

Mt. Nansen Mines Ltd.

FEASIBILITY REPORT
MT. NANSEN MINE & MILL
Carmacks, Yukon

Dolmage-Campbell & Assocs. Ltd.

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INTRODUCTION

INTRODUCTION

In 1964 Mt. Nansen Mines Ltd. came under the control of Peso Silver Mines Ltd. who inaugurated underground exploration of the Carmacks property of Mt. Nansen in 1965, following encouraging results from surface drilling and stripping. The Mt. Nansen properties are centered on a number of relatively high grade silver-gold vein zones, five of which have now been extensively exposed by drifts on one level in each of three mines; the Webber, the Huestis and the Brown-McDade. The underground drifting, diamond drilling and raising accomplished by Mt. Nansen Mines Ltd. has been done largely in 1965 and 1967 with sporadic work in 1966.

Considering the amount of development done to date on the property sufficient tonnages of silver-gold ore have been proven on the exposed veins, and sufficient ore potential has been indicated, to profitably support a small to modest size mill at this time. This report presents and assesses the data that verifies the feasibility of such an operation. Included in the report are reviews of the geology of the deposits, the ore reserves and potential, the metallurgy of the ore, the mill, the capital and operating costs and finally the cash flow.

Underground stope preparation as well as camp and mill construction, begun in late 1967, are proceeding on the property at the present time.

PROPERTY

The Mount Nansen property is comprised of four major claim groups which form one contiguous irregular shaped block. Of these groups, Mount Nansen Mines Ltd. owns two groups totalling 269 claims, Central Nansen Mines Ltd. owns one group of 64 claims, and Brown-McDade Mines Ltd. owns one group of 70 claims. All of the developed deposits are on the Mount Nansen Mines and Brown-McDade Mines claims.

A few miles north of the Mount Nansen Mines property Peso Carmacks Gold Mines Ltd. also holds a block of 306 claims on unexplored but promising ground where high grade gold-silver float has been found in the overburden. Peso Silver Mines Ltd. owns 87% of the outstanding shares of Peso Carmacks.

All of the above claims are presently in good standing and a complete list of the claims is available from the company office.

All of the property lies above timberline on gently sloping grass and bush-covered hills centered along a north-trending ridge that is the southern extension of Victoria Mountain six miles to the north. The general elevation of the workings is about 4000 feet, the main ridge rises to 5000 feet and the Victoria peak to 6148 feet. Mt. Nansen is located 4 miles northwest of the mine, across Nansen Creek, with its peak at 6100 feet elevation. The property is reached by 40 miles of good all-weather road from Carmacks to the east, which is on the Mayo-Whitehorse highway 100 miles northnorthwest of Whitehorse. Good roads connect the Webber, the Huestis and the Brown-McDade portals. Float plane connection to the property is also possible by landing on Victoria Lake 4 miles to the south; land planes are able to land at an airstrip 2 miles south of the mine during winter and dry summer months.

WORKINGS AND PLANT:

Total underground workings at all mines as of Dec., 1967, are:

<u>Webber</u>	-	Drifts	-	3,100 feet
		Crosscuts	-	600 "
		Raises	-	<u>260</u>
				<u>3,960 feet</u>
<u>Huestis</u>	-	Drifts	-	3,600 feet
		Crosscuts	-	1,620 " (2 Levels)
		Raises	-	<u>50</u>
				<u>5,270 feet</u>
<u>Brown-McDade</u>	-	Drifts	-	1,600 feet
		Crosscuts	-	990 "
		Raises	-	<u>20</u>
				<u>2,610 feet</u>
		<u>TOTAL</u>	-	<u>11,840 feet.</u>
<u>Diamond drilling</u>		Surface		7,000 feet
		Underground		<u>12,000 "</u>
		<u>TOTAL</u>	-	<u>19,000 feet</u>

No ore has been stoped from any of the deposits. Approximately 30,000 lineal feet of bulldozer trenching has been done on the surface in the vicinity of the Webber and the Huestis mines and about 10,000 feet in the Brown-McDade area. Essentially all of the Brown-McDade development work, plus most of the bulldozer trenching, were done prior to 1964.

By Dec. 31, 1967, the surface plant at the property included an old 40-man camp at Webber, being replaced by a permanent townsite at Huestis, plus temporary assay office, garage, dry and compressor houses. An entire new surface plant and mill is planned to be installed by summer, 1968.

HISTORY

Following the Klondike Gold Rush of 1898 placer mines spread through the Yukon and in 1910 most of the creeks in the Dawson Range, wherein Mount Nansen lies, were staked for placer gold. One or two of these placer claims were worked intermittently on the creeks north of the Webber Creek and some coarse gold was produced but essentially none of the operations proved consistently economic. In 1930 gold was found in place on Mt. Freegold, fourteen miles north of Mount Nansen Mines Ltd., and a small staking rush took place in the district. The Timmins Corporation began underground exploration on Mt. Freegold in 1934 and subsequently that property, the La Forma Mine, has changed owners frequently until finally, in 1965, Discovery Mines Ltd. has brought it into production as a gold mine at a target rate of 125 tons per day.

In the Nansen area the first lode deposit was found by prospectors Brown and McDade in 1943. Sampling of the surface trenches on their showings, plus subsequent drilling, returned sufficiently high values in gold and silver to induce Leitch Gold Mines Ltd. to form Brown-McDade Mines Ltd., and explore the ore zone underground with extensive drifting and drilling from a crosscut adit in 1946. At the same time Conwest Explorations Ltd. explored the Webber Creek area, 2 miles to the west, and the Huestis Syndicate trenched the Huestis Vein zone about one mile west of Brown-McDade. Underground results at Brown-McDade did not meet expectations and the project was abandoned in 1947 and all activity ceased in the area.

In 1958 prospecting activity revived in the area once again and in 1962-63 the Mt. Nansen Mines Syndicate (Newmont, Noranda, Rio Tinto, Kerr-Addison, Conwest, and Faraday) was formed and extensively stripped the Webber and Huestis vein zones and drilled four holes into the Webber zone.

In 1964 Mt. Nansen Mines Ltd. came under the control of Peso Silver Mines Ltd. and a program of further stripping, sampling and extensive overburden drilling was done on the Webber and Huestis vein zones. The results of this work prompted underground exploration, and drift adits were collared in December, 1964, and March, 1965, on the Webber and the Huestis respectively.

In 1965 the old Brown-McDade workings were remapped, resampled and check-drilled. Enough encouraging data has been accrued by the underground and surface exploration on all three zones (Webber, Huestis and Brown-McDade) to warrant the preparation of this feasibility study.

SUMMARY

SUMMARY

The Mt. Nansen Mines Ltd operation incorporates a large block comprised of 403 mineral claims located along a ridge that forms the southern extension of Victoria Mountain, about 40 miles west of Carmacks, Y.T. Three separate ore deposits have been explored by about 12,000 feet of underground openings on one adit level at each mine. Of the three mines, the 2600 feet of workings at the Brown-McDade mine were done in 1947 by previous owners, the 4000 feet at the Webber and the 5400 feet at the Huestis mines were done since 1964 by Peso Silver Mines Ltd., who own or control the companies to whom the various claims belong.

At the Webber and Huestis mines orebodies have been exposed, and are presently being developed for stoping, on four principal vein structures. These veins are in steeply-dipping, northwest-trending fracture-shear zones that have been traced by geochemical soil anomalies for several miles. The vein material is comprised principally of cherty quartz and silicified wallrock in which are bands, lenses and dispersions of very fine grained arsenopyrite, pyrite, stibnite, andorite, freibergite and probably ruby silver and gold. The veins range in widths from 0.5 to 8 feet but the average mining width is about 3 feet. Horizontal ore lengths range from 50 to 350 feet and ore has been indicated by limited diamond drilling to a depth of 400 feet below surface.

Ore reserves developed to date at the Webber and the Huestis mines are:

Proven-probable	- 130,225 tons @ 0.467 oz/t. Au, 18.38 oz/t. Ag
Dump ore	- 7,000 "
Possible	- 100,045 "
	<hr/>
	237,270 tons
	<hr/>

Addition of Brown McDade and other ore brings the total to 325,000 tons to date.

Potential reserves considered to be extremely good, as indicated by the unexplored extensions of the known veins as well as the excellent results of the silver soils sampling program completed in 1967. This potential suggests a life well in excess of 10 years at 300 tons per day. Mine development at present can support production of 250 tons per day and should be extended to produce 300 tons per day within a year.

Metallurgical tests on the Mt. Nansen ore are only completed through the first stage to determine the best general recovery process. Further testing will continue in order to determine how a lower-tonnage higher-grade

concentrate can be produced. Indications are that such improvement can be effected by finer grinding and reflation, by changes in reagents under operating conditions, by cyaniding of selected concentrates, and by roasting. Continued testing of these avenues of approach is being organized.

In the meantime, a bulk concentrate of 44.75 tons per day will be produced by a simple grinding and flotation circuit for a total gross daily worth of \$11,715.00. Detailed calculations on net smelter returns are presented in this report and indicate that the value of the ore at the mill at 250 tons/day is \$31/ton (Can.), using a price of \$2.00 (Can.)/oz for silver.

Total operating costs of the ore at 250 tons/day are calculated to be \$18.72/ton (Can.)

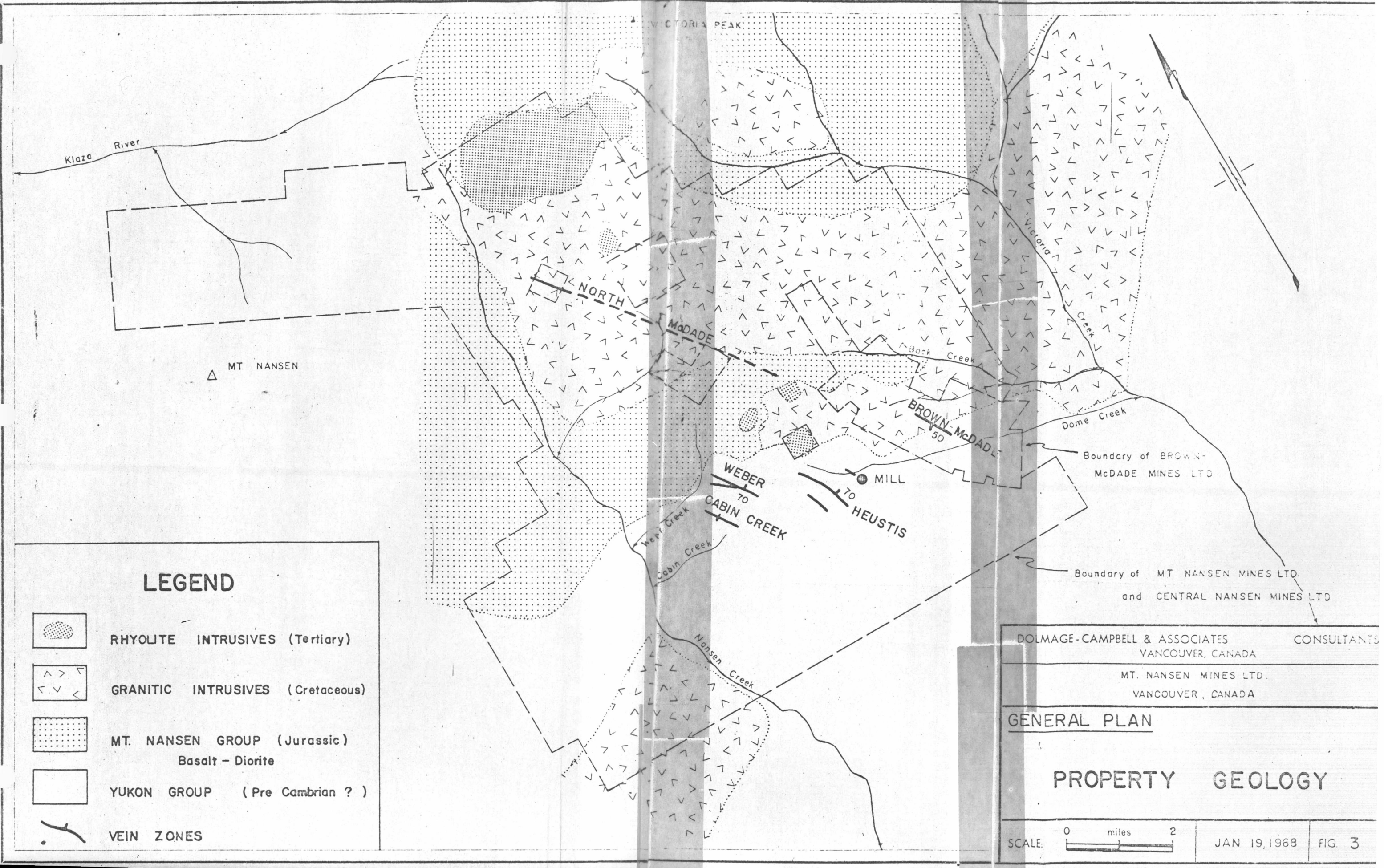
The mill presently being constructed at Mt Nansen will have an ultimate capacity of 350 tons per day but will start up at 250 tons.

The capital costs of bringing the mine into production are calculated to be \$1,781,126.00, after deduction of the road rebate and the excluded pre-production costs.


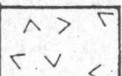
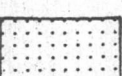
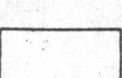

The annual net cash flow for the above-described operation is calculated to be \$1,073,000.00 (Can.). At a production of 300 tons per day this cash flow, for the presently assumed concentrate, will be \$1,400,000.00 (Can.). Every \$0.10 (Can.) increase in the price of silver above \$2.00 (Can.) will increase the annual net revenue of the 250 ton operation by \$140,000.00.

From the results of our investigations, summarized above, we conclude that the 250 ton/day operation at Mt. Nansen Mines Ltd., in the Yukon is feasible, very profitable, and in addition holds excellent promise for greatly increased revenue through improved metallurgy and expanded production. In addition, the potential of the deposits indicates a life well in excess of 10 years at 300 tons per day.

GEOLOGY



LEGEND

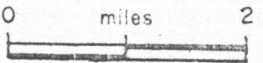
-  RHYOLITE INTRUSIVES (Tertiary)
-  GRANITIC INTRUSIVES (Cretaceous)
-  MT. NANSEN GROUP (Jurassic)
Basalt - Diorite
-  YUKON GROUP (Pre Cambrian ?)
-  VEIN ZONES

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VANCOUVER, CANADA

MT. NANSEN MINES LTD.
VANCOUVER, CANADA

GENERAL PLAN

PROPERTY GEOLOGY

SCALE:  0 miles 2

JAN. 19, 1968 FIG. 3

GEOLOGY

REGIONAL SETTING:

The Mt. Nansen area lies near the eastern edge of the main Cordillera batholith that trends northwestward across southwestern Yukon (Fig. 2). Extensive granite and granodiorite intrusive bodies of post-Triassic age are abundant north and south of the mine area but the immediate mine area is underlain not only by such intrusive rocks but also by older metamorphosed sedimentary formations and younger unmetamorphosed volcanic formations. Geologically the area can be considered an ideal setting for the occurrence of Cordillera-type ore deposits.

PROPERTY GEOLOGY: (Fig. 3)

The oldest rocks in the area are gneisses, schists and quartzites of the Yukon Group, believed to be of Precambrian-to-Cambrian age. These rocks underlie the southern and western portions of the property and are exposed as alternating bands of schist, quartzite and amphibolitic rocks. The formations in the Yukon Group generally strike northeastward and dip to the west.

Unconformably overlying the Yukon Group formations is an extensive thickness of Jurassic volcanic rocks termed the Mount Nansen Group. This group includes andesite flows, breccias and agglomerates, basalt flows and related dioritic intrusives. The diorite is exposed on the east side of the Webber ridge as intrusive into or contemporaneous with basalt and in turn is intruded by later granitic rocks. The Mount Nansen Group of volcanic rocks generally strike east-west across the ridge that forms the topographic backbone of the property. The dome at the south end of the ridge is comprised of rhyolite, the smaller but more rugged knob 1500 feet north of the dome is comprised of a basalt-andesite breccia that appears to be a plug intruding the surrounding basalt.

Intrusive into all the preceding rocks are two types of granitic rocks; granodiorite and porphyritic granite both believed to be of Jura-Cretaceous age. The two rocks occur side-by-side in the Brown-McDade adit but are separated by a fault three feet in width.

Extensive rhyolite intrusive stocks and dikes crop out the full length of Webber Ridge north to Victoria Mountain (Fig. 3). These rocks intrude all of the above-described formations and are pre-ore although dikes of intensely crushed and altered rhyolite occur in many of the ore vein zones.

FAULTS: Two sets of major and minor faults are known in the area from the underground work. The set of widest faults strikes northnorthwest, parallel to the ore veins, and some faults are themselves locally mineralized. These faults include gouge-filled shear zones which encompass widths of intensely clay-altered wallrocks, the entire zones ranging in widths from 2 feet to 50 feet. These shears dip 50° - 70° southwestward and include the extensively mineralized Brown-McDade Zone.

The other set of faults strikes northeast and dips vertically to steeply off vertical. This set of faults offset with left-hand displacements from one to 100 feet all formations and the ore veins. The relation of this fault set to the earlier-described major shear faults is not yet known. Major members of the northeast-striking set of faults are spaced at about 400-500 ft. intervals in the mine area, with minor members grouped in clusters in which individuals may be several feet apart.

ECONOMIC GEOLOGY:

The mineralized structures in the area of Mt. Nansen are comprised of complex fault-shear-alteration zones that cut all of the above-described rocks and are known to be persistent for many thousands of feet in length and at least 500 feet in depth. All of these zones strike northwest to northnorthwest and dip steeply to the east and west. Some zones are characterized in places by a gouge plane, generally on the footwall, adjacent to which is intensely sheared and altered rock which is locally host to replacement lenses and veins of quartz, carbonate and ore minerals. On the east side of the property the Brown-McDade zone, over 100 feet in width in the mine, pinches to the north to a foot or two in width. The cause of this pinching is a change in wallrock from granodiorite at the mine to Mt. Nansen Group basalt and diorite north of the mine. Where it passes back into granitic rocks in the north half of the property the vein zone widens again to nearly 100 feet and is well mineralized and gold bearing.

All of the known Mt. Nansen ore occurrences are vein-type deposits with values being in gold and silver. The veins range in width from 6 inches to 6 feet, with the average width being about 2-3 feet, but because of high grade gold-silver content minimum mining widths of 3 feet of possible throughout the deposits. Vein structures widen and pinch considerably when passing from one type of wallrock to another; in particular, the veins are widest within the granitic rocks and the Yukon Group metamorphic rocks, and markedly narrow within the Mt. Nansen Volcanics and the rhyolite intrusives.

All of the vein zones branch extensively but generally the principal structures are known to be continuous at least for 1000 feet. Some branches are mineralized to ore grade, particularly near the parent vein structure.

Mineralogy: The vein material is comprised mostly of watery, cherty quartz and white crystalline quartz, the former generally as replacement along the zones. In the wider sections of vein zone the quartz as well as included fragments of wall-rock are generally rusty and sheared. Within the ore zones the quartz is host to extremely finely divided pyrite and arsenopyrite which appears as watery black streaks or solid masses. A pale yellow secondary stain is characteristic of high grade silver ore and is possibly argentojarosite. No visible gold or identifiable silver minerals have been seen megascopically in the ore, even in places of extremely high assays.

In the Huestis veins the silver content is generally less than in the Webber veins and stibnite is more common. In the Huestis veins the gold and silver values occur in characteristically diffuse fine grained black dispersions in very hard flinty cherty quartz.

In the Brown-McDade zone the ore material is cherty replacement quartz within clay-altered wallrocks. Gold and silver values occur with very fine grained replacement and open-space filling sulphides. Pyrite is the most widely distributed mineral within and beside the ore zones but it is not related to the ore values. Arsenopyrite is the principal sulphide within the ore zones where, because it is finely divided, it imparts a characteristic bluish tinge to the ore material. Sphalerite, chalcopyrite and stibnite are locally plentiful but not to ore proportions. The precious metals are spatially related to the arsenopyrite and occur as native gold, andorite, freibergite and ruby silver, the last three being antimony sulphosalts.

WALLROCK ALTERATION: Hydrothermal alteration of the wallrocks of the Mt. Nansen ore veins, and larger faults, has been locally intense, generally pervasive and universally distributed. Two major types of alteration are encountered in various parts of all veins; silicification and argillic (clay) alteration, and both are generally accompanied by bleaching. The argillic alteration is the most wide-spread along the veins and faults and extends for tens of feet into the wallrocks along bedding or fracture planes. It does not provide a reliable guide to ore on the veins. The silicification occurs more sporadically along the veins, and does not occur adjacent to faults, and generally has not penetrated more than a few feet from the source vein structure. In many places it has proven to be an excellent indicator of ore on the veins.

The argillic alteration converts all rocks in many places to uniform cream-white, soft, gritty clay. All gradations toward this end-product are encountered in all mines. The silicification is white to glassy cherty quartz that in many places completely replaces all types of wallrock, frequently preserving original structures such as banding or bedding. Some portions of No. 2 Vein at the Webber Mine are nothing more than intensely silicified zones up to 8 feet in width within which fine

longitudinal and/or cross fractures are filled with sulphides to the extent that the whole zone comprises ore.

Chloritization, hematization, limonitization and pyritization are also common wallrock alterations but they occur more sporadically than the clay and silica and are generally more confined to rocks immediately adjacent to or included within the vein zones.

In several instances ore veins have been located in low core recovery diamond drill holes by the intersection of alteration zones only.

ORE OCCURRENCES

The principal features of the Mt. Nansen orebodies are described below:

(1) WEBBER VEINS:

Surface stripping and underground workings at the Webber mine have exposed ore on two major vein zones, one of which is a branch of the other and both have minor short branches that make ore for short distances from the parent structure. A plan of the Webber Adit Level is shown in Figure 4 of this report and on it is shown the configuration of the developed portion of the Webber vein system along with the locations of the ore shoots used in the ore reserve calculations in this report. It is significant when considering downward continuity of the Webber ore and the validity of the ore reserve projections above the level that the surface configuration of the vein system and the positions of the ore shoots, 160 feet above, are exactly the same as those on the level shown in Figure 4.

Although the Webber veins pinch and swell and in some places are reduced to only a few unmineralized, tight fractures the overall fracture structures have proven to be persistent for the 700 feet of developed strike length and are still open and orebearing at both ends of the mine and below the level.

Mapping and sampling of the Webber Vein zones has indicated that with few exceptions the ends of the ore shoots are sharp, exhibiting direct transition from ore to waste with negligible "tailing off" as marginal ore. Within any one ore shoot, whether very high or very low grade, there is a general constancy of grade, particularly when averaged to a common width. High grade lenses occur within some ore shoots but they appear to be cores flanked by lower grade material and are not dispersed as erratics.

The boundaries of the orebodies are remarkably regular in that every surface ore shoot can be projected directly down dip to a corresponding ore section on the level 200 feet below.

The average grade of the Webber ore shoots as sampled on the surface was 0.43 oz./t. Au and 29.6 oz./t. Ag, across an average width of 4 feet. The total average grade of all the ore shoots, both on surface and underground is 0.39 oz./t Au and 22.3 oz./t. Ag across 4 feet, with more ore occurring underground but at a somewhat lower average grade than on the surface. The highest grade ore section is a surface one 90 feet in length that assays 0.57 oz./t. Au and 38 oz./t. Ag across an average width of 5 feet. The lowest grade ore section used in the ore reserve calculations is an underground 70 feet length assaying 0.17 oz./t. Au and 11.2 oz./t. Ag across an average width of 2 feet. (In the latter ore section the actual average vein width is only three inches yet despite expansion to a 2 ft. mining width the grade is still appreciable. The grade of the undiluted ore (3") is 1.36 oz./t. Au and 89.6 oz./t. Ag.

The higher grades of gold and silver may or may not occur within the same ore shoots. As pointed out earlier, the gold values tend to maintain a relative consistency from shoot to shoot, whereas the silver values range considerably from shoot to shoot, for example:

	<u>Au (oz./t.)</u>	<u>Ag (oz./t.)</u>	<u>Width</u>
Orebody 101 B	0.32	2.3	3 (not used in
Orebody 105	0.38	9.7	4 reserves)
Orebody 130	0.20	56.1	3

Throughout the orebodies the average grade of the gold will range from 0.2 oz. to 1 oz. per ton, whereas that of the silver will range from 3 oz. to 100 oz. per ton. The amount of silver in any one ore shoot determines whether it is a high grade or low grade shoot. Gold occurs in all ore shoots and is the prime metal in the low grade ones.

(2) HUESTIS VEINS:

The surface exposures at the Huestis Mine consist of six widely-spaced cross trenches, therefore most of the information on the ore structures has been derived from the underground workings.

As shown on the level plan in Figure 5, two major branching vein structures have been exposed by drifting. One of these, No. 12 Vein, contains most of the Huestis known ore reserves. Diamond drilling has intersected two additional veins to the west and stripping for the millsite at the portal of the 4100 Level exposed another ore-bearing vein. The ratio of ore to waste along the drifted length of No. 12 Vein is exceptionally high (65%) for a vein structure; the ratio on the

other veins is much lower. All veins on the Adit Level (4300) are barren to the south (near the surface) but the No. 12 Vein was still in ore at the north face where a fault cuts it off. The Huestis veins strike northnorthwest and dip steeply to the east. Ore sections on No. 12 Vein are persistent for a strike length of nearly 1600 feet for an average vein width of less than two feet but an ore width of 3 feet.

Displacement of the veins by faults is not as common at the Huestis as at the Webber.

The ore shoots exposed at the Huestis to date are generally higher in gold but markedly lower in silver content than are the Webber veins; averaging about 0.55 oz. Au/ton and 13 oz. Ag/ton.

(3) BROWN-McDADE ZONE:

The Brown-McDade orebodies occur as replacement siliceous vein-like lenses within a wide zone of shearing and intense hydrothermal argillic and hematitic alteration that strikes N25°W and dips 50° west. It has been exposed by drifts and crosscuts on the Adit Level for a length of 1500 feet and trenched on the surface for an additional 500 feet.

The Brown-McDade Zone exhibits a main footwall fault plane characterized by about 6 inches of dense gouge. This structure is persistent in the mine and consistent in attitude. It has been traced by the E-M survey and float trains for a distance of over three miles. These features, plus the attendant wide zone of wallrock alterations suggest that the structure is probably a major plumbing system with a promising depth potential.

The Brown-McDade Zone, as exposed underground, is divisible into three main parallel zones which merge with one another along their contacts. Adjacent to the main footwall fault mentioned above is a "shear zone" approximately 15 feet in width comprised principally of hematized fault gouge in shears bounding highly sericitized and mylonitic rock slices. In rather sharp contact with this shear zone is the "ore zone" which is from 5 to 30 feet in width and is comprised principally of gray, limonitic silica-sericite-barite replacement lenses within which drusy cavities are common. Nests, veinlets, pods and disseminations of finely crystalline sulphide minerals occur dispersed rather erratically through this siliceous rock and consist principally of pyrite and arsenopyrite with minor chalcopyrite, galena and tetrahedrite. A number of grab samples of this typical replacement sulphide material averaged about 0.70 oz. Au and 8 oz. Ag. In some places underground the ore zone is separated from the shear zone by considerable thicknesses of alteration zone. The hanging wall of the ore zone is

everywhere occupied by an "alteration zone" which is about 75 feet in horizontal width and is comprised of intensely altered and sheared wallrock. It is a replacement zone of fractured, maroon-coloured rock comprised principally of argillized feldspar, hematite and quartz within which relicts of granodiorite are recognizable.

The underground headings criss-cross nearly the entire Brown-McDade Zone with some of their length being in the "shear-zone", some in the "ore zone" and much in the "alteration zone"

Remapping of the Brown-McDade workings has revealed a series of sinuous en echelon vein-like quartz replacement bodies occurring in two general sites, one along the main footwall fault plane, and the other along the zone 20 to 40 feet in the hanging wall. These bodies average 200-400 feet in length and 5 to 15 feet in width and dip parallel to the footwall fault. At their ends along strike individual bodies tend to pinch out rather abruptly or turn sharply into a nearby body. They are all comprised of cherty quartz, brecciated wallrock and are generally vuggy and leached. All are heavily pyritic but only some are appreciably mineralized with arsenopyrite and the sulphosalts.

Underground drifts and drilling have indicated a total strike length of nearly 2000 feet of these vein zones of which about 600 feet have been wholly or partially exposed by drifts and crosscuts. The remaining 1200 feet of zones are indicated by sparse drilling, some crosscuts and by mapping, and all require further investigation by further drilling and driftings. Of the 600 feet of zones that have been exposed by drifts 440 feet are of ore grade, occurring in four shoots three of which range in length from 120 to 155 feet and all of which range in width from 5 to 8 feet.

The ore-bearing sections of the vein zones are not everywhere clearly apparent without careful examination and sampling, therefore stoping of these bodies will require close geological control with considerable guidance from drill holes.

The Brown-McDade ore is much the same as the Webber and Huestis ores in mineralogy but decidedly different in grade. The gold content tends to be higher than the Webber-Huestis ores but the silver content much lower. Gold values of weighted samples at Brown McDade range from 0.40 to over 2.0 ounces/ton whereas the silver values are consistently 4 to 10 ounces/ton. The average values of the ore proven underground to date is 0.61 oz./ton Au and 5.4 oz./ton Ag across an average width of 6.7 feet.

Compared to the other Mt. Nansen properties the Brown-McDade ore-bodies, as exposed to date, are low grade and decidedly marginal if considered by themselves; however, they have a very large tonnage potential and if they are considered as feed to a mill servicing all the Mt. Nansen properties they

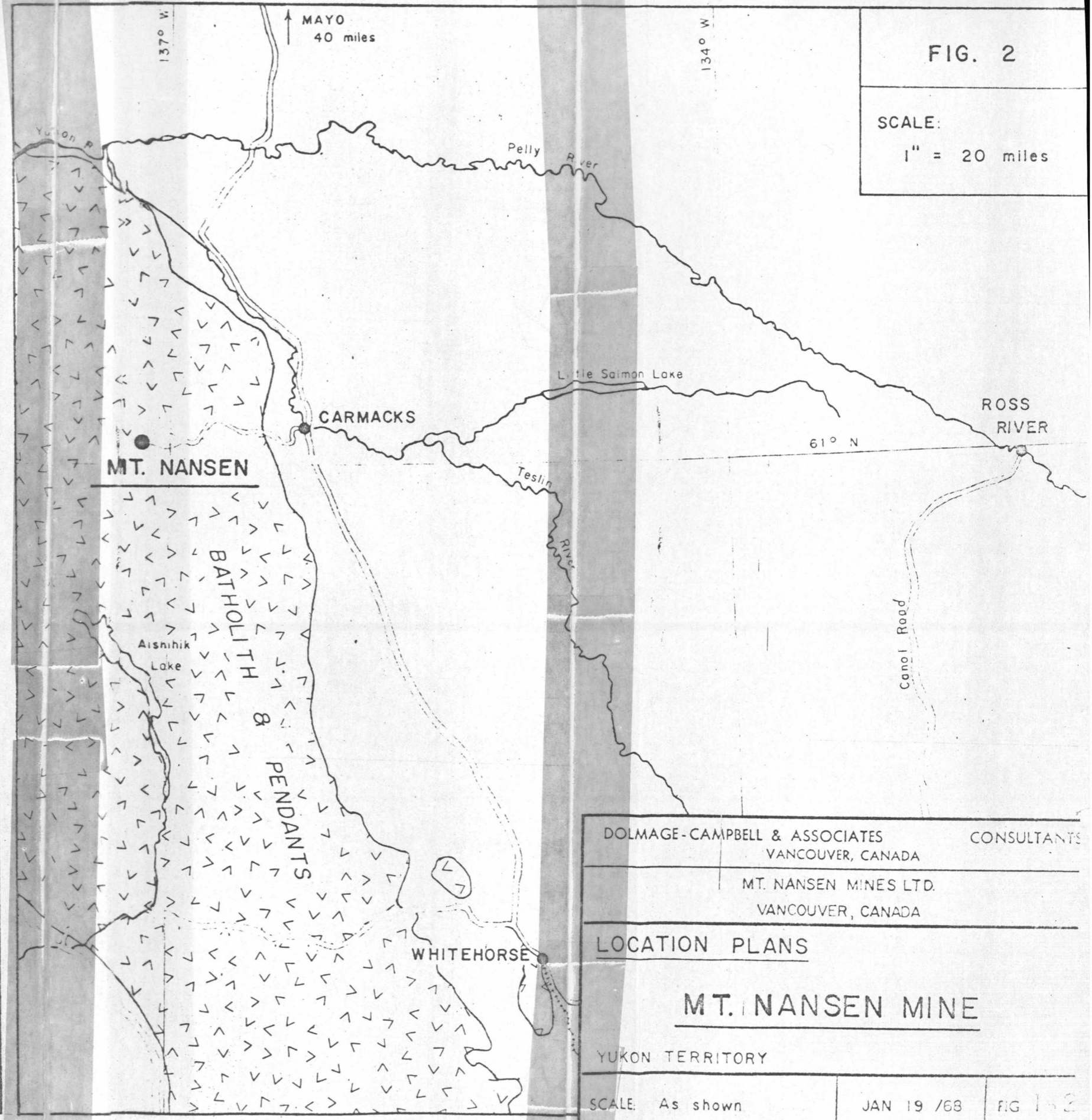
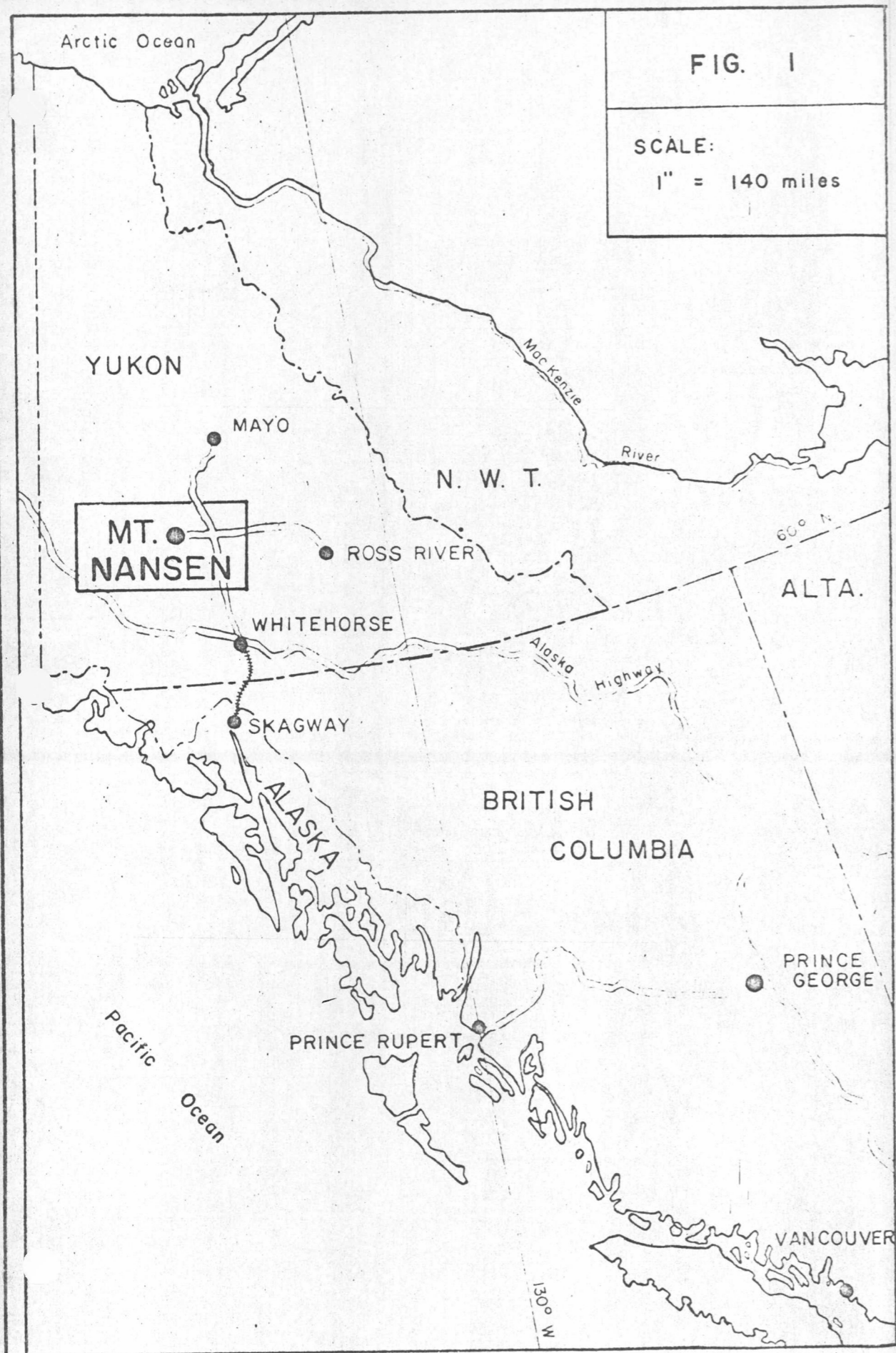
have promise of considerable profit. Also, more definitive development of the orebodies may well appreciably increase the grade of the Brown-McDade orebodies.

(4) CABIN CREEK VEIN:

Approximately 800 feet west of the Webber Vein Zone and parallel to it a strong vein structure has been exposed by surface stripping for a length of about 800 feet, 220 feet of which was cleaned off enough to sample by the Syndicate in 1963. The best portion of this sampling returned a length of 110 feet grading 0.23 oz./t. Au and 25.6 oz./t. Ag across an average width of 6 feet.

These showings were probed by diamond drill holes in the Fall of 1967. The vein proved to be persistent in width to the deepest intersection (100 feet) but core recovery in the vein was extremely poor, (less than 50%), and confined to pieces of vein quartz with some arsenopyrite. No ore values were intersected but the lack of good recovery practically eliminates the validity of the results.

It appears likely that the Cabin Creek Vein will provide an appreciable supplement to the Mt. Nansen production but it will best be explored and developed underground from the Webber workings.



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LOCATION PLANS

MT. NANSEN MINE

YUKON TERRITORY

SCALE: As shown

JAN 19 /68

FIG 1-2

ORE RESERVES

550 TON (LIVE LOAD)
COARSE ORE BIN

36" x 72" Vibrator Feeder

36" Conveyor

Grizzly 2" opening

Undersize

Oversize

18" x 32" JAW CRUSHER

24" Conveyor

24" Conveyor

3' x 8' Screen

Oversize

Undersize

5' SYMONDS CONE CRUSHER

18" Conveyor

18" Conveyor (shuttle)

250 T. FINE ORE BIN

250 T. FINE ORE BIN

18" Conveyor

18" Conveyor

7' x 60" BALL MILL

8' x 48" BALL MILL

750 UNIT CELL

750 UNIT CELL

3" x 3" Pump

3" x 3" Pump

12" Cyclone

12" Cyclone

CONCENTRATE

CONCENTRATE

Overflow

Underflow

Underflow

Overflow

6' x 6' Conditioner

6' x 6' Conditioner

ROUGHER FLOAT

ROUGHER FLOAT

CONCENTRATE

Tails

Tails

CONCENTRATE

CLEANER FLOAT

CLEANER FLOAT

CONCENTRATE

Tails

Tails

CONCENTRATE

Waste

THICKENER

Underflow

Overflow

Pump

STORAGE or TAILS

FILTER

36 TONS AU/AG CONCENTRATE

BIN

SCALE

Filtrate

STORAGE or WASTE

SCALE _____

INITIAL BULK CONCENTRATE

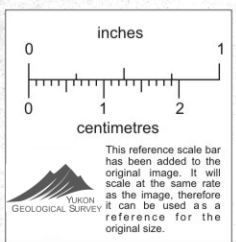
MT. NANSEN MILL

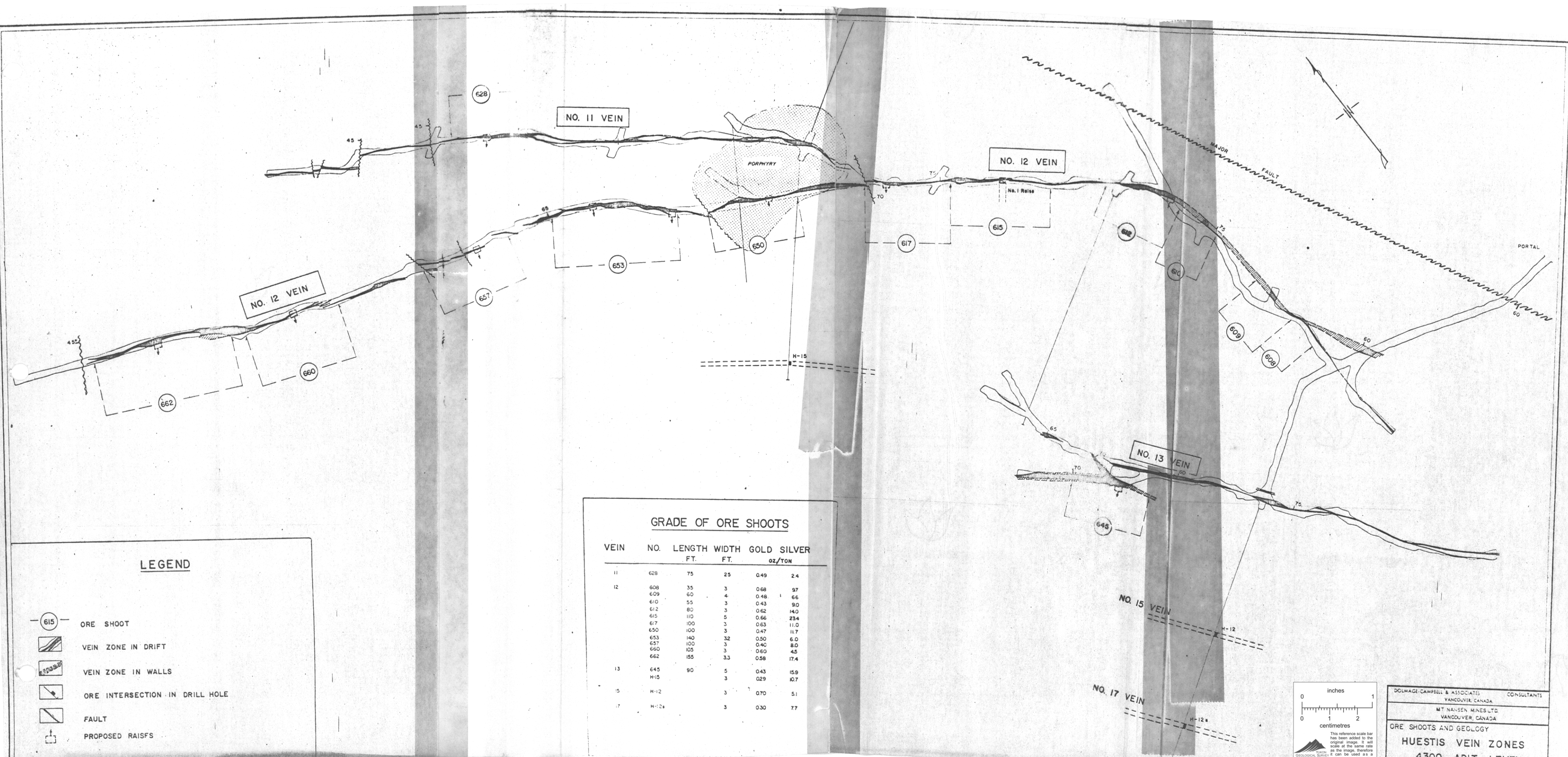
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VANCOUVER, B.C.

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VANCOUVER, CANADA
CONSULTANTS







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FIG. 8



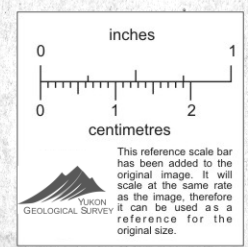


LEGEND

-  ORE SHOOT
-  VEIN ZONE IN DRIFT
-  VEIN ZONE IN WALLS
-  ORE INTERSECTION IN DRILL HOLE
-  FAULT
-  PROPOSED RAISFS

GRADE OF ORE SHOOTS

VEIN	NO.	LENGTH	WIDTH	GOLD SILVER		
		FT.	FT.	oz./TON		
11	628	75	25	0.49	2.4	
	12	608	35	3	0.68	97
		609	60	4	0.48	66
		610	55	3	0.43	90
		612	80	3	0.62	140
		615	110	5	0.66	234
		617	100	3	0.63	110
650	100	3	0.47	11.7		
13	653	140	32	0.50	6.0	
	657	100	3	0.40	8.0	
	660	105	3	0.60	45	
	662	155	3.3	0.58	17.4	
	H-15	90	5	0.43	159	
15	H-15	3	3	0.29	10.7	
	H-12	3	3	0.70	51	
17	H-12	3	3	0.30	77	









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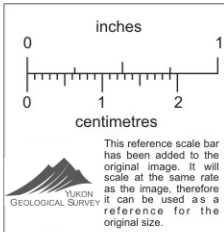
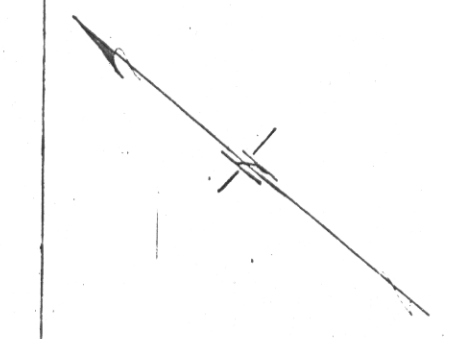
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ORE SHOOTS AND GEOLOGY
HUESTIS VEIN ZONES
4300 ADIT LEVEL

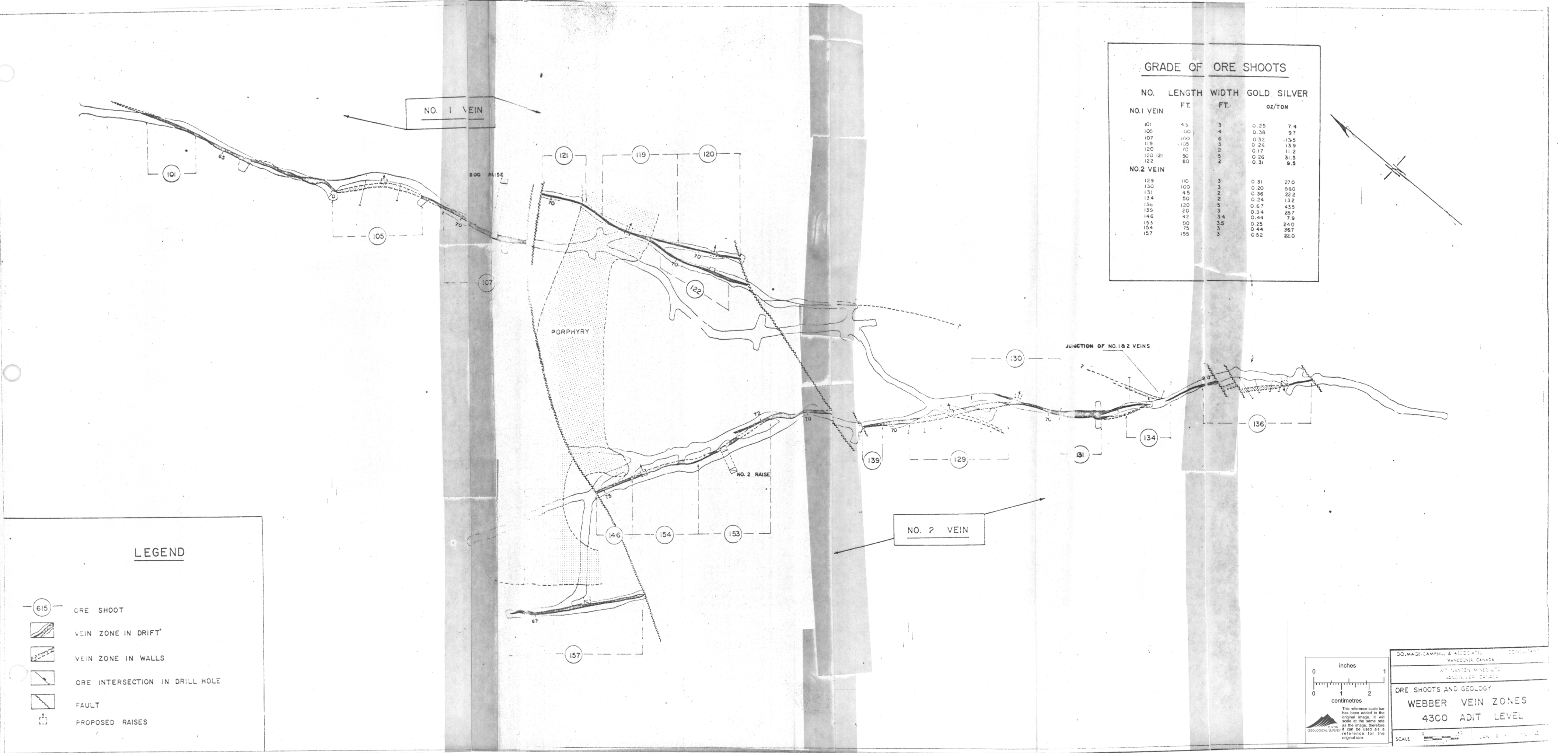
GRADE OF ORE SHOOTS				
NO.	LENGTH	WIDTH	GOLD SILVER	
NO.1 VEIN	FT.	FT.	oz/TON	
101	45	3	0.25	7.4
105	100	4	0.36	9.7
107	100	6	0.32	13.5
119	105	3	0.26	13.9
120	70	2	0.17	11.2
120 121	50	5	0.26	31.5
122	80	2	0.31	9.5
NO.2 VEIN				
129	110	3	0.31	27.0
130	100	3	0.20	56.0
131	45	2	0.36	22.2
134	50	2	0.24	13.2
136	120	5	0.67	43.5
139	20	3	0.34	28.7
146	42	3.4	0.44	7.9
153	50	3.5	0.25	24.0
154	75	3	0.44	36.7
157	155	3	0.52	22.0

LEGEND

-  ORE SHOOT
-  VEIN ZONE IN DRIFT
-  VEIN ZONE IN WALLS
-  ORE INTERSECTION IN DRILL HOLE
-  FAULT
-  PROPOSED RAISES



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 VANCOUVER CANADA
 MT. NENTEN MINES LTD.
 VANCOUVER CANADA
ORE SHOOTS AND GEOLOGY
WEBBER VEIN ZONES
4300 ADIT LEVEL
 SCALE 1" = 100'



ORE RESERVES

The majority of the ore reserves accumulated to date at Mt. Nansen have been indicated by underground workings, mostly drifting. Only at the Webber Mine have the surface stripping and sampling been so well done and comprehensive as to permit use in ore calculations.

For the ore reserves presented in this report three categories, proven, probable and possible, have been used and should be considered here in relation to the potential reserves that represent the very great lengths and depths of unexplored veins on the property.

CALCULATION PROCEDURES:

For purposes of this report the ore reserve categories are defined as:

Proven ore - Ore within 30 feet of completely exposed and sampled ore; whether drift, raise or on surface.

Probable ore - Ore within 30 feet of proven ore. Ore drilled off by test holes and partially exposed by drift or crosscuts (For 30 feet from the level). Ore within a 30 ft. radius of a diamond drill hole intersection.

In the case of the Webber zones, wherever the surface ore shoots match the underground shoots in position, grade, etc., as most of them do, the entire intervening section between the proven ore boundaries is categorized as probable ore. In most places this has been verified at least in part by overburden drill holes and, in the case of the main ore shoot, by a raise through to the surface.

Possible ore - Extensions of probable ore in well established ore shoots 60-100 feet to the proposed 4100 Level or to the surface.

Potential - Ore that will probably occur at depth and along the unexplored extensions of the known ore veins as well as on unexplored veins indicated by surface geochemical soil anomalies.

Sampling methods: A particular face sampling procedure has been followed throughout all of the underground work done at the Webber and the Huestis and is now the established method for the property. It has been verified as valid by

selected back-sampling done at different times by three different geologists representing three different companies. The sampling procedure was derived as follows: Initially each face was sampled wall to wall by three channels cut at 6, 4 and 2 feet above track. Also, every round was muck sampled by taking a random handful from the top of every second or third car so that about a powderbox of sample was garnered to represent the round. After 200 feet of ore was drifted it was found that the erratics expected in the ore did not occur and that for most faces the three channels would be about the same. Check calculations indicated that if any two channels per face were used for calculations the average of the ore section was essentially the same as if the three channels were used. With this confirmation sampling was then decreased to two channels per face, at 2.5 and 5 feet above track.

In both the Webber and the Huestis zones metallurgical assaying of bulk samples taken as raise and drift rounds, has confirmed the earlier face sample average grades exactly. In addition, in all orebodies, where the muck samples can be weighted by the known dilution the results generally correspond well with the face samples. One example is a section of No. 2 (n) Vein 20 feet in length which was first test holed then drifted, with the following average assay results:

	Au (oz./t.)	Ag (oz./t.)	Width (ft.)
Test Holes	0.18	18	3
Face Channels	0.34	28.7	3
Muck samples (6 ft. drift)	0.27	18.6	6
Corrected mucks	0.54	37.2	3

This example is given because it is one of the few places where the test holes have been drifted out to provide correlation of all types of samples.

Grade determination: In calculating the average grades for each underground ore shoot the following procedures have been followed for this report. High assays have been cut only where they are obviously erratics and in so doing they have been cut to 1 oz. Au and 100 oz. Ag. This actually has been infrequent because high assays generally occur in a series of faces and obviously represent a particular high grade section of ore. It was also found that in those cases where the two channels from one face are widely separated in values, their uncut average is invariably close to the average of the ore shoot. Barren sections within an ore shoot at Mt. Nansen are uncommon to rare.

In calculating the grade of an ore shoot the two channel samples for each face were averaged for all faces within the shoot. These averages were then weighted to a common mining width determined by the assay boundaries and the mapping and in all cases taking in at least 20 percent dilution, thus the ore reserves as presented are adjusted for mining dilution. All the face averages were then averaged to produce

a grade for that particular ore section. These averages were then applied to the respective tonnages calculated for each section and the resultant grades were weighted by the tonnages to produce a total grade for the total reserves.

RESULTS: (Ore Reserves)

Using the above-described procedures the ore reserve calculated for the Webber, the Huestis and the Brown-McDade are presented in Tables 2,3 and 4 at the end of this section of the report. The summary of these calculations is shown on Table 1.

The total proven and probable ore indicated on the Mt. Nansen property as of Dec. 31, 1967, is:

183,755 tons @ 0.46 oz./t. Au and 16.0 oz./t. Ag.

The total possible ore is:

117,055 tons @ an approximate grade of 0.44 oz./t. Au and 16.4 oz./t. Ag.

Of this ore about 2/3 of the proven-probable and 1/4 of the possible are readily available above the existing levels.

The most significant figures in these reserves are those for the Webber and the Huestis because most of the definitive underground development has been done at these mines. Thus the critical reserve figures from the Webber and Huestis are:

Proven-probable -	130,225 tons @ 0.467 oz./t. Au and 18.38 oz./t. Ag
Possible -	100,045 tons
TOTAL	<u>230,270 tons @ 0.467 Au 18.38 Ag</u>

This figure represents the source of the first two year's production from Mt. Nansen. The introduction of Brown-McDade ore to the mill will depend on future development results. It is on the above figures that the feasibility of the initial mill at Mt. Nansen depends.

At a milling rate of 250 tons per day the above Webber-Huestis reserves will guarantee production for approximately 3 years. With the inclusion of Brown-McDade reserves plus the results of the 1967 geochemical soils survey it is evident that there is sufficient ore potential at Mt. Nansen to sustain the 250 ton mill for at least 10 years. In all probability, increase of the ore reserves through exploration and development will justify a significant increase in the mill rate within 1-3 years.

BROWN-McDADE - Because the ore reserve data from Brown-McDade is not as

firmly established as those from the Webber and the Huestis no plans or sections have been presented for it in this report. Some discussion of this deposit is therefore necessary in order to clarify its significance to the property. At this time, for instance, some excellent surface sampling results cannot be correlated with underground because they are beyond the underground workings. Drilling has been sparse, erratically located and all core recovery has been very poor so that drill results, both good and bad, are difficult to assess. Underground, because the drift rarely entirely exposes any orebody, grades have to be calculated from mixtures of new wall samples, old back samples, and various drill holes.

With appreciation of the above limitations a preliminary estimate of ore reserves at Brown-McDade has been made to serve as a guide to the weighting of this property relative to the Webber and Huestis. Much more work is required to properly assess the Brown-McDade deposits but results to date certainly indicate that such work is very definitely warranted. Several orebodies have been well exposed and sampled in the Brown-McDade drift and have been intersected within 40 feet above and below the drift by limited drilling. These are considered here to be "proven" ore. Where ore has been partially outlined underground by crosscuts and drill hole it is considered "probable". A distance of 30 vertical feet has been taken on either side of the level for tonnage calculations.

The main significance of the Brown-McDade deposit is its tonnage potential. Although relatively low grade the orebodies are wide and closely grouped so that high tonnages are accumulated in a very limited extent of workings. The tons of ore indicated per lineal foot of drift at Brown-McDade is approximately four times that at Huestis or Webber. In addition to the 54,500 tons of ore given above as fairly well established are at least 60,000 tons of ore indicated by surface exposures and deep drill holes. These tons will be quickly confirmed by a relatively small amount of development.

TABLE 1

MT. NANSEN ORE RESERVES (1967)

	Category	Tons	Au oz/t.	Ag oz/t.	
<u>WEBBER</u>	Proven	32,245	0.42	23.8	
	Probable	39,635	0.39	22.3	
	SUB TOTAL	71,880	0.40	23.0	
	Possible	47,875	0.37	23.8	<u>119,755 T @</u> 0.39, 23.3
<u>HUESTIS</u>	Proven	20,775	0.55	13.0	
	Probable	37,570	0.55	12.5	
	SUB TOTAL	58,345	0.55	12.7	
	Possible	52,170	0.52	10.8	<u>110,515 T @</u> 0.54, 11.8
<u>BROWN- McDADE</u>	Proven	16,380	0.50	6.6	
	Probable	26,720	0.51	6.1	
	SUB TOTAL	43,100	0.51	6.3	
	Possible	11,440	0.44	6.6	<u>54,540 T @</u> 0.49, 6.4
<u>CABIN CREEK</u>	Probable	10,430	0.23	25.6	
	Possible	5,570	0.23	25.6	<u>16,000 T @</u> 0.23, 25.6

TABLE 2

WEBBER MINE ORE RESERVES

Dec. 31, 1967

	Vein	Orebody	Width (ft.)	Au (oz./t.)	Ag (oz./t.)	Tons	
<u>PROVEN ORE</u>	1	101	3	.25	7.4	705	
	1	105	4	.42	54.0	365	
	1	107	6	.43	23.5	10,800	
	1AN	121	5	.41	34.6	2,500	
	1AN	119	3.3	.30	11.2	2,585	
	1AS	120	2	.17	11.2	730	
	1 BS	122	2	.22	10.9	885	
	1CS		3.5	.40	11.8	595	
	1AS		2.5	.37	15.4	1,040	
	1AS	136	4.5	.64	36.2	3,910	
	1AS	South end	4.5	.32	9.2	940	
	2NA	157	3	.52	22.0	2,420	
	2N	146	3.4	.44	7.9	745	
	2N	154	3	.43	60.0	400	
	2N	153	2.5	.43	37.3	160	
	2N	139	3	.34	28.7	315	
	2S	130	4.6	.37	30.5	2,160	
	2S	131	2	.36	22.2	470	
	2S	134	2	.24	13.2	520	
	<u>TOTAL PROVEN</u>				0.42	23.8	32,245
	<u>PROBABLE ORE</u>	1	101	3	.25	7.4	350
		1	105	4	.39	14.0	3,020
1		107	6	.32	13.5	1,330	
1AN		121	5	.43	35.0	4,000	
1AN		119	3	.36	12.2	4,225	
1AS		120	2	.17	11.2	1,090	
1BS		122	2.5	.43	12.5	2,900	
1CS			3.5	.40	11.8	595	
1AS			2.5	.37	15.4	1,040	
1AS		136	4	.58	29.6	4,955	
1AS		South end	4.5	.32	9.2	940	
2NA		157	3	.52	22.0	2,420	
2N		146	3.4	.44	7.9	370	
2N		154	3.1	.33	17.3	3,270	
2N		139	3	.34	28.7	315	
2N		129	3	.31	27.0	1,720	
2S		130	3	.32	37.6	5,585	
2S		131	2	.36	22.2	470	
2S		134	2	.24	13.2	1,040	
<u>TOTAL PROBABLE</u>				0.39	22.3	39,635	
<u>TOTAL PROVEN-PROBABLE</u>				0.40	23.0	71,880	

TABLE 2 (Cont.)

WEBBER ORE RESERVES

<u>Vein</u>	<u>Orebody</u>	<u>Width (ft.)</u>	<u>Au (oz./t.)</u>	<u>Ag (oz./t.)</u>	<u>Tons</u>
<u>POSSIBLE ORE</u>					
1	101	3	.25	7.4	705
1	105	4	.38	9.7	2,050
1	107	6	.32	13.5	5,840
1AN	121	5	.26	31.5	2,170
1AN	119	3	.26	13.0	2,740
1AS	120	2	.17	11.2	1,220
1BS	122	2	.22	10.9	1,480
1CS		3.5	.40	11.8	1,190
1AS		2.5	.37	15.4	2,090
1AS	136	5	.67	43.5	5,220
1AS	South end	4.5	.32	9.2	1,880
2NA	157	3	.52	22.0	6,850
2N	146	3.4	.44	7.9	1,240
2N	154	3	.44	36.7	1,960
2N	153	3.5	.25	24.0	2,470
2N	129	3	.31	27.0	3,730
2S	130	3	.20	56.0	3,390
2S	131	2	.36	22.2	780
2S	134	2	.24	13.2	870
<u>TOTAL POSSIBLE</u>			<u>.37</u>	<u>23.8</u>	<u>47,875</u>

TABLE 3

HUESTIS MINE ORE RESERVES

Dec. 31, 1967

Tonnage factor = 11.5 cu. ft./t.

Dilution included in widths

	Vein	Orebody	Width (ft.)	Au (oz./t.)	Ag (oz./t.)	Tons	
<u>PROVEN ORE</u>	11	628	2.5	.49	2.4	980	
	12	608	3	.68	9.7	545	
	12	612	3	.62	14.0	1,250	
	12	615	4.6	.62	21.3	4,300	
	12	617	3	.63	11.0	1,565	
	12	650	3	.47	11.7	1,565	
	12	653	3.2	.50	6.0	2,340	
	12	657	3	.40	8.0	1,570	
	12	660	3	.60	4.5	1,640	
	12	662	3.3	.58	17.4	2,670	
	13	645	5	.43	15.9	2,350	
	<u>TOTAL PROVEN</u>				<u>.55</u>	<u>13.0</u>	<u>20,775</u>
	<u>PROBABLE ORE</u>	11	628	2.5	.49	2.4	2,450
12		608	3	.68	9.7	545	
12		609	4	.48	6.6	1,250	
12		610	3	.43	9.0	860	
12		612	3	.62	14.0	2,090	
12		615	5	.65	22.4	6,930	
12		617	3	.63	11.0	5,220	
12		650	3	.47	11.7	2,385	
12		653	3.2	.50	6.0	3,500	
12		657	3	.40	8.0	2,350	
12		660	3	.60	4.5	2,460	
12		662	3.3	.58	17.4	4,005	
13		645	5	.43	15.9	3,525	
<u>TOTAL PROBABLE</u>				<u>.55</u>	<u>12.5</u>	<u>37,570</u>	
<u>TOTAL PROVEN-PROBABLE</u>				<u>.55</u>	<u>12.7</u>	<u>58,345</u>	

TABLE 3, (Cont.)

HUESTIS MINE RESERVES

	Vein	Orebody	Width (ft.)	Au (oz./t.)	Ag (oz./t.)	Tons	
<u>POSSIBLE ORE</u>	12	H27	3	.86	14.4	3,440	
	12	612	3	.62	14.0	1,250	
	12	H22	5	.48	9.8	6,260	
	12	650	3	.47	11.7	4,700	
	12	653	3.2	.50	6.0	7,200	
	12	657	3	.40	8.0	4,820	
	12	660	3	.60	4.5	5,340	
	12	662	3.3	.58	17.4	8,900	
	13	645	5	.43	15.9	3,900	
	13	H15	3	.29	10.7	3,900	
	15	H12	3	.70	5.1	940	
	17	H12W	3	.30	7.7	940	
			Mill site	3.7	.57	5.7	580
	<u>POSSIBLE ORE</u>				<u>.52</u>	<u>10.8</u>	<u>52,170</u>

TABLE 4

BROWN-McDADE MINE ORE RESERVES
Dec. 31, 1967

Tonnage factor = 11.5 cu. ft./t.

Dilution included.

	Orebody	Width (ft.)	Length	Height	Au oz./t.	Ag oz./t.	Tons
<u>PROVEN ORE</u>	IN-1	8	155	70	0.67	5.1	7,550
	IS-1	5	125	60	0.53	4.8	3,260
	2N-1	4.1	125	90	0.26	10.0	4,020
	2S-1	5.4	55	60	0.21	9.2	1,550
<u>TOTAL PROVEN</u>					<u>0.50</u>	<u>6.6</u>	<u>16,380</u>
<u>PROBABLE ORE</u>	IN-2	6.7	55	60	0.56	3.0	1,920
	IN-1	8	155	110	0.67	5.1	11,850
	IS-1	5	125	60	0.53	4.8	3,260
	2N-1	4.1	125	60	0.26	10.0	2,670
	2S-1	5.4	55	60	0.21	9.2	1,550
	2S-2	10.5	50	60	0.34	8.4	2,740
	2S-3	6	55	60	0.29	8.5	1,720
	2S-4	3.5	55	60	0.49	3.3	1,010
<u>TOTAL PROBABLE</u>					<u>0.51</u>	<u>6.1</u>	<u>26,720</u>
<u>TOTAL PROVEN-PROBABLE</u>					<u>0.51</u>	<u>6.3</u>	<u>43,100</u>
<u>POSSIBLE ORE</u>	IN-2	6.7	55	60	0.56	3.0	1,920
	IN-1	8	155	20	0.67	5.1	2,150
	IS-1	5	125	25	0.53	4.8	1,370
	2N-1	4.1	125	20	0.26	10.0	890
	2S-1	5.4	55	25	0.21	9.2	650
	2S-2	10.5	50	60	0.34	8.4	2,740
2S-3	6	55	60	0.29	8.5	1,720	
<u>TOTAL POSSIBLE</u>					<u>0.44</u>	<u>6.6</u>	<u>11,440</u>

TOTAL BROWN-McDADE - 54,540 tons @ .49 oz./t. Au, 6.4 oz./t. Ag.

POTENTIAL ORE RESERVES

In all of the underground development done at Mt. Nansen new ore has been indicated or proven with no limits established in the distribution of orebodies or the continuity of the ore structures either laterally or at depth. Good intersections returned by the two deep holes that have been drilled at each of the three mines strongly suggest continuity of ore to a depth of at least 500 feet. Thus the potential of the deposits remains excellent and no geological limits have yet been determined for the ore structures or the orebodies in them.

In addition to the most encouraging strengths and continuities of the ore structures and the ore shoots on them, as established in the underground workings, are the indications of extremely long extensions of the known structures, plus the existence of hitherto unknown ore structures, as indicated by the geochemical soils survey conducted in August-September, 1967, on the central 10 square miles of the Mt. Nansen property. Because of the profound importance of the results of this survey on the concept of future exploration and potential of the Mt. Nansen deposits it is discussed in considerable detail below:

GEOCHEMICAL SOILS SURVEY:

Most of the area of the Mt. Nansen claims is underlain to depths of from 25 to 75 feet by a blanket of frost-broken and heaved moderately oxidized bedrock interspersed with silty matrix and ice. This in turn is covered by a thin layer of rocky humus supporting locally heavy growths of grass. The survival of vein material at the surface of this disturbed material and soil is negligible in most places, usually consisting of fine pieces of quartz from which all sulphides have been leached. In some places the veins can be traced by panning the soil but in general there is no evidence in the soil or the frost-heaved rock of any underlying veins. In bulldozer trenches positively identifiable vein material appeared at depths of about 5 feet below surface but vein that could be properly sampled was not reached until depths of 10 to 25 feet. Because of the permafrost and great depth of overburden the exploration for veins by bulldozer trenching at Mt. Nansen is slow and tedious if meaningful exposures are to be obtained.

Because of the above-described conditions a method of comprehensive, dependable and reasonably priced exploration had to be devised to properly evaluate the vast holdings of Mt. Nansen Mines Ltd. The aim of such exploration would be not only to trace known veins and to find new ones but also, if possible, to locate ore shoots on the veins. Upon consideration of all of the factors it was decided that geophysics would not be suitable but that geochemistry might be.

Early in the summer of 1967 a geochemical soils sampling program had been devised, tested and completed on the Arctic Mining and Exploration Ltd. property in the southern Yukon. Since the ore structures at Arctic are gold-silver-

quartz veins similar to those at Mt. Nansen and since the results of the soils survey at Arctic were most successful and encouraging the same type of survey was repeated at Mt. Nansen.

As a result of a detailed test program done at Arctic, verified by the subsequent survey there, the soils survey completed at Mt. Nansen was set up on lines laid out at right angles to the general northwest trend of the known ore structures. Most of the Mt. Nansen claims were soil sampled on lines 400 feet apart at a spacing of 50 feet between samples. Every other sample (at 100 feet intervals) was assayed and the intervening ones held for detailed work. Samples were assayed for silver and arsenic.

RESULTS:

Despite the fact that the arsenopyrite and silver contents of the Mt. Nansen veins are relatively low the results obtained over the known ore veins, particularly in silver, were reproducible and definite enough to permit the establishment of anomalous zones that apparently represent the extensions of the known veins as well as the presence of unknown veins. Generally the silver anomalies in areas of (known) strong vein structures are 100 to 400 feet in width, representing a broad dispersion in the soil above the veins. The arsenic anomalies are generally 50 to 200 feet in width and less common than the silver but because they are in the same positions as the silver anomalies they serve as local confirmation of the continuity of the anomalies.

The generalized anomalous zones obtained by the soils survey are shown on Figure 6 of this report. The area of this survey comprises approximately the central half of the total claim area controlled by Mt. Nansen Mines Ltd. When the areas of present exploration and underground development are noted on Figure 7 and their very limited extent is realized then the important significance of the great extent and number of soil anomalies can be fully appreciated. From the results of the survey, (Figure 7.), it is evident that the ore structures at Mt. Nansen occur as branching clusters grouped in two general belts which trend northwestward, one on each side of the Webber Ridge. It is of considerable geological interest that a series of intrusive rhyolite tertiary plugs crops out along the spine of this ridge, between the two belts of anomalies.

In detail the most important features of the soils survey anomalies are listed as follows:

- (1) The only anomalies from previously known veins are the five labelled on Figure 7; some 15 new vein structures have been indicated by the survey results.

- (2) The Webber vein zone appears to be the northern extension of the Huestis zone. The Huestis zone and branches of it, according to the soils anomalies, extends south of the mine for a distance of two and one half miles, with a significantly strong new structure appearing about 1000 feet to the west.

The total length of the Webber-Huestis vein zone is indicated to be three and one half miles.

- (3) About 1000 feet west of the Webber zone and parallel to it a series of complexly branching but silver-rich anomalies occurs as north and south extensions of the Cabin Creek vein zone. This system extends over one mile north of the Webber mine and one mile south.
- (4) The Brown-McDade vein system appears as the strongest and most persistent in the area, extending a distance of three and one half miles, and is comprised of a western branch (Brown-McDade) and an enclelon eastern branch (North McDade).
- (5) A large number of narrow but consistent anomalies occur between and on either side of the two major belts of anomalies.

Exploration by bulldozer stripping and follow-up drilling of the most significant soil anomalies will proceed outward from the existing mine workings during successive summer seasons. In addition, geochemical soil sampling will be extended to the limits of the property.

CONCLUSIONS:

It is evident from the encouraging results of the soils survey that the potential of the Mt. Nansen ore deposits could well be over 100 times that of the presently indicated reserves.

METALLURGY & MILL

METALLURGY

Metallurgical tests of the Webber-Huestis ores were done at the Britton Research Laboratories in Vancouver and have been under the guidance of Mr. S. Gray, consulting metallurgist, and Mr. J. Keyes, chief metallurgist for Mt. Nansen Mines Ltd. For these tests four bulk samples were taken from various places on the Huestis No. 12 Vein and five samples from the Webber No's 1 and 2 Veins. These samples were blended in order to obtain a grade as close as possible to the ore reserve grade for Webber-Huestis, 0.47 oz Au/t. and 18.4 oz Ag/t. Six tests were made, (152-1 to 152-6); one on a Huestis composite sample, two on a Webber composite sample and three on a blended Huestis-Webber sample. These samples assayed as follows:

	<u>Au (oz/t.)</u>	<u>Ag (oz/t.)</u>	<u>Pb (%)</u>	<u>Zn</u>	<u>As</u>
Webber	- 0.42	34.5	2.45	0.38	2.27
Huestis	- 0.50	29.1	0.50	0.81	4.25
Webber-Huestis	- 0.46	31.8	1.48	0.60	3.26
Reserve Grade	- 0.47	18.4	-	-	-

The test Webber-Huestis material is identical to the reserve grade in gold content but about 50% too high in silver, thus for concentrate grade calculations the silver contents have been adjusted accordingly in Table 5, which shows the Metallurgical Test Results of the best test (152-5) on the combined Webber-Huestis sample.

TEST RESULTS:

It has long been realized that the ores at Mt. Nansen present a very difficult metallurgical problem of recovery of the gold and the silver. Previous owners had dropped the Brown-McDade property because of the difficulties of recovery. It has been assumed that when Mt. Nansen would be brought into production the mill process at the mine would probably include cyanidation and roasting in order to effect the best recovery; however, the decision to bring the mine into production early in 1968 has necessitated the installation of the simplest mill and flowsheet possible to still provide a profitable concentrate without the use of cyanide or roasting. This has been necessary because there has been no opportunity to fully test the application of cyanidation or the use of roasting on these ores. Such testing is being organized now and will be well underway when the mill laboratory is completed.

Because of this decision, to begin production with a mill process that has not been perfected, a relatively low-return concentrate must be shipped initially. It must be appreciated that this state of affairs will be as temporary as possible and that marked improvement will probably be realized within two months of mill start-up; however, for the purposes of this feasibility report the low return concentrate has had to be used because it is the best available at this time and is a product that can be obtained with certainty.

Much of the difficulty in obtaining high recoveries of gold and silver from the ore is due to the fine grained character of the ore minerals in siliceous gangue; thus the -325 mesh fraction of the Huestis ore contains about 55% of the gold and silver, and the same fraction of the Webber ore contains about 65% of both metals. In addition, as is shown in Table 7, the best concentrate obtainable still has 20% silica in it. In all tests to date grinding has only been taken to -200 mesh, therefore it is reasonable to assume that the installation of a regrind mill in the flotation circuit will improve recovery and reduce the silica content.

The five concentrates and combinations of concentrates obtained from Test 152-5, as shown in Table 5, have a wide range in tonnage and gold-silver content. Choice of the optimum product is governed largely by the cost of transporting the concentrates to the smelter at Ronnskar, Sweden. (Because this smelter pays the highest price for gold and silver and puts no limit or penalty on arsenic content it is the most advantageous market at this time.) If the gross gold-silver values are calculated for the various concentrates then the high tonnage "bulk" concentrates are the most valuable in total; however, as shown in Table 6, when transportation costs (\$50/ton) of the extra tonnages are considered they offset the higher gross value in all but one case, the combined sulphide and oxide concentrates. This concentrate has therefore been chosen as the optimum product for this study and for initial mill production.

PRODUCT: Test 152-5, (1) + (3)

<u>Tons/d.</u>	<u>Au (oz/t.)</u>	<u>Ag (oz/t.)</u>	<u>Pb (%)</u>	<u>Zn (%)</u>	<u>Sb (%)</u>	<u>% of</u>	
						<u>Au</u>	<u>Ag</u>
<u>44.75</u>	<u>1.93</u>	<u>90.5</u>	<u>5.10</u>	<u>2.61</u>	<u>2.40</u>	<u>85</u>	<u>88</u>

Using this concentrate as a product for the initial production the sulphide and oxide cleaner tailings (Table 5) will be stockpiled until further research can be done to devise a system whereby they can be treated profitably. This stock piled material contains most of the values not recovered in the above concentrate. It is:

<u>Tons/d.</u>	<u>Au (oz/t.)</u>	<u>Ag (oz/t.)</u>	<u>Pb (%)</u>	<u>Zn (%)</u>	<u>Au</u>	<u>Ag</u>
37.75	0.25	8.6	1.6	0.14	9.1	7.1

PROCESS:

The milling procedures necessary to produce the above concentrates are simple; namely:

- 1) Grind to 64% minus 200 mesh
- 2) Float sulphides and clean
- 3) Condition sulphide rougher tailings with oleic acid and remove an oxide concentrate. Clean concentrate.

It is anticipated that perhaps by finer grinding and refinements in flotation and cleaning the recovery for this procedure will be improved once the mill is in operation. Tests made by cyaniding the ores and the products did not produce satisfactory results. Roasting tests have yet to be made but this process may prove to be a worthwhile procedure, particularly in view of the high transportation costs from Mt. Nansen.

MILL:

The mill flowsheet, as briefly described above, is shown in detail in Figure 8 of this report. The required mill and equipment, for 350 t/d. capacity, has already been purchased and is in the process of being shipped to the mine from Vancouver for immediate construction.

The mill is to be located at the lower (4100 level) portal of the Huestis (Figure 3) which will eventually serve as a main haulage level for both the Webber and the Huestis. Concentrates will be shipped in plywood containers by truck to Whitehorse, railway to Skagway, and ship to Sweden via Vancouver.

TABLE 5

METALLURGICAL TEST RESULTS
(250 T/d. feed)

Test 152-5

Product	Tons	oz/t.		Pb	% Zn As	
		Au	Ag		Zn	As
(1) Sulphide conc.	40.9	2.08	97.2	5.44	2.84	14.66
(2) Sulphide cleaner tails	23.6	0.30	10.5	1.63	0.15	1.79
(3) Oxide conc.	4.05	0.40	18.4	1.55	0.21	2.40
(4) Oxide cleaner tails	14.15	0.16	5.4	1.54	0.12	1.51
(5) Rougher tails	167.3	0.04	1.5	0.60	0.08	0.54
<hr/>						
(1)+(2) Sulphide conc.	64.4	1.43	65.6	4.04	1.86	9.95
(1)+(2)+(3) Bulk conc.	68.5	1.37	63.6	3.90	1.76	9.50
(1)to(4) Bulk conc.	82.5	1.16	53.8	3.49	1.48	8.13
* (1)+(3) Cleaner conc.	44.75	1.93	90.5	5.10	2.61	13.59
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METAL DISTRIBUTION (%)

CONCENTRATE	Tons	Au	Ag	As
(1)	40.9	82.8	86.4	78.5
(1)+(2)	64.4	89.7	91.8	84.1
(1)+(2)+(3)	68.5	91.3	93.4	85.4
(1)to(4)	82.5	93.5	95.1	88.2
* (1)+(3)	44.75	85	88	79.8
<hr/>				

TABLE 6

CONCENTRATE VALUE vs. TRANSPORTATION

Concentrate	Tons	Extra tons	Cost of extra tons	Gross Value Au Ag	Value less Cost of extra tons
(1)	40.9	-	-	\$11475	\$11475
(1)+(3)	44.75	3.85	\$ 193	\$11715	\$11522*
(1)+(2)	64.40	23.50	\$1175	\$12265	\$11090
(1)+(2)+(3)	68.50	27.60	\$1380	\$12470	\$11090
(1)to(4)	82.5	41.60	\$2080	\$12730	\$10650

Gross value at mine = Silver and gold content @ \$37/oz Au and \$2/oz Ag.

Freight cost (Mt. Nansen to Swedish Smelter) = \$50/ton. (approx.).

TABLE 7

MINOR METALS IN CONCENTRATE

Test 152-5 - (% of the conc.)

Copper	-	0.60	Silica	-	26.
Antimony	-	2.40	Sulphur	-	20.
Bismuth	-	0.005	Chlorine	-	0.06
Iron	-	20.	Fluorine	-	-

MARKETING OF CONCENTRATE

The only smelter that will take the high arsenic Mt. Nansen concentrates at this time without penalties is Ronnskar, Sweden. In the near future both Tacoma, Washington and/or Trail, B.C. may take such concentrates at reasonable penalties, in which case shipment may be transferred to them with a saving of about \$8 per ton on freight plus payment for lead and zinc of about \$15/t. At this time, for the purposes of this feasibility study, the value of the Mt. Nansen concentrate is taken to be as delivered to Ronnskar, Sweden, and is calculated as follows: (All in Canadian dollars.)

CONCENTRATE: Mill rate = 250 t/day

44.75 tons/day @ 1.93 oz/t. Au, 90.5 oz/t. Ag, 2.40% Sb.

CHARGES AND PENALTIES:

Freight (Mt. Nansen - Whitehorse @ 5¢/ton mile)	= \$ 7.50/t.
(Whitehorse - Vancouver, transfer and wharfage incl.)	= \$ 18.85
(Vancouver - Sweden)	= \$ 17.60
(Containers)	= \$ 4.00
	<hr/>
	\$47.95/ton = \$2,147.00

Smelting (\$16.10/ton)	\$ 720.00
Refining - Gold - \$21.50/payable Kg.	51.50
- Silver - \$1.07/payable Kg.	120.00
Antimony penalty (\$0.215/each 0.10% in excess of 0.60%/ton) = \$3.60/t	161.00
Marketing fee -	110.00
	<hr/>
	\$3,342.50

REVENUE: No payment for lead or zinc; Au = \$37.50/oz,
Ag = \$ 2.00/oz

Gold (98%)	\$3,150.00
Silver (97.5%)	7,900.00
	<hr/>
	\$11,050.00

NET SMELTER RETURNS: \$11,050.00
3,342.50

\$7,707.50/day

Profit at the mill per ton of ore mined @ 250-300 t/day = \$31/ton.

The above figures should be considered as minimal and will serve to start the Mt. Nansen operation. Considerable increase in revenue can be expected within 1-2 years from: (1) Improvement in mill recovery, (2) Reduction in freight cost for concentrate, (3) Increase in tonnage, and (4) Increase in price of silver. The principal of these factors is the improvement in mill recovery that will come once operating conditions are attained. It should be realized that to be sure of having a marketable concentrate of some kind by April, 1968, we are forced for this report to accept the best available process solely on the basis of the limited laboratory testing done to date. This now involves stockpiling 10 percent of the gold-silver values at the property as well as paying freight for shipping much waste material in the chosen concentrate. The ultimate target of improving recovery should be:

- 1) Investigations of finer grinding
- 2) Investigations with different reagents and flotation times.
- 3) Cyanidation of some products
- 4) Roasting

There is a reasonably good chance that a low tonnage (10), high grade concentrate similar to that produced at Arctic Mining & Exploration Ltd will be possible at Mt. Nansen. There is a chance that eventually two products can be produced, permitting the pouring of gold bricks on the property and the shipping of a very high grade silver-gold concentrate.

These ultimate goals are not unreasonable and should be born in mind when considering the relatively low initial returns from the operation. Further experiments in a test mill will be undertaken as soon as facilities permit and it could be that a major improvement in recovery may be affected soon after production begins. In the mill process used for the foregoing calculations, with the resulting concentrate being shipped, the 38 tons of material being stockpiled each day has a total value of \$1,000.00, for an equivalent of \$4.00 per ton of ore at 250 t/day. This should be ultimately recoverable. The most punishing cost is that of freight of concentrate which amounts to an equivalent of \$8.60 per ton; at least \$6.40 of that should be eliminated by an improved grade concentrate. Thus, improved concentrating in the mill could readily add \$10/ton to the net profit of the ore, making the total \$41/ton instead of \$31/ton.

COSTS

REPRODUCTION CAPITAL COSTS

Mt. Nansen Mines Ltd., is bringing the Webber and Huestis properties into production by summer 1968 on an intracompany financing advance of \$1.5 million. This capital advance will be repaid out of production in approximately 2 years, depending on the cash flow in the first year of production.

As of December 31, 1967, the following items necessary to bring the mine into production had been accomplished:

1. Road - All weather, graded, 40 mile haulage road built to Federal Government specifications, completed from the highway at Carmacks to the mill at the Huestis portal.
2. Mine plant - Approximately 10,000 feet of raises, drifts and cross-cuts on one level in both the Webber and the Huestis mines. Mine service buildings completed or in construction. Most of the mine equipment and surface mobile equipment on site.
3. Mill - Primary flowsheet established and the necessary equipment purchased. Foundations for building being prepared for erection to begin by February, 1968. Equipment to be installed in the late winter months.
4. Housing - Trailer camp presently being installed as permanent accommodation near millsite.
Permanent staff homes will be built at Carmacks to permit families to take advantage of school and other facilities there.

The preproduction and capital costs necessary to bring the Mt. Nansen Mine into production are taken as those being expended from June 1, 1967, to June 1, 1968. Any costs accruing after June 1, 1968, are considered as operating costs. The preproduction and capital costs are divided into two groups for the purposes of this report; those from June 1 to December 31, 1967, largely already spent, and those from January 1 to June 1, 1968.

Excluded from the mine preparation and exploration costs are the following expenditures which were specified as not to be included in the original budget:

(1) Administration costs	\$ 59,500.00	
(2) Huestis 4300 in excess of 800 ft.	39,317.81	
(3) Cabin Creek Vein diamond drilling	31,119.33	
(4) All geochemical costs	10,689.82	
(5) Road since June 1, 1967	<u>124,542.95</u>	
		<u>\$265,169.91</u>

EXPENDITURES JUNE - DECEMBER, 1967

Mine preparation and exploration \$390,596.81

Capital - Plant - Equipment

Mine Buildings	\$ 12,335.89	
Mine Equipment	105,179.62	
Mill Buildings	41,421.75	
Mill Equipment	222,034.02	
Well Site	1,987.68	
Townsite and Millsite	19,674.44	
Mobile Equipment	32,963.36	
Office & Engineering Equipment	709.05	
Camp Buildings	58,657.93	
Camp and Cookhouse Equipment	<u>6,945.53</u>	<u>501,909.27</u>
		<u>\$892,506.08</u>

ADDITIONAL EXPENDITURES JANUARY - JUNE, 1968

(1) Mine Development and Stope Preparation	\$288,524.00	
(2) Mine Services and overhead	180,000.00	
(3) Mine Plant and Equipment	175,050.00	
(4) Mill Buildings and Equipment	190,000.00	
(5) Mill overhead	5,000.00	
(6) Townsite	32,000.00	
(7) Administration	42,500.00	
(8) Water Supply (Pumped from Victoria Cr)	<u>95,546.00</u>	
	\$1,008,620.00	
Less road rebate (2/3 of \$300,000)	<u>- 200,000.00</u>	
	\$808,620.00	
Plus 10% for contingencies due to winter construction	<u>+ 80,000.00</u>	<u>\$888,620.00</u>
<u>TOTAL CAPITAL & PREPRODUCTION COSTS</u>		<u>\$1,781,126.00</u>

A detailed breakdown of each of the above items is included in the Appendix of this report. A number of items in our analysis have been added to, and some removed from, the list prepared by Mt. Nansen Mines Ltd., therefore the details in the Appendix are an important reference to permit appreciation of these revisions.

In the foregoing capital costs for January-June, 1968, saving can possibly be realized in the high contingency figure of \$80,000.00. Also, in view of the fact that full water supply will not be needed until early summer it may be advisable to consider postponing the very high cost of installing a pump and line from Victoria Creek until alternative sources of supply are investigated in the summer. Some saving can be realized by cutting down on mine development but it would have to be made up later.

In addition to the foregoing capital outlay there will be required enough funds to supply operating costs for about two months before financing can be obtained on concentrate shipments.

OPERATING COSTS

A summary of the Operating Costs at Mt. Nansen as calculated by Dolmage Campbell and Associates Ltd., from data supplied by Mt. Nansen Mines Ltd., for a production of 250 tons/day is:

Mining	9.57
Mine services and overhead	4.80
Milling	3.25
Head office costs	1.10
	<hr/>
TOTAL	\$18.72/ton
	<hr/>

The Operating Cost for 300 tons/day is estimated to be approximately \$17.80/ton.

The above costs are all those encountered in producing a marketable concentrate from the mill. Subsequent costs and charges are accounted for under Marketing to derive the net smelter return of the concentrate. In the operating costs the amount assigned to Head Office is very high for an operation of this size and should be carefully considered for possibility of reduction. All of the other costs have been estimated reasonably closely and may or may not be significantly reduced under operating conditions. Details as to the derivation of the Operating Costs are given in Appendix (2). The following general discussion of the costs will explain the assumptions on which the estimates were based:

MINE COSTS:

The essential particulars on ore production and mining methods are as follows:

Annual ore production	87,500 tons
Daily Mill Production	250
Mill operating days per year	350
Mine operating days	270
Daily Mine production	324 tons
Hours per week worked at mine	44
Number of shifts	2 (3 if required)

Mining Methods: Initial production is to be from the Huestis and Webber Vein Zones, the veins of which are generally relatively narrow, 2.5' to 5', with dips varying from 50° to 80° but generally around 70°. With few

exceptions reserves have been calculated for a minimum mining width of 3 ft. Ore shoots range in length from 25' to 220' but for estimating purposes an average stope length of 100' has been taken.

Stoping cost calculations are based on the application of cut and fill methods for all production. Shrinkage stoping is more economical but it is questionable if this method could be employed over such narrow stope widths where there would very likely be arching of the broken ore and possibly freezing for several months of the year.

Major production tonnages for the first year or two will be from the upper levels of the Huestis and the Webber veins and stopes are to be filled with material from the surface. Subsequently stopes below the 4300 ft level in the Huestis will be filled with de-slimed mill tailings and development waste.

Each stope will require a 5' x 7' raise driven to breakthrough in approximately the center of the block. This raise will serve to explore the ore shoot above the drift, ventilate the stope, and be used for filling. Timbered manways with slides are to be carried up at each end of the stope as mining and filling progresses, for ventilation, double access and air and water lines. Raise locations for the initial stopes are shown in Figures 4 and 5 accompanying this report.

For safety reasons and to cut down on the capital outlay for slusher hoists, tuggers, etc. it is proposed that two miners work in each stope. Drilling can be done on each side of the central raise but blasting would have to be programmed to ensure that one access raise is open at all times.

Taking the full cycle of drilling; blasting and scraping a lift, raising chute and manway timber and filling it is conservatively estimated that a production of 10 tons per manshift could be attained by the stope miners. On the basis of two shifts per day this gives a productivity of 40 tons per stope per day. To attain the required productivity of 324 tons per day a minimum of 8 working stopes is required. To allow for the fact that cut and fill stoping does not provide any storage of ore, and interruptions could occur provision should be made to develop 14 stopes 100 feet in length.

If it is found safe and practical to have one man working per stope it is recommended that 18 stopes be developed if access to orebodies permits.

Stope development raises should not be broken through to surface until immediately before stope production starts, thus minimizing freezing problems.

Initially it is planned to produce 124 tons per day from the Webber vein zone dump on a slab near the portal and load and truck it to the mill approximately one mile distant.

The remaining 200 tons per day is to be mined on the 4300 level of the Huestis, transferred through a raise to the 4100 level thence trammed beyond the portal to a hopper feeding a conveyor to the coarse ore bin.

Broken Ore Inventory

<u>Location</u>	<u>Tons</u>
Webber Dump	3500
Huestis Dump	3500
Webber and Huestis mine and stope dev .	10,000
	<hr/>
Total Broken Ore at Production Date	17,000
	<hr/>

MINE OPERATING COSTS:

This section includes all direct costs including wages, levies and bonuses and all equipment and supplies required to mine and deliver 87,500 tons of ore to the conveyor hopper from the Huestis and to the coarse ore bin from the Webber.

	<u>Amount</u>	<u>Cost per ton</u>
Exploration - (Drifts and crosscuts)	150,000	
Stope Development (includes raise, chutes, sill timber, take down back, raise bulkheads)	189,700	
Stoping (includes drill, blast, scrape, raise man- ways and chute raises, supply fill and scrape)	387,000	
Tramming	<u>61,300</u>	
SUB TOTAL	\$788,000	\$ 9.00

	<u>Amount</u>	<u>Cost per ton</u>
SUB TOTAL	\$788,000	\$ 9.00
Diamond Drilling	<u>50,000</u>	<u>.57</u>
<u>TOTAL MINING COSTS</u>		<u>\$ 9.57/ton</u>

MINE SERVICES AND OVERHEAD:

Mine Administration and Supervision	\$ 54,000	
General Office & Warehouse	23,640	
Engineering Geology Sampling and Assaying	53,964	
Mine Services	128,568	
Camp Services	148,896	
First Aid, Fire Protection, Freight	<u>9,504</u>	
SUB TOTAL	<u>\$418,572</u>	<u>\$ 4.80/ton</u>

CASH FLOW

CASH FLOW

Enough ore reserves have been well indicated at the Webber and Huestis mines of Mt. Nansen Mines Ltd. to assure 3 years of mill production at 250 tons per day. Possible and potential ore indicated by the underground development, the inclusion of the Brown-McDade and by the results of the geochemical soils survey suggest an ultimate life of production at 300 tons per day well in excess of 8 years.

The preproduction debt to the company will be retired by the initial cash flow as derived by marketing the large tonnage, "low yield" concentrate described in the Metallurgy section of this report. Improvements in the concentrate grade etc. will increase the cash flow very appreciably and in all probability the installation of a roaster will improve the recovery and cut transportation cost even more significantly; however, these changes will probably not be effective before the first year of production therefore the improvements they will make in the cash flow are not estimated at this time.

REVENUE: (From "Marketing of Concentrate" section of this report)

Low grade concentrate shipped to Sweden = \$31/ton of ore

(This figure is based on a price of \$2.00 (Can.)/oz. for silver; the current price is approximately \$2.25 (Can.)/oz.)

At 87,500 tons per year (250 t/day) the annual revenue for the operation will be:

\$2,713,000.00

COSTS: (From "Costs" section of this report.)

Costs per ton with concentrates in truck at mill = \$18.72/ton of ore

At 87,500 tons per year (250 t/d.) the annual costs, (not including capital pay-back), will be:

\$1,640,000.00

CASH FLOW:

Annual Revenue	\$2,713,000.00
Annual Costs	1,640,000.00
Net Revenue	<u>\$1,073,000.00 (Can.)</u>

The annual cash flow for the same concentrate at 300 tons/day production is:

Revenue -	105,000 tons x \$31.16	= \$3,270,000
Costs -	105,000 tons x \$17.80	= 1,870,000
		<hr/>
NET REVENUE		= <u>\$1,400,000</u> (Can.)

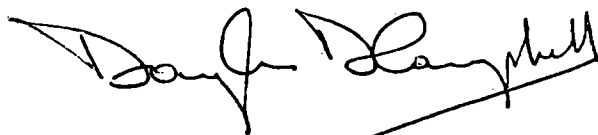
A production of 300 tons per day should be attainable by about 2 years production.

SILVER PRICE:

With the fluctuations in the price of silver, and its general upward trend, it is important to realize that even with the low grade concentrate used in this report the Mt. Nansen annual payable silver production will be 1,382,000 ounces. Thus, a \$0.10 per ounce increase in the price of silver increases the annual revenue of the Mt. Nansen operation, as calculated here for 250 t/day, by nearly \$140,000.00. An increase in the price to \$3.00 (Can.) per ounce will result in a net revenue increase of \$1,382,000.00.

Despite the fact that the Mt. Nansen operation will be put into production at a low metallurgical efficiency at this time it is evident that it will still be a very profitable operation and therefore economically feasible. There is good reason to expect that improvements in metallurgy, with or without the addition of a roaster, can be affected in the near future and will result in very appreciable increases in revenue for the operation.

Respectfully submitted,



Douglas D. Campbell, P.Eng., Ph.D.
per Dolmage-Campbell and Associates Ltd.,

Vancouver, Canada
January 19, 1968

APPENDIX

APPENDIX 1

CAPITAL AND PREPRODUCTION COSTS - Jan-June, 1968

Additional estimated expenditures required to prepare the mine for production:

1. MINE DEVELOPMENT AND STOPE PREPARATION

(a) Drifts and Crosscuts (7' x 8')

(i) Huestis

4100 Level - nil
4300 Level - 2000

(ii) Webber

4265 Level - 200

2200 ft @ \$40.00/ft - 88,000.00

(b) Transfer Raises (5' x 7')

Huestis

4100 to 4300 Level - 200

(c) Stope Preparation

Stope development raises
(5' x 7') in ore, timbered

(i) Huestis above 4300 level 1,370

(ii) Webber above 42 level 930

Total Raises 2,500 ft @ \$45.00 112,500.00

(d) Taking down back (2 lifts)

5,650 tons @ \$2.79/ton 15,764.00

(e) Stope Timbering

1,530 ft @ \$8.00/ft 12,240.00

(f) Chutes

19 at \$300.00 5,700.00

(g) Raise Bulkheads and Doors

18 at \$240.00 4,320.00

Note: Development costs include: Labour plus levies and bonuses, explosives, steel, bits, drill repair, hoses lubrication, track ties, pipe and tramping to the dump.

2. DIAMOND DRILLING

Underground 5000 ft @ \$8.00/ft 40,000.00

3. MISCELLANEOUS MINE INSTALLATIONS

Water and air lines, electrical distribution mechanical installations, slushers, fans, tuggers, etc. 10,000.00

4. MINE SERVICES AND OVERHEAD

Includes Management, Office, Mechanical, Electrical, Warehousing, Cookhouse, Bunkhouse, Engineering, Geology, Assaying, Mobile Equipment.
i.e. all costs not allowed for in unit prices 180,000.00

5. MINE PLANT AND EQUIPMENT

Mine Buildings and Installations

The following additional expenditures are necessary to complete the mine buildings:

Mine Dry	25,000	
Main Office	30,000	
Webber Ore Dump	5,000	
Garage	<u>8,000</u>	68,000.00

5. MINE PLANT AND EQUIPMENT (Cont .d)

Mine Equipment

Expenditures necessary for additional equipment
is as follows:

1 - 500 kw Diesel Generator	49,600	
10 - 7 H.P. Slusher Hoists	23,000	
13 - 26" Scrapers \$390/each	5,070	
10 - Tugger Hoists	11,000	
20 - 6" Sheave Blocks \$41/each	880	
7000 ft 3/8" cable	<u>1,000</u>	90,550

6. MOBILE EQUIPMENT

Additions to the loader	7,000	
Service Truck	4,500	
Ore Truck (trade in plus)	<u>5,000</u>	16,500

7. MILL BUILDINGS AND EQUIPMENT

Additional expenditures to bring
the mill into operation follows:

Shipping to site	10,000	
Reconditioning of equipment	45,000	
Additional purchases	35,000	
Concrete foundations, building) erection, equipment installation)	75,000	
Engineering	<u>25,000</u>	190,000

8. MILL OVERHEAD

Mill Manager (1/2 Arctic 1/2 Mt .Nansen)		
5 months		5,000

9. TOWNSITE

Additional building expenditures:

Cookhouse	25,000	
Recreation Hall (Moving)	2,000	
Additions to heating Plant	<u>5,000</u>	32,000

10. ADMINISTRATION

5 months @ \$8,500 .00 42,500

11. ROAD TO CARMACKS

Total expenditure approximately \$300,000
Estimated rebate from Federal
Government (200,000)

12. WATER SUPPLY (From Victoria Creek)

Well, pump, pumphouse, pipe
insulation, heating cable, tanks
purchase and installation 95,546

TOTAL OF ADDITIONAL CAPITAL EXPENDITURES
REQUIRED

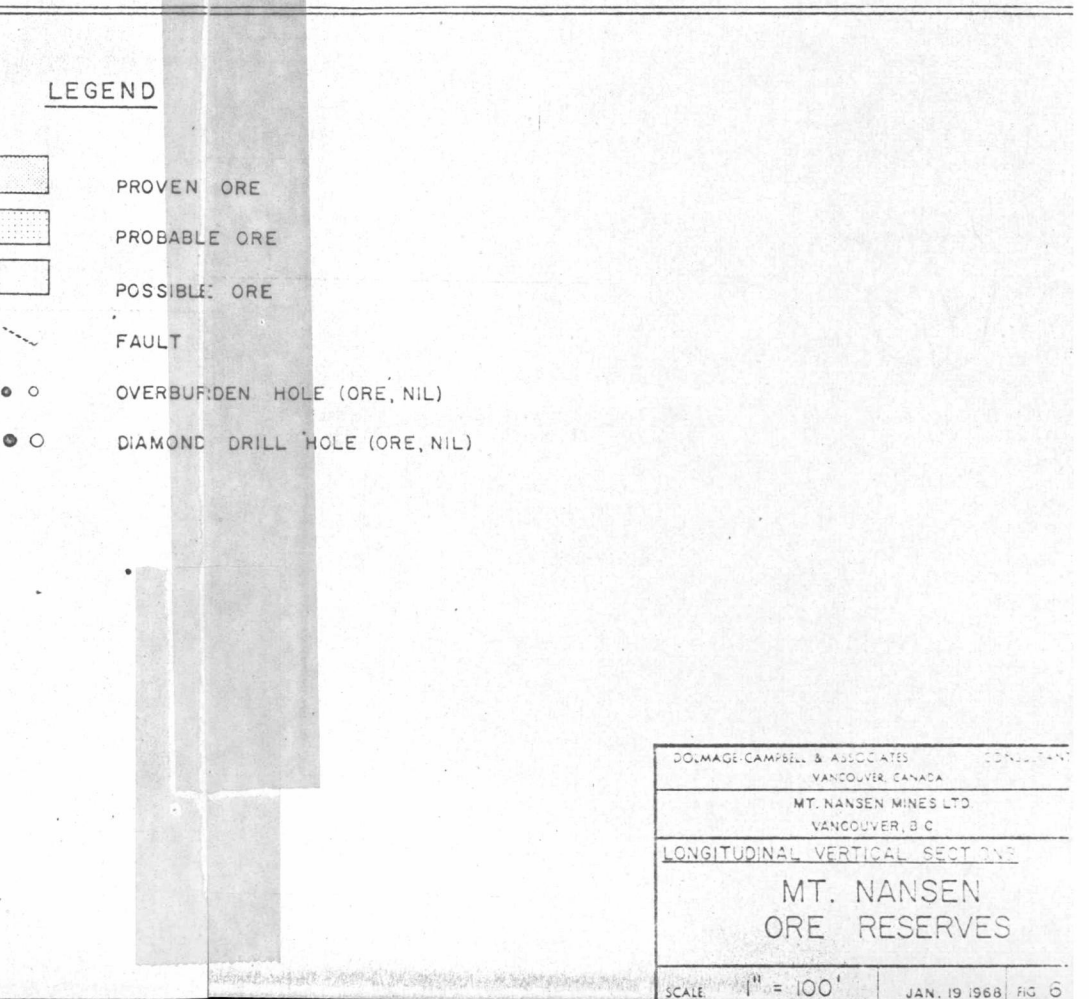
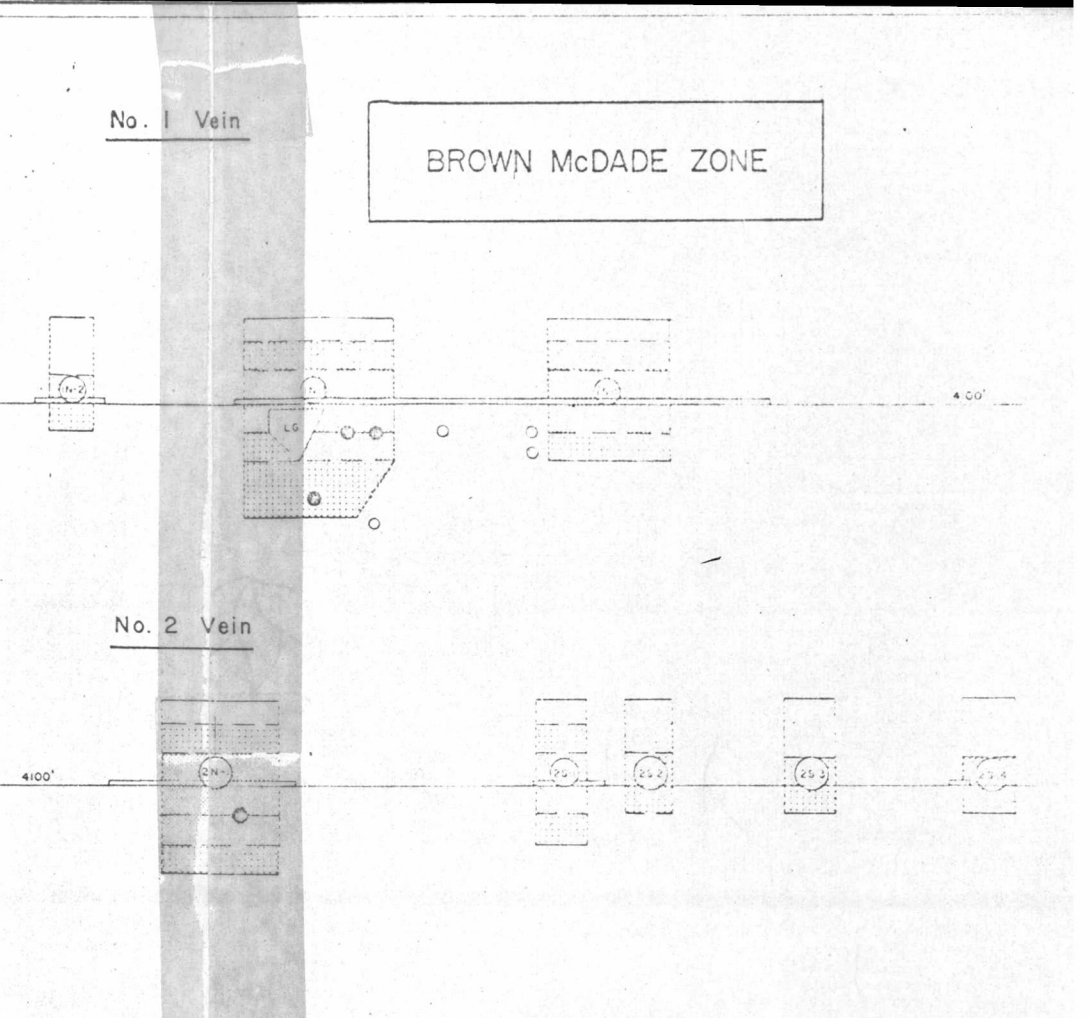
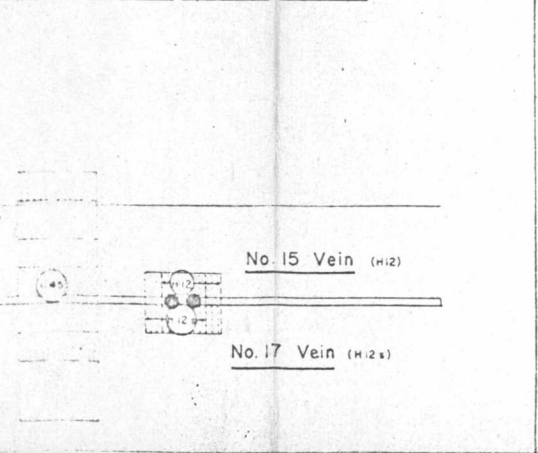
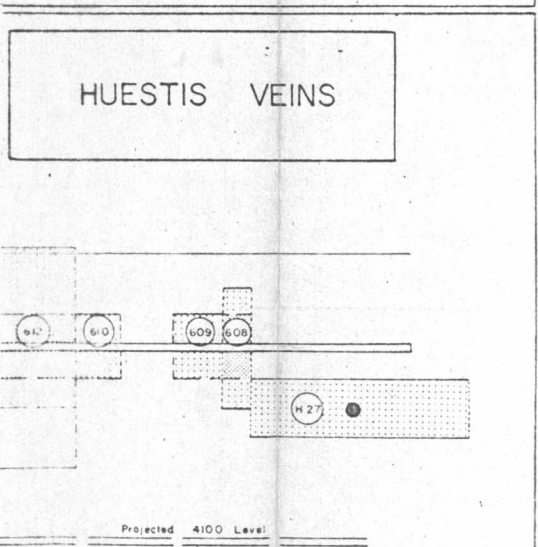
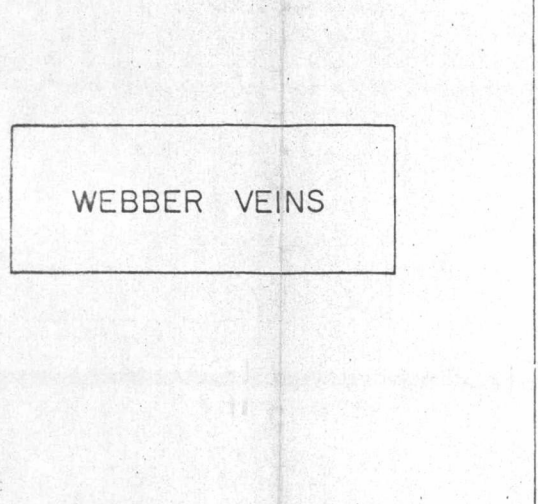
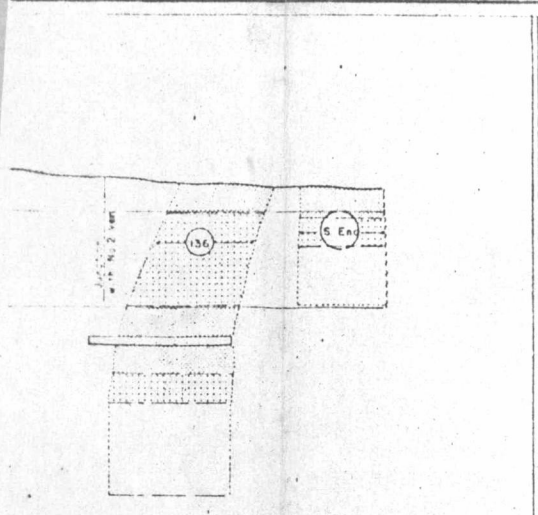
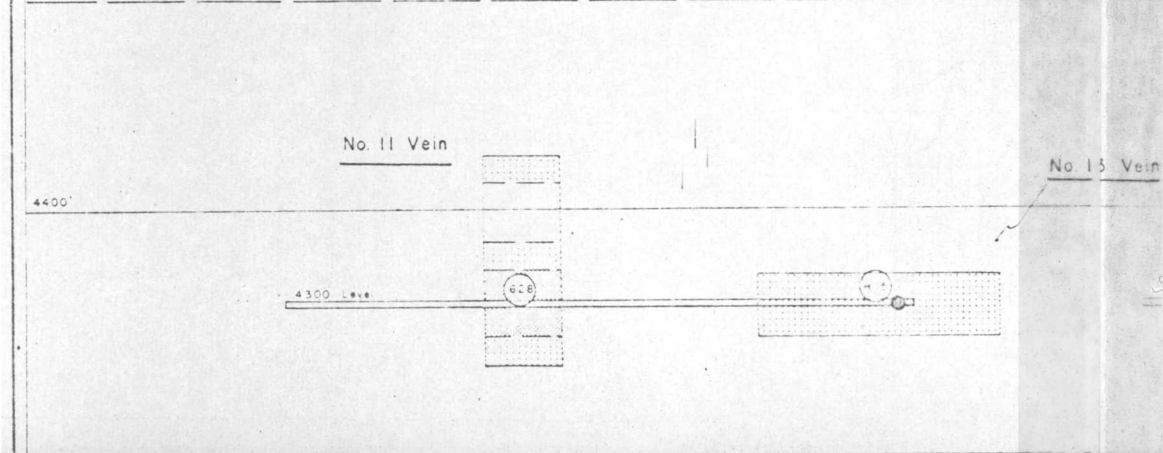
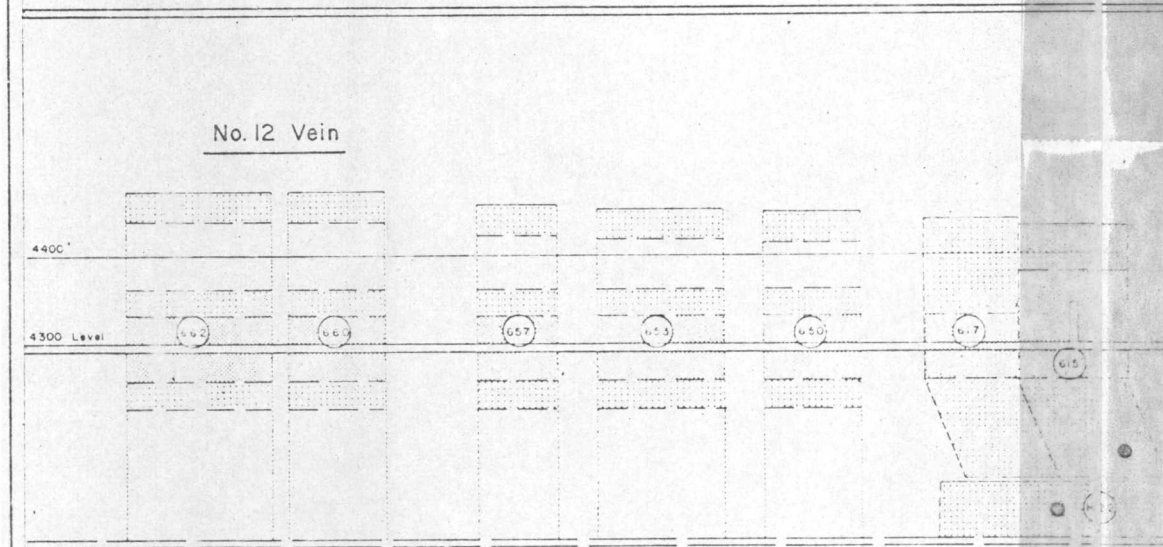
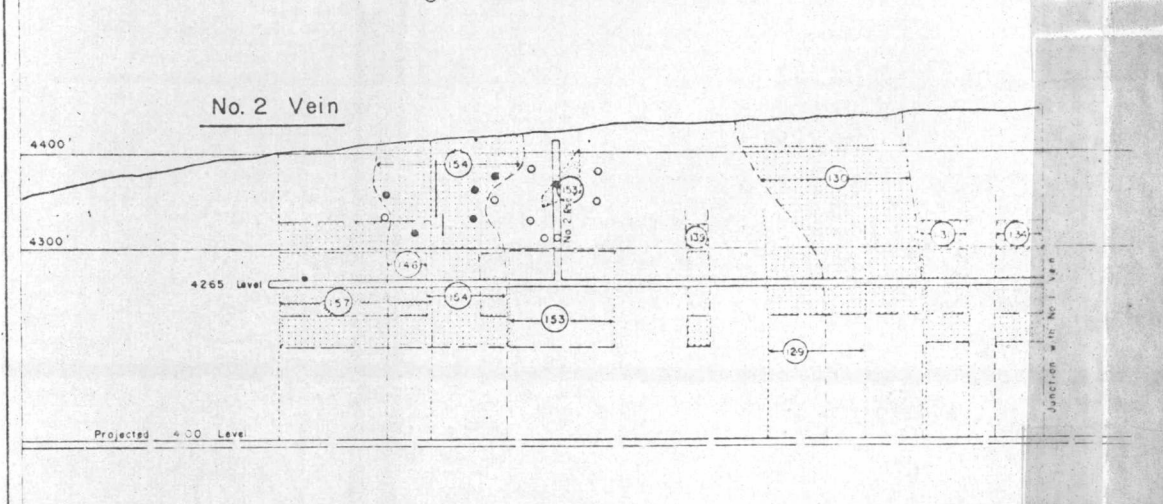
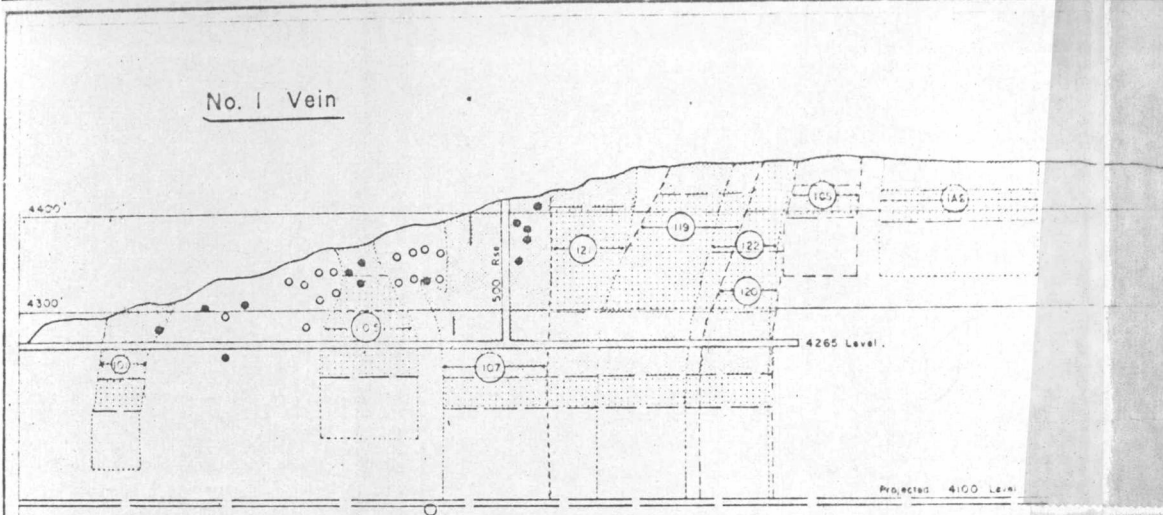
December 1 to June 1, 1968 to prepare Mine and Mill
for production \$808,620

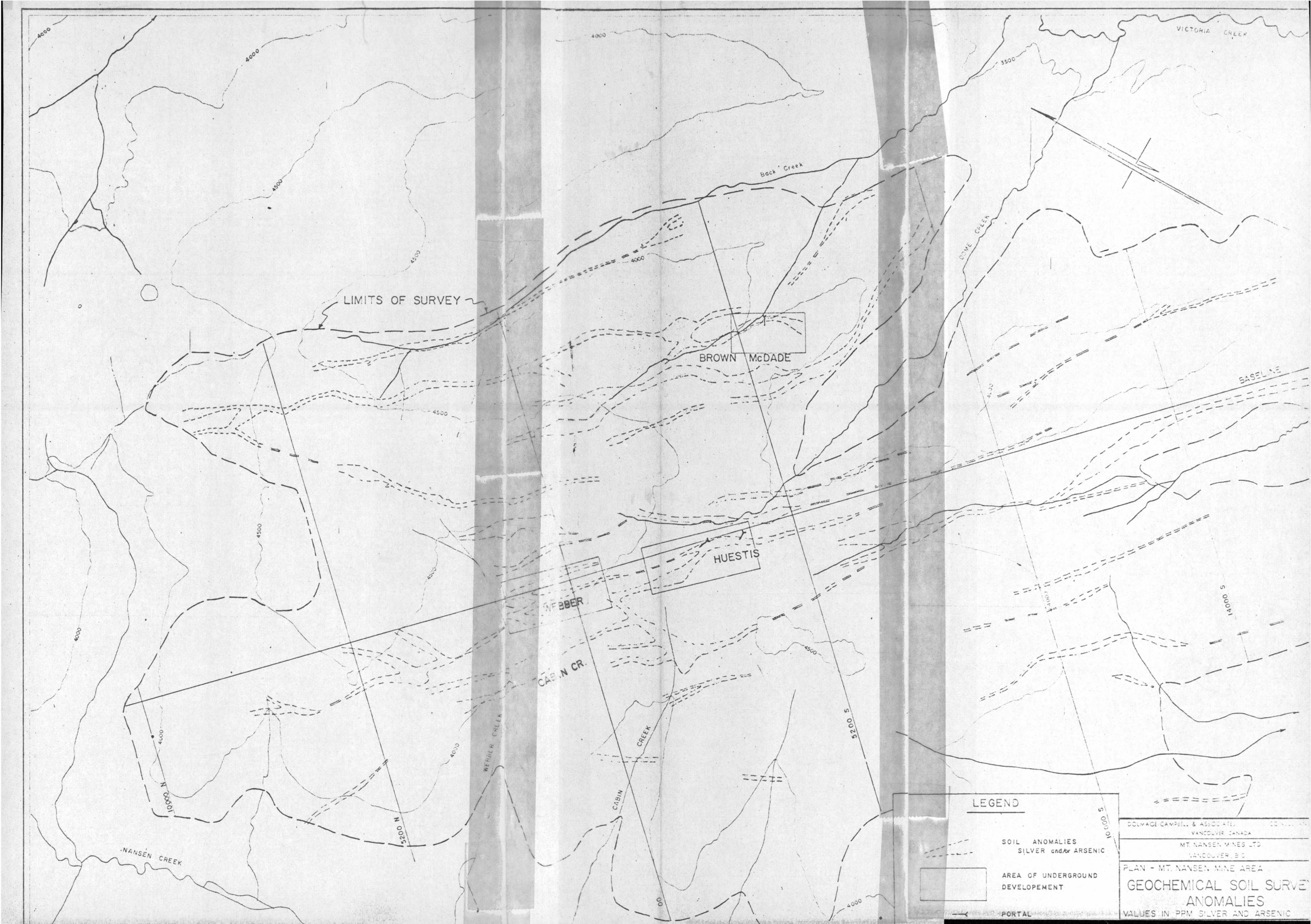
CONTINGENCIES 10% 80,862

GRAND TOTAL \$889,482


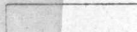

OPERATING COSTS

In the course of the compilation of this report the staff engineers of Dolmage Campbell and Associates Ltd., have accumulated a massive file of cost breakdown and calculations. It is not considered sensible to append all of this information to this report; however, because the calculations etc., may be of use for reference by the Mt. Nansen staff they will be compiled as a separate submission to Mt. Nansen Mines Ltd.,





LEGEND

-  SOIL ANOMALIES
SILVER and/or ARSENIC
-  AREA OF UNDERGROUND
DEVELOPMENT
-  PORTAL

DOLVAGE CAMPBELL & ASSOCIATES CONSULTANTS
VANCOUVER, CANADA
MT. NANSEN MINES LTD
VANCOUVER, B.C.
PLAN - MT. NANSEN MINE AREA
**GEOCHEMICAL SOIL SURVEY
ANOMALIES**
VALUES IN PPM SILVER AND ARSENIC