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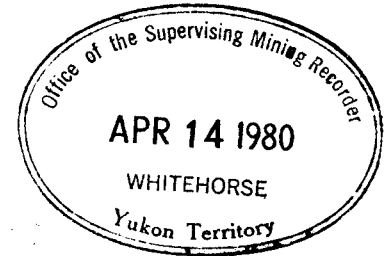
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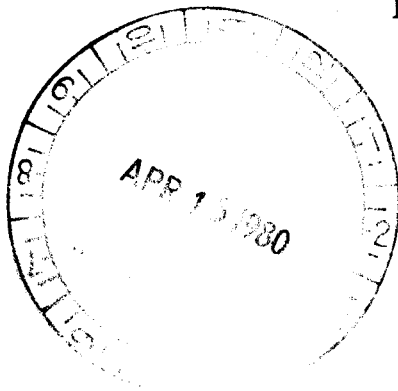
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REPORT ON
GEOLOGICAL, GEOCHEMICAL AND PANNING SURVEYS

CONDUCTED JULY 25 TO AUGUST 31, 1979

Ivo 1-40 Claims - YA36556-YA36595
41-80 Claims - YA45223-YA45262
81-128 Claims - YA45639-YA45686



WATSON LAKE MINING DISTRICT

CLAIM SHEET 95E/3

Latitude 61°03'N

Longitude 127°03'W

J.G. ABBOTT, P.Eng.

090553

This report has been examined by the Geological Classification Unit and is recommended to the Board of Mines to be considered as a preliminary estimate of the value of

28,000.00

J. A. Morin

Geological Engineer

Consulting Geologist and Registration work under Section 53 of the Quartz Mining Act.

Commissioner of Yukon Territory

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SUMMARY AND RECOMMENDATIONS

The Ivo claim group was staked in 1979 by CUB Joint Venture (Cassiar Asbestos Corporation Ltd., Highland-Crow Resources Ltd. and Union Carbide Canada Ltd.) to cover the margins of a small Cretaceous stock and several tungsten occurrences within lower Cambrian limestone.

Detailed prospecting, mapping and grid soil sampling on the Ivo property has resulted in the discovery of a total of six skarn showings. Of those, only the Main showing has the potential for even modest size and grade. It has been traced in suboutcrop for a length of 140 m and a maximum width of 20 m, with grades of up to 0.50% WO_3 over widths of 9 m. No significant panning anomalies were discovered away from known mineralization but geochemical and panning response is generally masked by glacial till over much of the intrusive contact. Despite the moderate success, the target is still considered promising because the geologic setting is favourable, the stock is well mineralized, and most of the contact areas have not been adequately tested. Covered areas along the granite contact should be explored with linecutting and geophysics to determine if drill targets can be identified.

INTRODUCTION

The Ivo claim group was staked by CUB Joint Venture in May and August, 1979. The property contains several new tungsten occurrences situated within lower Cambrian limestone along the margins of a small Cretaceous stock.

Scheelite-bearing massive sulphide float was originally found by Union Carbide in 1971 and subsequent prospecting by CUB JV in 1978 revealed the presence of

unmapped limestone and dolomite along the granite contact, as well as small amounts of high-grade garnet-diopside skarn talus at one location on the contact (78 showings). Because of the favourable geology and poor exposure, the northern half of the Ivo stock was staked in 1979. Preliminary geologic mapping, trenching, soil panning surveys and geochemical surveys were conducted over the margins of the northern half of the stock between July 25 and August 31. The property straddles the Yukon-N.W.T. border and about 30% of the work described in this report was conducted in the N.W.T. The writer supervised the field work and was assisted by geologist Trevor Bremner and assistants Nigel Peck, Ian Talbot, Mark Ward-Hall, Michael Payne and Anna Reid. The project was managed and conducted by Archer, Cathro and Associates Ltd.

PROPERTY, LOCATION AND ACCESS

The property straddles the Yukon-N.W.T. border at latitude 61°03'N and longitude 127°03'W and is some 140 km northeast of Watson Lake and 120 km southeast of the Cantung Mine. The nearest roads are the Nahanni Range (Cantung) Road 70 km to the west and a winter road from the Alaska Highway to the Mel lead-zinc property, 75 km to the south.

It consists of 128 contiguous Yukon claims and 3 contiguous N.W.T. claims (about 2479 acres or 48 Yukon equivalent claims). The Yukon claims are recorded in the name of Archer, Cathro and Associates Ltd. at the Watson Lake Mining Records office and the N.W.T. claims are recorded at the Yellowknife Mining Record office in the name of Union Carbide Canada Ltd. as follows:

<u>CLAIM NAME</u>	<u>GRANT NUMBERS</u>	<u>EXPIRY DATE</u>
Yukon - Ivo 1-40	YA36556-YA36595	22 May/80
41-80	YA45223-YA45262	9 Aug/80
81-128	YA45639-YA45686	4 Sept/80
N.W.T. - 1	F02067	28 May/81
2	F02066	28 May/81
3	F02065	27 Aug/81

FIELD AND ANALYTICAL PROCEDURES

Scheelite is a resitrate mineral that is transported both physically and chemically in the surface environment. As a result, soil panning is an effective alternative to geochemistry. Soil samples for panning surveys were slightly over a pan in size, weighed 2.5 to 3.0 kg, and were collected in large plastic bags. The samples were either carried to the nearest water or cached at helicopter pads and flown to camp for panning. Concentrates were collected in filter paper, dried and then examined under an ultraviolet lamp.

If the concentrates from the grid surveys contained too much scheelite for normal counting, estimates were made by spreading the concentrates evenly over grid paper, counting the number of grains within four or five randomly selected squares to obtain the average, and multiplying by the total number of squares covered by concentrates.

As a check on panning results, soil samples for geochemical analysis were collected in kraft envelopes from each panning sample and shipped by air freight to Chemex Labs Ltd., North Vancouver, B.C. for routine geochemical analysis. Soil samples were pulverized like rock samples to ensure that coarse scheelite grains would be included in the assay since tungsten disperses in soil mainly as clastic grains of scheelite.

All samples were analyzed for tungsten with a colorometric determination after fusing with potassium bisulfate, leaching with concentrated HCl, extracting into an amyl acetate solution containing dithiotoluene, and reducing interfering elements with stannous fluoride in a hot water bath.

The samples were also analyzed for copper, using a nitric-perchloric acid extraction and atomic absorption spectrometry.

Baselines were chained, picketed and cut where necessary and sample lines were located by using compass and topofil without slope correction. Stations were marked with 1 m lath pickets on baselines and above timberline and with flagging elsewhere.

GEOMORPHOLOGY

The Ivo property is located along the crest of a north-trending upland at the height of land between the headwaters of Rock River to the southeast, the Coal River to the west and the Flat River to the northeast. Maximum elevations reach 2000 m and local relief is about 700 m. Most of the surrounding area is bush covered, with timberline at about the 1600 m elevation. With the exception of steeper terrain along the southern half of the property, valleys are broad and U-shaped. Outcrop is generally scarce and thickness of overburden varies greatly. Above valley floors, overburden usually consists of a thin layer of locally derived talus or felsenmeer. Granitic glacial erratics are common and can be confused with similar boulders derived from granite in place. Along valley floors, overburden varies from a thin layer of locally derived boulders to relatively thick accumulations of glacial drift.

GEOLOGY

The geology of the Ivo property is shown at a scale of 1:10,000 on Figure 1 (in pocket) and the various map units are described in the Table of Formations on the following page. A sequence of quartzite, phyllite, dolomite and limestone at least 500 m thick is exposed in the core of a broad, north-trending anticline. Mapping along strike to the north has shown that these rocks underlie the Sekwi Formation and belong mainly to the lower Cambrian Backbone Ranges Formation and, in part, to the lower Cambrian and older "Phyllite Unit".

A regional north-trending hinge line that passes through the property is defined by an abrupt facies change from carbonate to clastic rocks as well as a general westward thinning of carbonate units and fining of clastic rocks. As a result, only four lithologic subdivisions are practical within rocks underlying the Sekwi Formation. These are phyllite (6H), quartzite (I6brq), dolomite (I6brd) and limestone (I6brl). Because of the uncertainty of stratigraphic correlations, the carbonate rocks are discussed first and the clastic rocks second, rather than the more usual order from oldest to youngest.

Massive pink and cream weathering dolomite (unit I6brd), exposed mainly in the southeastern and southwestern portions of the claim group is the most distinctive rock type present and is apparently restricted to one stratigraphic horizon. From east to west, its thickness varies from about 250 m down to 75 m.

The dolomite is overlain by at least two horizons of distinctive buff to grey weathering, sandy to pebble limestone of unit I6brl. Quartz grains up to 1 cm across form the clastic component. Bedding is commonly prominent and in places forms westerly directed crossbeds up to one metre or more in height.

TABLE OF FORMATIONS

CRETACEOUS

Kqm Quartz monzonite

UPPER CAMBRIAN to ORDOVICIAN

€Or Rabbitkettle Fm
Wavy banded limestone

LOWER CAMBRIAN

I€s Sekwi Fm
Limestone and dolomite; swiss cheese limestone

LOWER CAMBRIAN and OLDER (?)

I€brq Backbone Ranges Fm
Quartzite, siliceous light grey hornfels,
quartz-biotite schist, lesser green phyllite and siltstone

I€bri Siliceous limestone, pebbly limestone

I€brd Pink or cream coloured dolomite

LOWER CAMBRIAN (?) and OLDER

€H Phyllite Unit
Green muscovite-chlorite phyllite, siltstone, banded
argillite, dark grey phyllite, dark grey pyritic hornfels

One apparently continuous limestone horizon directly overlies the dolomite and at least one other occurs within quartzite about 50 m higher in the section. From east to west across the property, the lower limestone varies in thickness from about 30 m to less than 10 m and the upper, from about 3 m to 1 m. Along the northern and western sides of the property, sandy limestone up to 10 m thick forms lenses within both quartzite and phyllite. Neither the configuration nor stratigraphic position of these lenses is certain.

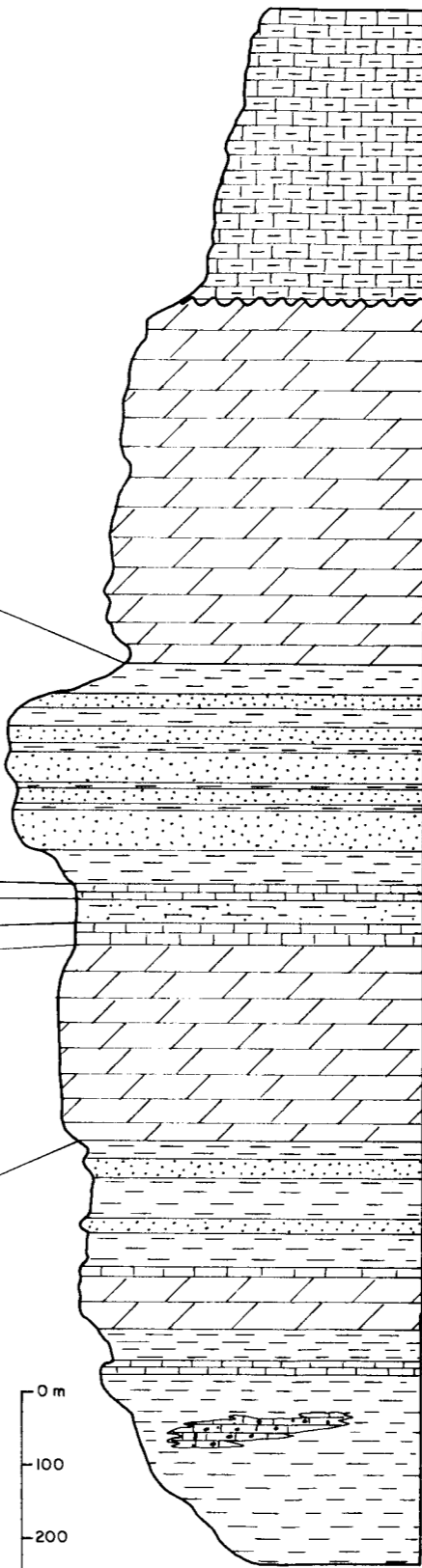
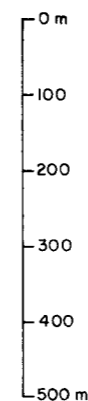
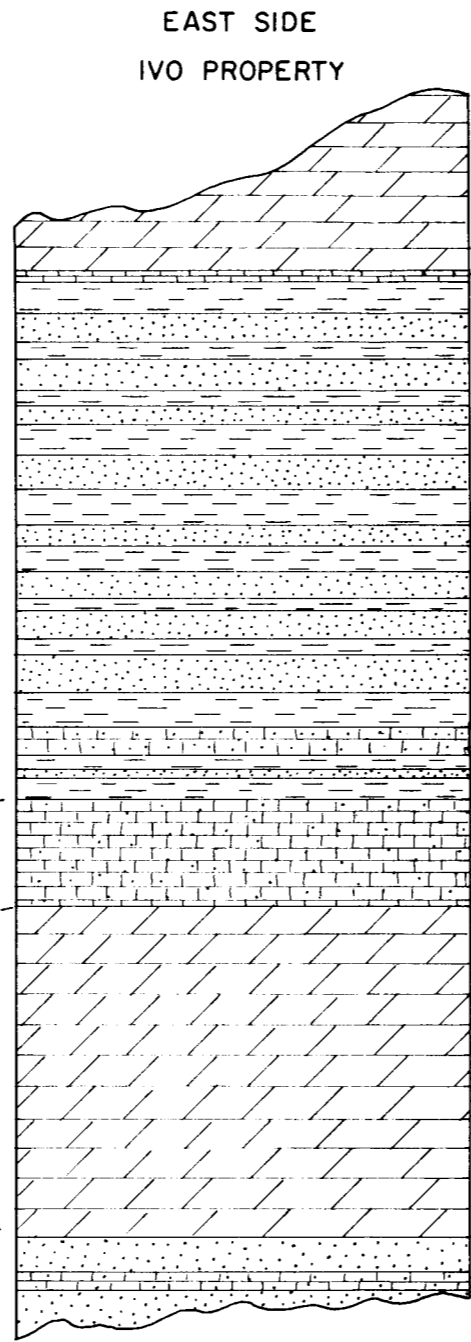
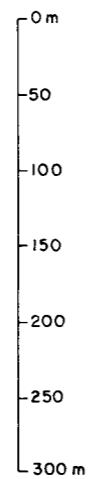
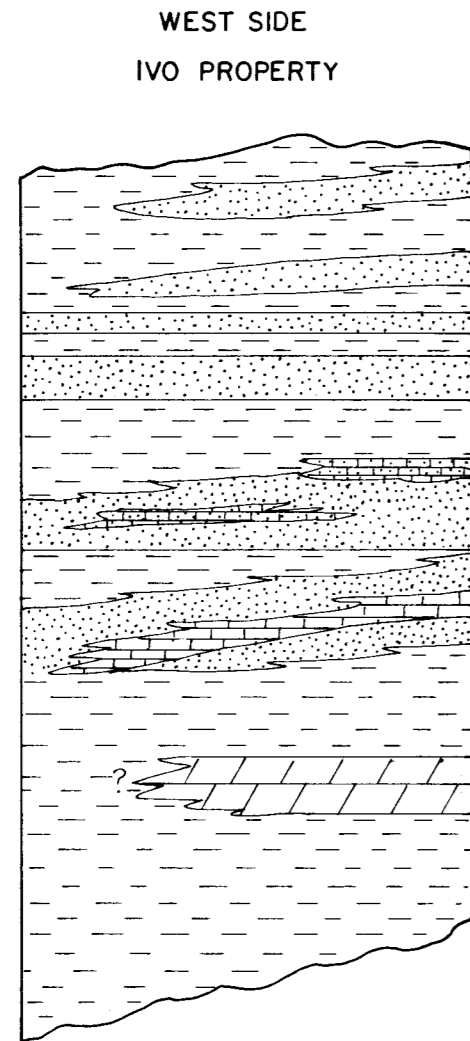
Dark, grey-green non-calcareous phyllite and siltstone interbedded with massive, crossbedded, grey quartzite and quartz grit enclose the carbonate rocks. The clastic rocks have been subdivided into a quartzite unit (IGbrq) and a phyllite unit (GH). The distinction between the two is sometimes arbitrary and depends on the predominance of one rock type or the other. All clastic rocks overlying the dolomite are included within the quartzite unit, although phyllite is locally a large component. In general, phyllite with minor sandstone and quartzite underlies the carbonate sequence but similar rocks also comprise the westward facies equivalents for the upper members. These rocks have been mapped regionally as the lower Cambrian (?) and Hadrynian "Phyllite Unit" by the G.S.C.

The Backbone Ranges Formation is conformably overlain along the eastern margin of the property by massive limestone and dolomite of the Sekwi Formation. The Sekwi Formation is over 1000 m thick regionally, but only the lowermost members are exposed on the property. These consist of a basal member less than 20 m thick of thin bedded, brown and grey weathering, nodular "swiss cheese" limestone and overlying massive, structureless grey limestone at least 100 m thick.

A tentative correlation of the local geology to regional stratigraphy is shown on Figure 2. The regional stratigraphy has been mainly determined from a relatively well exposed section located 8 km north of the property. From this section, it is apparent that as many as four limestone and two dolomite horizons may be exposed on the eastern side of the property. On the west side, however, the number and thickness of carbonate horizons is not known, although a tentative correlation is shown on the same figure.

The Ivo stock is composed of medium grained, equigranular to porphyritic granodiorite or quartz-monzonite, and is similar to Cretaceous intrusions throughout eastern Selwyn Basin. The small size of the stock, domal configuration of host rocks along the relatively well exposed northern contact, gently dipping contacts near the Main and Trevor showings and abundance of roof pendants indicate that the pluton has only been barely unroofed. Most of the granite contact is covered but it likely dips moderately to steeply away from the core of the stock in most places.

A gently northward-plunging, broad, open anticline, up to 8 km across, is the dominant structural feature of the Ivo area. The fold terminates against a fault along the Rock River, immediately south of the property, and can be traced northward for at least 30 km. Rocks on both limbs dip uniformly at about 20° to 40°. No related smaller scale structures have been observed. Several medium scale folds mapped near the granite contact appear to be younger local features related to the granite emplacement. Cleavage related to the anticline, both on the property and further to the north, dips moderately westwards. Gently eastward-dipping foliation in the northern part of the map-area may be related to the same structure as well although those attitudes are not typical. Near granite margins, cleavage is obliterated by hornfels development.



UPPER CAMBRIAN AND ORDOVICIAN
RABBITKETTLE FORMATION
 recessive, grey silty thin bedded wavy banded limestone

— unconformity

LOWER CAMBRIAN
SEKWI FORMATION
 massive, light grey and pastel coloured limestone and dolomite

— conformable

LOWER CAMBRIAN AND OLDER (?)
BACKBONE RANGES FORMATION
 massive, grey weathering quartzite, grit noncalcareous phyllite

grey limestone
 grey phyllite, quartzite
 grey limestone

cream coloured dolomite

massive, grey weathering quartzite
 noncalcareous phyllite

grey limestone
 cream coloured dolomite
 grey noncalcareous phyllite
 grey limestone — indefinite boundary

LOWER CAMBRIAN (?) AND OLDER
PHYLLITE UNIT
 grey non calcareous phyllite
 minor buff weathering sandy limestone

Figure 2
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STRATIGRAPHIC CORRELATIONS
 IVO PROPERTY
 CUB JOINT VENTURE

Numerous small, vertical faults are the second most prominent structural feature. Most are northeast-trending and have displacements that suggest a relationship to doming about the Ivo stock. This effect is best illustrated by the steplike, eastward displacement of the Sekwi Formation northeast of the property.

MINERALIZATION

Six skarn showings have been discovered on the Ivo property to date: Ivo; 78; North; Trevor; Tuanipel; and Main showings. The first three occur as float and only the Main showing appears to have the potential for significant size and grade. The 78 showing is hosted by dolomite and all others by pebble or sandy limestone. With the exception of the Tuanipel showing, all are basically similar and consist of dark green and reddish brown garnet-diopside skarn with variable sulphide content.

The Ivo showing consists of several scheelite-bearing garnet-diopside skarn float boulders, which are surrounded by granite float near the centre of the stock. The mineralized float probably represents erosional remnants of a larger skarn zone situated mainly within limestone above the contact. This showing has no potential.

The 78 showing consists of a few pieces of float grading up to 3.84% WO_3 found by CUB JV in 1978 in a talus slope at the contact between dolomite and granite. It has little potential because of the small amount of float found. However, 1979 mapping indicates that the dolomite unit exposed at surface is probably underlain by at least one other dolomite horizon and two favourable limestone horizons. The presence of erratic high grade mineralization within the upper dolomite could indicate the presence of better mineralized zones at depth.

The North showing consists of a few weakly mineralized, angular boulders up to 1 m across situated in brushy, gently sloping and poorly drained terrain. Glacial till is apparently thin or absent but exposures are limited to scattered, frost heaved, angular boulders. Granite boulders accompany the float, suggesting that the margin of the stock is nearby.

Typical skarn is miarolitic, fine grained and thinly laminated with garnet forming patches up to 1 cm across within a pyroxene matrix. This unusual texture is similar to that of pebbly limestone, the probable host rock. A representative specimen assayed 0.16% WO_3 and the showing is only of interest as an indicator of the presence of mineralization.

The Tuanipel showing was discovered by soil panning and was exposed by hand trenching. Scheelite occurs with massive pyrrhotite, quartz and clay in a vertical, northwest-trending zone bounded by massive, grey limestone on one side and fine grained, leucocratic intrusive rocks on the other. Unlike the other showings, the host rock is pale calc-silicate skarn and dark coloured garnet-diopside skarn is absent. A random chip sample from the mineralized zone, which is exposed for a length of about 5 m and varies between 0.2 m and 0.6 m in width, gave an assay of 1.04% WO_3 . The sample also assayed 1.6 ppm Ag, 1580 ppb Au and 1000 ppm Bi. The configuration, as well as the unusual mineralogy, suggests that this showing may be fault controlled.

The Trevor showing was discovered at the end of the mapping program. It was examined briefly but is essentially unexplored. Scheelite occurs intermittently within both dark and pale garnet-diopside skarn within coarse talus above timberline. The showing has a strike length of about 100 m. Two large fragments of massive sulphides, one well mineralized and the other barren, were also found. Mineralized skarn comprises about 5% of talus fragments. A weakly

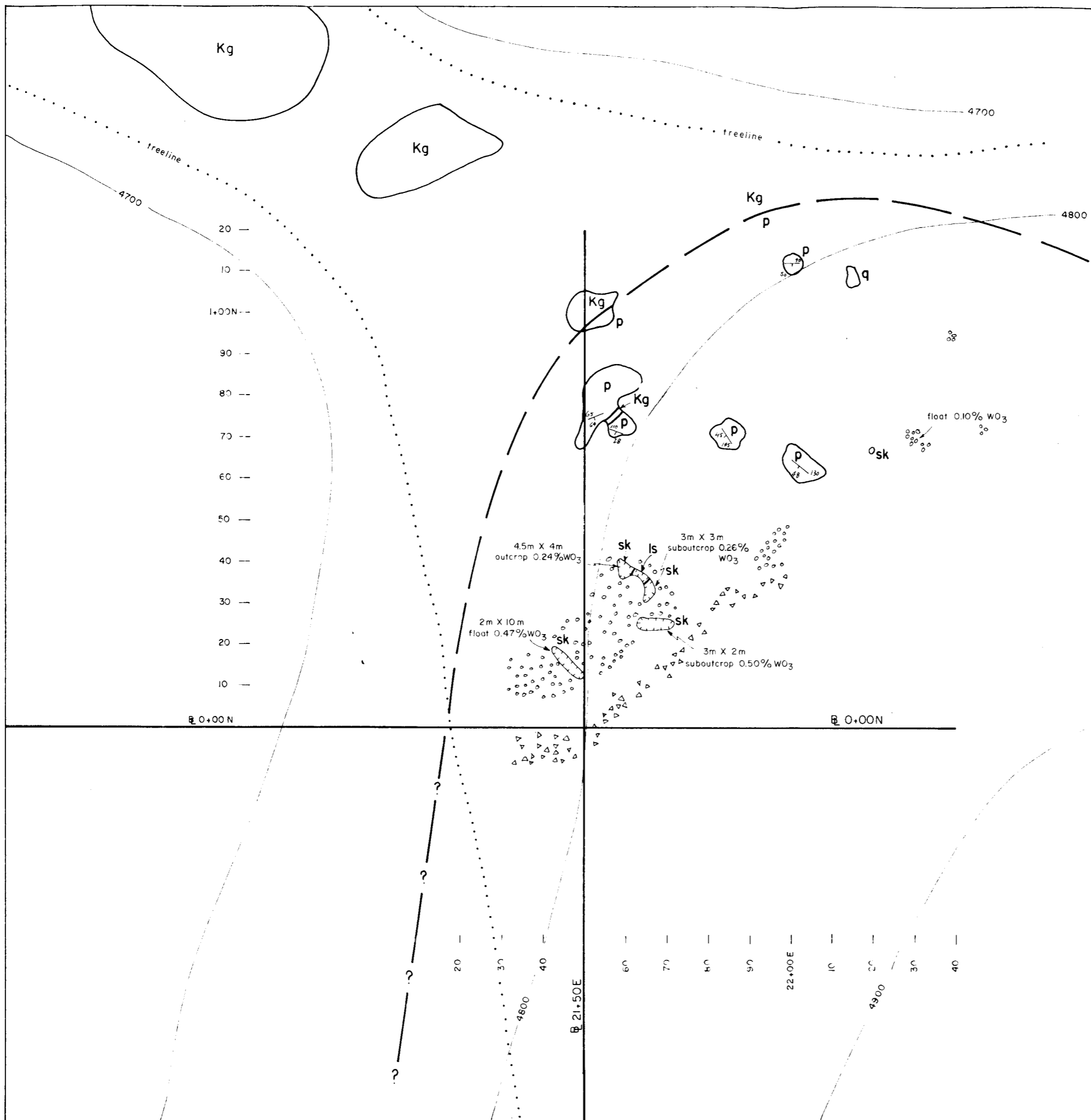
mineralized zone about 30 cm wide occurs within a small outcrop of phyllitic hornfels but does not appear to be the main source of float. Typical specimens of garnet-diopside skarn and massive sulphides assayed 0.46% and 1.65% WO_3 respectively and low unimportant values in Cu, Zn and Mo.

Accompanying talus consists of brown weathering, spotted, phyllitic hornfels and minor grey limestone. Granite becomes the main rock type in the talus about 20 to 50 m downslope from the upper limits of skarn. The trace of the limits of granite float indicates that it underlies the skarn and hornfels along a gently dipping contact. Bedding appears to dip gently to moderately towards the granite contact.

The Main showing is exposed in talus and suboutcrop along a gentle slope just above timberline (Figure 4). Overburden comprises a mixture of erratic granitic boulders and solifluction lobes of locally derived felsenmeer and reaches thickness of several metres near the showing. Outcrop is restricted to a small area located about 50 m north of the showing.

The showing occurs near the base of a roof pendant about 1 km in diameter. It is comprised of moderately westward-dipping quartzite and phyllite that probably belongs to the upper part of the Backbone Ranges Formation above the dolomite horizon. Large, angular talus blocks and a few small outcrops of skarn and massive grey limestone are exposed intermittently within a narrow, southwestward-trending zone about 140 m long and 5 to 20 m wide. The zone appears to pinch out to the northeast and disappears beneath increasingly thick overburden and vegetation to the southwest.

The orientation of both skarn and bedding is uncertain. A few measurements of possible bedding taken from nearby, intensely hornfelsed phyllite and quartzite suggest a southeasterly strike and a moderate southwesterly dip. On the other hand, the distribution of skarn and limestone float suggests that bedding strikes north-easterly.



CRETACEOUS

Kg Medium to coarse grained granodiorite or quartz monzonite

LOWER CAMBRIAN

BACKBONE RANGES FORMATION (I_{br})

sk Green and brown garnet, diopside, pyrrhotite skarn; grades to massive sulphides

ls Massive medium grey marble

P Purplish grey phyllitic hornfels

q Massive grey quartzite, quartz grit

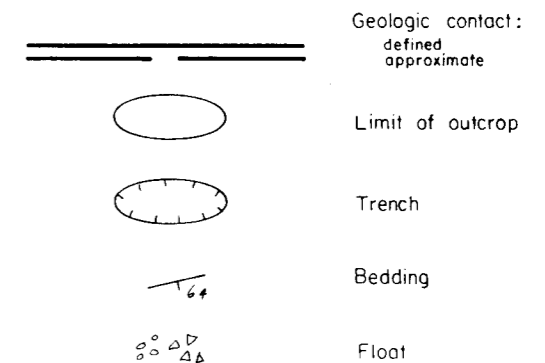


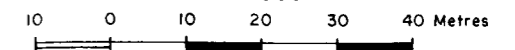
FIG. 4

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**GEOLOGY
MAIN SHOWING
IVO PROPERTY**

CUB JOINT VENTURE

Scale 1:1000



The size of the skarn depends on the position of the granite contact. In general, the contact dips gently southeastwards beneath the roof pendant. Granite only occurs below the showing as coarse talus more than 100 m downslope, although nearby exposures north of the showing suggest that the contact could be as close as 50 m below.

Four hand trenches were dug within the highest grade part of the skarn zone. Trench 4 was dug to find the source of particularly well mineralized, massive sulphide float but was abandoned at a depth of 1.5 m without reaching bedrock. Float from the trench consisted mainly of rusty, massive sulphide boulders with minor limestone and hornfels in a soil matrix. Trenches 1, 2 and 3 were dug across the widest and best exposed part of the zone. Outcrop was only reached in trench 3 but rubble in the other two is coarse, angular and close to its source. Skarn is exposed in two zones separated by a barren limestone interval of 4 m across a total width of 20 m. The full width of the zone was not exposed and the southwest side is open. Skarn in trenches 2 and 3 consists of massive, dark green and brown garnet and diopside with minor sulphides whereas that in trench 1 is sulphide rich and grades to massive sulphides. The following assays were obtained from random chip samples from each trench:

Trench 1 - 0.50% WO_3 /9 m
2 - 0.26% WO_3 /4 m
3 - 0.24% WO_3 /5 m
4 - 0.47% WO_3 /10 m

Selected massive sulphide specimens from trenches 1 and 4 assayed 0.66 and 2.51% WO_3 respectively. All samples contain only background values in Cu, Mo, Ag and Au. Both tungsten grade and sulphide content increase to the southwest, along the trend of the zone, which is towards the intrusive contact.

Figure 5 shows the results of two magnetometer profiles at right angles to one another taken across the showing. Readings were taken every 10 m and show that the deposit gives a magnetic response of about 4,000 gammas. The uncertain size of the roof pendant and the skarn make an estimate of potential difficult. However, this zone appears too small to be of mineable size by itself and is probably more important as an indication that larger deposits could be found elsewhere along the contact.

PANNING AND GEOCHEMISTRY

Grid soil sampling was completed over some 50% of the covered granite contact. About 450 samples were collected on the Yukon claims, mostly at a spacing of 100 by 200 m but locally on a 100 by 50 m or 50 by 25 m grid near mineralized areas. In addition to the panning of soil samples for scheelite, sample splits were geochemically analyzed for tungsten and copper. The panning and geochemical results are plotted at a scale of 1:10,000 on Figures 6 and 7 (in pocket), respectively.

With the exception of a few isolated, single point anomalies, the tungsten geochemistry and panning show good correlation. Threshold is about 20 ppm W and 50 grains of scheelite respectively. Strongly anomalous values in excess of 100 ppm and 1000 grains occur only in the area of known mineralization at the Tuanipel and Main showings. Weakly anomalous values (from 20 to 100 ppm W and 50 to 100 grains scheelite) are erratically distributed, but fall mainly within three large irregular clusters situated near the Main and 78 showings and between the North and Tuanipel showings. The weak anomalies may represent areas of thinner overburden, in contrast with lower backgrounds from areas of thicker glacial drift. Therefore, the weak anomalies may simply indicate areas where panning is effective in measuring the relatively weak bedrock background.



FIG. 5
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**MAGNETOMETER
 TEST PROFILES**
 MAIN SHOWING—IVO PROPERTY
 CUB JOINT VENTURE

Scale 1:1000
 10 0 10 20 30 40 50 Metres

CONCLUSIONS

Despite the modest results of the 1979 program, the Ivo property is still a promising target and warrants further work. The following are both regional and local geological factors that make the property attractive. Like Mactung and Cantung, the Ivo property occurs at the eastern margin of Selwyn Basin at the facies boundary between carbonate and clastic rocks. Host rocks are lower Cambrian carbonates. The granite intrusion is relatively small and barely unroofed.


The 1979 program resulted in the discovery of four new showings, bringing the total to six, although only the Main showing has even modest size and grade potential. Over 80% of the granite contact is covered however, and the number of showings found to date indicates that the contacts of the Ivo stock are well mineralized.

The complete lack of response to panning and geochemistry over most of the buried portions of the granite contact suggest that these techniques are ineffective. This theory is substantiated by the broad, weakly anomalous response near the North and Tuanipel showings where the known lack of glacial till suggests that these techniques should work.

The only alternative exploration method is geophysics and further exploration should consist of reconnaissance proton magnetometer and VLF-EM surveys to outline drill targets.

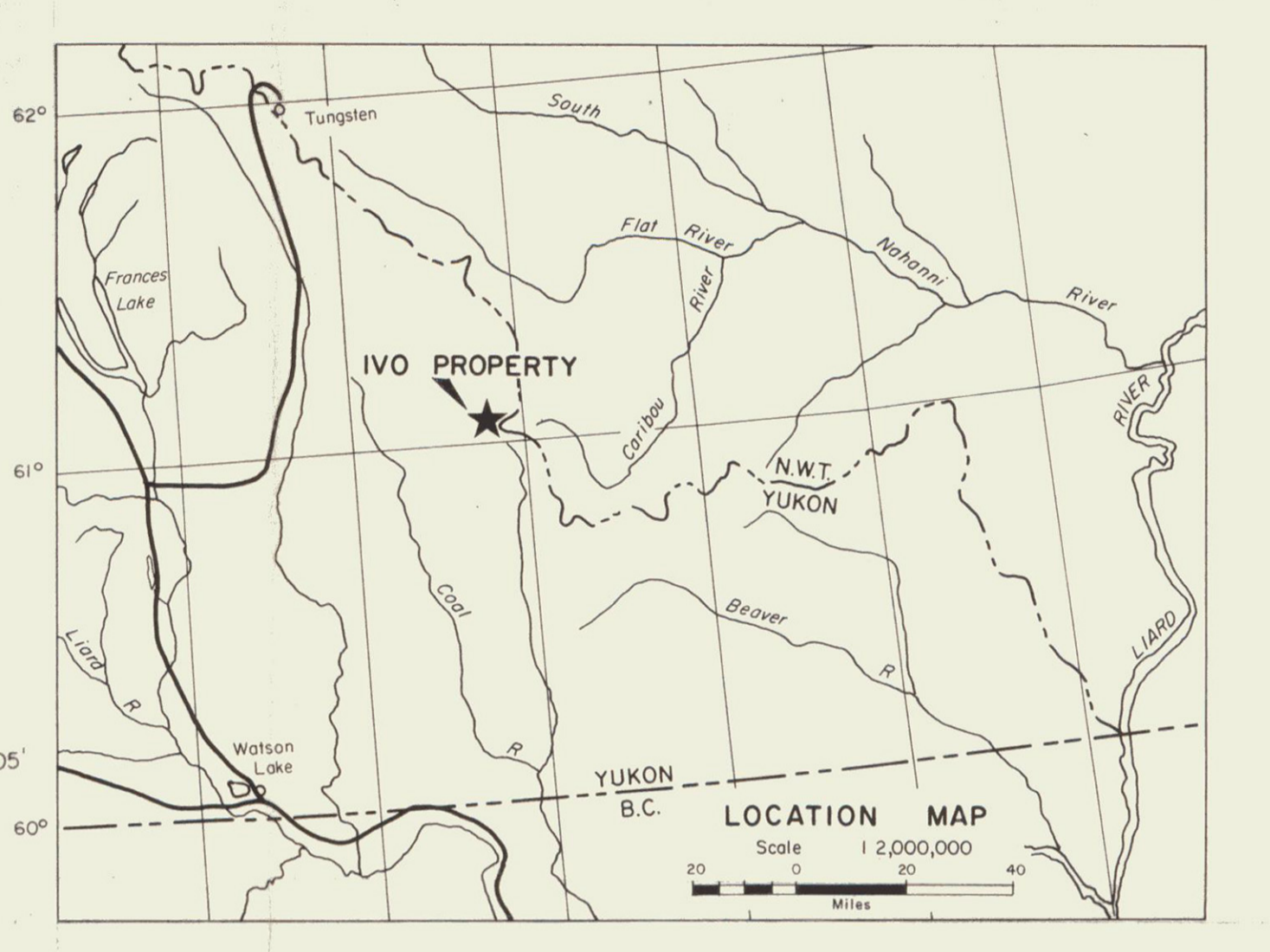
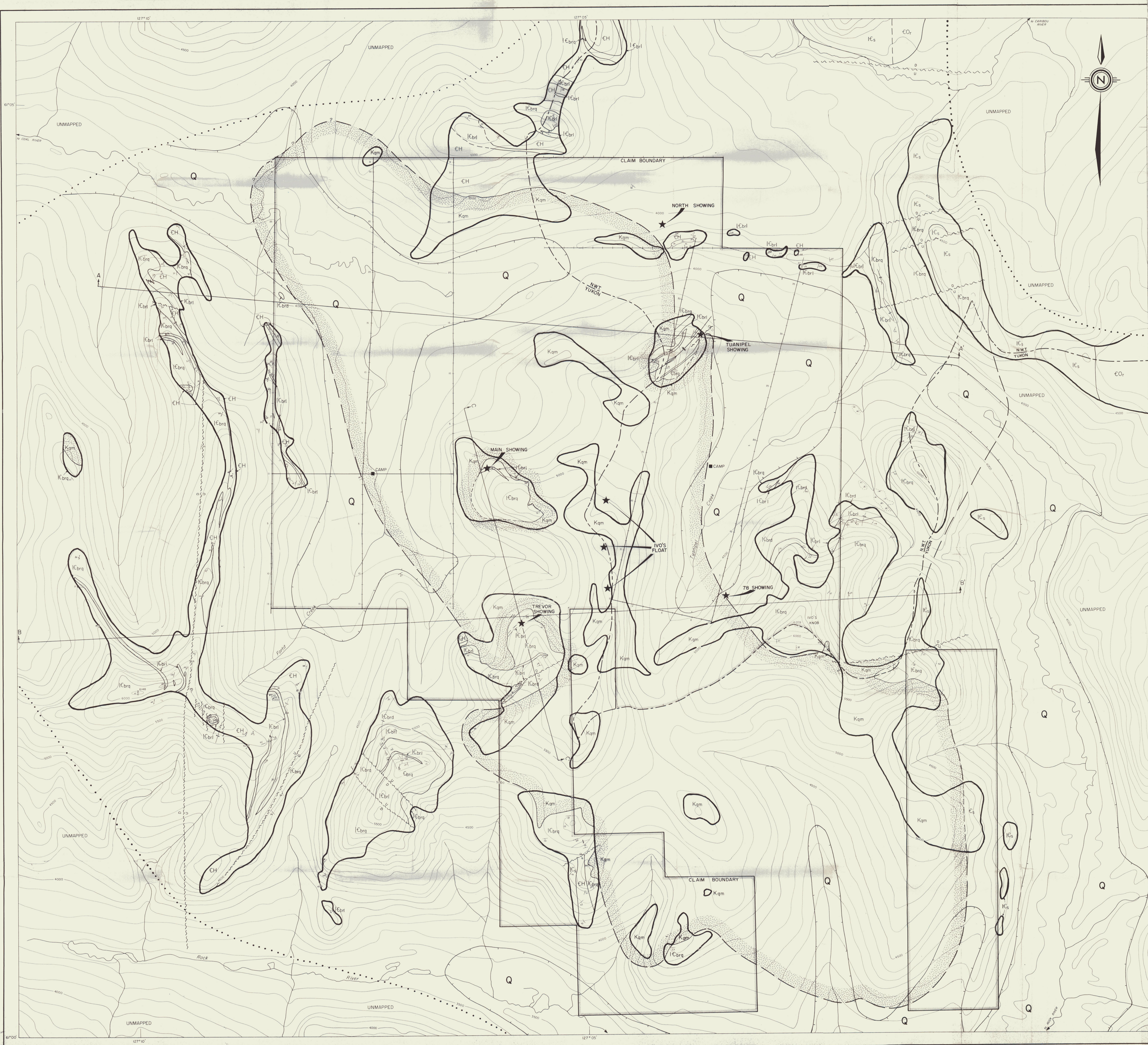
Respectfully submitted,

ARCHER, CATHRO AND ASSOCIATES LTD.



/mc

J.G. Abbott, M.Sc., P.Eng.



LEGEND

QUATERNARY
 Q Thick glacial till

CRETACEOUS
 Kam Quartz monzonite

UPPER CAMBRIAN to ORDOVICIAN
 ICOr Rabbittine Fm.
 Heavy bedded limestone

LOWER CAMBRIAN
 ICs Saker Fm.
 Limestone and dolomite, thin chert lenses

LOWER CAMBRIAN and OLDER (?)
 ICbra Bosquepelt Fm.
 Quartzite, siliceous (tan grey horizons, dark grey siliceous, rather green shale and slate)
 ICbrl Siliceous limestone, sandy limestone
 ICbrd Pink or cream coloured dolomite

LOWER CAMBRIAN (?) and OLDER
 CH Phyllite Unit
 Dark grey-green chlorite phyllite, siliceous, bedded argillite, dark grey phyllite, dark grey psyllite

--- bedding
 --- horizon
 --- fault
 --- geological contact - suspect, assumed
 X X anticline, syncline
 --- limit of outcrop

FIGURE 1
 ARCHER, CATHRO & ASSOCIATES LTD
GEOLOGY
 IVO PROPERTY
 CUB JOINT VENTURE
 SCALE 1:100,000

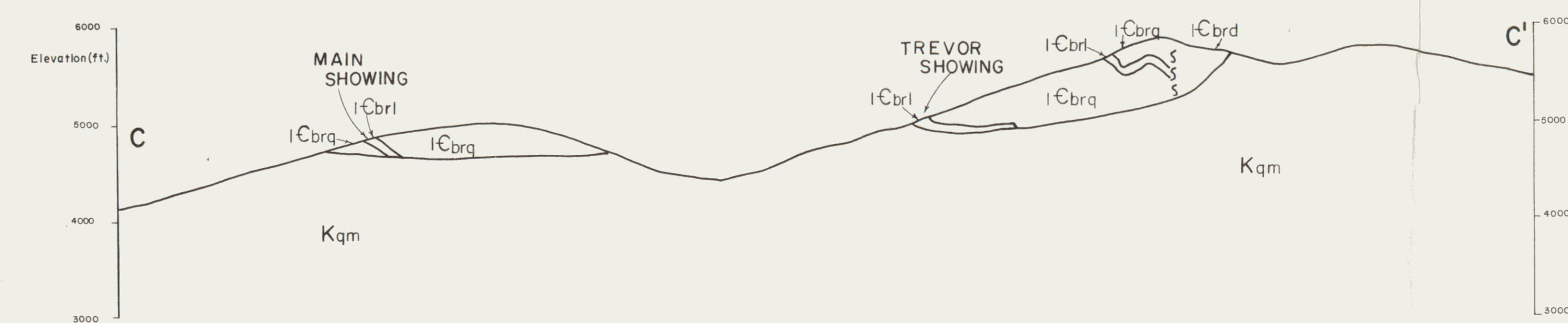
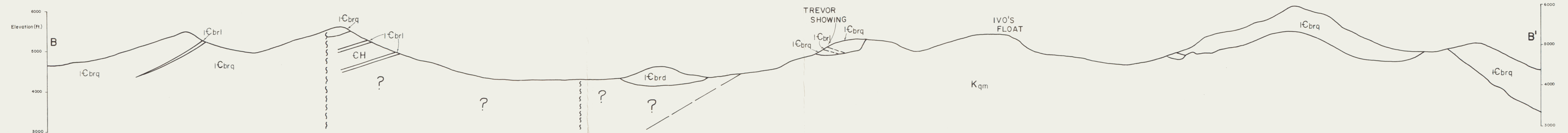
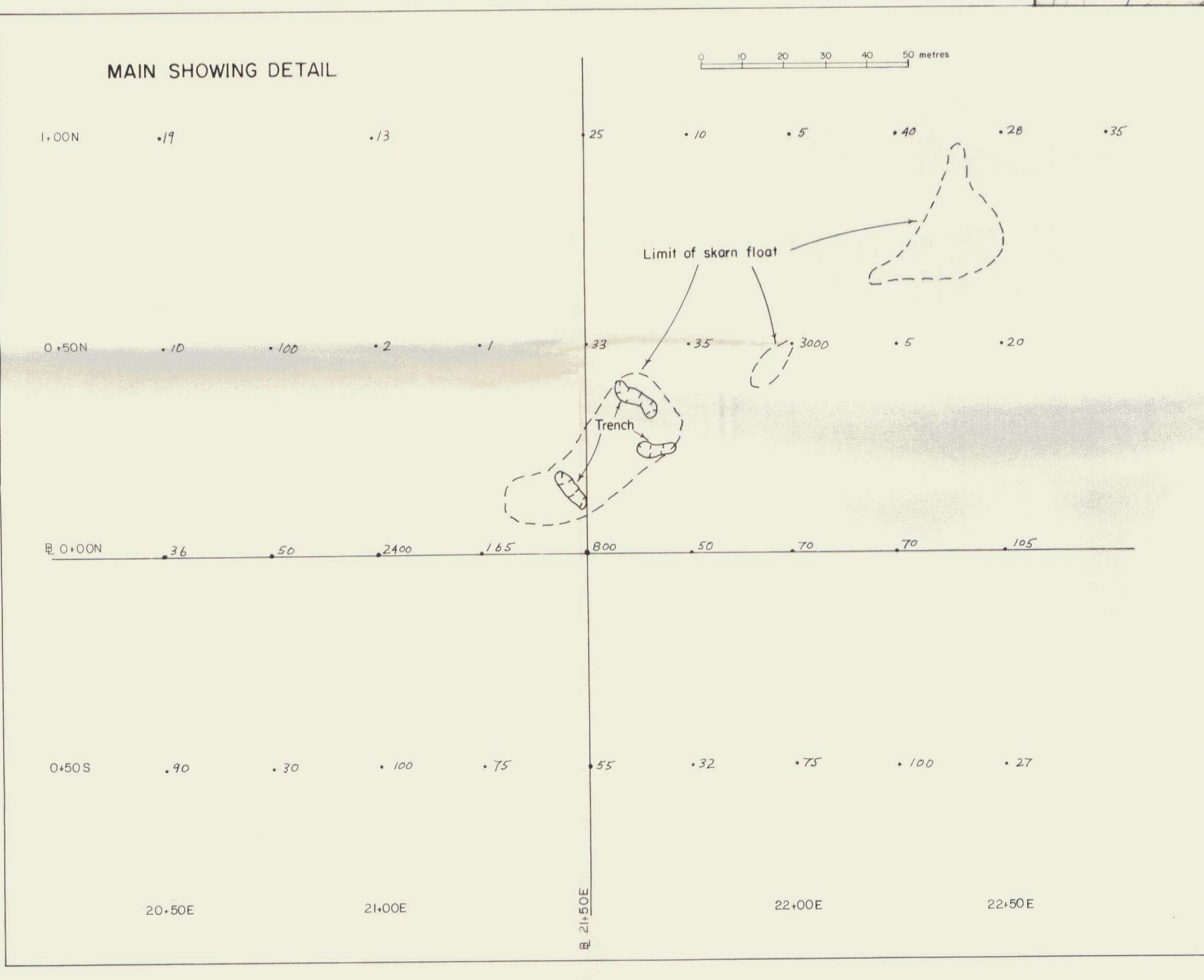
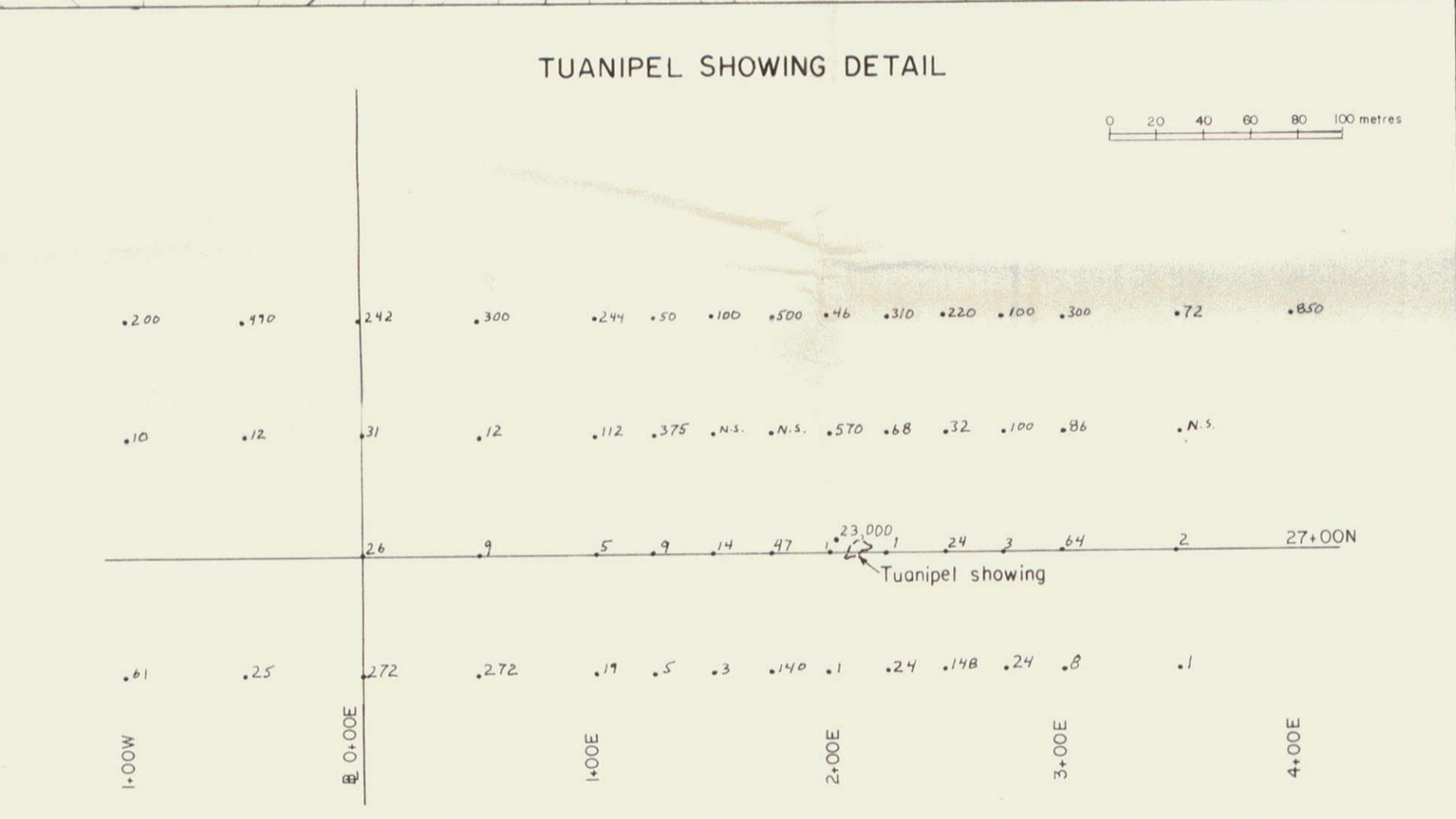
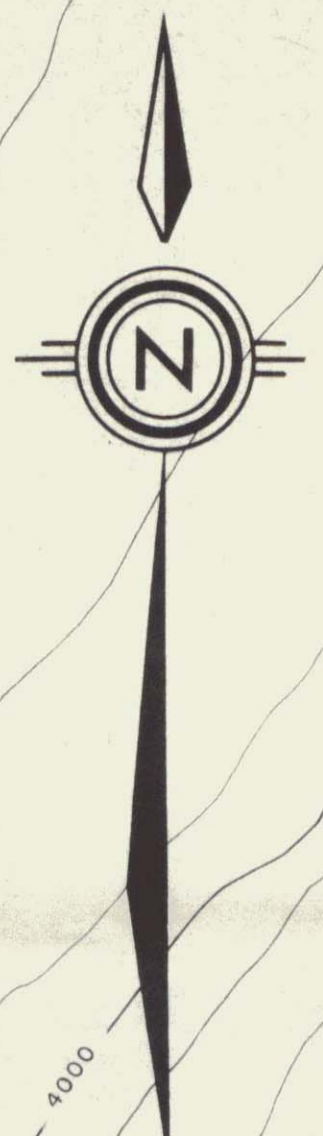
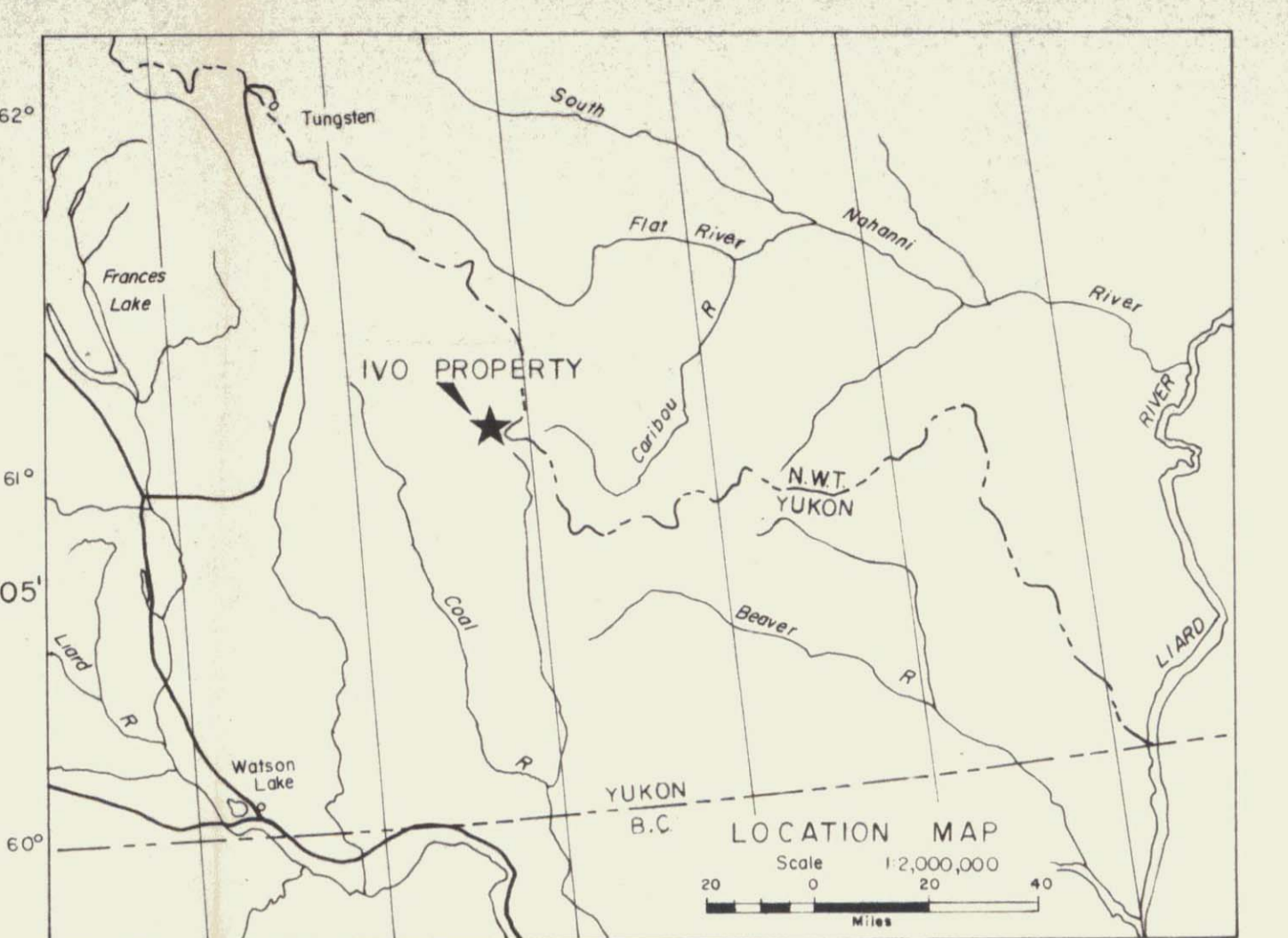


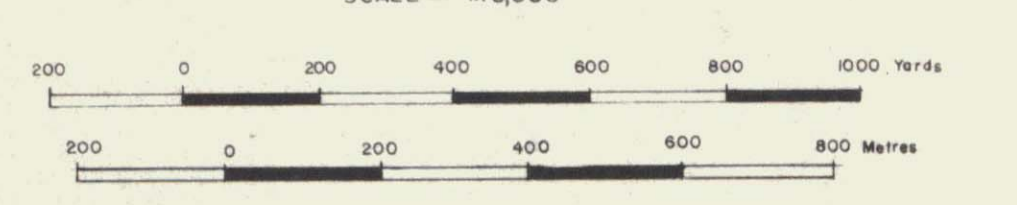
FIGURE 3
 ARCHER, CATHRO & ASSOCIATES LTD
CROSS SECTIONS
 IVO PROPERTY
 CUB JOINT VENTURE

HORIZONTAL SCALE 1:10,000
 VERTICAL SCALE 1:12,000



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FIGURE 6
 ARCHER, CATRO & ASSOCIATES LTD
PANNING
 IVO PROPERTY
 CUB JOINT VENTURE
 SCALE 1:10,000



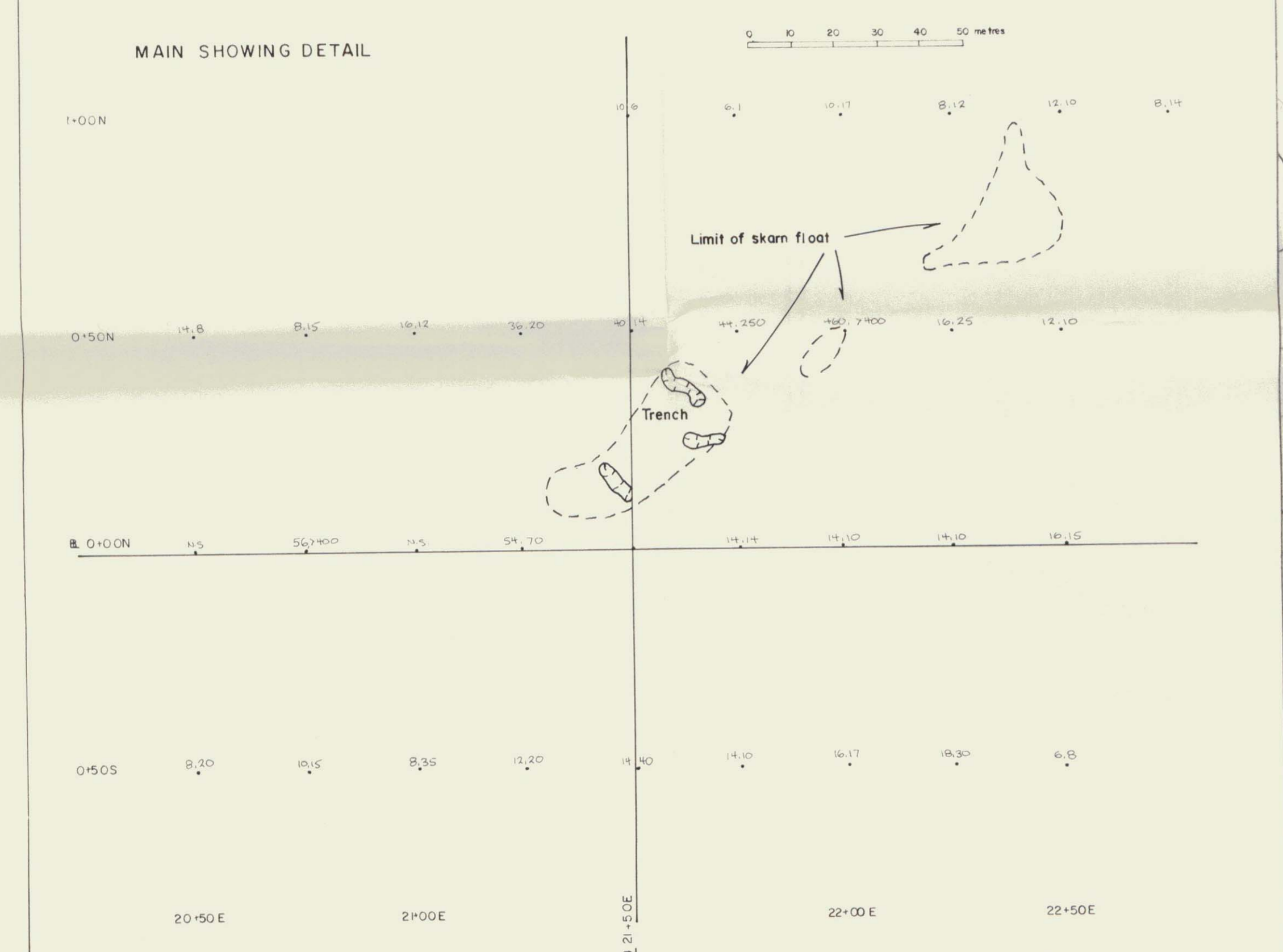
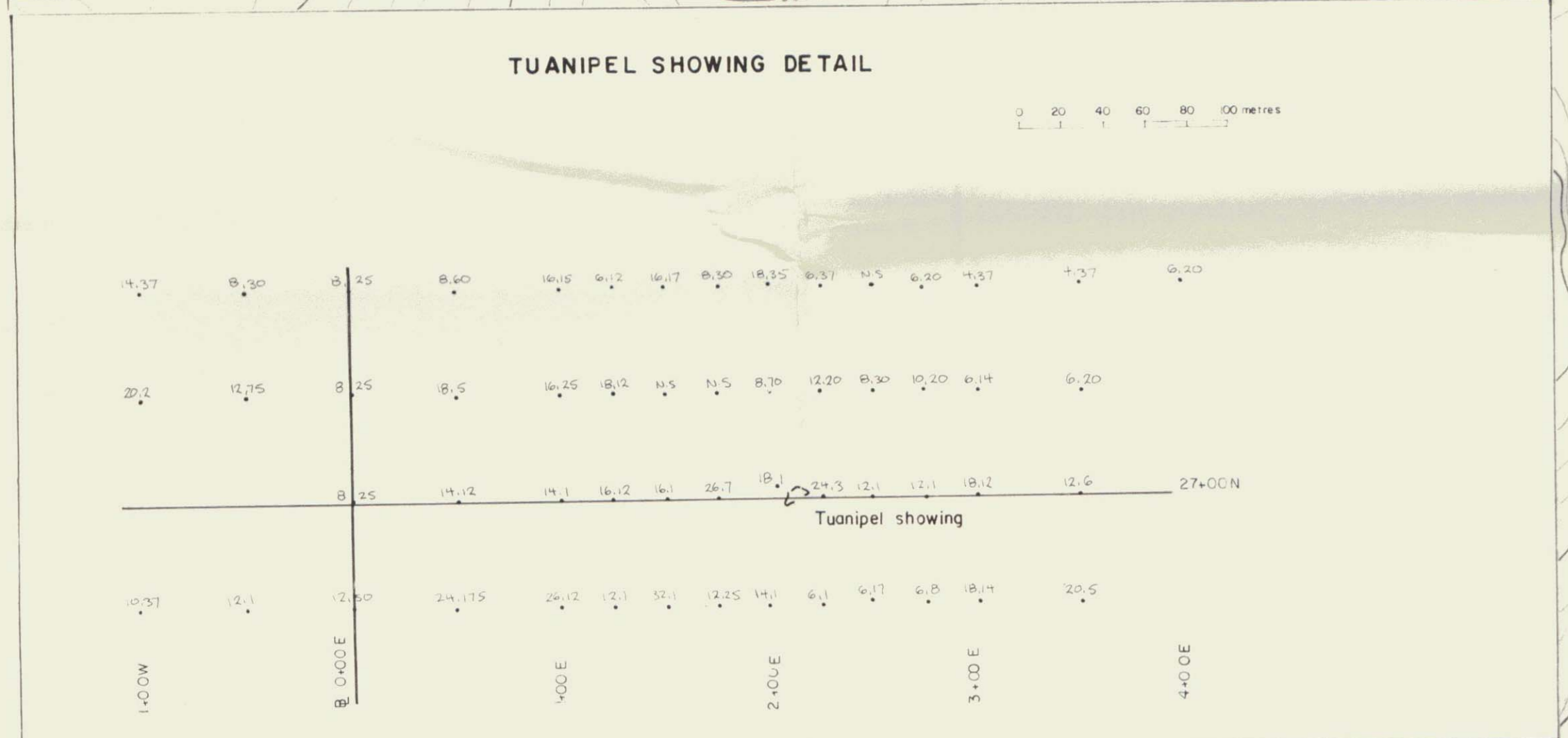
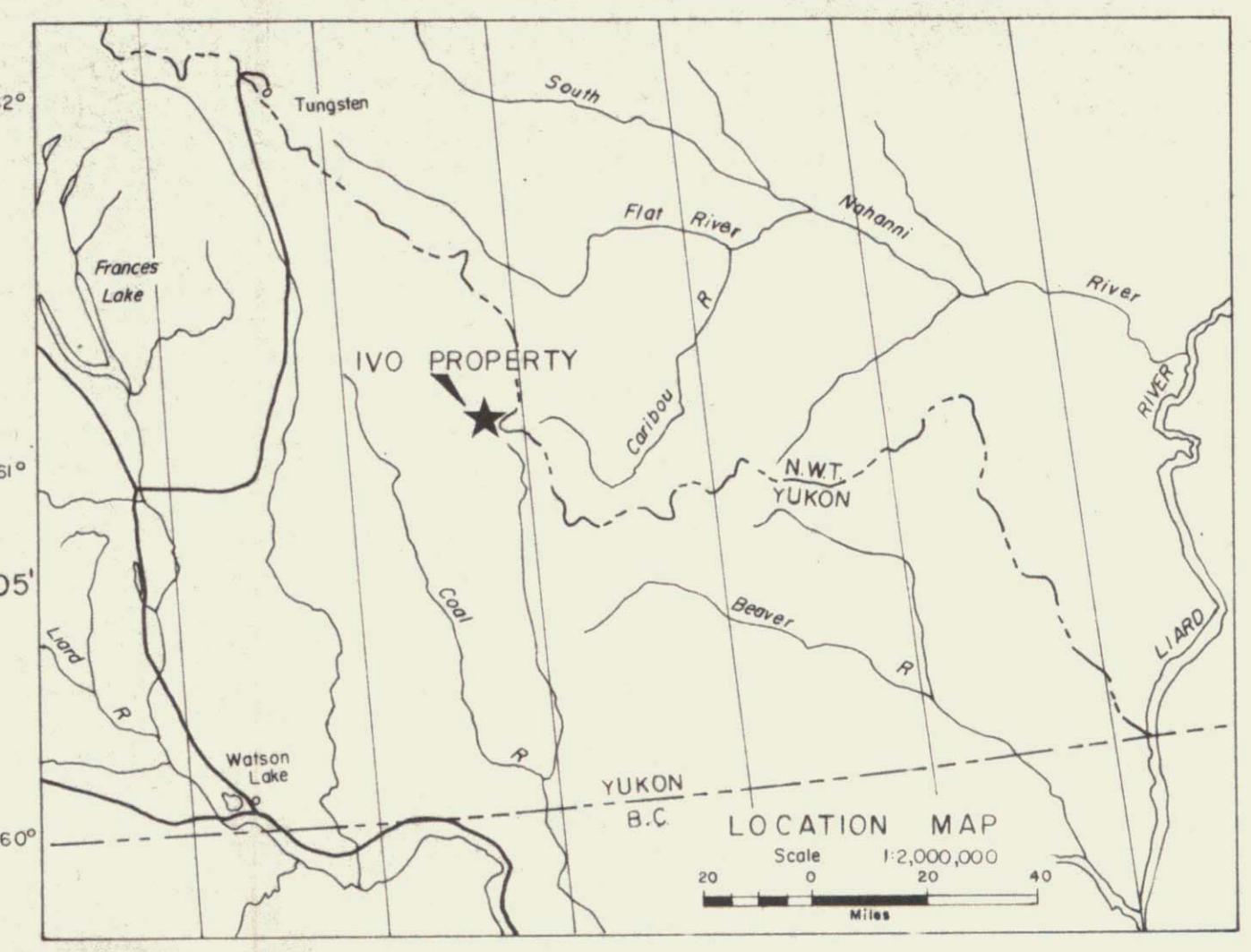


FIGURE 7
 ARCHER, CATHRO & ASSOCIATES LTD
Cu, W GEOCHEMISTRY
 IVO PROPERTY
 CUB JOINT VENTURE
 SCALE 1:10,000
 0 100 200 300 400 500 600 700 800 900 METERS