 94/d }	1316.00	
	3,052.00	
EXPENSES		
Accounting JUNE	500.00	C3
Expediting JUNE 1-30	1400.00	D3
Room & Board in Whse 1 man day @ 45/d	45.00	D2
	total days at \$ /day	
Field equipment from AC stock	122.43	D1
Xerox copies, 524 copies at 25¢/copy	131.00	C1
Radio rental 3 Bx100 June 1-30 plus 5 Bx11 June 1-30 ul	550.00	D1
Rental AC truck at \$ /mo.		
plus (to) kms at /km		
Petty cash 28.87 D1; 20.03; 7.10 D4; 11.80 D1; 20.03; 21.84 D1; 21.65 D2	139.61	CV 1.00 D1 - 47.01 D2 - 43.00 D3 - 40.00 C1 D4 - 7.10
Telephone 1.80 C2; 4 D1; 21.55 D2		
Blueprinting, 144 sq. ft. Ozalid at 30 c/ft plus - sq. ft. Dilar at \$ - /ft.	43.20	C1 D4
Drafting, 43 hrs. at \$ 22 /hr.	946.00	C1
Rental AC large Honda generator, June 1-30 @ 5/d	150.00	D1
Rental AC core splitter, June 1-30 @ 20/wk	80.00	D1
ABC Training School, first aid course for H. Oiy	150.00	CV
paid by Nat in March/82		
Receives General, Round Fleet 9-16 ch	80.00	F
McGraw	20.85	D1
telegrams - 18.67 + 19.55 + 1.80	40.02	CV
Coffee, Tea & Spice	25.25	D2
Can. Freightways	21.34	D3
Yuba Instant Print	23.75	CV
Nortach	13.20	CV
B.C. & Yrs. Co.	8.75	D1
Supervisor Report	13.86	C1
Shapers Drug	21.18	D1
Holbrook	4.00	CV
	4529.44	
		28,441.90
Credit		
2 propane tanks sold to NAT OV.	(200.00)	D1
3 " " " " to Church M504	(300.00)	D1
	(500.00)	(500.00)
Total		27,941.90

IN ACCOUNT WITH

Project - WERNERCKE JOINT VENTURE
 Date -- AUG 31, 1982

		Total
MANAGEMENT		
	Aug	3000.00
LABOUR		
Supervisory		
	M. P. Phillips - 1 hr. review C of W & claim expenses	37.50
Field		
4-	D. EATON - 13 DAYS @ \$3400/mo	1426.
12-	D. HERBERLEIN - AUG 1-31 @ 2600/mo	2600.
2-	S. SHALANSKI - AUG 1-31 @ 1400/mo	1400.
-	B. SINCLAIR - AUG 1-16 @ 1700 @ 1/2 mo	878.
-	D. STANFORTH - AUG 1-16 @ 1700 @ 1/2 mo	932.
2	J. DERNETT - AUG 1-25 @ 2100	1694.
6	J. MORTENSEN - AUG 1-31 @ 3000	3000.
(UNIT NAT)	H. OYER - 7/30 OF ONE MONTH @ \$2400/mo	560.
		12,490.
		6,245.
Casual 3-	K. HARMANN - 3 DAYS @ 140 plus 50%	420.
EXPENSES		
Accounting	Aug	500.00 C3
Expediting	Aug	1400.00 D3
Room & Board in Whse	29 MANDAYS AT \$45/DAY	1305.00 D2
	total days at \$ /day	
Field equipment from AC stock		7.90 D1
Xerox copies, 119 copies at 25¢/copy		29.75 C1
Radio rental 5BX10 Aug 1-21 @ 400/mo plus 1 5BX10 @ \$150/mo.		372.58 D1
Rental AC truck at \$ /mo. plus (to) kms at /km		196.05 C2-27.50 D2-168.50
Petty cash 27.55 C2; 141.35 D2; 3.90 D2; 23.25 D2		196.05
Telephone		
Blueprinting, - sq. ft. Ozalid at - c/ft plus - sq. ft. Dilar at \$ - /ft.		
Drafting, 45 1/2 hrs. at \$ 22 /hr.		1001.00 C1
rental large AC Idemora generator Aug 1-21 @ \$5/day		105.00 D1
Food Fair		17.70 D2
Norwalk		1.58 C2
Chemical Lab		22.89 D3
Kelly Douglas		14.36 D2
Coffee, Tea & Snacks		7.50 D2
Yellow Wheel Road		6.35 D2
		4987.60
		27,180.14
Credit		
sub-let helicopter to NAT on AUG 4, 49425	(1960.00)	G1
Whitcomb Travel	(90.53)	D3
		(2050.53)
Total		25,129.6

Keystone Helicopters Ltd.

P.O. Box 178, Atlin B.C. V0W 1A0 Phone (604) 651-7569 N^o 003334

CHARTERER ARCHER / CATRO		DATE JUNE 7/82
ADDRESS Box 4127 WHITE HORSE, YUKON		A/C B1W0
		TYPE BELL 206B
		BASE
CHEQUE	CASH	CHARGE
		P.O.

REMARKS	PASS	CARGO	TIME
SET OUTS DOUG IE. & DAVE H. DEMON			1.9
HEATHER, STEPHAN, STEVE PIKE.			.
2 DRUMS SP4 BRS.			.
			.
			.
			.
			.
			.
			.
			.

TERMS: NET 10 DAYS	TOTALS	1.9
FUEL COST \$ _____	TOTAL	\$ 760.00
FLYING 19 HRS. AT \$40.00 = \$760.00		

AUTHORIZED BY PRINT **D. HEBERLEIN** SIGNATURE *[Signature]*

CONTRACT HRS. _____

DAY _____

MONTH _____

YEAR _____

FUEL SUPPLIED BY: CUST. KH

KEYSTONE FUEL

_____ GALS. FROM _____ AT _____ PER GAL.

_____ GALS. FROM _____ AT _____ PER GAL.

_____ GALS. FROM _____ AT _____ PER GAL.

_____ GALS. FROM _____ AT _____ PER GAL.

PILOTS NAME **Taylor**

SIGNATURE *[Signature]*

Arctic Star Printing Inc.

FLIGHT TICKET NO.

Keystone Helicopters Ltd.

P.O. Box 178, Atlin B.C. V0W 1A0 Phone (604) 651-7569

No 4466

CHARTERER DRILLER / PATTER (WTV)	DATE Apr 05/82
ADDRESS	A/C B-1W0
	TYPE Roll 26B
	BASE
	CHEQUE <input type="checkbox"/> CASH <input type="checkbox"/> CHARGE <input type="checkbox"/>
	P.O.

REMARKS	PASS	CARGO	TIME
DEMAN/CLOW	4		1.0
160R - R.R. STRIP - MAYO			
RETURN			
SLUG DRILL BASKET			2.9
			3.9

TERMS: NET 10 DAYS	TOTALS	3.9
FUEL COST \$ _____	TOTAL	\$ 1560.00
FLYING 3.9 HRS. AT \$400.00 = \$1560.00		

AUTHORIZED BY PRINT D. NEBERLEIN	SIGNATURE <i>[Signature]</i>
CONTRACT HRS. DAY _____ MONTH _____ YEAR _____	FUEL SUPPLIED BY: <input checked="" type="checkbox"/> CUST. <input type="checkbox"/> KH <input type="checkbox"/>
	KEYSTONE FUEL
	_____ GALS. FROM _____ AT _____ PER GAL
	_____ GALS. FROM _____ AT _____ PER GAL
	_____ GALS. FROM _____ AT _____ PER GAL
	_____ GALS. FROM _____ AT _____ PER GAL
	PILOTS NAME TOM TAYLOR
	SIGNATURE <i>[Signature]</i>
Arctic Star Printing Inc.	FLIGHT TICKET NO. _____



CHEMEX LABS LTD.

212 BROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1

TELEPHONE: (604) 984-0221
TELEX: 043-52597

• ANALYTICAL CHEMISTS

• GEOCHEMISTS

• REGISTERED ASSAYERS

*** INVOICE ***

To : ARCHER CATHRO & ASSOC. (1981) LTD.,

Invoice # : I8213002

1016-510 WEST HASTINGS
VANCOUVER, B.C.
V6B 1L8

Date : 8-SEP-82
P.O. # : NONE
Project WJV

Invoice for analytical work reported on certificate(s) A8213002-001

Quantity	Analysed for code description	unit price	amount
17	004 - Pb	ppm	
	005 - Zn	ppm	
	006 - Ag	ppm	
	009 - Co	ppm	
	101 - Au NAA	ppb	
	301 - Cu	%	
		15.15	257.55

Sample preparation and other charges :

17	208 - Assay - RING	3.25	55.25
----	--------------------	------	-------

TOTAL	\$	312.80
Discount (20 %)	\$	62.56

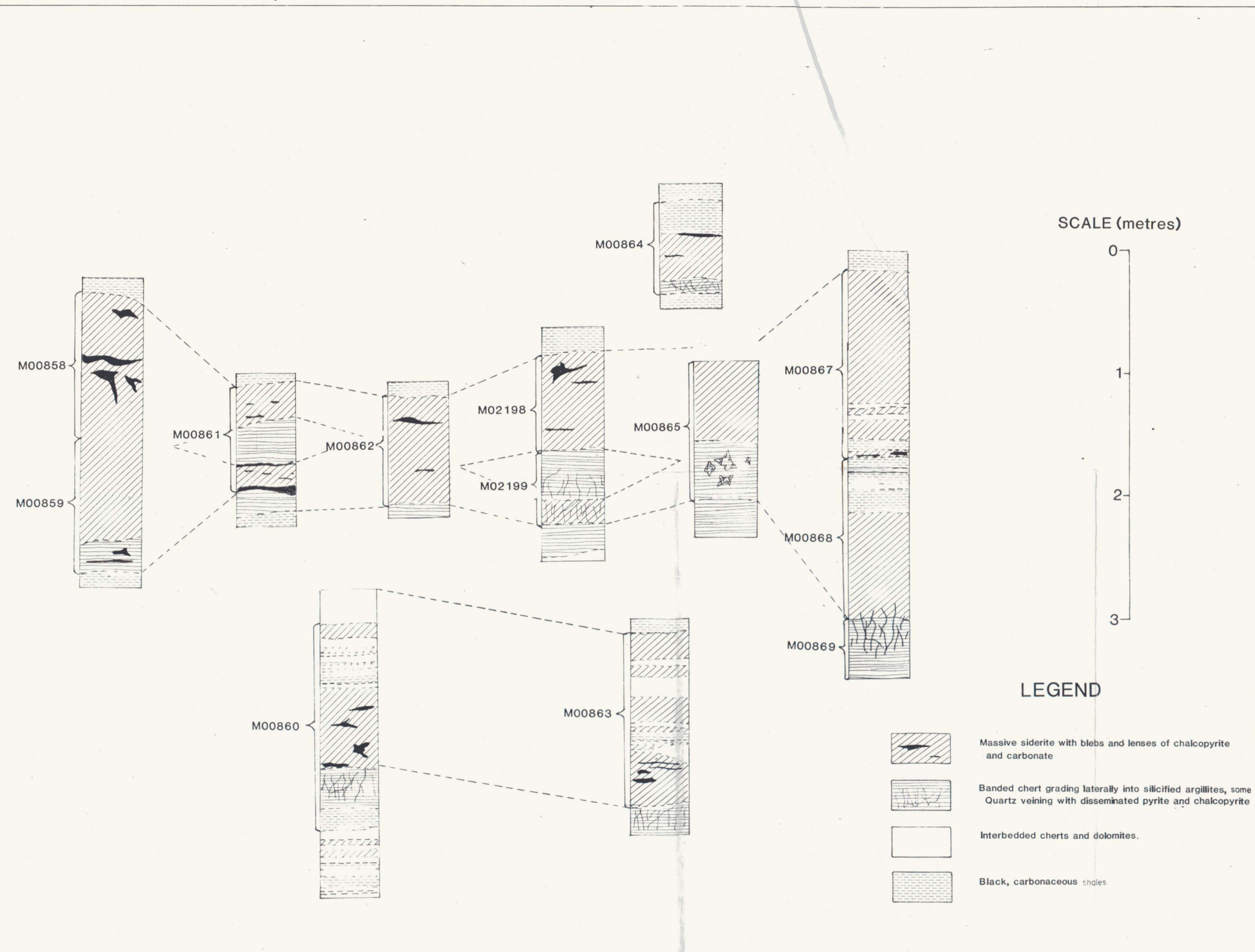
Please pay this amount ----> \$ 250.24
=====

TERMS -- NET 30 DAYS

2.0 % per month (24 % per annum) charged on overdue accounts



MEMBER
CANADIAN TESTING
ASSOCIATION



CHIP SAMPLE SUMMARY

SAMPLE NUMBER	LENGTH	Cp%	Py%	Er(✓)	ppbAu	ppmAg	%Cu	ppmCo	ppmPb	ppmZn
M00870	8m	0.5%	40%	X	10	1.0	0.16	85	19	14
M00867	1.5m	2-5%	10%	✓	90	6.1	1.28	720	18	37
M00868	1.0m	0.5%	5-10%	✓	13	1.1	0.16	180	20	35
M00869	0.5m	0.5%	10-20%	X	7	1.1	0.15	113	42	39
M00865	1.25m	tr	1%	X	2	0.7	0.02	17	33	35
M00864	0.80m	5%	2%	X	131	4.8	1.44	188	89	42
M00863	1.5m	2-5%	2%	X	257	6.4	1.28	420	36	38
M02198	0.75m	5%	0.5%	✓	207	4.5	1.58	98	17	673
M02199	0.5m	2%	1-3%	✓	38	2.4	0.64	680	27	38
M00862	1.0m	1%	10%	✓	45	1.1	0.35	545	53	31
M00860	1.5m	0.5%	1-2%	X	29	2.7	0.16	45	485	220
M00861	1.0m	1%	20%	X	20	1.5	0.29	85	72	57
M00858	1.25m	5-10%	1%	X	114	10.3	2.61	118	1200	285
M00859	1.0m	10%	2%	X	396	11.2	3.85	120	148	76
M02163	1.0m	3%	5%	X	25	2.6	0.96	113	28	21

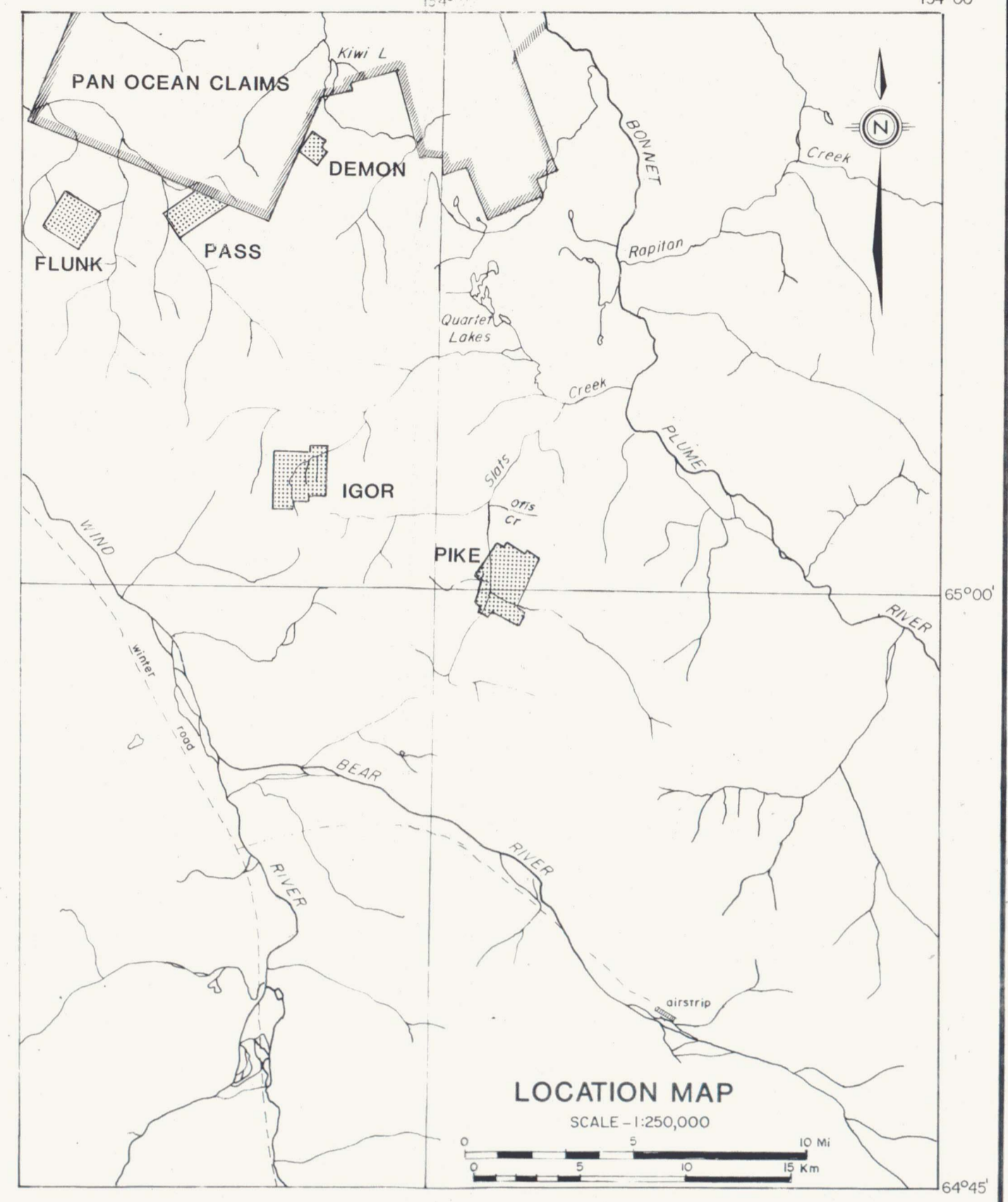


Figure WJV82 - D2
 ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

GEOLOGY AND SAMPLE LOCATIONS
 DEMON PROPERTY
 091436
 WERNECKE JOINT VENTURE

SCALE - 1:2000
 0 50 100 150 Metres

W. J. Cathro
 Jan 23/83