

012156

Yukon Revenue Mines Ltd.

GEOLOGICAL REPORT ON THE
YUKON REVENUE PROPERTY, CARMACKS, Y.T.
(formerly Revenue Copper)

January 10, 1969

Douglas D. Campbell

Dolmage-Campbell & Associates Ltd.

Vancouver, Canada.

January 14, 1969

Mr. H.C. Fromme,
General Enterprises Ltd.,
Whitehorse, Y.T.

Dear Harry:

Enclosed are five copies of my report on the Yukon Revenue property.
If you wish the return of any of the data that you left with us please let me know.

Yours very truly,

Douglas D. Campbell

DDC/jk
Encls. - 5

TABLE OF CONTENTS

	<u>Page</u>
INTRODUCTION	1
Location and Access	2
History	2
Exploration and Development Expenditures	3
SUMMARY & RECOMMENDATIONS	4
GEOLOGICAL SETTING	5
Regional	5
Local	5
ORE OCCURRENCES AND PREVIOUS EXPLORATION	7
Copper in Granodiorite	7
Copper in Breccia Pipes	8
Results of Geochemical and Geophysical Surveys	9
CONCLUSIONS & RECOMMENDATIONS	10
CERTIFICATE	12

ILLUSTRATIONS

- ✓ Figure 1 Location Map of Property, Scale 1" = 140 mi.
- ✓ Figure 2 Claim Boundary Map, approx. scale 1" = 3000 ft.
- ✓ Figure 3 Geological, Geochemical and Geophysical Plan, with Proposed Drilling, Scale 1" = 400'
- ✓ Figure 4 Vertical Drill Section Thru "A" Vein Zone, Scale 1" = 40'

INTRODUCTION

The Yukon Revenue property consists of 122 contiguous mineral claims located about 40 miles west of Carmacks, Yukon Territories (Figure 1). One hundred and seven of these claims are held outright by Yukon Revenue and 15 are currently under option from Mr. P.F. Guder. The outline of the entire claim group is shown in Figure 2 and the claim numbers are listed below:

CLAIMS HELD OUTRIGHT BY YUKON REVENUE MINES:

		<u>No. of Claims</u>
INCA 1-8 incl.	Y21008 to Y21015	8
Revenue 9-12 incl.	Y21270 to Y21273	4
Revenue 13-23 incl.	Y24017 to Y24032	16
Rev 2-8 incl.	Y25912 to Y25918	7
Rev 1 and 25	Y25955 and Y25956	2
Rev 9-16 incl.	Y25957 to Y25964	8
Rev 17-24 incl.	Y25965 to Y25972	8
Revenue 3 and 4	Y26361 and Y26362	2
Revenue 1 and 2	Y26363 and Y26364	2
Revenue 5 and 6	Y26365 and Y26366	2
Add 1-4 incl.	Y26367 to Y26370	4
Add 5-13 incl.	Y26371 to Y26384	14
Revenue 7 and 8	Y26404 and Y26405	2
Add 19-46 incl.	Y26406 to Y26433	28
	Sub-total:	<u>107 claims</u>

CLAIMS UNDER OPTION FROM MR. P.F. GUDER:

Revenue Copper 1-8 incl.	67180 to 67187	8
Addition 1 and 2	68060 and 68061	2
Addition 3 and 4	74488 and 74489	2
Homestake 1 and 2	75321 and 75322	2
Addition 5	75323	1
	Sub-total:	<u>15 claims</u>

TOTAL CLAIMS: 122

LOCATION AND ACCESS: (62°20' N; 137°20' W)

The property of Yukon Revenue Mines Ltd. comprises a group of 122 mineral claims located astride Revenue Creek, a two-mile long north-flowing tributary of Big Creek, lying 40 miles west-northwest of Carmacks, Y.T. Big Creek flows 30 miles east and north into the Yukon River a few miles downstream of Minto.

The Yukon Revenue property lies on the south side of the Big Creek valley on ground that slopes moderately northward. The claims are fairly densely wooded by spruce. Outcrop is generally scarce.

The property is reached by approximately 40 miles of all-weather road from Carmacks to the Discovery Mines Ltd. mine, now closed, and thence by about 5 miles of bulldozer tote road west of Granite Mountain.

HISTORY:

The general property has been prospected for placer gold by Fritz Guder since the 1930's. In the course of his prospecting Mr. Guder discovered a showing of high grade chalcopryite in an outcrop in the bed of Revenue Creek. Mr. Guder subsequently staked the showing and his claim group, with various alterations through the years, has continued to be the Revenue Copper property.

A short adit was driven into the copper showing in 1951 and the property was optioned by Conwest Explorations Ltd. who performed E.M. and resistivity surveys on the property. In 1952, the option was taken over by Teck Corporation who drilled five holes around the adit with negative results and therefore subsequently dropped the property.

In 1959, the property was optioned by Asbestos Corporation who made a heavy metal geochemical soil and stream deposits survey of the claim group.

In 1964, the syndicate sponsored by Canex Ltd. optioned the property and performed a soil survey of the area of the showings. They drilled three diamond drill holes on geochemical anomalies 1500 feet west of the high grade copper showing in Revenue Creek. Canex apparently removed the drill core from the property in 1967 when the property option passed to the present owners.

On November 17, 1967, the writer submitted a summary report on the Yukon Revenue property (formerly the Revenue Copper property, but referred to henceforth by its new name) in which he reviewed the general geology of the property and recommended an exploration program for the encouraging areas of copper mineralization.

In that report, a possible large area of low grade chalcopyrite mineralization in fractured granodiorite was described, and a program of soil sampling, bulldozer trenching and diamond drilling was recommended to explore it. Also, in that report a showing of high grade chalcopyrite vein-type mineralization was described as occurring within what appears to be a tuffaceous breccia pipe intruding the granodiorite. A program of additional bulldozer trenching was recommended for this showing, to be followed by diamond drilling.

During 1968, the company completed some of the recommended work and the property was visited by Mr. R.S. Adamson, P.Eng. of Dolmage-Campbell & Associates Ltd. late in August. The results of the new work were described in a Progress Report by the writer dated September 4, 1968. In this report, the original work program was revised and an Induced Polarization survey was recommended, to be followed by diamond drilling if warranted.

The Induced Polarization survey was completed on October 19, 1968 and a report of the results was submitted to Yukon Revenue Mines by Seigel Associates early in November. The company then proceeded on its own initiative with a limited diamond drilling program which was terminated in December. (see results under Ore Occurrences.)

EXPLORATION AND DEVELOPMENT EXPENDITURES:

In a financial statement to November 29, 1968 by Collins and Collins, Chartered Accountants, Whitehorse, it was shown that Yukon Revenue Mines Limited had spent a total of \$153,873.29 on exploration and development to that date. The breakdown of expenditures is repeated below:

Assay	\$ 214.00
Camp Rental and Expenses	14,447.26
Consulting Fees	1,109.03
Diamond Drilling	53,751.81
Engineering Fees, I.P. Survey	10,000.00
Geological Fees	11,703.99
Line Cutting	2,850.50
Road and camp maintenance	22,152.39
Supervision	6,480.00
Travel and Transportation	7,562.81
Trenching	23,596.50
TOTAL:	<u>\$153,873.29</u>

SUMMARY AND RECOMMENDATIONS

The Yukon Revenue property, consisting of 122 located mineral claims in the Carmacks area, Yukon Territories, is underlain by crystalline rocks classed mainly as granodiorites. In the central part of the property, these rocks are intruded by what is probably a volcanic breccia pipe measuring about 3000 feet in diameter.

Mineralization has taken place in two geological environments: (1) within the breccia pipe as high grade chalcopyrite-rich veins of apparently limited extent, and (2) as sulphide disseminations in the granodiorite surrounding the breccia pipe where possibilities exist for the occurrence of large tonnages of relatively low grade copper ore of the porphyry copper type.

Geochemical and geophysical surveys followed by a limited drilling program indicate that a fairly extensive program of exploration drilling is required to test the economic potential of this property. Recommendations are summarized below:

RECOMMENDATIONS:

1. Property payment due September, 1969	\$ 30,000.
2. Diamond drilling 8,880 ft. (BQ) @ \$15.	133,200.
3. Engineering and assays	5,000.
4. Supervision, transportation, camp costs	10,000.
5. Consulting charges	2,000.
6. Contingencies	<u>15,000.</u>
TOTAL:-	<u>\$195,200.</u>

GEOLOGICAL SETTING

REGIONAL:

The Yukon Revenue property is located in the central part of a northwest-trending belt of granitic intrusives that forms a major outlier of the Coast Range Complex. This outlier is approximately 40 miles in width and extends northwestward from Carmacks 150 miles to the Alaskan border. Included with the several ages of intrusive rocks that constitute the outlier are numerous septa and roof pendants of older metamorphosed sedimentary and volcanic rocks.

LOCAL:

The property area is typical of the lightly glaciated central part of the Yukon and outcrops are rare, restricted largely to ridges. Bulldozer trenches and road cuts have uncovered bedrock generally at depths of 5 to 20 feet beneath frozen ground.

Much of the claim group is underlain by massive, medium crystalline granodiorite which in places is foliated and even schistose. In general, the rock is hard, medium-grained and composed principally of hornblende, feldspar and quartz. Drill core indicates that the granodiorite in the vicinity of Revenue Creek is extremely and pervasively altered to a rusty pale greenish grey rock by chloritization and limonitization of the hornblende and plagioclase as well as kaolinization of the feldspars to form a softer, paler rock than the typical granodiorite.

As shown in Figure 3, an elliptically-shaped area in the central part of the claim group is underlain by a rock classified by earlier workers as "arkose", but which is believed by the present writer to be a volcanic breccia. This rock, as exposed in the core from five holes drilled by Teck Exploration in 1955 under a high grade copper showing near Revenue Creek, comprises a relatively soft, dense, chalky grey-white matrix material containing abundant angular rock fragments. The fragments constitute 60 percent of the rock and are generally composed of bleached and/or silicified aphanitic rocks. Several fragments were found by the writer that are identical to the intensely hydrothermally altered granodiorite. It is important to note that in the hundreds of feet of drill core of this rock, from holes drilled at many angles and orientations, there is practically no evidence of bedding, grading sorting or rounding of fragments or any other features that should be present if this material was originally waterlain, as arkose would be. The rock bears more resemblance

petrologically to a fragmental tuff than to any sedimentary rock. However, even a tuff would be expected to show some signs of fragment orientation or crude layering. All exposures of the rock exhibit pervasive kaolinization and local silicification of both matrix and fragments. Pyrite cubes up to 1/4" in size are thinly disseminated throughout.

From the writer's experience with such structures throughout the world the above evidence strongly suggests that this rock is an explosive breccia pipe that has intruded through the granodiorite. The roughly elliptical outline of the body and the depth continuity indicated by the drilling also suggest such a body.

Recent detailed surface and underground work at Mt. Nansen Mines, 15 miles due south, has revealed the existence of a large number of similar sized intrusive rhyolite porphyry and volcanic breccia pipes intruded through all pre-Tertiary rocks, particularly along major fault lines. Also, a breccia pipe has been identified immediately adjacent to the Anvil orebody at Vangorda. In the Yukon and throughout the world such breccia pipes are commonly associated with metalliferous ore deposits, probably indicating a related source for the ore fluids and the breccia-forming gases. It is the writer's opinion that the fragmental rock exposed at Revenue Creek is probably a breccia pipe around which the granodiorite has been extensively fractured and altered. Both the pipe ("arkose") and granodiorite are mineralized with disseminated and locally concentrated chalcopyrite.

ORE OCCURRENCES & PREVIOUS EXPLORATION

For a chronological summary of the work done on the Yukon Revenue property, the reader is referred to the Introduction (History section) of this report. In the present section, previous work done on the property is referred to only where it helps illustrate a point regarding mineralization or assists in planning future exploration.

The mineral of economic interest on the Yukon Revenue property is chalcopyrite. It is known to occur in two environments, with widely different concentrations in each. The first is as disseminations within the granodiorite around the breccia pipe, and the second is as high grade concentrations in local coarse breccias within the pipe. Both warrant further investigation and both are discussed in detail below:

COPPER IN GRANODIORITE:

As revealed in surface exposures and in core that was left at the property from three holes drilled by Canox (all drilled in granodiorite west of the breccia pipe; Figure 3), the granodiorite ranges from slightly to intensely hydrothermally altered. The most intense alteration is associated with more closely spaced fracturing than is found in the unaltered rock. The most intensely altered granodiorite is a pale, mottled grey and white rock with the feldspars entirely kaolinized, the hornblende chloritized and the quartz unaltered. In the three vertical Canox holes the altered granodiorite occurs in what appear to be flat-lying layers, alternating with fresh rock, from the surface to the bottoms of the holes, the deepest hole being about 200 feet in depth.

In the relatively fresh granodiorite exposed in the bulldozer trench at holes #1 and #2 and in all of the altered and unaltered granodiorite in the cores there occurs extremely fine grained but pervasive disseminations of chalcopyrite and pyrite. Locally, in the more altered and fractured granodiorite the chalcopyrite is coarser grained and locally accompanied by relatively coarse grained disseminated molybdenite. No assays were made of the specimens collected by the writer but it would appear that the copper content of selected pieces could range from trace to over one percent. The features of economic interest about the chalcopyrite in the granodiorite are:

1. Ubiquitous distribution throughout the granodiorite over a large area.
2. Pervasive occurrence everywhere as disseminated grains within the rock.

It is logical to assume that the Canox core was taken from the property because it showed interesting mineralization; there would be little sense in flying out core by helicopter if it were barren.

In any case, the widespread, locally intense hydrothermal alteration, plus the pervasive finely disseminated chalcopyrite, indicate that the granodiorite in the vicinity of Revenue Creek warrants considerable additional investigation. This is discussed further under Conclusions.

COPPER IN BRECCIA PIPE:

The original discovery of high grade copper in Revenue Creek was exposed by an adit that has since caved and frozen tight (Figure 4). In this adit a zone of intensely kaolinized and silicified coarsely fragmental breccia was exposed in bedrock and reported and sampled by Dr. W. Smitheringale. A sample taken by Dr. Smitheringale assayed 15.2% Cu across a width of 13 feet. The upper half of the adit was not in bedrock but was comprised of frozen mudslide material that lies on the breccia. This adit has since caved and the fill frozen solid. Bull-dozer stripping this Fall reached the upper part of the adit and exposed a small portion of the mineralized breccia. This breccia is coarse and vuggy with a large amount of silicification and baking of the fragments, indicating metasomatic conditions during or after formation of the breccia. Also associated with the breccia in this exposure is a gouge-filled shear as well as a flat-lying band of powdery pyrite about 4 inches thick. Coarsely crystalline chalcopyrite is liberally disseminated throughout the exposed breccia, generally as interstitial fillings.

If the "arkose" body is assumed to be a breccia pipe then the occurrence of a local high grade concentration of chalcopyrite in an environment of coarse, open breccia and shearing is not unexpected.

Five diamond drill holes were drilled by Teck Corporation to explore beneath the adit to depths up to 300 feet. In practically every hole the core recovery did not exceed 50 percent, therefore the results of this drilling cannot be considered as definitive. No assays are reported from any of the core but the logs indicate definite content in the core of every hole beneath the adit, (#1-4 Incl.), of disseminated chalcopyrite and coarse brecciation. These features appear to be about 100 feet in width (E-W) and persist to a drilled depth of 160 feet below the adit. Examination of some of the remaining core from these holes corroborates the content of chalcopyrite in this rock. Figure 4 is a vertical section showing the extent of the weakly mineralized, pipe-shaped zone disclosed by the Teck drilling. Copies of the original logs of these holes are on file with Dolmage-Campbell & Associates Ltd.

Recent drilling on the "D" zone intersected two feet of massive sulphide assaying 10.9 oz. Ag per ton and 12.7 percent Cu. This intersection occurred in hole 68-1 (Figure 3) at footage 419, at a vertical depth of 250 feet. No eastern extension of this mineralization was detected in hole 68-2 (near the eastern margin of the intrusive breccia) but two zones of high core loss were encountered. A possible western extension of the silver-copper mineralization in hole 68-1 was intersected in hole 68-5 in a highly weathered hydrothermally altered section between 99 and 129 feet. Unfortunately, however, core recovery was extremely low (approximately 10 percent) and assays of cuttings and sludge were not made at regular intervals.

RESULTS OF GEOCHEMICAL AND GEOPHYSICAL SURVEYS:

The results of the heavy metal geochemical survey carried out by the Asbestos Corporation in 1959 are summarized in Figure 3. The anomalous areas shown represent samples of stream sediments and soils that gave copper analyses in excess of twice background. These anomalies take the form of three irregularly shaped zones at and beyond the west contact of the breccia pipe.

The results of the Induced Polarization survey have been described in a separate report dated October 31, 1968, by J.G. Baird of Seigel Associates Ltd. In essence, this survey reveals the presence of three peripheral areas of high chargeability (I.P. response) surrounding a central area of low response. These two extremes are separated by a rudely circular zone of varying intermediate responses.

The central area of low I.P. response overlaps the south contact of the breccia pipe as well as the easternmost geochemical anomaly. All of the significant copper values found to date on the property occur along the north side of the low I.P. anomaly in either the breccia or adjacent granodiorite.

It is known from preliminary drilling (holes 68-3 and 68-4, Figure 3) that the largest ("positive") I.P. anomaly is underlain by crystalline rocks carrying abundant pyrite, with little or no chalcopyrite, suggesting that the peripheral area of high I.P. response correlates with a pyrite-rich aureole. This aureole is presumably related in origin to the formation of the explosive breccia and may represent an outer limit of diffusion of sulphides away from the central pipe. Knowing that chalcopyrite occurs in significant quantities in the "B" zone (Figure 3), in the country rock at the margin of the pipe) the areas of intermediate I.P. response become logical targets for copper mineralization. Such deposits, if they exist, would be expected to be of low to medium grade with potential for large tonnage.

CONCLUSIONS & RECOMMENDATIONS

The Yukon Revenue property consists of 122 contiguous claims located some 40 miles west of Carmacks, Yukon Territories. The claim group has only been explored in detail over about one-fifth of its total area, principally on the claims known as the "Guder Option", located in the central part of the main claim group.

The claims are underlain by crystalline rocks classed mainly as granodiorites which locally contain schistose or gneissic sections. In the central part of the "Guder Option", these rocks are cut by a highly altered, brecciated mass of volcanic rock which is elliptical in plan and measures about 3000 feet in diameter. Its shape, structure and lithologic character suggest that it developed during an explosive volcanic event. The structure is therefore assumed to be a breccia pipe.

The occurrences of economic interest on the property consist of disseminated, fine grained chalcopyrite within the altered and fractured granodiorite around the breccia pipe, as well as relatively high grade local concentrations of chalcopyrite within the pipe near Revenue Creek. Both types of occurrences have been inadequately tested by limited diamond drilling. Deposits discovered in the peripheral environment away from the breccia pipe would be expected to be of the porphyry copper type; i.e. low in grade but with large tonnage potential. Deposits discovered within the breccia pipe would be expected to have higher grades, with correspondingly lower tonnage potentials.

Geochemical and geophysical (Induced Polarization) surveys suggest that the most favourable exploration target for the porphyry copper type deposit is the belt of intermediate I.P. response bordering the core area of low response. Accordingly, a drilling program is recommended to test the intermediate I.P. response zones.

The high grade vein-type deposits within and adjacent to the breccia pipe also require additional testing by diamond drilling. Based on mildly encouraging results of a recently completed drilling program on the "D" zone together with the presence of favourable geological factors such as intense hydrothermal alteration aureoles near the known veins, additional drilling is judged to be justified and warranted.

Drilling recommended for both types of ore targets is, for purposes of practicality and costing, grouped as a single program. A drill plan showing hole locations and other relevant information is included in Figure 3.

Because the history of core recovery in brecciated and hydrothermally altered zones on the Yukon Revenue property has been poor, all efforts should be made to obtain a maximum amount of information from sludge samples when the recommended drill program is implemented on the high grade veins. Sludge samples should be taken separately every five feet so as to provide a maximum amount of information. The bit size should be BQ with a double-sleeved core barrel (wire line).

RECOMMENDATIONS:

On the basis of the conclusions derived above, the following work and expenditures are recommended on the Yukon Revenue property:

1. Property payment due September, 1969	\$ 30,000.
2. Diamond drilling (BQ) 21 holes totalling 8880 feet @ \$15.	133,200.
3. Engineering and Assays	5,000.
4. Supervision , transportation, camp costs	10,000.
5. Consulting charges	2,000.
6. Contingencies	<u>15,000.</u>
Total:-	<u>\$195,200.</u>

Respectfully submitted,

Douglas D. Campbell, P.Eng., Ph.D.

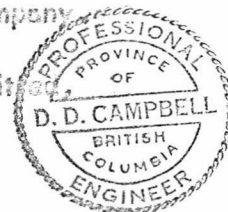
CERTIFICATE

January 10, 1969

I, Douglas D. Campbell, with business and residential addresses in Vancouver, British Columbia, do hereby certify that:

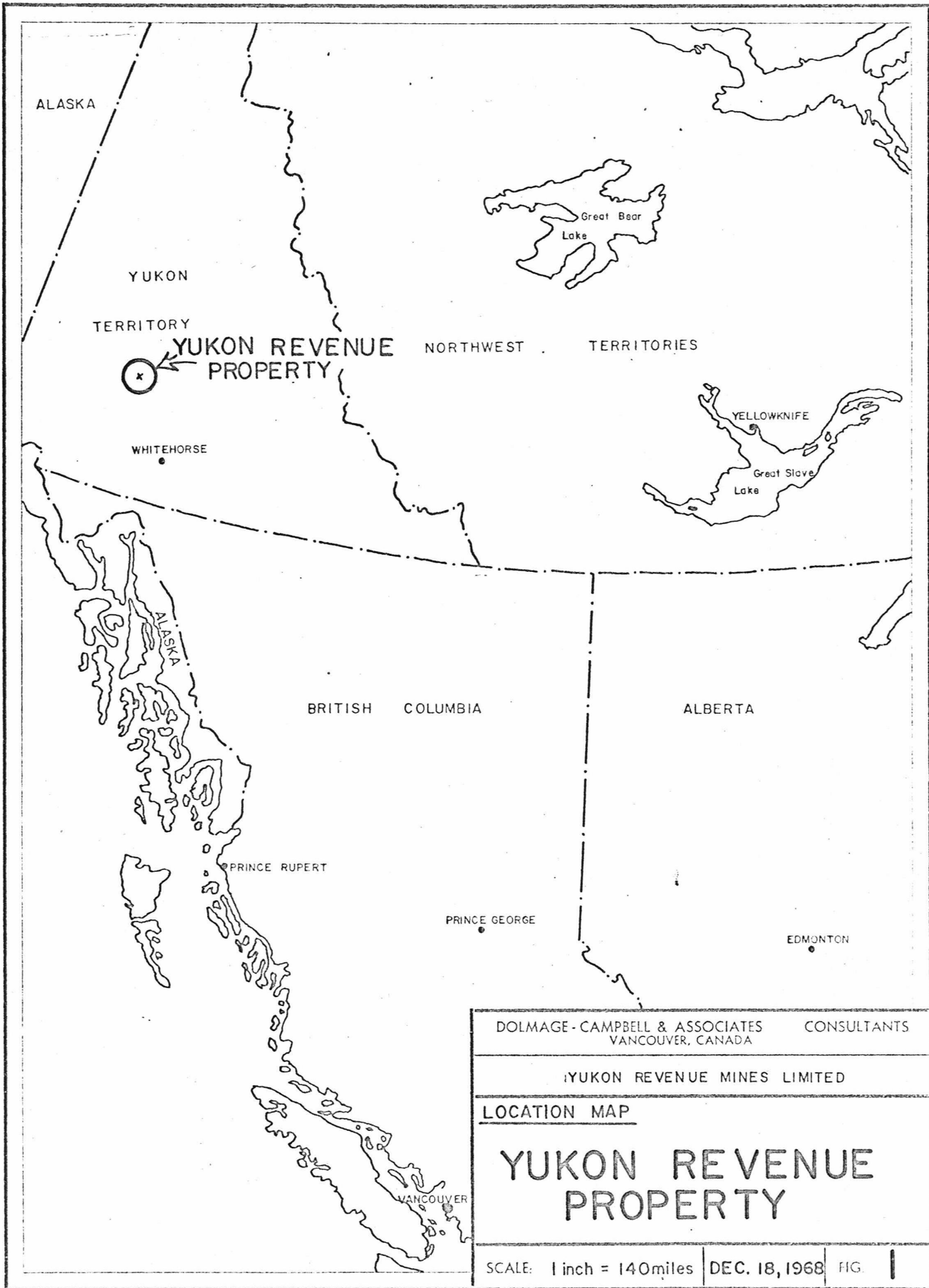
1. I am a consulting geological engineer.
2. I am a graduate of the University of British Columbia, (B.A. Sc., Geological Engineering, 1946), and of the California Institute of Technology, (Ph.D., Economic Geology and Geophysics, 1950).
3. I am a registered Professional Engineer of the Province of British Columbia and of the Yukon Territory.
4. From 1946 until 1957 I was engaged in mining and mineral exploration in Canada and the United States as geologist for a number of companies. In 1957 I retired as chief geologist for Eldorado Mining & Refining Co. Ltd. to begin private practice as a consulting engineer.
5. In October, 1967, I examined the showings and area of the property of Yukon Revenue Mines Ltd. and have studied all available private and public information on the property. Compilation of this report has been in collaboration with my associates, Mr. R.S. Adanson, P.Eng., who examined the property in 1968, and Dr. J. Chamberlain, P.Eng. who correlated the geophysical, geochemical and geological data.
6. I have not received, nor do I expect to receive, any interest, directly or indirectly, in the properties or securities of Yukon Revenue Mines Ltd., or any associated company.

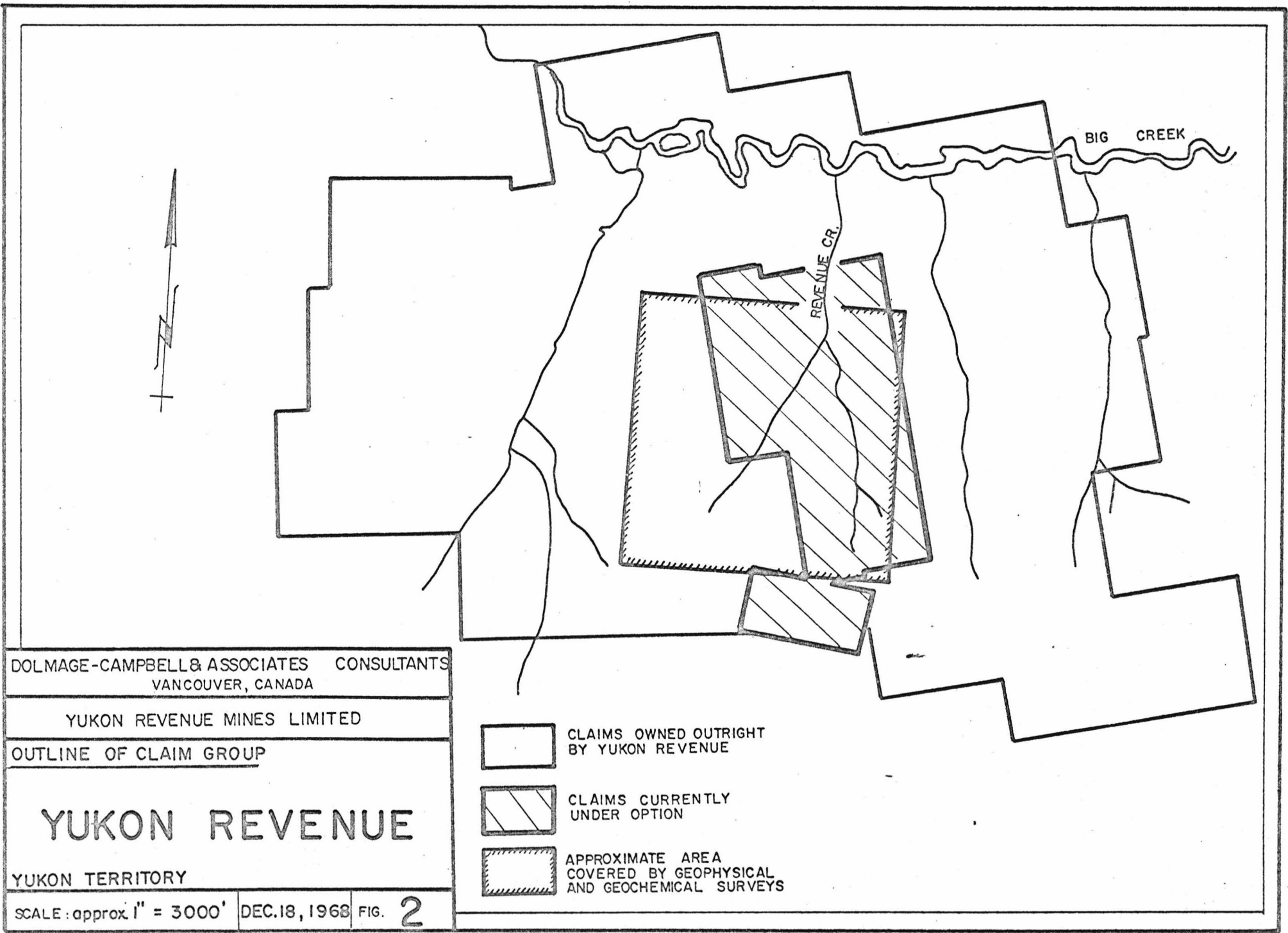
Respectfully submit



Douglas D. Campbell, P.Eng., Ph.D.

Vancouver, Canada.





DOLMAGE-CAMPBELL & ASSOCIATES CONSULTANTS
VANCOUVER, CANADA

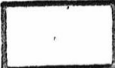


YUKON REVENUE MINES LIMITED

OUTLINE OF CLAIM GROUP

YUKON REVENUE

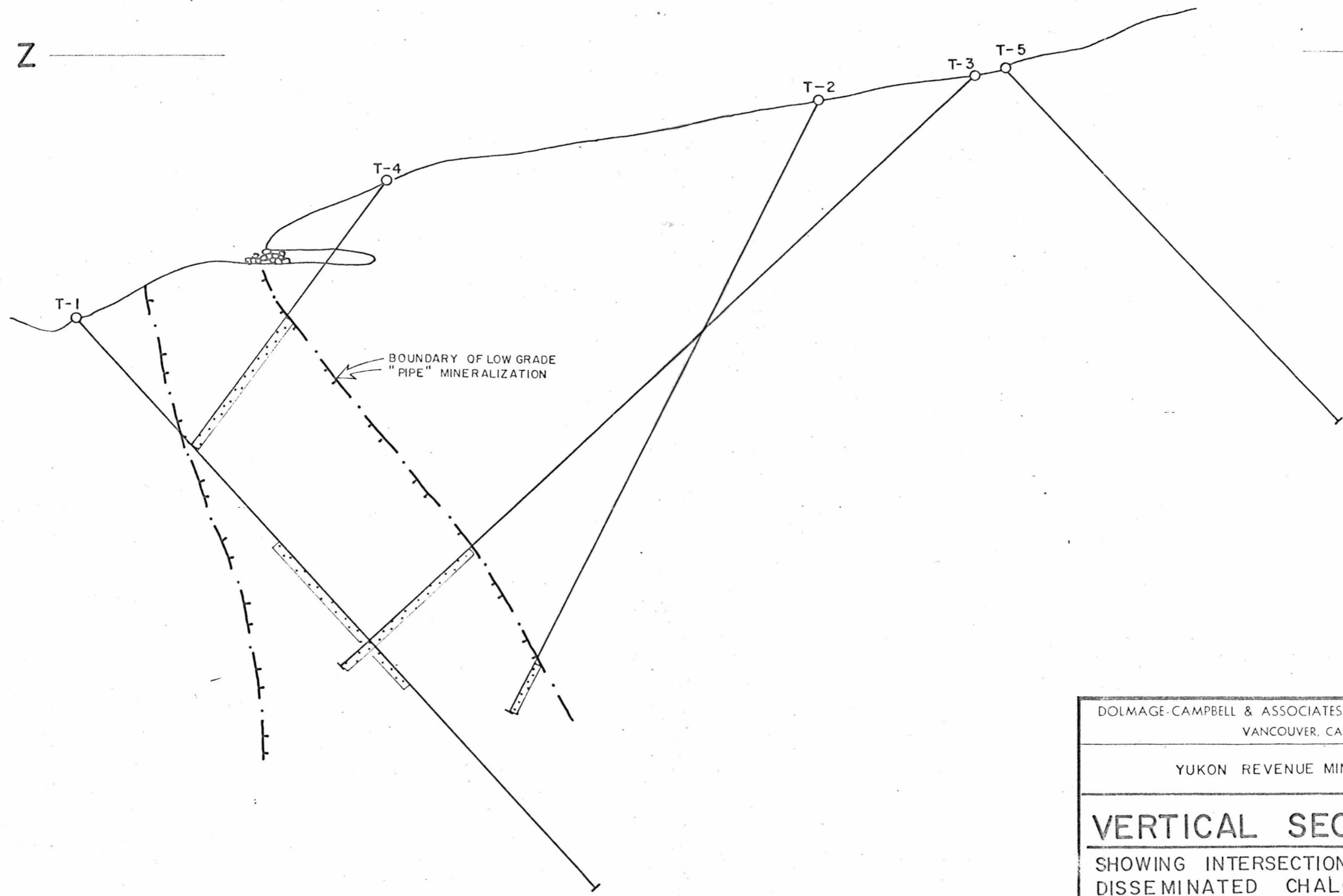
YUKON TERRITORY

SCALE: approx. 1" = 3000' DEC. 18, 1968 FIG. 2

-  CLAIMS OWNED OUTRIGHT BY YUKON REVENUE
-  CLAIMS CURRENTLY UNDER OPTION
-  APPROXIMATE AREA COVERED BY GEOPHYSICAL AND GEOCHEMICAL SURVEYS

Z

Z'



BOUNDARY OF LOW GRADE
"PIPE" MINERALIZATION

DOLMAGE-CAMPBELL & ASSOCIATES		CONSULTANTS
VANCOUVER, CANADA		
YUKON REVENUE MINES LIMITED.		
VERTICAL SECTION Z-Z'		
SHOWING INTERSECTIONS OF LOW GRADE DISSEMINATED CHALCOPYRITE IN "A" ZONE		
SCALE: 1" = 40'	DEC. 18, 1968	FIG. 4