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PROPERTY FILE

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CARIBOO QUARTZ
MINE

EXPLORATION IN 1968

93H-19

93H/4E

DOLMAGE, CAMPBELL & ASSOCIATES
CONSULTING GEOLOGICAL & MINING ENGINEERS
808 BANK OF CANADA BUILDING
VANCOUVER 1, B.C.

Cariboo Gold Quartz Mines Ltd.

Summary Report

SURFACE EXPLORATION, 1968

and

PRODUCTION POTENTIAL OF CARIBOO GOLD QUARTZ MINE

Wells, B.C.

Jan 1 1969

Dolmage Campbell & Associates Vancouver, B.C.

Consultants

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INTRODUCTION

In a report entitled "Potential of Ore Reserves and Production, Cariboo Gold Quartz Mine," dated March 1, 1966, the writer explained in detail the probable ore controls of the gold vein deposits at Wells, B. C., and discussed the possibility of success for an extensive surface and underground exploration program outlined for the mine. About one year later the mine closed down, due to the lack of developed ore, before any of the recommended program could be implemented. In 1968 the company decided to finance a previously recommended bulldozer surface stripping program according to a revised report by the writer entitled "Report on Recommended Surface Exploration, Wells, B. C." dated February 1, 1968.

The present report reviews the results of the 1968 surface program and in conclusion reviews the potential for future production from the Cariboo Gold Quartz deposits.

LOCATION: (53° 10' N, 121° 30' W)

The Cariboo Gold Quartz Mine is located at the town of Wells in the Cariboo District of central British Columbia. The mine is reached by paved road from rail, airline and highway connections at the city of Quesnel, 55 miles due west of Wells.

HISTORY:

All of the mineral production from the Wells' area has been gold derived from placer and lode. The lode deposits were first staked by placer miners in 1890 but the first underground exploration did not begin until 1927 when development of gold-quartz veins was undertaken on Cow Mountain, immediately southeast of Wells. In 1933 mill production began at 50 tons per day on this property, the Cariboo Gold Quartz Mine, and was increased to 100 tons in 1934.

Northwest of Cow Mountain, across the Jack-of-Clubs valley, underground exploration began on Island Mountain in 1932 and production began at 50 tons per day on the Island Mountain Mine in 1934.

By 1935 Cariboo Gold Quartz had mined to a maximum depth of 600 feet veins that were distributed along the favourable Rainbow Formation for a distance of 2 miles southeast of Wells. In 1942 the exploration and most development ceased in both mines until 1946. By 1948 increased costs of vein mining caused the Cariboo Gold Quartz Mine on Cow Mountain to shut down, however production at Island Mountain was maintained because of the mining of ore from replacement orebodies, few of which had been developed on Cow Mountain. In 1952 the Island Mountain Mine was sold to Cariboo Gold Quartz Ltd. and maintained production, mostly from replacement orebodies, until the recent shutdown.

The placer gold production from the Barkerville District at Wells had reached a value in excess of $35 million by the end of World War II when the last placer mining ceased.

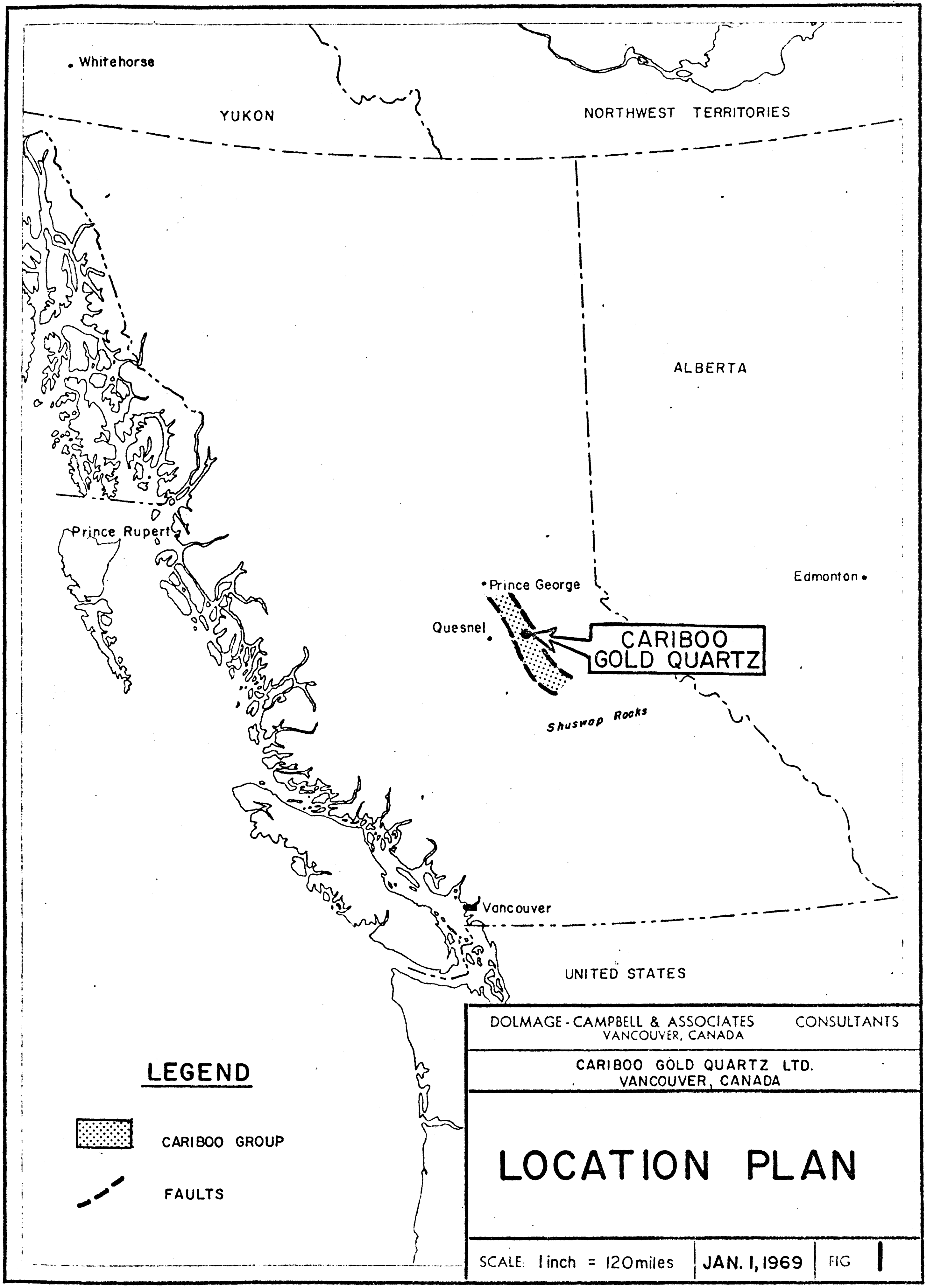
The lode gold production from the two mines at Wells was $45 million to 1964, of which $21 million was contributed by the Island Mountain Mine. Peak production was reached from 1937 to 1942 when the Cariboo Gold Quartz mine alone was averaging 40,000 oz. of gold per year.

Production in 1966, the last full year of production, entirely from the Island Mountain mine, was approximately 20,000 oz of gold and 4,000 oz of silver from 32,000 tons milled.

The average grade of gold ore from Island Mountain was 0.46 oz/t., whereas that from the Cariboo Gold Quartz mine on Cow Mountain was 0.39 oz/ton. This disparity in grade is largely because 60% of the total Island Mountain production was derived from replacement bodies, whereas less than 20% of the Cow Mountain production was from replacement ore.

The 1968 bulldozer surface trenching program was conceived with the purpose of exploring the Baker side of the (Baker) Rainbow contact for replacement-type orebodies, only a few of which had been mined from the upper levels of the Island Mountain mine and none of which had been mined from most of the levels of the Cow Mountain mine. The trenching was completed in approximately three months, (July-September), in 1968 and is considered to have been comprehensive enough to exhaust the opportunities for any future trench exploration.

The beginning of this report is devoted to a rather detailed discussion of the geology of the Cariboo Gold Quartz mines at Wells to provide background for the presentation first of the results of the summer program and second of the potential for further production at the mines, subjects which comprise the main body of the report.



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CARIBOO GOLD QUARTZ LTD.
VANCOUVER, CANADA

LOCATION PLAN

SCALE: 1 inch = 120 miles	JAN. 1, 1969	FIG 1

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SUMMARY & RECOMMENDATIONS

Cariboo Gold Quartz Mines Ltd. owns a large block of mineral claims in the central Cariboo District of British Columbia at the town of Wells. Two mines, the Island Mountain and the No. 1 (Cow Mountain), are located on this property and are now shut down because rising costs have made their gold ore too marginal for a reasonable profit. The value of lode gold production from the two mines between 1933 and 1964 was $45 million from ore with an average grade of approximately 0.43 oz Au/ton.

The gold orebodies in the Cariboo Gold Quartz mines occur in two geological environments, as quartz-pyrite veins within the Rainbow argillaceous formation, and as pyrite replacement bodies in the 339 Limestone bed within the adjacent, overlying, Baker limey formation. Both of these types of orebodies are located within a few hundred feet of the contact between these two formations and are generally concentrated where the contact is faulted and/or drag folded. The veins occur in swarms that die out at the contact with the Baker Formation but are generally reflected by the occurrence of replacement bodies directly above them in the Baker Formation. The replacement ore generally grades 0.60 - 0.80 oz Au/ton whereas the vein ore generally averages less than 0.35 oz Au/ton.

Most of the production of replacement ore has come from the Island Mountain Mine where in the last 10 years of production vein ore was largely by-passed. In the No. 1 mine (Cow Mountain) about 80% of the production was from vein ore and practically no exploration for replacement ore was done in this mine, prior to its shut-down in 1948. Thus, the potential for success in the exploration for both replacement ore and vein ore in the No. 1 Mine is very good. Similarly, the potential for success in the exploration and development of vein ore in the Island Mountain Mine is excellent. However, all of these will be profitable ores only if the price of gold exceeds $50 (Can.) per ounce.

A program of surface bulldozer trenching was completed in 1968 as an inexpensive step in the exploration for replacement orebodies along the Rainbow-Baker contact. These trenches, cut across and along the contact, intermittently covered a contact length of 2.5 miles, for a total of 3.1 line miles of trenches. One replacement orebody was discovered on Island Mountain but none on Cow and Barkerville mountains, due to the fact that the host 339 Limestone has pinched out on these mountains.

In addition, a bulk sampling of those trenches exposing both replacement ore and veins, or a swarm of veins, revealed that overall assays from these surface areas were not high enough to support a surface openpit type of mining.

The negative results of the 1968 surface exploration indicate that any future exploration of the mines must be done from underground, where the large amount of geological and assay data on miles of many levels of development headings provide a firm basis for drilling and drifting etc.

Should the price of gold increase to at least $50/oz it is suggested that rehabilitation and exploration of the Cariboo Gold Quartz mines would be worthwhile, and that a target reserve of about 400,000 tons of indicated ore reserves would not be unreasonable to attain by exploration. The recommended program to attain this target would be done in two phases totalling $880,000. The second phase, $480,000, would only be done if the first phase met with success.

RECOMMENDATIONS:

Phase 1	-	Rehabilitate main levels of Island Mountain and No. 1 mines	$ 400,000
	-	Diamond drill, sample etc.	
Phase 2	-	Development and further drilling	$ 480,000
		TOTAL	$ 880,000

Phase 2 would be entirely contingent on the results from Phase 1.

GEOLOGICAL SETTING

The lode gold orebodies at Wells occur within formations belonging to the Cariboo Group of Early Cambrian and later age. The rocks comprising the Cariboo Group are metasediments, principally phyllites, micaceous quartzites, marbles and limestones. These formations tend to show obscure interrelations to one another because of intense local folding and dynamic metamorphism as well as local hydrothermal alterations, areas of which are regional in distribution. These metamorphosed clastic and carbonate rocks form a relatively thin sequence which is locally duplicated by tight overturned folding and faulting. In the Cariboo District they are folded into the regional Cunningham and Island Mountain anticlinoriums which trend northwestward and plunge at about 20° down to the northwest. This belt of structures has been mapped for a strike length of over 50 miles. In the mine area the Cariboo Group formations occur in a belt about one mile wide and 10 miles long as folds, overturned to the southwest, on the northeast flank of the Island Mountain Anticlinorium. The orebodies are restricted to rocks in the northeast flank of the Island Mountain Anticlinorium.

FAULTING: In the mine district the Cariboo Group has been displaced by major northeast trending, southeast dipping (60°), right lateral faults which strike at right angles to the formations and tend to shift the regional folds upwards in steps as they plunge to the northwest, thus the plunge of the folds is offset regionally by the displacement on the cross faults. The horizontal offsets of these faults range from 400 feet to 1200 feet. In the mines these cross faults are spaced from 700 to 2,000 feet apart and they have probably acted as a partial plumbing system for the ore solutions.

The Cariboo Group formations are generally traversed, nearly at right angles to strike, by steeply dipping tension fractures which are in the nature of regional gash joints. They probably originated during the regional folding and opened during faulting, after which they were locally extensively mineralized to form the vein deposits of the mines. Because of differences in formational competencies these fractures, and the consequent veins, are almost exclusively well developed in what is referred to as the Rainbow Member beds. Since the replacement orebodies occur exclusively in the adjacent Baker Member beds a sound interpretation of the inter-relation of these two formations is of utmost importance in the search for gold ore in this district. To aid in such an interpretation the following portion of this report is devoted to a summary discussion of the geology of the Cariboo Group rocks, relative to the orebodies.

CARIBOO GROUP

The regional geology in this part of the Cariboo District of British Columbia has been mapped and remapped by numerous geologists of both the federal and provincial governmental services. To the work of these men have been added various contributions by very capable successive mine geologists. Because of the obscurities caused by metamorphism and by hydrothermal alterations to rocks of the Cariboo Group the interpretations by different geologists at different times, in various parts of the area, have varied considerably and, because the ore occurrences are directly related to rock types, the proper assessment of these interpretations is important.

Both Uglow and Hanson mapped the mine area rocks as the "Gold Belt" which they subdivided into five principal members; the Baker, the Rainbow, the B. C., the Lowhee and the Basal. Of these members the Baker was described as grey fissile fine grained calcareous quartzite and the Rainbow as interbedded fine grained argillite and quartzite. A contact between the Rainbow and the Baker in the mine area was mapped by Hanson and it is important to note that all of the known gold vein deposits occur on the Rainbow side of this contact as located by Hanson.

In 1954 Holland conclusively demonstrated that the stratigraphy of the area was complicated by repeated tight overturned folds and for this reason the members of the Uglow-Hanson Gold Belt rocks were not true geological formations but in some instances were repetitions of the same formation.

Generally the mine geologists, represented by Benedict and Skerl, have been consistently successful in distinguishing and mapping a contact between the so-called Rainbow and Baker members throughout 15,000 feet of strike extension of excellent exposures in the mines. Throughout this mapping the limestone beds at the top of the Baker, near the Rainbow contact, have comprised dependable horizon markers wherever metamorphism has obscured other rock differences.

There is no doubt, from Holland's work, that the original Gold Belt Series was not a true interpretation of the stratigraphy and many members are not valid; however, it is indicated that two of the original members, the Rainbow and the Baker, are consistently regionally distinguishable and comprise two valid formations, perhaps not in the thicknesses as originally conceived but at least where they are in contact.

Thus, for the purposes of this investigation at least, the writer retains the accepted distinction of the Baker and Rainbow members and the contact between the two is presented in Figure 1. The economic importance of this contact is evident and its exact location is necessary to be known for proper layout of exploration programs.

RAINBOW MEMBER: The only rock formations at Wells that have economic significance as host rocks for the gold ore deposits are the aforementioned Rainbow and Baker Members. These rocks are briefly described here to provide background for later discussions of the ore-bodies.

The Rainbow Member in the mine area is comprised predominently of fissile, fine grained, finely bedded micaceous quartzite. These rocks are distinguished primarily in the mines by their abundance of dark smoky gray quartzites, plus or minus interbedded black argillite, the whole of which comprises 50 to 75 percent of the formation. Some limestone occurs in the Rainbow as discrete, relatively thin beds several hundreds of feet from the Baker contact. One such bed is the 309 Limestone, which comprises a good horizon marker but has apparently not been a favourable host for gold-quartz deposition. The Rainbow rocks are generally darker coloured than the Baker rocks but near the gold-quartz veins they are characteristically bleached of carbonaceous material.

As explained earlier, the Rainbow Member has acted as a unit in that it has been everywhere extensively cross fractured by tension cracks of several orientations but with a common trend at right angles to the strike of the beds. These fractures are most intensely developed along the Baker contact but do not extend significant distances, at least as veins, into the Baker Member. Within the Rainbow rocks these tension fractures are invariably filled with pyrite and quartz many of which have comprised gold ore.

BAKER MEMBER: The old Baker member lies entirely within Sutherland Brown's Snowshoe Formation.

The Baker Member rocks are generally lighter coloured than the Rainbow rocks and on exposure many exhibit a characteristic rusty mottling due to oxidized ankerite. The rock types are predominantly gray calcareous sericitic phyllites and quartzites interbedded with a few bands of limestone. One limestone band is persistent within the Baker Member along the contact with the Rainbow. This limestone, termed the Baker Limestone by Sutherland Brown and the 339 by the mine workers, has been traced through both mines for a length of 15,000 feet and ranges from 5 to 50 feet in thickness, lensing out locally. It lies either adjacent to the Rainbow Contact or up to 50 stratigraphic feet away from it. Essentially all of the known replacement pyrite-gold orebodies occur within this bed of limestone. Other limestone beds occur deeper within the Baker beds but they have been very sparsely explored and no ore is known to occur within them.

On either one or both, but generally on the north, sides of the 339 limestone bed there occurs a discontinuous series of very lensey beds, ranging in thicknesses from nil to 50 feet, comprised of fine to medium crystalline quartz, dolomite, diopside and minor garnet, all aligned to lend a vaguely gneissic appearance to the rock. This rock grades laterally into dolomite and/or argillaceous quartzites. This rock has been variously mapped as "volcanic tuff", "dolomite", "diorite gneiss" and "diorite sills". The mineralogy, the texture, and the relation to adjacent rocks of this rock, plus the spatial relation of it to the 339 limestone, generally in the hanging wall, as well as its discontinuous nature indicate to the writer that the rock is a skarn. Examination of a few exposures and specimens of the rock by the writer have confirmed this opinion. The acceptance that this rock is a skarn formed by the action of hot solutions or gases on the nearby limestone near a formational contact and near quartz veins in the Rainbow Member, is important because it obviously signifies hydrothermal activity and may therefore be correlative with the replacement orebodies in the adjacent limestone. If this is so the skarn occurrences may prove to be ore indicators.

THE CONTACT:

The contact between the Rainbow and the Baker rocks in the mine district is the most important guide to ore. The contact is generally not difficult to recognize underground, with the 339 limestone lending confirmation where needed. The contact trends northwestward and dips at about 40° to the northeast with the Baker Member in the hanging wall. Since the beds are overturned in the Wells area the Baker actually represents the older beds.

Generally, the contact strikes reasonably straight for many thousands of feet but locally it is disjointed and saw-toothed because of large and small fault displacements as well as drag folds. The drag folds range in amplitude from a few feet to 500 feet and plunge down the contact to the northwest at about 20 degrees. Most of the best replacement ore has been found in the vicinity, in both troughs and noses, of these drag folds and exploration is therefore, oriented preferentially toward them; however, good orebodies have been found recently along straight sections of the contact, away from folds, therefore all of the contact in the mine area represents favourable ground for exploration.

ORE OCCURRENCES

The lode gold ore in the Wells mines occurs in two separate and distinct forms, as quartz veins in the Rainbow Member and as pyrite bedded replacement bodies in the Baker Member. Most of the production from the Cariboo Gold Quartz mine southeast of Wells and much of the early production from the Island Mountain mine was derived from the vein orebodies; however, all of the most recent production and the best grade of past production has been derived from the replacement orebodies. Because of the relatively high cost of development the vein ore was no longer an attractive target for exploration at the prevailing price of gold ($38/oz). Conversely, because of fairly high grade, fair tonnages and reasonable costs of development the replacement orebodies comprise an attractive and lucrative target for extensive exploration. Despite the unfavourable economic aspects of the vein deposits in 1967, they now warrant close study for they are directly related to the replacement orebodies in genesis and to some extent in space. Also, in the event of an increase in the price of gold the veins in both mines at Wells could comprise a considerable profitable reserve. Therefore, the first section of the following discussion is devoted to a summary description of the vein orebodies in the mines, and to their possible relation to the replacement orebodies.

QUARTZ-PYRITE VEINS

The quartz-pyrite veins are almost exclusively restricted to the Rainbow Member rocks and extend in those rocks for distances up to 900 feet from the Baker contact, and generally strike at right angles to that contact. They represent fillings of an extensive fracture system that regionally ruptured the Rainbow Member and which probably formed during the tight regional folding of the formations. Subsequent regional cross-faulting and displacement of the formations was in all likelihood the event that caused parts of the Rainbow fracture system to open and act as conduits for the passage of hydrothermal solutions.

At Island Mountain 1948 of 200 quartz veins exposed on the 8th Level alone only 8 contained more than 20% pyrite and were therefore drifted. Examination of the geological plans of any level on either the Island Mountain or the Cariboo Gold Quartz mines reveals hundreds of exposed veins ranging in widths from a few inches to tens of feet, but only a very minor percentage of the veins have contained orebodies. This low return for extensive search of a myriad of veins results in high development costs for the ore that is found.

The grade of the vein ore, as mined, has ranged from 0.20 to 0.60 oz. Au/ton with an overall average of approximately 0.34 oz/ton. There has been no significant decrease in values with depth or lateral extent along the formation. At present costs and $37.50 (Can.) per oz. of gold the average gross value of the vein ore, $13.00 (Can.) per ton, is insufficient to make it more than a supplementary ore to the replacement ore, and then only in particularly convenient underground circumstances. At an increased price of gold, to $50 (Can.) or more, the vein ore would probably comprise profitable mill feed, particularly if supplemented by replacement ore, considering that much of the development is done and the mill is on the property.

The veins and fracture systems in the Rainbow Member apparently provided a plumbing system through which hydrothermal solutions gained access to the overlying Baker Member rocks. Although only a very minor percentage of the Rainbow fractures penetrated the Baker Member those that did so invariably reached the 339 Limestone bed immediately adjacent to the contact. Proof is fragmentary but there is enough to indicate that such leakage into the Baker Member resulted in the skarnization of the limey Baker rocks near the contact, generally in the hanging wall of the 339 limestone, and the formation of the replacement orebodies within the 339 Limestone. Obviously, where the 339 Limestone and adjacent beds were severely folded, and/or faulted, they would be more fractured or dilated and would be more permeable for solutions travelling in the adjacent Rainbow fractures. It is obvious that wherever there are strong ore-bearing veins in the Rainbow Member, the adjacent and overlying Baker rocks warrant exploration for replacement orebodies.

PYRITE REPLACEMENT OREBODIES

The pyrite replacement orebodies are entirely restricted to the 339 Limestone bed in the Baker Member, the limestone immediately adjacent to the Rainbow-Baker contact. Other limestone beds occur deeper within the Baker Member, farther from the contact, but the little drilling that has been done on them indicates an absence of both replacement ore and skarn in them. This would not be unexpected if the theory of the ore solutions originating in the underlying Rainbow Member fractures, which do not penetrate the Baker rocks more than tens of feet, is valid.

ORIENTATION AND DISTRIBUTION: The replacement bodies follow the 339 Limestone bed and commonly diffuse into adjacent beds as well, therefore they follow the formational trends and of course the Rainbow-Baker contact. About 95 percent of the replacement ore has been derived from the 339 Limestone. The replacement orebodies appear to be best developed in the vicinity of the thickening of this limestone on drag folds. With few exceptions the orebodies rake down the plunge of the drag folds at - 20° in a N 50° W direction, this feature is true even of those orebodies well removed from any folds. On the crests and in the troughs of the folds the orebodies are in a form of flattened pipes, whereas on the limbs of the folds and along unfolded sections of the beds they are tabular in form.

The replacement orebodies are generally 6-10 feet in stratigraphic width and 100-300 feet in length at any level but up to 600 or more feet in extent down the plunge. Average tonnages range from 2000 to 7000 tons, with the smallest mined being 500 tons and the largest being 35, 000 tons.

Replacement orebodies have been exposed and mined pretty well throughout the entire underground extent of the Island Mountain mine but only in a few underground locations in the Cariboo Gold Quartz mine southeast of Wells (Figure 3). This is at least partly due to the fact that lode mining started at Cariboo Gold Quartz with exploitation of the Rainbow vein orebodies and because these died out as the Baker contact was approached exploration naturally avoided the Baker contact. According to Skerl there was no exploration for replacement ore at Cariboo Gold Quartz up to 1943. In 1944 the first replacement ore at the Cariboo was found by accident while stoping through the Baker contact on a transverse vein. The few replacement bodies found at the Cariboo are exactly like those occurring at Island Mountain. By 1957, at the end of the life of the Cariboo mine, only 4% of the ore had been replacement. In contrast, a replacement orebody was inadvertently found on the surface early in the history of Island Mountain and by 1935 a few were being mined and had proved to be higher grade than the veins, which were also being mined. This set a general development pattern for the history of that mine whereby the Baker rocks inside the contact were explored when convenient but not systematically, by crosscuts or drill holes. By 1957 about 25% of the Island Mountain ore had been replacement, in 1966, it was all replacement. It should be appreciated that the best exploration and development of the vein orebodies at both mines involved drives and drill holes well within the Rainbow Member, directed along strike thereby not likely to intersect replacement orebodies.

Because practically no exploration or development have been done on the Baker (replacement) side of the contact in the mines southeast of Island Mountain it is obvious that these original Cariboo Gold Quartz mines comprise good prospecting ground for replacement-type ore provided that the Baker 339 Limestone bed persists that far southeast as a favourable host.

MINERALOGY AND GRADE: The replacement orebodies are comprised of masses of fine grained pyrite within limestone or dolomite beds of the 339 Limestone. Very minor amounts of scheelite, galena, sphalerite and arsenopyrite occur commonly with the pyrite and the gold occurs as free gold. The orebodies tend to have sharply defined hanging and foot walls but grade out along the bedding through sporadic and very coarsely crystalline euhedral pyrite, low in gold, and an increase in ankerite mottling and finally into silicified limestone.

The finest crystalline pyrite contains the highest gold values, individual samples ranging up to 5 oz. Au/ton. The average grade of the replacement ore at Island Mountain to 1964 was 0.67 oz. Au/ton and about 0.10 oz Ag/ton. This higher gold content, nearly twice that of the vein ore, is probably due largely to the fact that the replacement ore contains a higher proportion of pyrite than the vein ore.

SIGNIFICANCE TO EXPLORATION:

Obviously, the 339 Limestone bed inside the Rainbow-Baker contact comprises excellent prospecting ground for replacement ore. Essentially all of this limestone is available for new systematic exploration outside of the Island Mountain mine, and a large percentage of it within the mine.

The targets for such exploration would be individual orebodies of about 5,000-15,000 tons in size, with a present value of about $30. (Can.) per ton or $150,000 - $450,000 total. To date at the Island Mountain mine 32 replacement orebodies in excess of 5,000 tons have been mined after exploration of about 50 percent of the favourable 339 Limestone to the bottom level of the mine in a strike length of 5,500 feet. At Cariboo Gold Quartz (No. 1 Mine) the only replacement orebody of any consequence (172-R-B), under Jack-of-Clubs Lake, was one of the largest in either mine, (30,000 tons), and indicates excellent potential for more replacement ore southeastward from the lake.

1968 SURFACE EXPLORATION

Funds are not available to rehabilitate the mines and conduct an extensive underground program of exploration for orebodies at Cariboo Gold Quartz; however, in early 1968 the company made enough money available to explore the surface by trenching with a ripper-equipped bulldozer. As originally conceived the program would begin with the cutting of trenches across the Baker-Rainbow contact on Island Mountain, above the areas that were most productive underground, and proceed northwestward to the property boundary and then go southwards to Cow Mountain and proceed southeastward to the Lowhee Fault, a distance of about one mile, and on to the vicinity of Barkerville if the season permitted. The total length of contact to be thus prospected is 3.5 miles. The trenches were originally designed to be 200 feet apart to be supplemented by intermediate trenches where results warranted.

The objectives of the program were two-fold; first, to search for replacement ore on the Baker side of the contact, and; second, to determine if any large areas of gold-bearing veins and/or replacement orebodies could be exposed that would support low-cost surface mining on a relatively large scale.

DESCRIPTION OF PROGRAM:

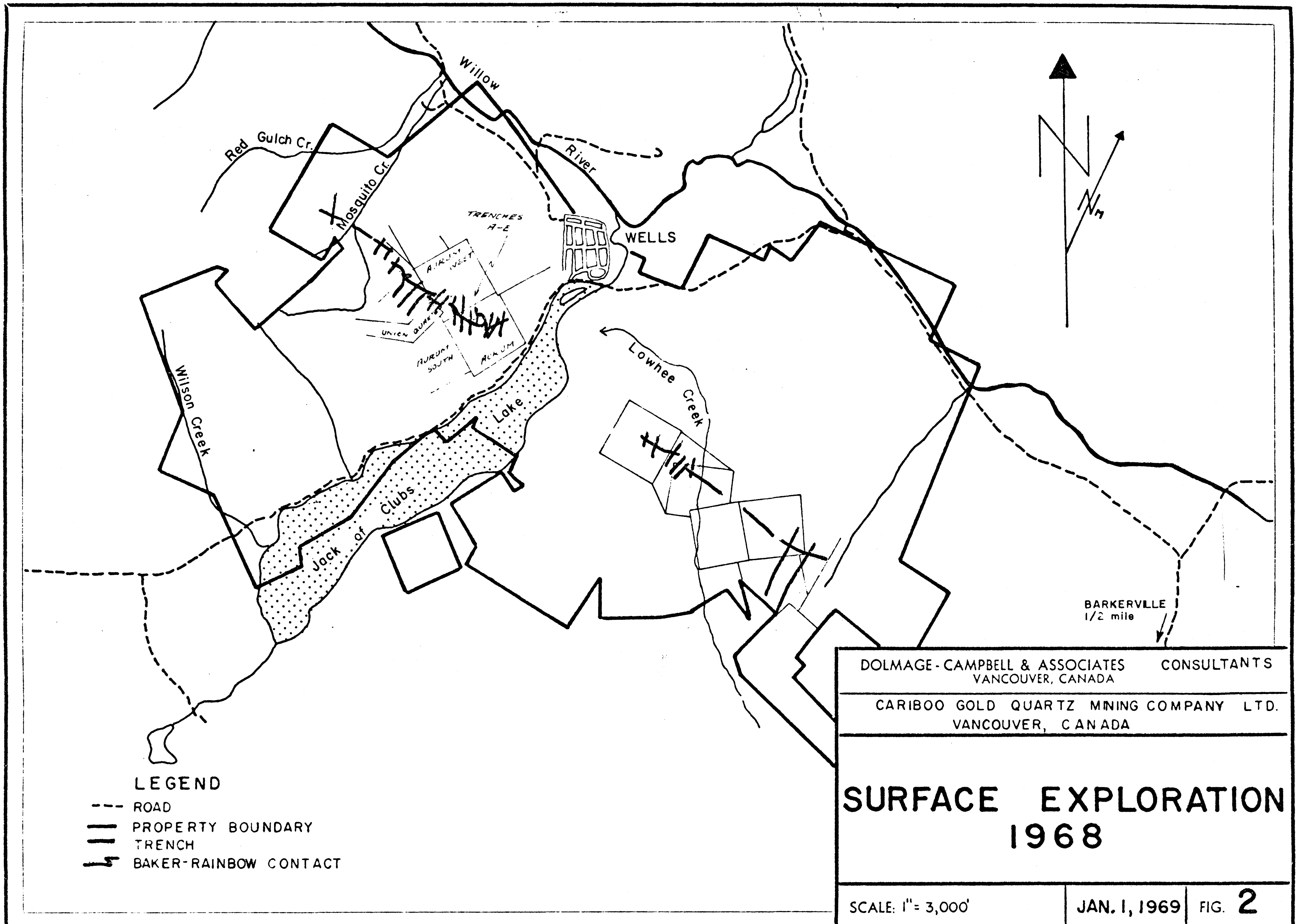
The entire trenching program was completed in 3 months, (July-September), by one D-8 Caterpillar bulldozer equipped with a ripper. A similarly equipped D-9 was also used for one week.

The trenches were grouped in 3 areas selected for their potential as well as their accessibility:

(a) Island Mountain: trenches exposed the contact for 1 mile in length to Mosquitoe Creek where overburden became too deep and wet to be able to trench.

The depths of the Island Mountain trenches ranged from 8 to 16 feet.

(b) Cow Mountain: a series of trenches exposed the contact over a distance of 2000 feet, to Lowhee Creek. The westernmost trenches reached depths of 25 feet in overburden and rotten rock whereas the eastern trenches were about 6 feet in depth.



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CARIBOO GOLD QUARTZ MINING COMPANY LTD.
VANCOUVER, CANADA

SURFACE EXPLORATION 1968

SCALE: 1" = 3,000' | JAN. 1, 1969 | FIG. 2

(c) Barkerville Mountain: across the broad Lowhee Creek valley two trenches did not reach bedrock at 30 feet therefore the trenching was shifted 3000 feet further eastward and two very long trenches exposed the Baker and Rainbow rocks for several hundreds of feet on either side of the contact.

The trenching covered a total strike distance of 2.5 miles of contact and totalled 3.1 line miles of trenches, exclusive of the many necessary service roads.

The trenching was continually under the full time supervision of a geologist and was conducted in two stages at each locality; first, a long trench at right angles to the Baker-Rainbow contact to locate it, then second, subsidary trenches along the contact to find and expose any mineralization, either vein or replacement, related to the contact, Each trench was geologically mapped on 40 ft/inch and all of the trenches were tied in to claim posts by transit or chain-and-compass survey. The maps of the trenches that accompany this report omit much of the detail existing on the original work sheets; however, the work sheets are permanently available in the files of Dolmage Campbell and Associates Ltd. and will serve as a continuing record of the trenches, all of which will be caved in by 1969-70.

Any veins, gossan or pyrite replacement exposed in the trenches were sampled immediately as a guide to further stripping. At the conclusion of the program certain trenches in three separate localities were bulk sampled to determine if large areas of vein and/or replacement exposures may have sufficient grade to support openpit mining.

In this report the general location of the trenches is shown in Figures 2 and 3, and the particular locations and shapes of the trenches are presented in Figures 4 to 6. Details of the geology and the assay results of the trenches that were bulk sampled are shown on Figures 7 to 11.

RESULTS

REPLACEMENT OREBODIES:

Based on the distribution of the replacement orebodies underground, (Figure 3), it was assumed that the trenching program would have an excellent chance of exposing ten to thirty replacement bodies in the 3.5 mile length of contact. Actually only one significant replacement orebody was found on Island Mountain, Trench J near Wells. Other limestone replacement high-grade mineralization was found on Island Mountain to the northwest but it proved to be in very small isolated patches, which may represent tips of orebodies but, as exposed, do not comprise orebody dimensions.

Throughout the major area of exploration, Cow Mountain and Barkerville Mountain southeast of Wells, where the best results were anticipated because of the great length of contact available for exploration, the trenching revealed that the 339 Limestone bed inside the Baker Formation does not persist to the southeast, apparently having lensed out on the surface on the west slope of Cow Mountain. Thus, with no limestone host rock available in the two miles of contact trenched southeast of Wells there had been no opportunity for the formation of replacement orebodies and therefore none were found.

Thus the first target of the trenching program, to locate a large number of replacement orebodies along the Baker-Rainbow contact, was completely defeated largely by critical change in the geology of the Baker Formation by the lensing out of the necessary 339 Limestone host rock.

OPENPIT ORE:

The second target of the trenching program was to determine if areas of gold-bearing veins and/or replacement orebodies along the contact would be found to have sufficient grade to support small open-pit operations. For this investigation the trenches that had exposed zones of quartz veins and high-grade lenses of replacement ore, most of them very small, in relatively close spacing were selected for bulk sampling. Three such trenches were chosen, two on Island Mountain and one on Cow Mountain:

Island Mountain:

J. Trench - exposed the folded Baker-Rainbow contact for 450 feet of length, (Also called the A-B-C Zone, after the original cross-trenches that located the contact). In this zone one replacement body about 20 feet in length and 3 feet in width occurs in the Baker rocks together with many small replacement patches of gossan and a myriad of narrow, (3"-1'), quartz veins in the Rainbow rocks across the contact from the Baker replacement ore

G. Trench - a cross-trench located 750 feet west of the western end of J Trench. It exposed limited replacement and vein mineralization.

Cow Mountain:

F. Trench - a cross-trench which exposed some quartz veins within the Rainbow rocks at the contact.

Sampling Procedures:

The bulk sampling was done by first cleaning the floor of the trenches with hand tools, then cutting a uniform chip-channel. Samples were taken at 10-foot intervals, each sample containing twenty pounds of rock.

In Island Mountain G. Trench and Cow Mountain F. Trench, the samples were taken in a continuous line down the centre of the trench. In Island Mountain J. Trench, a continuous line of samples at 10 foot intervals was taken on the south wall of the trench, and the contact was sampled at 10 foot intervals in the floor of the trench, the samples running perpendicular to the contact. A tight network of mineralized quartz veins exposed in Rainbow rocks adjacent to the contact was also sampled -- three channels, spaced 15 feet apart, were cut in an area roughly 40 feet by 50 feet.

Results:

Despite the occurrences of local very high assays in all of the trenches sampled the results of the overall bulk sampling were essentially negative. It is apparent from the results that not only is the rock between the veins etc. completely barren but also most of the veins themselves, particularly the myriad of narrow ones, are barren; thus the mass of low grade rock necessary to carry an openpit of this type is absent. (The assay results are shown on Figures 8, 9 and 11, where the assay in oz/t. of gold are plotted with the sample widths.)

CONCLUSIONS

With both the first and second targets of the trenching program thus proven to be not worthwhile the program was concluded. Since the results are so definitely negative no recommendations for further surface exploration can be made. Any worthwhile exploration or development of the Cariboo Gold Quartz mines must be done from underground.

UNDERGROUND POTENTIAL

In the case of the Cariboo Gold Quartz mines on Cow Mountain and Barkerville Mountain underground operations were not closed down because of the lack of ore sources so much as because of the rising costs of mining narrow veins. It is evident that comprehensive underground exploration by crosscutting and diamond drilling from the existing workings has an excellent chance of finding not only new vein orebodies but also replacement bodies, particularly in the lower levels at the northwest end of the mine, (Figure 3).

In the case of the Island Mountain mine much of the favourable Baker-Rainbow contact remains to be explored in the upper levels, (Figure 3), for all types of orebodies. The problem at the close of the mine was that rising costs had restricted mining to higher grade replacement orebodies only and that exploration for such bodies had lagged so badly that the development costs were too high for the targets available. The potential for developing vein-type ore in the Island Mountain mine is excellent because for most of the latter years of the operation many such deposits were exposed in the development but were not mined because of high costs.

In 1966, at 100 tons/day, the Island Mountain mine produced a total net profit of $2.85/ton at the then prevailing price for gold, ($37.50 Can.). At an increased price for gold, of at least $50 (Can.)/oz, the potential at both mines for increased production of ore from both vein and replacement orebodies is excellent because much known and developed vein mineralization would then be classified as profitable ore. If at the same time the proven ore reserve can be increased to 200,000 tons and the indicated ore to 200,000 tons by an extensive underground exploration program then a mill production of at least 300 tons per day is conceivable and would definitely be profitable since the only major capital repayment would be for the exploration program and for the necessary new mine and mill equipment.

The major problems governing the above proposal for reopening the mines at an increased price for gold are:

1. Are there sufficient geological reasons to indicate that an appreciable increase in reserves is possible?

2. What will be the approximate expenditure necessary to accomplish the exploration and development programs to prove the required ore reserves?

Discussion of the above two questions follows:

EXPLORATION POTENTIAL:

A complete and detailed discussion on the underground exploration potential at the Cariboo Gold Quartz mines has been presented by the writer in his report "Potential of Ore Reserves and Production, Cariboo Gold Quartz Mine," March 1, 1966, pp. 18-25, and the reader is referred to that report for particulars on the subject. Essentially there have been no changes since that report except that the recommendations for surface bulldozer trenching have been done in 1968, with negative results. The only effect of these results on the overall potential at the mine is that the possibility for finding replacement orebodies along the contact on Barkerville Mountain near the surface is negated by the absence of the 339 Limestone within the Baker Formation; otherwise the exploration opportunities described in the 1966 Report remain unchanged.

The potential for exploration for replacement orebodies in the Cow Mountain mine at depth is excellent. From the information available there is no reason not to expect as much replacement ore in the developed parts of No. 1 Mine (Cow Mountain) as have been mined from Island Mountain, namely about 500,000 tons, with undetermined potential at depth. This is corroborated by the mines' production record; by 1945 the No. 1 Mine had produced 101,000 tons of replacement ore @ 0.83 oz Au/t. from a very restricted portion of the mine. This grade is appreciably higher than that of the replacement ore average for Island Mountain. A study of the No. 1 Mine maps and records indicates that exploration into the Baker Formation was everywhere meagre and inadvertent, with little exploration across the contact, therefore the development of replacement ore was minimal.

COST ESTIMATE FOR EXPLORATION & DEVELOPMENT:

Some of the costs of a comprehensive exploration program of the Cariboo Gold Quartz mines, such as mine rehabilitation (Dewatering the lower levels etc.), can only be very roughly estimated by the writer at this time, therefore the following costs are very general and would require considerable refinement if such a program is to be undertaken:

<u>Phase 1:</u>	(Exploration)	
1.	Rehabilitate Island Mountain Mine and No. 1 Mine and renew equipment	$ 80,000
2.	Thorough diamond drill exploration of Island Mountain Mine from existing workings. For both vein and replacement ore. (20,000 ft @ $5)	$100,000
3.	Diamond drill No. 1 Mine extensively for replacement ore. (30,000 ft @ $5)	$150,000
4.	Review mine plans, check assay plans, resample where necessary.	
	Sampling, assays, geologists, engineering	$ 10,000
5.	Overhead, consultants, administration	$ 30,000
6.	Contingencies	$ 30,000
	Phase 1 - (Exploration)	$400,000
Phase 2:	(Development)	
1.	Extended development at Island Mountain. 6000 ft. new drifts (NW & SE) @ $50/ft.	$300,000
2.	Assuming success for Phase 1 (3), rehabilitate whole mine and add another drill and continue program for 6 more months.	$180,000
	Phase 2 - (Development)	$480,000

By the end of Phase 1 the efficacy of proceeding with Phase 2 will be determined, therefore the expenditure of $480,000 of Phase 2 will in large measure be proceeding on success.

CONCLUSIONS

Because of the known profusion of both vein and replacement orebodies at the Island Mountain and the No. 1 mines and because large areas of those two mines have not been explored for any kind of orebodies and many known vein orebodies in both mines have not been developed, the writer believes that there are excellent geological reasons for assuming that an appreciable tonnage of reserve ore can be developed in the mines. The grade of this ore is such, however, that for it to be profitable an increase is necessary in the price of gold to at least $50/oz (Can.).

The negative results of the 1968 surface exploration indicate that further exploration and development must be done from underground where ore environments are established and much undeveloped marginal (vein) ore has been exposed. It has been estimated that a first Phase of underground exploration to test this ore potential would cost approximately $400,000. If Phase 1 is successful then a second Phase of exploration costing $480,000 would be warranted. If successful these programs will have indicated approximately 400,000 tons of ore that would be profitable at a price of gold greater than $50/oz. This reserve would support the reopening of the Cariboo Gold Quartz mines and mill at a production rate of at least 300 tons per day since the potential for finding more of such ore would be excellent if the programs recommended in this report have proven successful.

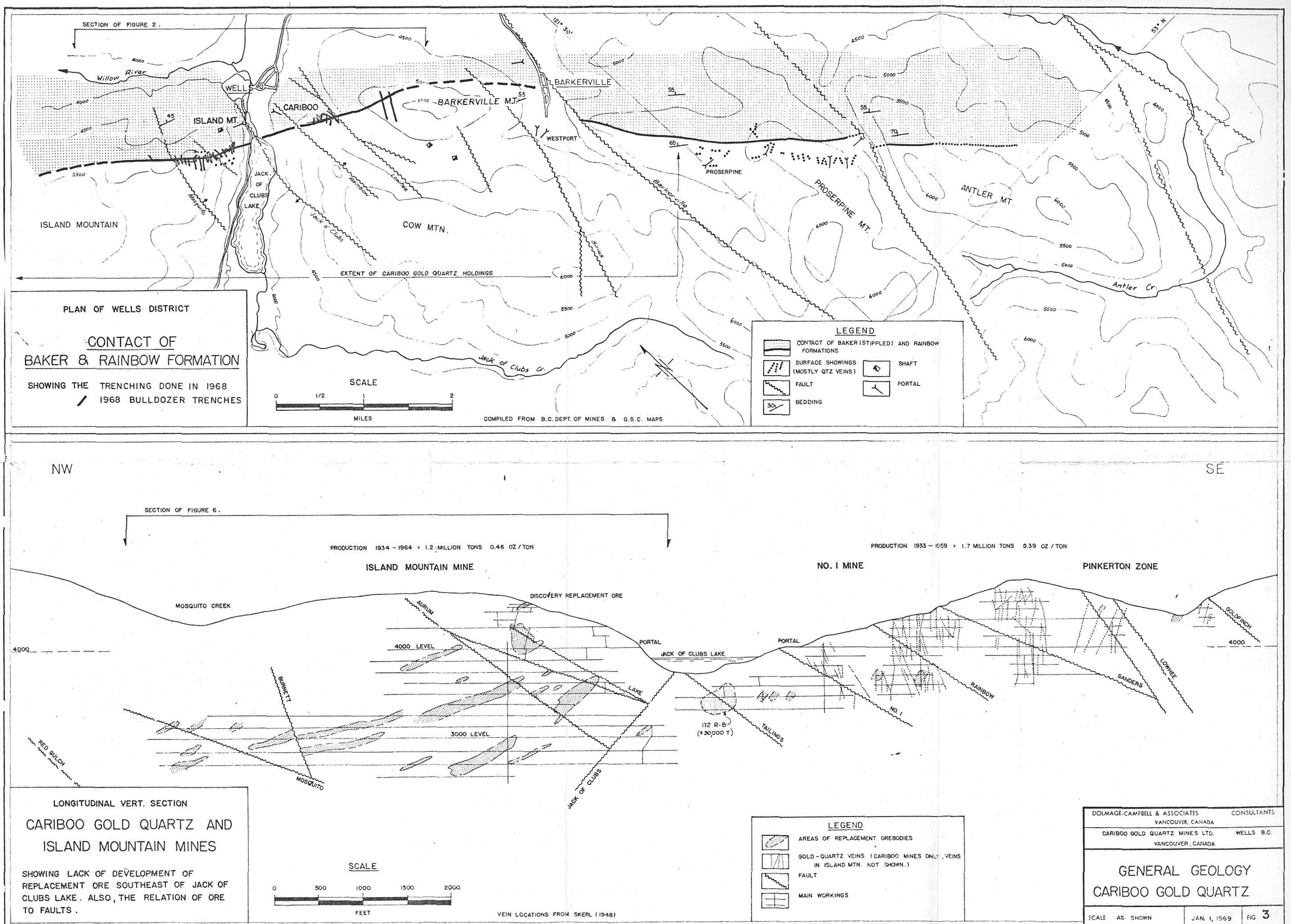
Respectfully submitted,

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

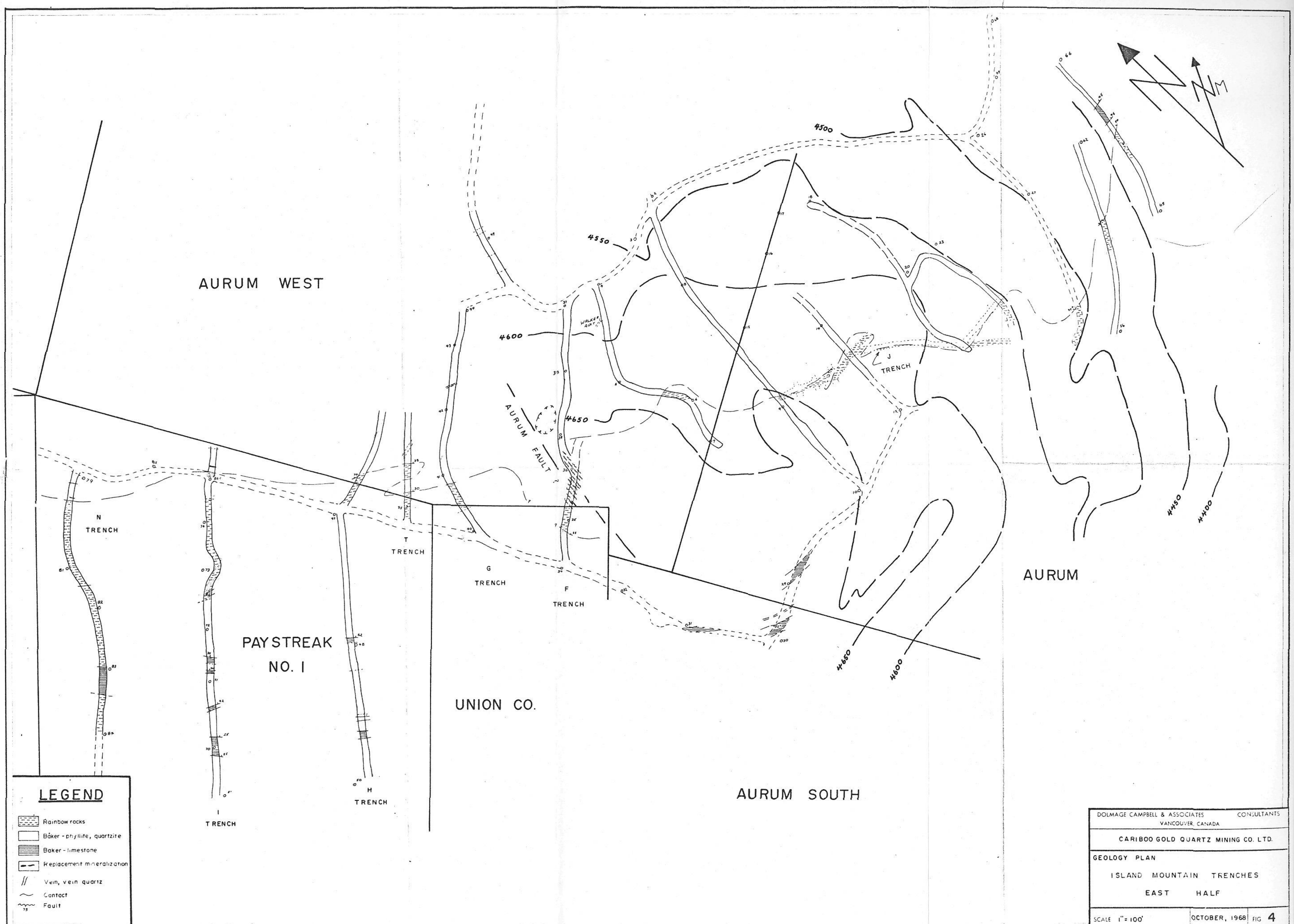
PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
D. D. CAMPBELL

January 1, 1969

Vancouver, Canada



SECTION OF FIGURE 2.
Willow River
WELLS
ISLAND MT.
CARIBOO
BARKERVILLE MT.
BARKERVILLE
WESTPORT
PROSERPINE
PROSERPINE MT.
ANTLER MT.
Antler Cr.
JACK OF CLUBS LAKE
ISLAND MOUNTAIN
COW MTN.
Mosquito
Jack o' Clubs
Rainbow
Lowhee
Barkerville
Sirius
Jack of Clubs Cr.
121° 30'
53° N
EXTENT OF CARIBOO GOLD QUARTZ HOLDINGS
PLAN OF WELLS DISTRICT
CONTACT OF BAKER & RAINBOW FORMATION
SHOWING THE TRENCHING DONE IN 1968
1968 BULLDOZER TRENCHES
SCALE
0 1/2 1 2
MILES
COMPILED FROM B.C. DEPT. OF MINES & G.S.C. MAPS
LEGEND
CONTACT OF BAKER (STIPPLED) AND RAINBOW FORMATIONS
SURFACE SHOWINGS (MOSTLY QTZ VEINS)
SHAFT
FAULT
PORTAL
BEDDING
NW
SE
SECTION OF FIGURE 6.
PRODUCTION 1934 – 1964 = 1.2 MILLION TONS 0.46 OZ/TON
ISLAND MOUNTAIN MINE
PRODUCTION 1933 – 1959 = 1.7 MILLION TONS 0.39 OZ/TON
NO. 1 MINE
PINKERTON ZONE
MOSQUITO CREEK
DISCOVERY REPLACEMENT ORE
AURUM
4000 LEVEL
3000 LEVEL
BURNETT
RED GULCH
MOSQUITO
LAKE
JACK OF CLUBS
PORTAL
JACK OF CLUBS LAKE
172 R-B (±30,000 T)
TAILINGS
NO. 1
RAINBOW
SANDERS
LOWHEE
GOLDFINCH
LONGITUDINAL VERT. SECTION
CARIBOO GOLD QUARTZ AND ISLAND MOUNTAIN MINES
SHOWING LACK OF DEVELOPMENT OF REPLACEMENT ORE SOUTHEAST OF JACK OF CLUBS LAKE. ALSO, THE RELATION OF ORE TO FAULTS.
SCALE
0 500 1000 1500 2000
FEET
VEIN LOCATIONS FROM SKERL (1948)
LEGEND
AREAS OF REPLACEMENT OREBODIES
GOLD-QUARTZ VEINS (CARIBOO MINES ONLY, VEINS IN ISLAND MTN. NOT SHOWN.)
FAULT
MAIN WORKINGS
DOLMAGE-CAMPBELL & ASSOCIATES CONSULTANTS VANCOUVER, CANADA
CARIBOO GOLD QUARTZ MINES LTD. WELLS B.C. VANCOUVER, CANADA
GENERAL GEOLOGY CARIBOO GOLD QUARTZ
SCALE AS SHOWN
JAN. 1, 1969
FIG 3



AURUM WEST
AURUM
AURUM SOUTH
UNION CO.
PAYSTREAK
NO. 1
AURUM FAULT
N TRENCH
I TRENCH
H TRENCH
T TRENCH
G TRENCH
F TRENCH
J TRENCH
4500
4550
4600
4650
4450
4400
LEGEND
Rainbow rocks
Baker - phyllite, quartzite
Baker - limestone
Replacement mineralization
Vein, vein quartz
Contact
Fault
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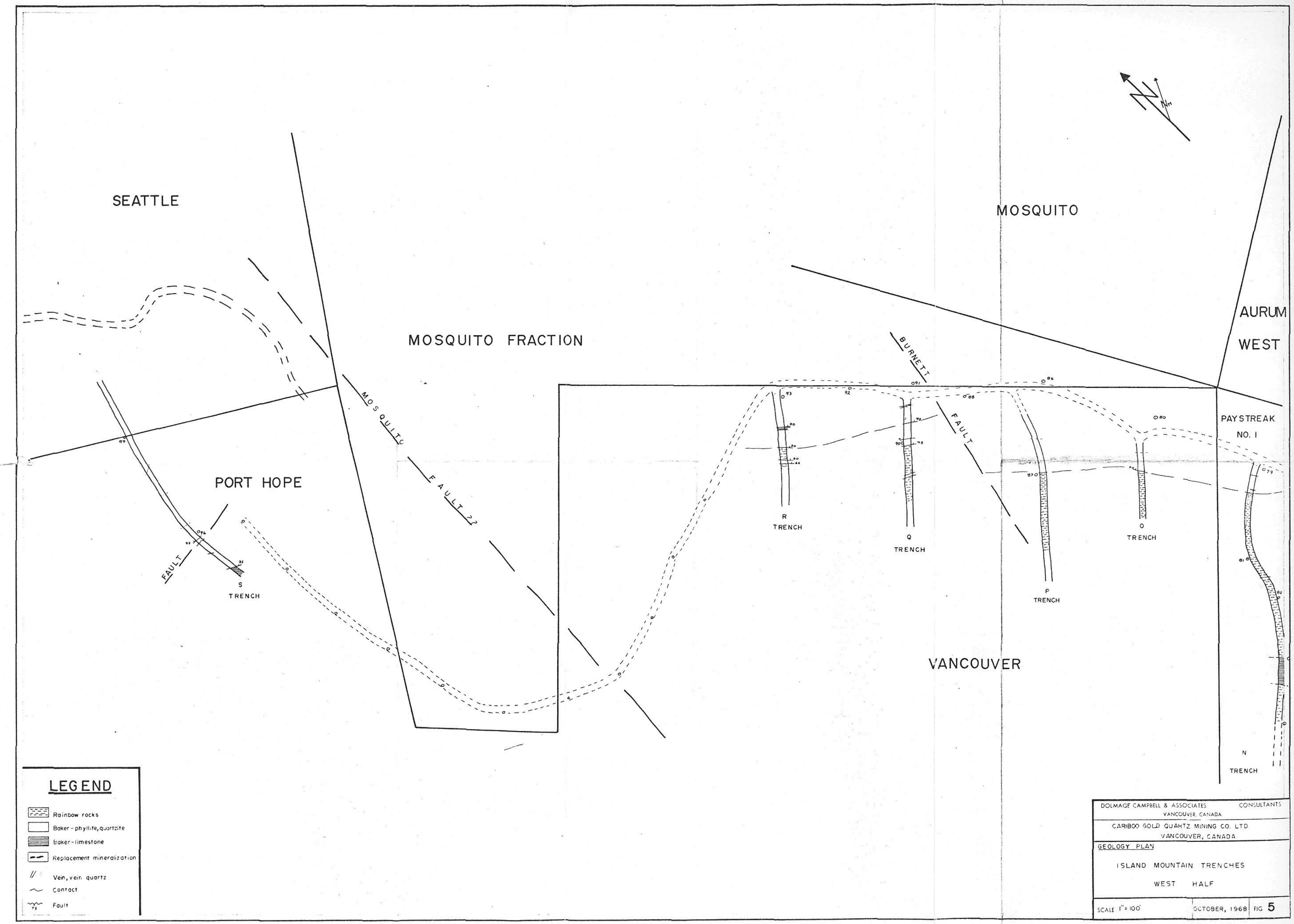
VANCOUVER, CANADA
CARIBOO GOLD QUARTZ MINING CO. LTD.
GEOLOGY PLAN
ISLAND MOUNTAIN TRENCHES
EAST HALF
SCALE 1" = 100'
OCTOBER, 1968
FIG 4


SEATTLE
MOSQUITO
MOSQUITO FRACTION
AURUM
WEST
BURNETT
MOSQUITO FAULT ??
FAULT
PAYSTREAK
NO. 1
PORT HOPE
FAULT
S
TRENCH
R
TRENCH
Q
TRENCH
P
TRENCH
O
TRENCH
N
TRENCH
VANCOUVER
LEGEND
Rainbow rocks
Baker - phyllite, quartzite
Baker - limestone
Replacement mineralization
Vein, vein quartz
Contact
Fault
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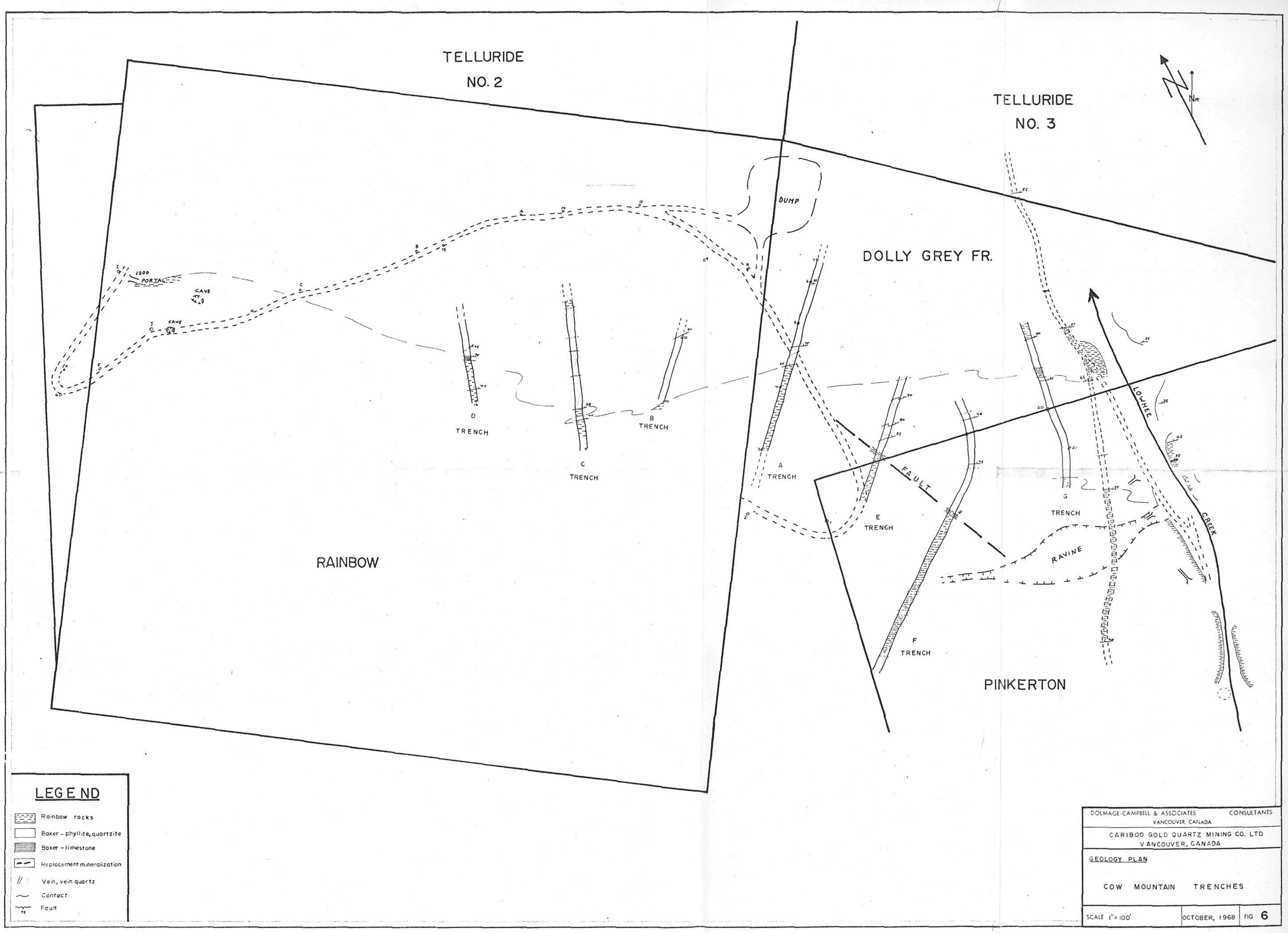
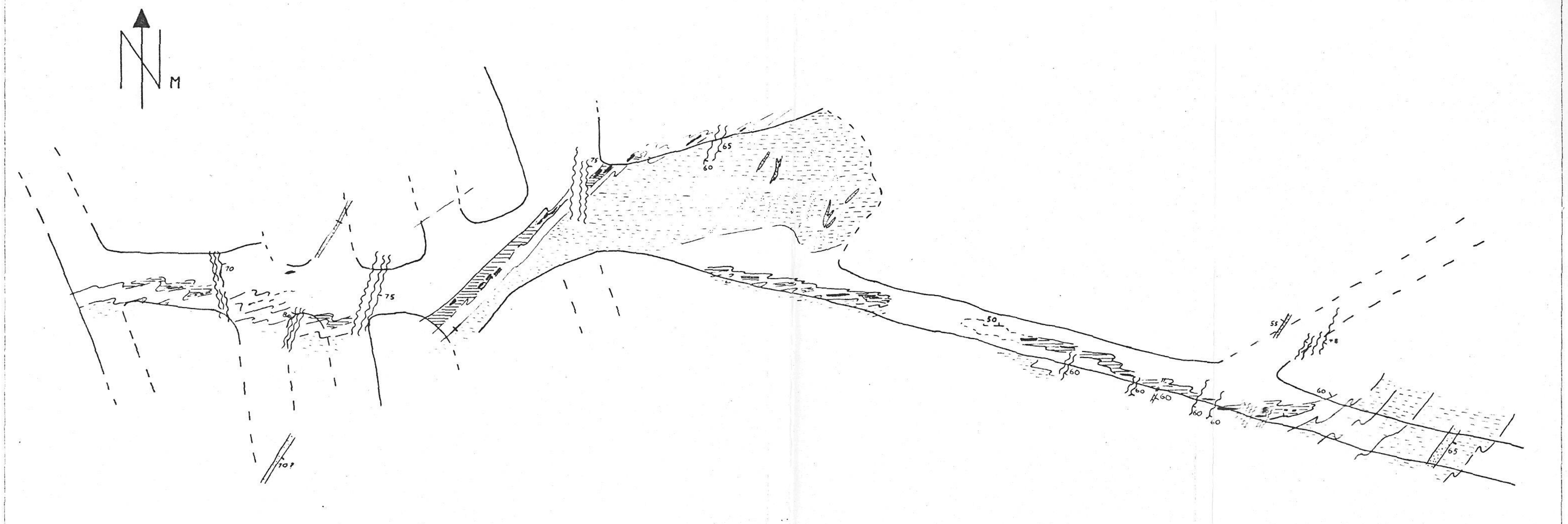
CARIBOO GOLD QUARTZ MINING CO. LTD
VANCOUVER, CANADA
GEOLOGY PLAN
ISLAND MOUNTAIN TRENCHES
WEST HALF
SCALE 1" = 100'
OCTOBER, 1968
FIG 5



TELLURIDE NO. 2
TELLURIDE NO. 3
DOLLY GREY FR.
RAINBOW
PINKERTON
1200 PORTAL
CAVE
CAVE
DUMP
D TRENCH
C TRENCH
B TRENCH
A TRENCH
E TRENCH
F TRENCH
G TRENCH
FAULT
RAVINE
LOWHEE CREEK
LEGEND
Rainbow rocks
Baker – phyllite, quartzite
Baker – limestone
Replacement mineralization
Vein, vein quartz
Contact
Fault
DOLMAGE-CAMPBELL & ASSOCIATES CONSULTANTS
VANCOUVER, CANADA
CARIBOO GOLD QUARTZ MINING CO. LTD
VANCOUVER, CANADA
GEOLOGY PLAN
COW MOUNTAIN TRENCHES
SCALE 1" = 100'
OCTOBER, 1968
FIG 6



LEGEND

- Rainbow rocks, undifferentiated
- Baker - phyllite, quartzite
- Baker - limestone
- Replacement mineralization
- Vein, veinquartz
- Contact
- Faults, fractures (75)

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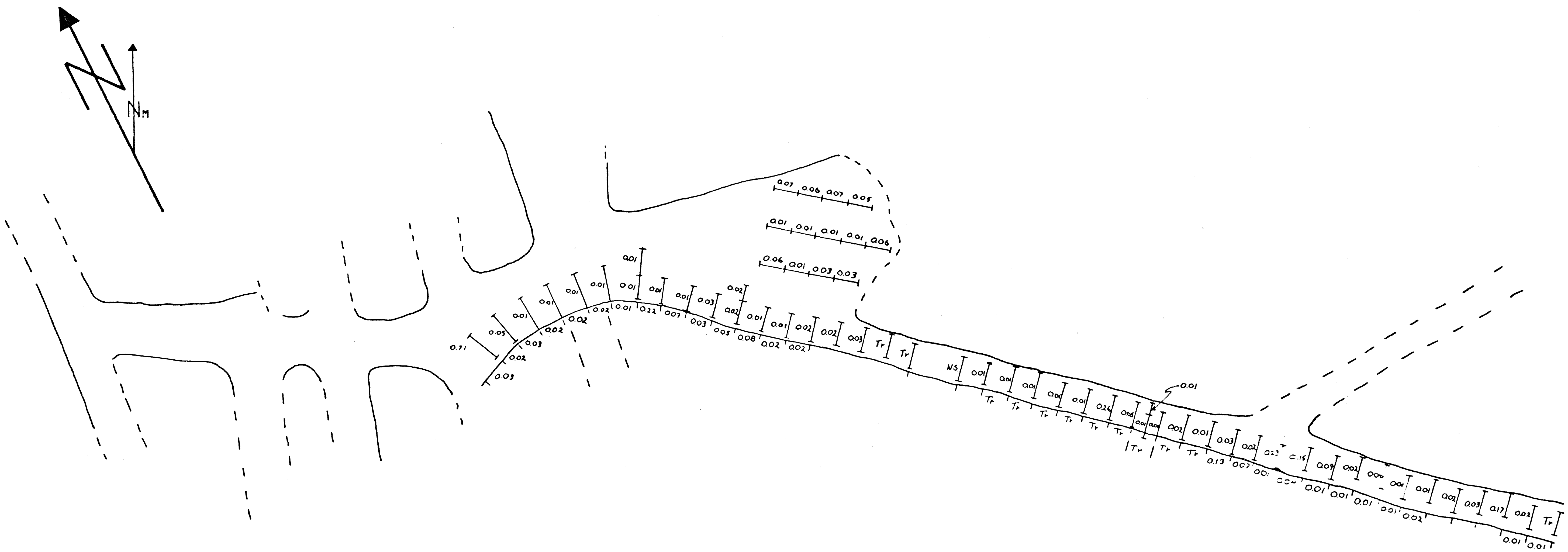
GEOLOGY PLAN

ISLAND MOUNTAIN 'J' TRENCH

SCALE: 1" = 40' | OCTOBER 1968 | FIG. 7



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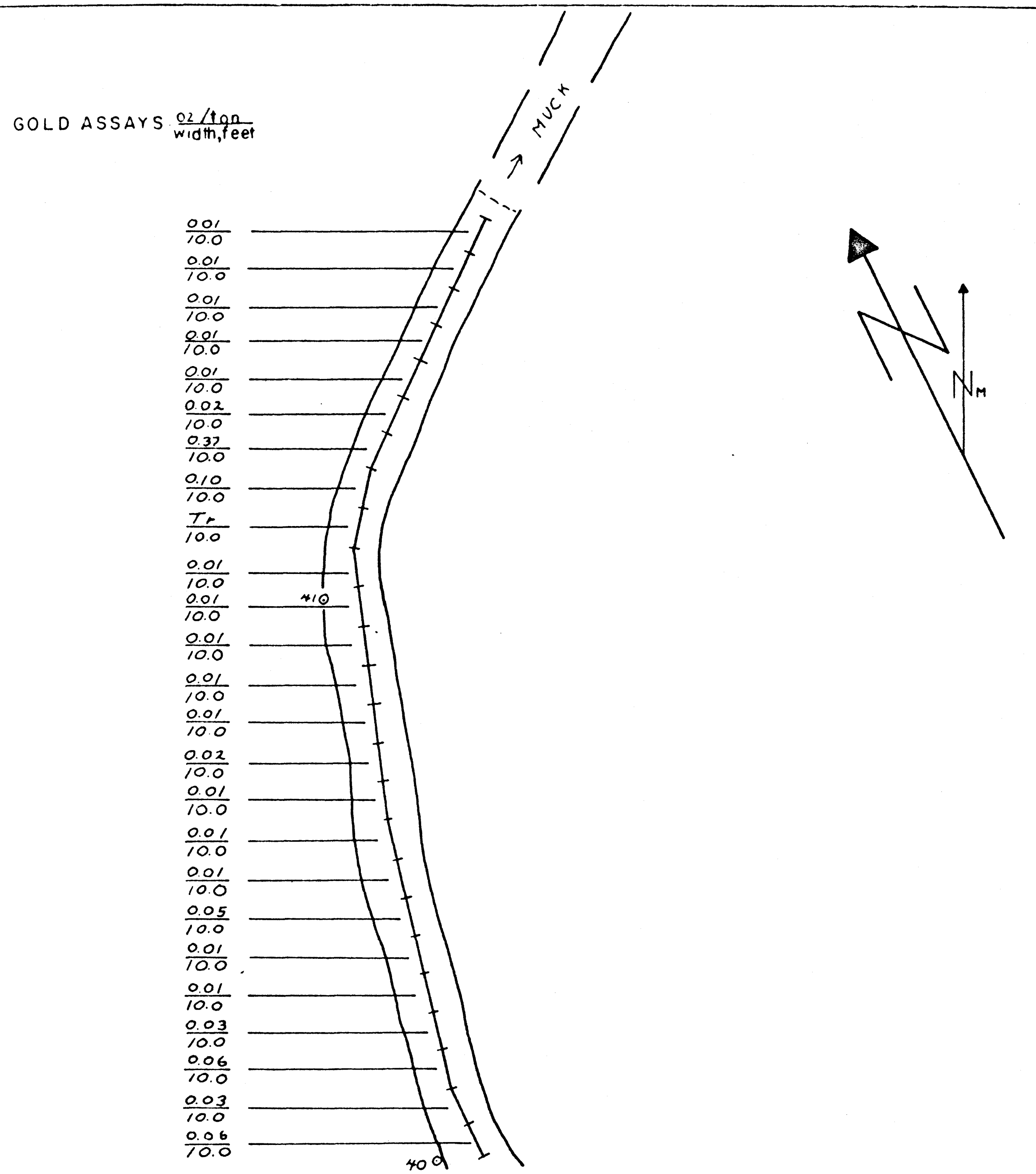
ASSAY PLAN – GOLD

ISLAND MOUNTAIN 'J' TRENCH

SCALE: 1" = 40'

OCTOBER 1968

FIG. 8



Sample location & width

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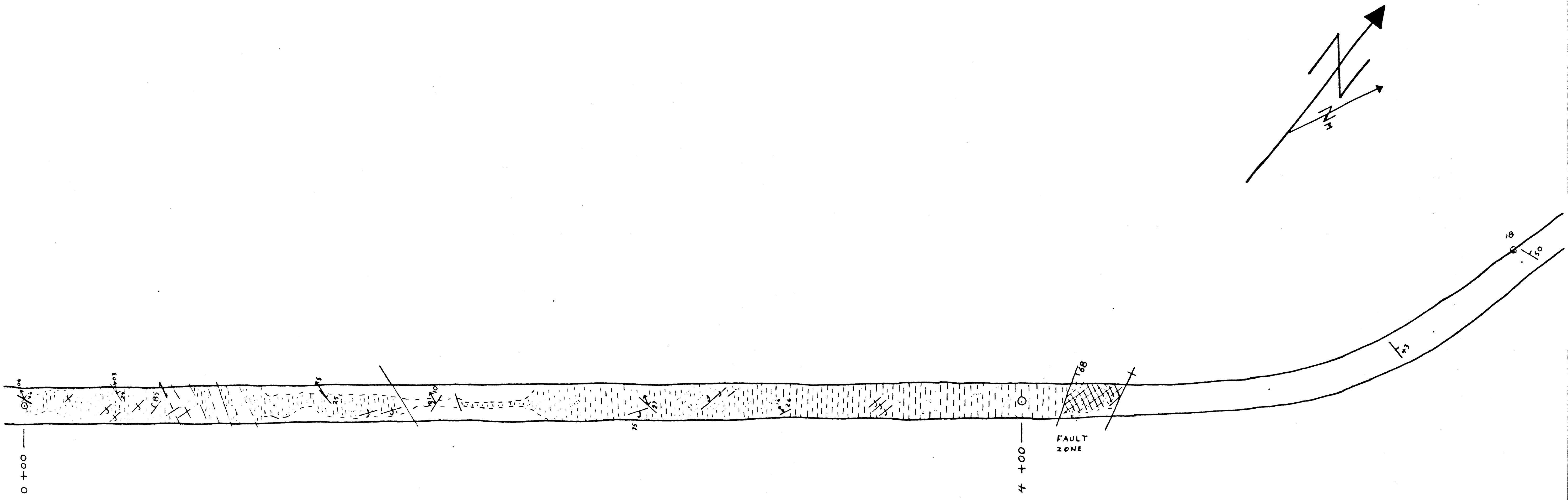
ASSAY PLAN - GOLD

ISLAND MOUNTAIN

'G' TRENCH

SCALE 1" = 40'	OCTOBER, 1968	FIG 9



LEGEND

- Rainbow rocks
- Baker - phyllite, quartzite
- Baker - limestone
- Replacement mineralization
- Vein, vein quartz
- Contact
- Minor fault
- Strike, dip, plunge of lineation
- Jointing

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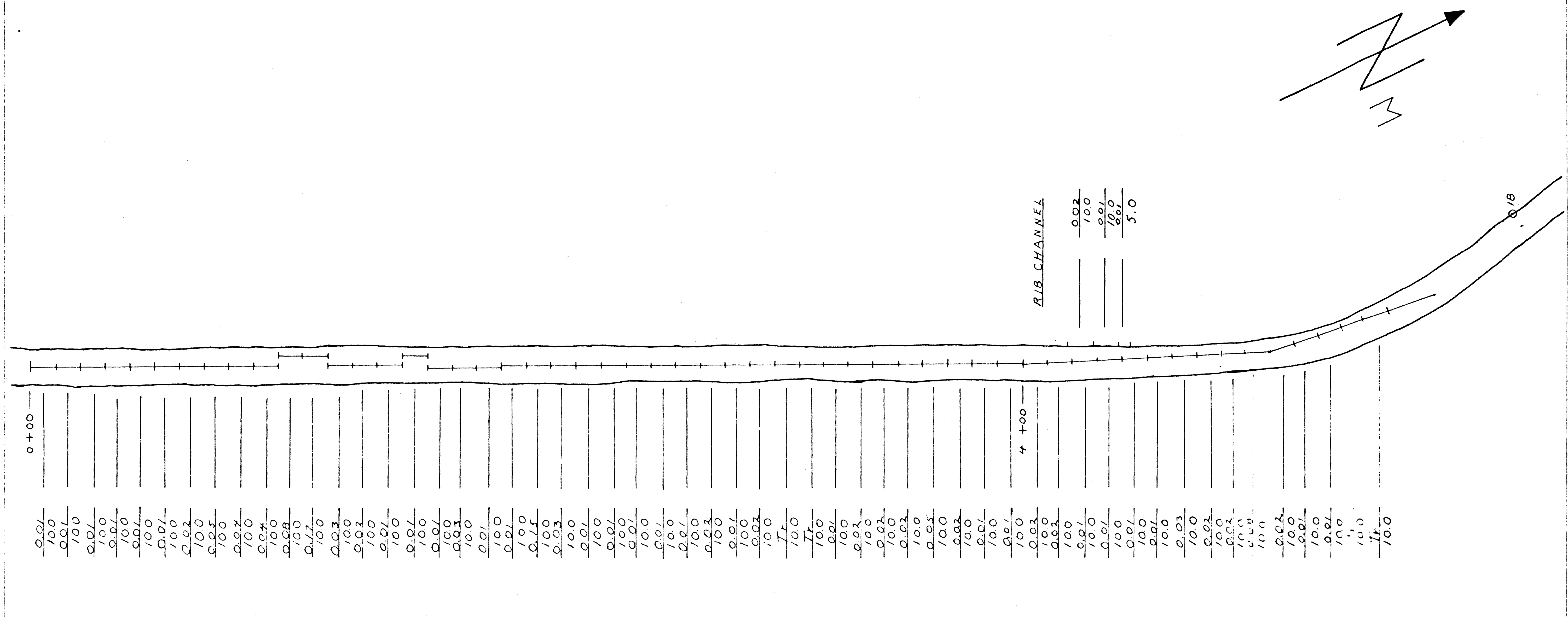
GEOLOGY PLAN

COW MOUNTAIN 'F' TRENCH

SCALE: 1" = 40' | OCTOBER, 1968 | FIG. 10



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CARIBOO GOLD QUARTZ MINING CO. LTD.

ASSAY PLAN-GOLD

COW MOUNTAIN 'F' TRENCH

SCALE: 1" = 40' OCTOBER, 1968 FIG. 11