REPORT ON THE ASSETS, GOLD RESERVES AND ECONOMIC POTENTIAL OF THE JACKSON HILL PROPERTY

Dawson Mining District
Yukon

N.T.S. 116 B/3

64° 1.5' N., 139° 21.5' W.

for:

Cheers International Telemarketing Ltd.

880-1500 West Georgia Street

Vancouver, B.C.

V6G 2Z6

American Highland Mining Corp
89-064

by:

John Ostler: M.Sc., P.Geol.

Consulting Geologist

November 7, 1989

REPORT ON THE ASSETS, GOLD RESERVES AND ECONOMIC POTENTIAL OF THE JACKSON HILL PROPERTY

SUMMARY

The writer was retained by Cheers International Telemarketing Ltd. of Vancouver, B.C. to examine the Jackson Hill property and report on its plant, equipment, gold reserves and economic potential. The writer examined the property from October 18 to 20, 1989.

The Jackson Hill property is located about 6 km (3.7 mi) southeast of Dawson City, Yukon. It comprises 58 placer claims covering about 110 ha (264 A) located in the Dawson Mining District. The main mine workings are centred on 64° 1.5' N. and 139° 21.5' W.

The main placer drift mine workings are located in a hydraulic pit on the southern part of the property. There, a Tertiary-age high-level channel of Bonanza Creek has been preserved from recent erosion.

The property is owned 60% by Gustav Heitmann and 40% by Walter Hinnek; who leased it to Universal Explorations Ltd. in 1979 for $100,000 and a 10% production royalty. Jackson Hill Mining Limited bought Universal's lease in 1986 for $1,000,000 representing $600,000 for plant that had been erected since 1980 and $400,000 for the leases themselves. It is the writer's understanding that this lease and equipment is being acquired by the company.

There is a substantial amount of plant and equipment on the property including: a pump and water pipeline, sluicing plant, heavy mining machinery and light trucks, camp and supplies.

The current in-place value of these assets on the property is estimated to be $1,215,657. The replacement value would be much higher.

Most of the area containing the Klondike goldfields including the property is underlain by Palaeozoic-age metamorphic rocks of the Yukon Group.

These rocks were eroded during a long weathering period during Tertiary time. Then, a great thickness of rock was weathered and completely washed away leaving an accumulation of vein quartz cobbles, the White Channel gravel and its high content of native gold. This gravel was the source of most of the gold produced from the Klondike goldfields including that mined on the property.

More recent streams have cut into White Channel gravel redistributing the gold in their own sediments. Jackson Creek which flows across the north-central part of the property is a good example.

Gold from the property is flat nuggets and flakes up to 4 cm long, averaging about 4mm long. These nuggets and flakes have been folded, flattened and hammered down.

As early as 1907, it was well-known that almost all of the gold occured in the basal 6 ft of the White Channel gravel in the workings on the southern part of the property. Although hydraulicking was cheaper per cubic yard mined, it produced little more gold than drift mining despite the hugh amount of gravel that hydraulic operations moved.

Both hydraulicking and drift mining has been conducted on the southern part of the property since the early 1900's. Recent advances in trackless underground mining methods have made that the preferred method of mining on the property.

The underground drift mine on the property has been operating contunually since 1982.

A form of unsystematic room and pillar mining is employed in the drift mine in which prospect drifts are driven out to find the best pay gravel. From these radiating drifts, cross-cuts are excavated and pillars isolated. Finally, pillars are slashed to a minimum size. In all, about 87% of the pay gravel is taken out.

Mining is done during winter when permafrost can be maintained in the tunnels. The ice in the gravel sticks it together and holds the roof up. In the summer, the gravel is sent through a large sluicing plant to recover the gold. The placer gold recovered from this mine is about .836 fine.

From 1982 until 1989, the operators have mined a total of 290,488 yd^3 of pay gravel from the drift mine yielding 14,852.5 ounces of .836 fine placer gold containing 12,417 troy ounces of .999 fine gold. At current prices, the 1982-9 gold production from the mine would be worth about $5,463,480.

Underground reserves contain an estimated minimum recoverable volume of 55,700 yd^3 of gravel containing about 3,720 ounces of .999 fine gold worth about $1,636,800 at Au=$440 CDN/oz. These reserves can be mined profitably at today's costs and prices.

A surface reserve of up to 16,000 yd^3 of White Channel pay gravel in the hydraulic pit may contain from 1072 to 2720 ounces of .999 fine gold worth from $471,680 to $1,196,800 at current prices. This reserve would be very profitable to strip and sluice.

A large body of gold-bearing lower Jackson Creek gravel may be present beneath the north-central part of the property.

This drill-indicated exploration target could contain up to 416,000 yd^3 of pay gravel containing up to 74,050 ounces of .999 fine gold worth about $32,581,120 at Au=$440 CDN/oz.

All permits required to mine on the property are in place.

A three-phase exploration and production program is recommended comprising:

PHASE 1: 1400 ft of churn drilling to expand surface gold reserves in the hydraulic pit and in the lower Jackson Creek area

PHASE 2: stripping and sluicing the surface reserves in the hydraulic pit

PHASE 3: stripping and sluicing pay gravel in the lower Jackson Creek area

CONTENTS

continued

CONTENTS

REPORT ON THE ASSETS, GOLD RESERVES AND ECONOMIC POTENTIAL OF THE JACKSON HILL PROPERTY

1.0 INTRODUCTION

1.1 Terms of Reference

The writer was retained by Cheers International Telemarketing Ltd. of Vancouver, British Columbia to examine the Jackson Hill property and report on its plant, equipment, gold reserves and economic potential. This report is a record of the writer's personal examination of the property conducted from October 18 to 20, 1989.

1.2 Location and Access

The Jackson Hill property is located about 6 km (3.7 mi) southeast of Dawson City, Yukon, a major supply and service centre for western Yukon (Figure 1). The property comprises 58 placer claims covering about 110 ha (264 A)(Figures 2 and 3). The main mine workings are centred on about 64° 1.5' north latitude and 139° 21.5' west longitude.

Access to the property and the mine workings is by a service road that joins Yukon Hwy. 2 about 5 km (3 mi) east of Dawson.

1.3 Terrain and Vegetation

The Jackson Hill property is located in the Klondike Hills of the Klondike Plateau. This plateau is a Tertiary-age erosional remnant forming part of the Western Yukon Plateau located northeast of the Coast Mountains. The area is characterized by a series of low rounded hills separated by recently steeply incised creek valleys. Bostock (1948) described the area as a remnant peneplane that had been subjected recently to uplift and renewed erosion.

The property covers part of the north-facing slope of Lovett Hill, a ridge that separates the lower part of Bonanza Creek from Klondike River (Figure 2). The drift mine workings are located in the south wall of an old hydraulic pit in a saddle west of the crest of Lovett Hill at an elevation of about 438 m (1435 ft). There, an old high-level channel of Bonanza Creek has been preserved from recent erosion (Figures 2 and 5).

The mine camp and water supply are near the northern boundary of the property at an elevation of about 335 m (1100 ft)(Figures 2 and 5).

Slopes on the property are gentle to moderate and are generally soil-covered. Lower parts of the property near its northern boundary are covered by old dredge tailings and ponds (Figure 5). The northwestern part of the claims is covered by tailings from the currently operating sluice plant.

Stunted black spruce and birch form the predominant forest in the property-area. A sparse undergrowth of moss, Labrador tea and alder bushes grow beneath the spruce and birch. The crest of the saddle west of Lovett Hill is covered with second-growth poplar and birch. There is no timber suitable for mining use on the property.

The climate of the area is characterized by very cold long winters and short cool summers. Snowfall is slight, but commonly stays from October until May.

The cold climate is an advantage to placer drift mining. Cold air can be blown into the underground workings from November until March to maintain permafrost in the workings.

1.4 Property

The Jackson Hill property comprises the following creek and bench placer claims, all located within the Dawson Mining District of the Yukon Territory (Figure 3):

Claim Name	Claim No.	Claim Name	Claim No.
Hill Claim	38625	Hill Claim	38626
Hill Claim	38725	Hill Claim	38726
Creek Claim	38870	Creek Claim	38871
Creek Claim	38872	Bench Claim	38887
Bench claim	38888	Bench Claim	38889
Bench Claim	38897	Rommy Bench	42432
Rosi Bench	42588	Gus Bench	42820
Gerry Hill	P0223	Barney Hill	P0224
Gus Creek	P1317	Walter Bench	P8222
Liz	P8239	Berg	P8240
Theresa Bench	P8242	Gus Bench	P8243
Jenni	P8244	Gary	P8245
Al	P8246	Uschi	P8248
Eva Bench	P8260	Mike Bench	P8261
G.C. Fraction	P8313	O.K. Fraction	P8414
Lundstrom No.1	P8918	Lundstrom No.2	P8919
Judy	P8920	Leopard	P8921
Billy Boy	P8922	Shannie Darlin	P8923
L.D. No.1 Fraction	P8934	Lois	P9285
Giant Bluff	P9308	Hynd End	P9303
Pearl	P9318	Whatever	P9319
Jeannie	P9320	Toma Tara Bench	P9324
Universal Bench	P9504	Throndiak	P9508
Lana	P9512	Ganymede	P9579
Bev Bench	P9580	Carol Cookie Baker	P9581
Grubmaker	P9582	Musicman	P9885
Glenna	P9886	Rose	P10092
Protection No.1 Bench	P28408	Protection No.2 Bench	P28409
Yard	P30922	Dieter	P30923

The writer has personally inspected some of the posts and lines of these claims and in his opinion, the claims have been staked in accordance with the laws and regulations of the Yukon Territory.

All of the above claims but one are owned 60% by Gustav Heitmann of Port Moody, British Columbia and 40% by Walter Hinnek of Dawson City,

Yukon. Gus Creek P1317 is owned 100% by Gustav Heitmann.

All of the claims are in good standing until October 22, 1992. Assessment work has been banked to the credit of the claims until after 2000.

The core of the property was staked by Heitmann and his agents from 1969 until 1975. On August 22, 1977, Heitmann and Hinnek entered into a partnership agreement whereby 40% ownership of the claims was transferred to Hinnek. All subsequent claims have been included in the partnership.

On December 18, 1979, Heitmann and Hinnek entered into an agreement with Universal Explorations Ltd. of Calgary, Alberta. Universal was granted exclusive right to mine the property for a $100,000 payment and a 10% gross production royalty. All claims acquired by the leasors within 3 mi (5 km) of the property automatically became part of the leased property.

During 1986, Jackson Hill Mining Limited of Vancouver, B.C. bought Universal's option for $1,000,000. This payment reportedly represented $400,000 for the claims and $600,000 for assets. There have been considerable additions to the assets on the property since 1986.

There is a disputed lein by L.K. Yardley against Gustav Heitmann and Walter Hinnek for $9000 filed on the Yard P30922 claim. The Yard claim is underlain by dredge tailings near Yukon Hwy. 2 and is not near any mine workings or exploration targets (Figures 3 and 5).

Many of the posts and lines of the claims have been removed by surface stripping or buried beneath tailings. Some of the claim boundaries have been assumed from the claim map for the purpose of reserve calculation (Figures 3 and 6).

2.0 GEOLOGY AND ECONOMIC MINERALIZATION

2.1 Regional Geology

Most of the area containing the Klondike goldfields is underlain by Palaeozoic-age metamorphic rocks of the Yukon Group (Green, 1972).

The term Yukon Group was first used by Cairnes (1914) as a field term to describe undifferentiated schists and gneisses outcropping in the Dawson area southwest of the Tintina Trench. Sparse outcrop and a lack of good regional stratigraphic marker beds has hampered correlation within the Yukon Group and between the rocks of the Yukon Group and other rocks in western Yukon.

Recently, a moderately successful correlation has been made by Mortensen (1988) of the Yukon Group rocks north of Dawson.

Green (1972) divided the Yukon Group into five units based on field characteristics. They were: Nasina series, Klondike schist, greenstones, gneisses and ultramafic intrusives (Figures 4 and 4A). This generally agrees with a previous division by Bostock (1942).

The Nasina series rocks are moderately metamorphosed sedimentary rocks, principally quartzite, quartz-mica schist and metalimestone.

Echinoderms collected from this unit near the Yukon-Alaska boundary indicated a Devonian age.

This unit weathers recessively in the Dawson area. Outcrops of this unit are sparse and deeply weathered.

The Klondike schist is the most common bedrock lithology beneath the Klondike goldfields. This unit varies from soft quartz-feldspar-muscovite schist containing varying amounts of chlorite to dense hard rocks gradational into quartz-feldspar-biotite gneiss.

These rocks are highly foleated. Rarely can any primary bedding structures be seen in them.

Lenses and veins of milky to light grey quartz are common throughout the Klondike schists. These veins may be up to several metres long and commonly trace out 'S' folds following compositional banding in the enclosing schists.

The quartz in these veins is identical to that of the gold-bearing White Channel gravels near Dawson. These veins may be the source of the Klondike gold.

Earlier workers in the area (McConnel, 1905 and Cockfield, 1921) believed that the Klondike schists evolved from the metamorphism of igneous rocks of andesitic composition.

Green (1972) convincingly deduced that the Klondike schist was derived from arkosic sedimentary rocks. His deduction was based on their high quartz content, general chemistry and the detrital characteristics of quartz grains in the schist.

Green's (1972) 'C' unit is a mixed group of rocks containing mostly greenstone; metamorphic equivalents of mafic igneous rocks. Some strata in this unit resemble those of the Nasina series and the Klondike schist.

Rocks of this unit commonly form dark green rounded bluffs outcropping in a narrow belt along Yukon River near Dawson (Figures 4 and 4A).

Green (1972) believed that rocks of unit 'C' were metamorphosed gabbroic sills similar to the Mesozoic-age mafic sills that intruded Palaeozoic-age sedimentary rocks east of the Tintina Trench.

Rocks of Green's (1972) unit 'D' are gneissic equivalents of the previously described units. These gneisses occur west of Dawson along Sixty-Mile

River.

Ultramafic bodies forming unit 'E' are sparsely distributed throughout the Klondike region. They are composed almost entirely of green serpentinite and are easily recognized in the field by their orange and green weathering and lack of vegetation cover.

During the Mesozoic Era, rocks of the Yukon Group were complexly deformed and metamorphosed. This tectonism culminated during the Cretaceous Period with the intrusion into the Yukon Group rocks by quartz monzonites and granodiorites. Narrow contact aureoles were developed around the margins of these intrusions.

The Tintina Trench, located northeast of the Dawson area, became tectonically active during the Early Tertiary Period. Poorly sorted arenaceous sediments, coal and mafic volcanic flows were deposited onto the floor of the trench.

Tectonic activity was recorded from the Early Tertiary Period in the Dawson area by the emplacement of quartz porphyry dykes.

From the Middle Tertiary Period to present, the Dawson area has undergone continual erosion and denudation of the underlying Yukon Group rocks releasing the gold that was collected in the Klondike placers.

This Tertiary-age erosion progressed in three stages which respectively: concentrated, preserved and exposed the gold-bearing placers in the Klondike region.

During a long period of continual slow denudation, a large amount of the Yukon Group rocks were weathered and washed away. Only highly resistant vein quartz carrying native gold remained and collected in the creek beds of the region. This formed the White Channel gravels which host

much of the placer gold in the region.

At the close of the White Channel stage the land surface subsided and the Klondike River migrated to its present channel. The Klondike River filled the lower parts of its tributary creeks with flood deposits burying and preserving the White Channel gravels and their placers. The Klondike gravels are locally named the Yellow Channel gravels. They contain no significant gold.

Recently, the Klondike region has been uplifted resulting in streams cutting down through and exposing the older gravels.

The most eloquent description of the development of the White Channel gravels and their gold-bearing placers was by McConnel (1907).

McConnel's description as reprinted in Bostock's (1957) selected Yukon field reports in part as follows:

REPORT ON GOLD VALUES IN THE KLONDIKE HIGH LEVEL GRAVELS

by R. G. McConnell

A general report by the writer on the geology, topography and gold-bearing gravels of the Klondike district was published by the Geological Survey in 1905. The present report, although a few other subjects are briefly discussed, is special in its object and deals principally with the values still remaining in the bench and creek gravels and especially in the important high level deposit known as the White Channel gravels.

Classification of Gravels

Low level gravels	Gulch gravels. Creek gravels. River gravels.
Gravels at intermediate levels	Terrace gravels.
High level bench gravels	Klondike gravels. White Channel gravels.

The gravels enumerated in this table are fully described in the report referred to above and only certain points on which additional information was obtained need be treated at length. The diagram on page twenty-one shows the relationship of the various types on the lower part of Bonanza creek.

The White Channel bench or hill gravels are the oldest in the district, and, excepting the present creek gravels, the most important from an economic standpoint. They were originally creek gravels, deposited in a similar manner to those occupying the low levels at present, and their elevated position is due to an uplift which affected the whole region bordering the Yukon from the Stewart river northwest to the Alaskan boundary and for a considerable distance beyond. This uplift, and a small depression which preceded it, produced many notable changes in the topography of the country.

It is probable, although not conclusively proved, that during the White Channel period the lower portion of the Klondike valley, the portion into which the principal gold-bearing creeks discharge, was occupied by a small local stream and that the Klondike itself flowed either into the Stewart or into Twelve-mile river. The White Channel deposits are remarkable in this respect that even when completely destroyed their former position is marked by a trail of gold. They are traceable in this manner from the present mouth of Hunker, Bear and Bonanza creeks far out into the present valley of the Klondike, showing that the old valley was small, smaller than that of Hunker creek and unlikely to have contained a large rapid river such as the Klondike.

At the close of the White Channel period the district was depressed, and it was during this depression that the Klondike is considered to have broken into its present valley. It brought down an immense quantity of material from its upper reaches, and rapidly built up a wide gravel bed fully 150 feet in depth. These gravels at the mouth of Hunker and Bonanza creeks rest on the White Channel deposits and at other points, where not destroyed, are distributed along the hill sides at the same level. They are composed principally of well-rounded pebbles of quartzite, hard slate, diorite and occasionally granite, all, unlike the other gravels, foreign to the district, and so far not proved to be of much economic importance.

The depression was followed by an uplift of approximately 700 feet, which gave new life to all the streams by increasing their grades, and they immediately commenced to deepen their channels. This process was continued not only through the old gravel deposits but down into the bedrock to a depth of from 150 to 300 feet. The new valleys are sunk, as a rule, through the bottom of the old ones, but in a few places, as at the mouth of Bonanza creek, they deviate from them and have carved out independent courses.

The difference in character between the old and new valleys is striking. The old ones represent the product of long continued stable conditions, and are characterized by wide flats and gently sloping sides, from which all traces of angularity have been smoothed away. The flats of the old Hunker creek valley have a width in places of over a mile. The new valleys on the other hand, while opening out into occasional basins, are generally narrow, steep-sided and angular. This applies only to the creeks, all of which are small, as the Klondike river has cut a huge trench through the district since the uplift.

Only a portion of the deposits of the old valleys was destroyed during the excavation of the recent valleys, as the latter are much narrower and do not follow exactly the same courses. The undestroyed portions constitute the White Channel gravels of the miners.

White Channel Gravels

The White Channel gravels differ somewhat from the ordinary type of stream deposit. They are very compact as a rule and in some of the hydraulic cuts stand up in almost vertical cliffs, even when the face is unfrozen. The white or light gray coloration from which the deposit derives its name is very conspicuous in most of the sections but is not universal, as red, yellow and dark gray beds frequently occur. The deposit is highly siliceous, the principal constituent consisting of rounded pebbles and rounded and subangular boulders of vein quartz. Flat schist pebbles and boulders, usually in a more or less advanced stage of decomposition, occur with the quartz, and also occasional pebbles derived from the various dikes and stocks outcropping along the valleys. No material foreign to the district occurs in the deposit. The pebbles and boulders are usually small, seldom exceeding eighteen inches in diameter, and are embedded in a compact matrix consisting essentially of small sericite plates and fine angular quartz grains. A

few large angular blocks from three to four feet in diameter are occasionally met with but are rare and usually occur on or near bedrock.

The uniformity of the deposit in composition and general character throughout sections a hundred feet or more in thickness is very striking. The bedding planes, as a rule, are inconspicuous, and there has been no sorting of the various constituents into separate beds.

The deposits, unlike the creek and gulch gravels, appear to be destitute of vegetable and animal remains. None were found by the writer and the few reported discoveries by miners lack confirmation.

The thickness of the White Channel gravels varies from a few feet to 150 feet and the original width from a couple of hundred yards to over a mile. The volume of the deposit on both Hunker and Bonanza creeks increases steadily down stream.

On Gold, Adams and other hills on Bonanza creek the typical compact white variety of the White Channel deposit is replaced towards the sides of the old valley by flat rusty coloured gravels, more loosely bedded and containing a smaller proportion of quartz than the ordinary white variety. These probably represent flood plains deposits. They have the appearance of overlying the white variety and were formerly, in the absence of sections, considered to be younger. The long exposures, however, now available for study in the various hydraulic cuts, show that the two varieties pass gradually one into the other both horizontally and vertically and in places are interbanded, evidence of contemporaneous deposition. The loose yellow variety is seldom productive.

The White Channel gravels were probably deposited by winding streams with easy grades and comparatively slack currents. The preponderance of vein quartz pebbles and boulders, the most resistant rock in the district, gives them the character of a residual deposit. They were built up slowly and in the long process the softer rocks were mostly destroyed and carried away.

The great length of the White Channel period is indicated by the enormous gold accumulations, all derived from the slow breaking up of auriferous quartz veins which took place in it. Since the close of the period the additions to the supply have been trifling, although a sufficient time has elapsed to enable small streams to excavate channels, mostly through hard schists from 300 to 600 feet in depth. Practically all the gold in the present low level valley flats is of secondary origin and derived from the partial distribution of the older gravels.

The age of the White Channel gravels has not been determined, but they must date back to the Pleiocene at least. They were certainly deposited before the advent of the present severe climatic conditions, as the white coloration is largely due to the leaching out of the greater portion of the iron by circulating surface waters, and this must have taken place before they were permanently frozen.

Distribution of Gold in Gravels and Bedrock

The greater part of the gold both in the hill and creek gravels occurs on or near bedrock, either in the lower four to six feet of gravel or sunk for some distance in the bedrock itself. The distribution depends largely on the character of the bedrock. Soft schists such as those underlying the rich portion of Upper Dominion creek prevent the gold from descending, and it accumulates in a thin layer at the base of the gravels. In many of the rich claims between the two discoveries on Dominion creek a thin stratum of gravel resting immediately on bedrock proved extraordinarily rich, while the bedrock and the upper gravels were comparatively lean. On Bonanza creek the bedrock as a rule is harder and more flaggy, and the action of frost has parted the layers and allowed a portion of the gold to descend along them. From three to five feet of bedrock are usually mined at a profit, and gold has been found in some quantity at a depth of twelve feet and probably descends still deeper.

On a couple of claims on Hunker creek below the mouth of Seventy pup practically all the gold occurred in a shattered porphyry bedrock, the overlying gravels proving almost barren.

The bedrock underlying the White Channel gravels is more decomposed than that in the creek bottoms, does not open out in the same way and retains most of the gold at or near the surface. In a few places gold has been found in paying quantities in the schist partings under the decomposed layer, but as a rule only the upper few inches are mined.

The rapid decrease in gold values in the White Channel gravels above bedrock is shown in the following table which gives the average values obtained in sampling Trail and Lovett hills. The samples were taken in successive six foot columns.

		Total value
144–150 feet.	Average value per cubic yard .006....	.012
138–144 "	" " .007....	.014
132–138 "	" " .008....	.016
126–132 "	" " .009....	.018
120–126 "	" " .009....	.018
114–120 "	" " .010....	.020
108–114 "	" " .010....	.020
102–108 "	" " .011....	.022
96–102 "	" " .011....	.022
90–96 "	" " .012....	.024
84–90 "	" " .013....	.026
78–84 "	" " .015....	.030
72–78 "	" " .020....	.040
66–72 "	" " .020....	.040
60–66 "	" " .021....	.042
54–60 "	" " .023....	.046
48–54 "	" " .025....	.046
42–48 "	" " .045....	.090
36–42 "	" " .030....	.060
30–36 "	" " .032....	.064
24–30 "	" " .034....	.068
18–24 "	" " .040....	.080
12–18 "	" " .047....	.094
6–12 "	" " .180....	.360
1–6 "	" " $4.130....	8.260
Total values in square yard column fifty yds. high.		$9.532

Note: Gold was $20.67 (US) in 1907.

The values in the lower four yards, including a foot of bedrock, average $2.15 per cubic yard, while those in the upper forty-six yards of the column average less than two cents per cubic yard. The decrease in values from the bottom to the top of the section proved to be constant, except at one point forty-five feet above bedrock where a slight enrichment takes place.

***

The concentration of all the coarse, and the greater part of the fine, gold in the White Channel gravels on or near bedrock seems incapable of explanation except on the assumption that the gravels have been worked over probably several times by the stream that deposited them. The deposit is over 150 feet thick in places, is very compact and includes numerous medium sized and a few large angular boulders which would serve to intercept a portion of the gold if it descended under the influence of gravity alone. That they have not done so is shown by the fact that in all our sampling not a single coarse piece was found in the upper gravels.

***

Transportation of Gold

The two main factors in the transportation of coarse gold by natural causes are grade and bedrock. With steep grades and smooth bedrock transportation is comparatively rapid, while little movement takes place when the grades are moderate and the valleys are floored with the tilted flaggy schists characteristic of the district.

The Klondike slopes are everywhere mantled with a thick covering of broken and partially decomposed schist fragments easily moved when not frozen and ever tending downwards towards the creek and gulch levels. The downward movement is slow and intermittent at present on account of the perpetually frozen condition of the surface, except on sunny slopes. During the period of the White Channel gravels, the period of the great gold accumulations, climatic conditions were less severe and the movement must have been much more rapid.

The slide material carries with it the gold and gold-bearing quartz released by the breaking up of the auriferous quartz veins, and when running water is reached the gold is sluiced out and remains behind, while the rock fragments are ground up and carried away.

The distance travelled by the gold after reaching the waterways, neglecting the time element, depends on the grades and bedrock. The upper portions of the creeks, and the steep gulches, except where they cross the paystreak of the White Channel gravels and are directly enriched from them, have not proved rich and are only occasionally productive. The gold washed down into them moves slowly on, and all the great accumulations occur on portions of the creeks with grades of 150 feet or less to the mile. The rate of movement diminishes rapidly with the grade and near the mouths of the creeks is excessively slow.

Evidence of the tardy movement of coarse gold down streams of moderate grade, even where the latter are actively engaged in eroding their channels, is furnished at many points along Bonanza and Hunker creeks. The paystreak of the elevated White Channel gravels has been destroyed in places along both these streams. Whenever this occurs the creek bottoms directly opposite the destroyed portions are immediately enriched, showing that the gold, or a large portion of it at least, has remained almost stationary during all the time the creeks were employed in deepening their channels from 150 to 300 feet. The horizontal movement in some instances scarcely exceeds the vertical movement. The complementary relationship existing between the creek and the hill pay gravels has been recognised by the miners, and whenever the creek gravels are lean, pay is confidently expected on the hills, and in the productive portions of the creeks is usually found.

The influence of bedrock in retarding or accelerating the progress of gold down stream is almost as important as that of grade. The common bedrock of the district is a light coloured flaggy sericite schist of unequal hardness and usually tilted at high angles. The sericite schist alternates in places with bands of dark graphitic schists and is broken through by numerous porphyritic dikes and stocks. The light coloured flaggy schists when hard form an excellent bedrock from the miner's point of view as they weather unequally into irregular rock ripples which arrest the progress of the gold. The partings also open out under the influence of the alternate freezings and thawings to which the rocks are subjected and the gold descends along them, and continues to descend as the surface is gradually lowered by erosion. Its progress down stream when caught in this manner is indefinitely delayed.

The porphyritic rocks when shattered, as is often the case, also arrest most of the gold. The soft varieties of the sericite schists and the dark graphic schists, on the other hand, offer small resistance to the passage of the gold. They weather to a smooth surface along which the gold moves easily, and the portions of the creeks underlaid by them are usually lean.

from McConnel, 1907
as reprinted in Bostock ed., 1957 pp.217-225

2.2 Property Geology and Geomorphology

The Jackson Hill Property occupies the northern slope of a saddle west of Lovett Hill where Bonanza Creek used to flow on its way to Klondike River (Figure 2).

Before work commenced on the property, it was almost totally covered with soil.

The only surface bedrock outcrops on the property occur in the road cut near the water pipeline at an elevation of about 411 m (1350 ft), at the sluice plant and on the floor of the holding basin at an elevation of about 436 m (1430 ft)(Figures 5 and 6).

There, bedrock resembles Green's (1972) unit 'C' of the Palaeozoic-age Yukon Group; dark green metamorphosed mafic volcanics. These rocks are deeply weathered and crumble readily into small blocks along cleavage planes. Earlier cleavages in these metavolcanics strike west-northwest and dip subvertically. Later fractures strike north-northeast and have steep variable dips. The latest fractures are almost horizontal. Primary structures are not discernable in these rocks.

An abrupt contact between the Yukon Group volcanics and the overlying White Channel gravels is exposed along the 1989 trench west of the apron in the hydraulic pit (Figure 6). There, White Channel cobbles lay directly on a layer of very weathered volcanics which have been reduced to mostly clay.

On the Jackson Hill property, White Channel gravels are composed almost entirely of white to grey translucent quartz.

Clasts in this unit are most commonly pebbles. Boulders are rare. These clasts are imbricated indicating a northward flow direction. Most of

them are well-rounded and subsphearical. No broken rounds are present. The clasts are set within a matrix of poorly sorted sand and silt. There are no well-sorted and stratified sand beds or lenses within this sediment.

Many of the clasts are partially rusty due to weathering of sulphides, mostly pyrite, contained within. It is generally believed that the White Channel gravels are residual vein quartz left by Tertiary-age weathering. This quartz and its contained sulphides are believed to be the source of the placer gold found therein.

The writer examined several ounces of gold taken by Walter Hinnek from several clean-ups on the Jackson Hill property.

Gold from the property occurs as flakes and nuggets ranging in length from 0.5 mm to 4 cm. Most of the gold examined is flakes and flat nuggets about 4 mm long.

They have been derived from thin sheets of gold the margins of which have been folded, flattened and hammered down. The enclaves in the central parts of these flakes have retained a delicate texture of pits and spires indicating that this gold has not travelled far from its point of liberation.

Nuggets over 1 cm in length invariably consist of a series of thin gold sheets held within vein quartz. Large massive gold nuggets are not recovered from the Jackson Hill property.

The gold previously described is lemon yellow. Commonly, purple-brown mangenese-like stains coat pitted surfaces of some nuggets. This yellow gold comprises about 98% of the gold recovered from the property.

The rest is greenish yellow gold that almost always occurs as small blades less than 5 mm long with smooth surfaces. It is assumed by local

prospectors that the greenish tint is due to copper in the gold.

White Channel gravels are about 20 m (66 ft) thick at the south wall of the hydraulic pit where they are overlain by yellow Klondike gravels.

The Klondike gravels contain clasts of many lithologies, mostly schist and gneiss. These clasts are well-rounded but have low sphearicities. They are set in a matrix of coarse micaceous sand. Stratified sand lenses are sporadically distributed throughout these gravels which are about 15 m (50 ft) thick above the hydraulic pit. They are of no economic importance.

The area around the property was not glaciated during the Pleistocene age. However, the White Channel and Klondike gravels on the property were permanently frozen at that time. Hilker (1987) deduced that permafrost advanced laterally into the gravels as well as vertically. He noted that unfrozen gravels were encountered in the most southerly underground workings by Universal Explorations Ltd. mining during the early 1980's (Figure 6).

Permafrost has been a great advantage to underground mining on the property by enhancing ground strength and stability.

Many of the modern streams in the area have cut down through old White Channel sediments. Where this has occured, gold from the White Channel gravels has been redeposited in recent stream sediments.

This happened on the northern part of the property where Jackson Creek cut through White Channel gravels and redeposited gold in its channel below.

Before dredging and the dumping of tailings in its course, Jackson Creek flowed westward across the central part of the property (Figures 2 and 5).

This is the largest unexplored placer gold target on the property.

3.0 EXPLORATION AND MINING ON THE JACKSON HILL PROPERTY

3.1 Early Exploration

When McConnel (1907) made his extensive study of the placers near the mouth of Bonanza Creek and the property-area near Lovett Hill, very little exploration seems to have been conducted in the property-area.

McConnel's work seems to have been the earliest detailed appraisal of the property-area. In it, he recognized the property-area as one of significant economic potential. His work is reprinted as follows:

Lower Bonanza Hill Gravels

Between Boulder and Cripple hills, a distance of three miles, the hill gravels bordering Bonanza creek are unimportant. A few small areas have been preserved at various points on both sides of the valley but these represent largely the lean rim gravels of the old deposit. The central portion containing the paystreak has been almost entirely destroyed.

Below Cripple creek pay gravels are again preserved on the benches, but occur on the right limit, the paystreak having crossed the valley. They extend through from Cripple creek to the Klondike valley, a distance of three miles, except where cut across by Trail and Lovett gulches. These gulches separate the gravels into three areas known as Cripple, Trail and Lovett hills.

Below Cripple creek the present Bonanza valley bends to the left away from the old valley and joins the Klondike some distance lower down. In consequence of this divergence only a small proportion of the gravels of the old valley on Trail and Lovett hills have been destroyed and the paystreak, except where cut transversely by gulches, has been preserved intact.

The volume of White Channel gravels on Lovett hill exceeds 71,000,000 cubic yards, an amount almost equalling the combined volumes on all the other hills bordering Bonanza creek. The deposit has a thickness in the centre of the channel of 168 feet and a width of 5,200 feet. It occupies a wide shallow depression in the Klondike schists and is overlaid and overlapped on both rims by 150 feet of younger gravels deposited by the Klondike river.

The White Channel gravels on Trail hill above Lovett hill have a thickness of 230 feet. They are overlaid in places by Klondike river gravels but are not completely buried as on Lovett hill.

The volumes of White Channel gravels and overlying Klondike gravels on the three lower Bonanza hills are as follows:

Cripple hill (White Channel gravels)	7,820,460 cu. yds.
Trail hill (partly Klondike gravels)	22,235,390 "
Lovett hill (White Channel gravels)	71,366,370 "
" (Klondike River gravels)	66,997,230 "
Total	168,419,450 "

These figures include all the White Channel gravels both in and off the paystreak, but only those portions of the Klondike river gravels which overlie the White Channel gravels and which would be required to be washed away if the latter were hydraulicked.

These lower Bonanza hills, although originally much lower in grade than the Upper Bonanza hills, are now almost as important economically, as they have been mined to a much less extent. The production to date is estimated at $750,000, mostly obtained by drifting.

The paystreak is remarkably wide and very uniform in grade. It is partially destroyed on Cripple hill but on Trail and Lovett hills where fully preserved has a width of from 1,000 to 1,400 feet.

The workable gravels are practically limited to the paystreak. The volumes are estimated as follows:

Cripple hill—White Channel gravels		614,910 cu. yds.
Trail hill—Mostly White Channel gravels		11,802,250 "
Lovett hill	White Channel gravels	23,503,770 "
	Overlying Klondike River gravels	14,511,760 "
		50,432,690

The average grade of these gravels is estimated at 14·9 cents per cubic yard and the amount of recoverable gold in the three hills at $7,528,720.

The low general average, notwithstanding values of over a dollar per square foot of bedrock, is due to the exceptional thickness of the gravels over the greater portion of Lovett hill, amounting to fully 300 feet, of which the upper 200 feet are practically barren. The values in Cripple and Trail hills, and the rim portions of Lovett hill, considerably exceed the general average, while those in the central portion of Lovett hill are somewhat less.

Summary of Bonanza Creek workable hill gravels.

	Volume.	Estimated Values.
Upper Bonanza hills	24,116,056 cu. yds.	$ 8,213,532
Lower Bonanza hills	50,432,690 "	7,528,720
Total	74,548,746 "	$15,742,252

Average estimated yield per cubic yard, 21.1 cents.

Total quantities of high level gravels along Bonanza creek.

Upper Bonanza hills (White Channel gravels)	45,326,889 cu. yds.
Small hills between Boulder and Cripple hills not measured, estimated at	3,500,000 "
Lower Bonanza hills (partly Klondike gravels)	168,419,450 "
	217,246,339

from McConnel, 1907
as reprinted in Bostock ed., 1957; pp.228-230.

McConnel's (1907) sampling of the White Channel gravels (page 11 of this report) indicated that almost all of the placer gold was located in the lowest 2 m (6 ft) of the White Channel gravels in a pay channel estimated to be up to 457 m (1500 ft) wide.

The lower part of McConnel's table of sample data is reproduced as follows with calculations of gold contents and approximate current values.

Elevation	Tl. Value Au=$US20.67	Tl. Value Au=$375US	Tl. Value Au=$440CDN	Tl. Au troy oz	Tl. Au (.836 fine) Placer oz	troy oz/yd^3	$CDN /yd^3
24-30 ft	$0.068	$ 1.23	$ 1.45	0.003	0.004	0.002	$ 0.88
18-24 ft	$0.080	$ 1.45	$ 1.71	0.004	0.005	0.003	$ 1.32
12-18 ft	$0.094	$ 1.71	$ 2.00	0.005	0.006	0.003	$ 1.32
6-12 ft	$0.36	$ 6.53	$ 7.67	0.017	0.020	0.009	$ 3.96
0- 6 ft	$8.20	$149.85	$176.08	0.397	0.475	0.199	$ 87.56
1-150 ft	$9.532	$172.93	$203.20	0.461	0.551	0.009	$ 3.96
1-12 ft	$8.62	$156.39	$183.75	0.417	0.499	0.104	$ 45.76

It was obvious that hydraulicking the whole 150 ft thick column above the base of the channel would produce little more gold than drift mining beneath the column along the bedrock.

Hydraulicking was inexpensive but required large amounts of water and produced great quantities of gravel that wore out sluices.

Drift mining produced a comparatively large amount of gold in a small amount of gravel using moderate amounts of water. However; at that time, thawing of frozen gravels using steam points and wood-burning boilers was very time consuming.

Jim Simcox (Simcox and Craig, 1987) reported that his experiment using steam points and a wood-burning boiler to thaw gravel in the 1970's revealed that it took as much time to cut firewood for the boiler as it did to mine the gravel.

Both hydraulicking and underground drift mining were subsequently employed in the Jackson Hill property-area. Recent advances in applied underground mining technology have made drift mining the preferred method.

A prospect tunnel was driven along bedrock in the deepest part of the pay channel for a distance of 286.5 m (940 ft) from the Crofton claim (now expired) during 1923 (Hilker, 1987). The terminus of the Crofton tunnel was uncovered during Universal's drift mining during the early 1980's (Figure 6).

The tunnel was sampled throughout its length as follows:

TABLE

	Drift Values Reported		Drift Values Reported		Drift Values Reported		Drift Values Reported
Portal	$0.82		0.96	Area of apron in hydraulic pit	1.68		1.93
	0.36		1.44		2.40	Portal +	3.40
	1.02		1.20		0.96	800 ft	2.16
	2.85		0.48		2.76		1.82
	2.39		2.04		1.50		1.28
	2.28		2.04		0.96		1.32
	0.72	Area of apron	2.16		2.70		1.08
	2.00		2.76		1.44		1.28
	----		0.60		3.32		2.16
	1.35		2.52		0.54		2.28
	1.32		3.48		2.16		3.00
	1.56		2.52		0.84		1.56
	1.32		1.94		0.72		2.16
	2.46		1.80		0.41		1.32
	0.96		1.20		1.32		0.60
Portal +	1.44	Portal +	3.84		1.08		0.72
400 ft	1.28	600 ft	0.96		3.40		0.45
	----		1.44		1.44		1.56
	1.56		1.80		2.40		1.20
	1.56		3.00		1.20		1.44
	1.68		0.90		1.32		5.40
	2.40		0.60		0.54	End	----
	2.04		0.48		0.94	Drift	
						9+40	

gold at $20.67/oz US

from Hilker, 1987; p.32.

Hilker (1987) inferred an average concentration of 0.1549 oz/yd^3 sampled over the length of the 6 ft high drift. This average was slightly lower than McConnel's 1-6 ft value of0.199 oz/yd^3.

The writer calculated the average concentration in the part of the Crofton tunnel crossing the apron of White Channel gravel north of portal 'B' (Figure 6) to be about 0.17 oz/yd^3. A copy of the 1923 Crofton tunnel plan was used for this calculation.

By the late 1930's most of the hydraulic pit located in the central part of the property had been excavated (Figures 5 and 6). Mining probably ceased when the back wall of the pit became too high, creating unacceptable dilution of pay gravels, and inflation acting in consort with a fixed gold price made the metal generally less profitable to mine.

During that time, large dredges were working over the whole lower Klondike River valley.

Reportedly, rich pay gravel was encountered while dredging the lower part of Jackson Creek directly below the hydraulic pit (Figure 5). The dredge worked as far as it could along the creek until it was stopped by hard frozen gravel and excessive elevation above the main river.

Subsequent test drilling; to be discussed later, indicated that the dredge left a large wedge of high-grade pay gravel in the central part of the Jackson Hill property-area.

During the 1989 mining season, old drift mine workings were discovered in the area near portals 'E' and 'F' (Figure 6). No record of this old work could be found by the writer.

3.2 Hydraulic and Underground Drift Mining by Universal Explorations Ltd. 1980-1986

Upon concluding option agreements with Gus Heitmann and Walter Hinnek, Universal Explorations Ltd. prepared large-scale hydraulicking of the Lovett-Jackson pit. They installed a large diametre steel pipeline, pump system and sluicing plant designed to handle the huge flow-through of gravel that was anticipated.

These assets are being used on the property presently.

Universal hydraulicked the pit during the 1980 and 1981 seasons. Huge quantities of gravel were handled during that operation. Hydraulicking probably would have continued into the mid 1980's had the price of gold remained in the $600 US to $800 US range.

Using McConnel's (1907) sampling data (pages 11 and 18, this report), the writer calculated that although hydraulicking would have produced about 0.461 troy oz per yard advance, it would recover only about 0.009 troy oz per yd^3 of material moved. This was because at least 150 ft (45.7 m) of gravel would have had to have been stripped from the pit wall to uncover the pay gravels near bedrock. This would yield about $3.96 CDN /$yd^3$ of gravel moved at today's gold prices ($375 US of $440 CDN).

North american placer miners generally think in terms of cubic yards rather than cubic metres. In the interest of not irritating those readers familiar with the subject, the writer has reported amounts of gravel moved in cubic yards (1 yd^3 = 0.766 m^3).

The writer has seen no official calculation of how much gravel was moved during the 1980-1 hydraulicking operation. It was probably in excess of 1,000,000 yd^3, accounting for most of the sluice tailings on the property (Figure 5).

Hilker (1987) reported that Universal Explorations recovered the following approximate amounts of gold from its hydraulic mining of the Jackson Hill property:

Year	placer gold recovered .835 fine	.999 fine gold recovered
1980	1200 tr. oz	1000 tr. oz
1981	1700 tr. oz	1400 tr. oz

It seems that most of Universal's hydraulicking was conducted between portals 'A' and 'C' where the richest pay gravels were located (Figure 6).

When hydraulicking was done in the Dawson area before the 1940's; local legend has it that men were sent out on the cleared bedrock with iron bars and brooms to pick residual gold out of fractures in the bedrock. The 1980-1 crew was not so assiduous. They left a large apron of White Channel pay gravel on the bedrock in the most lucrative part of the pay channel (Figure 6). This apron was subsequently discovered during sluicing in 1989.

With declining gold prices in 1982, Universal Explorations abandoned its hydraulicking operation and commenced underground drift mining.

Universal contracted with White Channel Underground Mining Ltd. of Whitehorse, Yukon to operate trackless underground development in the 'B' portal area in the back of the hydraulic pit (Figure 6).

White Channel Mining employed a form of unsysetmatic room and pillar mining at the Jackson Hill property.

Prospect drifts were driven out from a main tunnel or portal in

search of the best pay gravels. These drifts were about 15 ft (4.6 m) high and up to 25 ft (7.6 m) wide. They extended from 1 ft beneath the surface of the weathered Yukon Group bedrock to 14 ft above the bedrock in the White Channel gravels.

Over 90% of the total available gold was recovered by taking that part of the section (pages 11 and 18, this report).

From the radiating drifts, cross cuts were excavated and pillars were isolated. Finally, pillars were slashed to a minimum size and about 87% of the mass was removed.

In permanently frozen gravel such as that at the Jackson Hill property, rooms as large as 150 ft (46.7 m) by 250 ft (76.2 m) have been excavated in underground placer mines. They have remained stable for considerable lengths of time as long as the surrounding gravel was kept frozen.

To maintain permafrost in the workings, underground mining was conducted on the property only during winter; between November and March, when cold fresh air could be blown into the tunnels to dissipate heat and gasses created by the heavy machinery operated in the drifts.

Mining ceased and the portals were plugged shut before the spring thaw each year to prevent thawing in the workings.

Unlike the old-time drift miners, the White Channel Mining crew did not thaw frozen gravel. It was drilled and blasted using conventional trackless mining methods.

An air track drill trailing a scrubbed diesel compressor was used to drill blast holes during the 1982 mining season. The air track proved

to be too awkward to move about in confined drifts. It was replaced by a tank drill during the 1984-5 season. The tank drill was enclosed and modified for use underground.

ANFO (amonium nitrate-fuel oil) explosives were used to blast the frozen gravel. Charges were blown into drill holes under pressure from a loading unit mounted on a scrubbed diesel 3/4 ton pick-up truck.

At first, misfires were common due to blast holes springing shut before detonation from the shock waves eminating from adjacent blast holes. (The diametre of a mass of ANFO is critical to its speed of detonation.) Blast-hole spacing was redesigned so that each blast hole would fire before shock waves from adjacent holes arrived, eliminating the problem.

From 1984 to 1986, ANFO was mixed on the site to lower costs.

The general practice was to operate two working headings at once. While one was being drilled in preparation for blasting the other was being cleared (mucked).

Mucking was done by a CAT. 966B loader which was later replaced by a larger model. At the portal, the loader dumped pay gravel into a 14 yd^3 Kenworth dump truck for transport to the holding basin near the sluice plant (Figure 6).

Sluicing was done during the summer when the gravel had thawed. Gravel was conducted to the sluices by a large CAT. D9 bulldozer and hydraulic monitors. A detailed discussion of the sluice plant is in section 4 of this report.

Hilker (1987) summarized Universal Exploration's underground drift mining production as follows:

1982-1983

- 17,000 yd^3 gravels mined in 60 days by four men working two 12-hour shifts; gold recovered 2,000 placer ounces.

  Volume - 17,000 yd^3
  Gold Content - 2,000 placer ounces (fineness 835)
  Pure Gold - 1,670 fine troy ounces
  Inferred Grade - 0.0982 oz/yd^3
  Inferred Value - \$49.10 yd^3 (gold \$500 Cdn.)

1984-1985

- 40,000 cubic yards mined in 90 days by eight men working two 12-hour shifts; gold recovered 4,240 placer ounces.

  Volume - 40,000 yd^3
  Gold Content - 4,240 placer ounces (fineness 835)
  Pure Gold - 3,540.4 fine troy ounces
  Inferred Grade - 0.0885 oz/yd^3
  Inferred Value - \$44.25 yd^3 (gold \$500 Cdn.)

1985-1986

- 30,000 cubic yards mined in 90 days by six men working one 12-hour day shift; gold recovered 3,000 placer ounces.

  Volume - 30,000 yd^3
  Gold Content - 3,000 placer ounces (fineness 835)
  Pure Gold - 2,505 fine troy ounces
  Mining/Processing Costs - approx. \$15.00/yd^3
  Inferred Grade - 0.0835 oz/yd^3
  Inferred Value - \$41.75 yd^3 (gold \$500 Cdn.)

Note - Report placer gold fineness of 829 - 842 on Jackson Gulch or an approximate average of 835 fineness.

from Hilker, 1987; p.5.

3.3 Underground Exploration and Mining by Jackson Hill Mining Limited 1986-1989

Jackson Hill Mining Limited bought out Universal's agreement on the Jackson Hill property during 1986.

Jackson Hill's development philosophy was different from Universal's Each year, Jackson Hill combined a certain amount of exploration with mining in an attempt to develop future reserves ahead of mining. Universal seemed most interested in high-grading. White Channel Mining's contract to operate the mine was extended but unlike Universal which had leased most of its equipment, Jackson Hill acquired some of its own equipment.

With Jackson Hill, White Channel Mining continued to mine using the previously described unsystematic room and pillar method. However, Jackson Hill rationalized mining by replacing equipment and modifying work programs.

Despite the introduction of a tank drill to the operation in 1984, drilling and blasting remained a bottleneck in the underground operation. The acquisition of a second tank drill by White Channel Mining solved the problem.

Jackson Hill acquired its own CAT. D9G bulldozer and CAT. 980B loader to replace leased equipment and lower costs.

Later, Jackson Hill improved mucking and transport of gravel. Two Eimco 10 yd^3 scoop trams were bought for mucking and transport to the portal The Kenworth dump truck was replaced by a CAT. 631B 30 yd^3 scraper, resulting in a reduction of the amount of time expended to move gravel from the portal to the holding basin.

The CAT. 631B scraper replaced the CAT. D9G bulldozer as well as the dump truck. Unlike the truck which dumped gravel in high piles, the

scraper laid out gravel in an even bench. This ended the necessity to continually flatten the pile with the bulldozer so that more could be added on top.

The bulldozer was kept for moving slump material and summer sluicing.

Because Jackson Hill's equipment was used on a seasonal basis, it was idle part of the year. The company has been able to generate revenue by leasing its equipment to other operators during slack seasons.

Jackson Hill's CAT. 980B loader was rented out during the writer's examination of the property during October, 1989.

Jackson Hill continued to mine from Universal's workings south of portals 'B' and 'C' during the 1986-7 winter season (Figure 6). From that area, a total of 55,797 yd^3 of gravel were sluiced to recover 2328.5 ounces of placer gold. (1986-9 production figures are summarized on page 28 of this report.)

A major underground exploration program was conducted west of the known pay channel near portal 'A'(Figure 6) in order to determine if any braided pay channels occured west of the main pay channel. A total of 28,785 yd^3 of gravel were sluiced from these exploration workings yielding about 100 ounces of placer gold. Obviously no new pay channels were found there.

During the 1987-8 winter season, mining was conducted in the 'D', 'H' and 'J' portal areas (Figure 6). Exploration in the portal 'Z' area was sufficiently successful to be reclassified by the company as mining. A total of 39,225 yd^3 of gravel were mined yielding about 1691 placer ounces of gold.

JACKSON HILL PROPERTY: 1986-1989 GOLD PRODUCTION

Year	Location (Figure 6)	yd^3 Moved	.836 fine Placer Gold Recovered	.999 fine Gold Equivalent	Inferred Grade fine Au/yd^3	$ CDN Value @ $440 CDN /$yd^3$	Tl $CDN @ $440 CDN
1986-7							
Exploration	'A'	28,785	100.0	83.6	0.003	$ 1.78	$ 51,237.30
Mining	'B','C'	55,797	2328.5	1946.6	0.035	$15.35	$856,483.95
1987-8							
Mining	'D','H', 'J','Z	39,225	1691.0	1413.7	0.036	$15.86	$622,108.50
1988-9							
Exploration	'E',F'	25,561	70.0	58.5	0.002	$ 1.01	$ 25,816.61
Mining	'G', 'J','Z'	42,120	1123.0	938.8	0.022	$ 9.81	$413,197.20
Surface Stripping	apron	12,000	300.00	250.8	0.021	$ 9.20	$110,400.00
Totals:	Exploration	54,346	170.0	142.1	0.002 av.	$ 1.42 av.	$ 77,053.91
	Mining	149,142	5442.5	4549.9	0.030 av.	$13.40 av.	$2,002,189.70
Total Revenue inferred @ $440 CDN							$2,079,243.60

Note: Revenue inferred @ $440 CDN / oz Au is not actual revenue received for production from 1986 to 1989. It reflects what the material mined would be worth in today's values for easy comparison with the reserve blocks discussed in section 6 of this report. Also; although gold prices have varied considerably from 1986 to 1989 $440 CDN/oz Au could be used as a conservative average for the period for general comparison.

Mining was continued in the 'G', 'J' and 'Z' portal areas during the 1988-9 winter season (Figure 6). A total of 42,120 yd^3 of gravel were mined from these areas from which approximately 1123 placer ounces of gold were recovered.

Exploration was conducted over old drift mine workings in tunnels 'E' and 'F'. There, 25,561 yd^3 of gravel were moved yielding approximately 70 placer ounces of gold.

Ratios between recovery from 1989 underground mining and exploration were inferred from drift sampling data. It was all dumped in the same pile before sluicing.

The highlight in 1989 mining came with the discovery of the apron of White Channel pay gravel north of the portal 'B' workings. Part of the apron was stripped with the bulldozer at a cost of about $\$1/yd^3$. A trench containing about 12,000 yd^3 of gravel was excavated (Figure 6). The gravel yielded about 300 placer ounces of gold.

3.4 Surface Drilling by Jackson Hill Mining Limited, 1987

Two churn drill holes were drilled in the northern part of the property during 1987 to explore for undredged auriferous Jackson Creek sediments (Figure 5).

The first hole was drilled 58 ft (17.7 m) down where it encountered dredge tailings beneath sluice tailings. That hole was then abandoned and drilling was recommenced 104 ft (31.7 m) up hill and south of hole No.1.

Hole No.2 penetrated gold-bearing strata below 62 ft (18.9 m) of sluice tailings. From 71 to 77 ft (21.6 to 23.5 m) down, significant amounts of gold were encountered in coarse stratified sand and gravel. The

inferred value of gold in that interval was computed to be $107.29/yd^3 at gold = $604 CDN/oz. That would be about $78.15/yd^3 at today's prices; about $440 CDN/oz Au.

No significant gold was found below the 77 ft (23.5 m) depth. The hole was stopped at 100 ft (30.5 m) depth.

This account of the drilling was summarized by the writer from the drill logs of Brenon White Drilling, June 11 to 17, 1987.

4.0 DESCRIPTION AND EVALUATION OF PLANT AND EQUIPMENT ON THE PROPERTY

4.1 Water Supply System for Sluice Plant

Water for the sluicing plant is lifted 100.5 m (330 ft) through a 1981 m (6500 ft) long steel pipeline and delivered to the plant at a rate up to 20,520 l/min (4500 gal/min). Water is taken from a dredge pond near the northern boundary of the property (Figure 5). Dredge tailings surrounding the pond are very permiable. Consequently, there is not a significant draw-down problem from pumping in the pond.

The pump is a 7-stage 27 in (68.5 cm) diametre vertical turbine attached to a CAT. 398B diesel engine through a 2 to 1 transmission and a right-angle gear. The pump assembly is housed in a wooden shed mounted on a steel bridge assembly that spans part of the dredge pond.

The pipeline is of the type commonly used for oil trunk lines. It comprises 1615.5 m (5300 ft) of 16 in (40.6 cm diametre steel spiral-seam pipe made from $\frac{1}{4}$ in thick stock. This is joined to 365.75 m (1200 ft) of 12 in (30.5 cm diametre steel pipe. The 16 in diametre pipe was assembled by welding 20 ft (6.1 m) lengths. The 12 in diametre pipe was assembled in 20 ft (6.1 m) lengths with victolic couplings.

Cut-off valves are located at each end of the pipeline. Near the pump there is a check valve and a blow-out safety valve.

Water for sluicing is supplied from the pipeline through a series of valves and monitors.

4.2 Description of the Sluice Plant

The sluice plant is located at the northern end of a rock-floored holding basin in the west-central part of the claims at an elevation of about 436 m (1430 ft)(Figures 5 and 6).

Power for the plant is provided by a 27 kw Finning Porta-lec PL501 diesel generator. The generator is located by the water pipeline just east of the s luice plant.

The sluice plant comprises two primary sluices, a large double-decked shaker box, 12 secondary sluices, a clean-up plant and associated flumes and hardware.

All of the plant and machinery has been assembled using S.A.E. sizes and imperial measurements. These have been retained in the following description for simplicity.

The primary sluices are 2 parallel 40 ft long, 3 ft x 4 ft boxes made of $\frac{1}{4}$ in steel plate. There is a steel plate flood gate at the lead-ent of these boxes to enable clean-up of one box to proceed while gravel is being run through the other. The floors of the boxes contain 3 in angle iron transverse "hungarian" riffles over rubber-coated matting held in place by steel jam cleats. A trap door at the tail end of each primary box is opened during clean-ups to pass gold and black sand directly to the clean-up plant below. About 91% of the total recovered gold is reportedly caught in the primary sluices.

Gravel is dumped from the primary sluices into a 7 ft x 16 ft Hewitt-Robins double-deck shaker box. This box is operated by a 25 hp electric motor that turns an eccentric cam. shaft with a ½ in stroke at 0.625 RPM.

All material over 3/4 in diametre is passed over the screens in the shaker directly to the tail race. The -3/4 in fraction falls through the box to 12 secondary sluices.

The 12 secondary sluices are 1 ft x 4 ft x 20 ft long. They are made of steel plate and are floored with 5/8 in expanded steel mesh set on mat. Gravel is collected from the secondary sluices by a transverse tail sluice set with steel strap riffles about 2 ft apart and expelled to the tailings pile through a 20 ft long 1 ft x 4 ft tail race.

During clean-up, material from within the riffles of the secondary sluices is washed into steel boxes. The boxes are taken up to the primary sluices by a CAT. 980B loader and dumped in. From there, gold and black sand is sent through the trap doors in the primary sluices to the clean-up plant.

The clean-up plant is housed in a shed below the primary sluices. There, gold and black sand enters a triple-deck Dillon Screen shaker unit with 3/4, ½ and ¼ in screens. The three fractions passing over the screens are sluiced in small sluices set at steep angles. The -¼ in fraction is sent directly to a Mill-Spex centrifuge for gravity separation of gold and black sand.

Compared with many regions, the amount of black sand occuring with gold in the White Channel placers near Dawson is very slight. The

normal ratio of gold to black sand is about 10:1. This greatly enhances the efficiency of clean-ups.

Sluicing efficiency was tested by New Era Engineering Corporation as part of a territory-wide project funded by the Yukon Placer Miner's Association.

Radio-active gold tracer particles of known size distribution were sent through the sluice plant, collected and recounted.

Randy Clarkson (1989) reported that the secondary sluices at the Jackson Hill plant recovered 98% of the gold received, indicating that the overall recovery of the entire sluicing system was in excess of 99%.

4.3 Description of Mobile, Camp and Mining Equipment

Some of the equipment previously described in this report was leased from White Channel Underground Mining Ltd. and others. Only owned equipment is included in the description that follows.

A. Heavy Mining Equipment

Eimco 10 yd^3 scoop trams with underground exhaust scrubbers:

No.1 -generally in good condition, normal wear on bucket, no hydraulic problems, 60-70% rubber on tires

No.2 -moderately good working condition, needs welding on bucket, needs 2 tires

Caterpillar 631B Scraper:

-has newly rebuilt engine (about 50 running hr since rebuild), no hydraulic problems, normal wear on bucket, extensive wear on cutting edge, needs 2 tires

Caterpillar D9G Bulldozer with end-push blade and single-tooth ripper

-transmission and torque converter rebuilt during 1989, recent extensive hard-surfacing on blade, tracks and rollers are all good, extensive undercarraige wear

Caterpillar 980B Loader:

-engine rebuilt in Nov., 1988, new cutting edge and wear plates on bucket, no hydraulic problems, moderately good tires

Joy 1200 CFM Compressor with a CAT. 343 diesel engine:

-generally good condition

Small trucks:

1980 GMC 3/4 ton 4X4 pick-up, V8 gas engine
1977 FORD 3/4 ton 4X4 pick-up, V8 gas engine
1977 FORD 3/4 ton 2X4 crew cab, V8 gas engine
1985 FORD 1 ton 4X4 crew cab, V8 gas engine

-good operating condition

Camp:
-4 insulated steel trailers with freezer-type doors, all mounted on steel skids; 2 are outfitted for sleeping, 1 is ½ bunks and ½ washing facilities, 1 trailor contains a complete kitchen for a crew of 20
-Power Plant; 27 kw BBC 205 generator powered by a Nissan SD 33 diesel contained in a steel shed mounted on skids
-Fuel Tanks; 1000 gal diesel and 800 gal propane tanks mounted on steel skids

Other Mining Equipment:
Fuel tanks; 500 gal, 1000 gal, 3000 gal.
Air fans; 2 36 in, 1 30 in, 2 24 in
3000 ft of 2.0 heavy electrical cable
Explosive plant for mixing ANFO
light, fixtures, hand tools, power tools, parts, filter inventory

4.4 Estimated Value of Plant and Equipment

A. Water Pump and Pipeline

CAT. 398B diesel (with about 10,000 hr)	$ 30,000	
Pump, transmission and gears	$130,000*	
5300 ft 16" dia. spiral-weld steel pipe @ $17.31/ft	$ 91,743	
1200 ft 12" dia. victolic steel pipe @ $20.65/ft	$ 24,860	
58 victolic couplings @ $50 ea.	$ 2,900	
Valves and monitors	$ 20,000	
Assembly costs: pump, shed and bridge	$ 20,000*	
pipe laying and welding	$ 80,000*	Bal. C.F.
	$399,423	$399,423

	Bal C.F.	$399,423

B. Sluicing Plant

Finning Porta-lec PL501 30 kw Generator (11,000 hrs)	$ 5,000	
80 ft 3X4 ft steel plate primary sluice with doors, jam cleats and steel hungarian riffle sets	$ 25,000	
Hewitt-Robins M11 double-deck shaker with engine, mounts and eccentric drive system	$ 25,000	
200 ft of steel sluice (iron-bending in Vancouver)	$ 24,000*	
Dillon Screen triple-deck clean-up plant with water valves, pipe and sluices	$ 25,000	
Mill-Spex centrifuge	$ 1,500	
Steel tressle, connecting pipes, electrical gear	$ 25,000	
Site preparation and assembly costs	$260,000*	
	$390,500	$390,500

C. Mobile Machinery

Eimco 10 yd^3 scoop tram No.1	$ 25,000	
" " " " " No.2	$ 15,000	
CAT. 631B Scraper	$ 40,000	
CAT. D9G Bulldozer	$ 60,000	
CAT. 980B Loader	$ 30,000	
4 small trucks (total)	$ 12,000	
Joy 1200 CFM Compressor	$ 5,000	
	$187,000	$187,000

D. Camp

4 10 x 40 ft steel trailers, skid mounted	$ 40,000	
1 27 kw generator in shed, skid mounted	$ 3,000	
1000 gal diesel, 800 gal propane tanks	$ 6,000	
20-man kitchen, water and sewage equipment	$ 11,000	
	$ 60,000	$ 60,000

E. Other Mining Equipment

Air fans 2 x 36", 1 X 30 ", 2 X 24"	$ 18,000	
Fuel tanks	$ 3,000	
Tools, filter inv.,lights, etc.	$ 20,000	
3000ft 2.0 elec. cable @ $44.90/m	$ 40,234	
	$ 81,234	$ 81,234
	Bal. C.F.	$1,118,157

Bal. C.F.	$1,118,157

F. Transport

The preceeding prices are all calculated F.O.B. Vancouver. The writer estimates that it would take about 25 flat-bed trucks to haul unassembled steel and equipment to the property at Dawson City Yukon

25 flat-bed loads Vancouver-Dawson @ $3900 ea.	$ 97,500
Total Estimated Value of Plant and Equipment on the Property:	$1,215,657

Notes:

* original 1980 construction cost quoted from G. Crawford who contracted for some of the assembly for Universal Exp. in 1980

5.0 OPERATING AND ENVIRONMENTAL PERMITS

5.1 Water Use Licence

The company has Water Use Licence No. Y-PM88-109 issued by Indian and Northern Affairs pursuant to the Northern Inland Waters Act and its regulations.

This licence grants the right to obtain water from the dredge ponds on the property near the Klondike River at a maximum rate of 4,620,000 gal/day.

The company uses 3000 gal/min in its sluicing operation. During a standard 12-hour shift, water consumption is rated at 2,160,000 gallons. This is well below the maximum allowed by the licence.

The company also has the right to return water and sluice tailings to the western part of the property (Figure 5).

This water use licence expires on September 30, 1991.

During a telephone conversation, it was conveyed to the writer by

officials of the local water board that they were quite satisfied with the sluicing operation on the Jackson Hill property.

It seems that the company will be able to renew its water use licence in 1991 if it chooses to do so.

6.0 LOCATION AND EXTENT OF MINABLE GOLD RESERVES AND EXPLORATION TARGETS

6.1 White Channel Gravel Apron in the Hydraulic Pit

When Universal Explorations extended the hydraulic pit in 1980-1, an apron of basal White Channel gravel was left on the floor of the pit in the portal 'B' area (Figure 6).

It seems unlikely that the apron was left through incompetence. It was probably saved for the conclusion of underground mining behind the pit.

The apron was discovered by the Jackson Hill Mining crew during sluicing in 1989. They excavated a trench in the apron that contained about 12,000 yd^3 of gravel, of which about 4,000 yd^3 was undisturbed White Channel pay gravel.

About 300 placer ounces of gold was recovered from the gravel in the trench resulting in an inferred concentration in the White Channel gravel of: 0.08 placer oz/yd^3 X 0.836 fine = 0.067 fine oz/yd^3 gold.

The writer examined the gravel in the walls of the 1989 trench during his examination of the property (pages 13 and 14, this report). In the eastern wall of the trench, White Channel gravels were 4 to 8 ft (1.2 to 2.4 m) thick. They rested on very weathered Yukon Group bedrock and were themselves overlain by about 30 ft (9.1 m) of slump gravel.

The existence of the apron's western margin is verified in outcrop in the eastern wall of the 1989 trench (Figure 6). A possible shape of the

remaining apron has been determined by the writer's observations of elevation contours within the hydraulic pit.

The remaining apron may extend over an area of about 8000 yd^2. An average White Channel gravel thickness of 5 ft (1.5 m) would result in a body with a minable pay thickness of 6 ft (2 yd) if 1 ft of weathered bedrock was taken with the pay gravel. Thus, the total volume of pay from this apron would be 16,000 yd^3.

Part of the 1923 Crofton tunnel went through this gravel apron, following the lowest and richest part of the pay shannel (page 19, this report). The writer calculated that the average gold concentration along the tunnel where it crossed the apron to be 0.17 oz/yd^3.

Averaging the Crofton channel bottom average gold concentration with the side-channel average gold concentration obtained from production from the 1989 trench results in a possible average gold concentration within the whole apron of (0.067 oz/yd^3+0.17 oz/yd^3)÷2=0.12 oz/yd^3.

Possible volumes and values of gold contained within the apron are as follow:

Apron Pay Volume	Grade Au Placer oz (.836 fine)	Grade Au Troy oz (.999 fine)	Tl. Au content Troy oz	Tl. Value Au= $440 CDN	Value/yd^3 Au= $440 CDN	Value Source
16,000 yd^3	0.08	0.067	1,072	$471,680	$29.48	1989 Trench
"	0.14	0.12	1,920	$844,800	$52.80	average
"	0.20	0.17	2,720	$1,196,800	$74.80	Crofton Tunnel

If the volume of pay gravel is larger than 16,000 yd^3 or the grade of gold is higher than the computed average, the value will increase toward that indicated in the Crofton tunnel. If the volume of pay gravel is smaller or the grade of gold is similar to that obtained form production

in the 1989 trench then the total value will decrease toward that indicated in the trench.

The pay gravel lies beneath an average thickness of about 30 ft (10 yd or 9.1 m) of slump gravel. The slump gravel must be stripped to uncover the pay gravel. The volume of slump gravel is about 80,000 yd^3.

The company can strip unconsolidated, unfrozed gravel on surface for about \$1/yd^3 using the CAT. 631B scraper (A. Skerlec, pers. comm.). Current sluicing costs on the property are quoted to be about \$2.50/yd^3. which are similar to those reported by Hilker(1987).

Production cost projections for the White Channel gravel apron are as follow:

	1989 Trench Value 0.067 oz/yd^3	Average Value 0.12 oz/yd^3	Crofton T. Value 0.17 oz/yd^3
Revenue: gold @ \$440 CDN/oz	\$ 471,680	\$ 848,800	\$1,196,800
silver @ \$6.17 CDN/oz	\$ 1,296	\$ 1,974	\$ 3,294
Total Revenue	\$ 472,976	\$ 850,774	\$1,200,094
Costs:			
Stripping 80,000 yd^3 slump gravel	\$ 80,000	\$ 80,000	\$ 80,000
Tspt. of 16,000 yd^3 pay gravel to sluice plant	\$ 16,000	\$ 16,000	\$ 16,000
Sluicing 16,000 yd^3 pay gravel	\$ 40,000	\$ 40,000	\$ 40,000
10% royalty to Heitmann and Hinnek	\$ 47,298	\$ 85,077	\$ 120,009
Yukon royalty \$0.375/oz	\$ 402	\$ 648	\$ 918
Bullion tspt \$0.60/oz	\$ 643	\$ 1,152	\$ 1,632
Refining: \$200+2% Au+4%Ag	\$ 8,739	\$ 15,490	\$ 21,860
Total Cost:	\$ 193,082	\$ 238,367	\$ 280,419
Profit:	\$ 279,894	\$ 612,407	\$ 919,675

6.2 Gold Reserve Blocks in the Drift Mine Workings

There are three significant reserve blocks in the drift mine workings in the southern part of the Jackson Hill property (Figure 6). They are located west of portal 'B' and south of portals 'D' and 'H'.

All of these reserve blocks are bounded to the south by the property boundary which is extrapolated by the writer from measurements from posts near the sluice plant and from the claim map (Figures 3 and 6).

An accurate location of the boundary would require a legal survey.

Reserve block 'A' is located west of the 'B' workings near the western boundary of the pay channel (Figure 6). Gravel mined in the nearby 'B' workings had an an average grade of about 0.035 oz/yd^3 worth about \$15.35/yd^3 at gold = \$440 CDN. This was recovered from 15 ft high drifts.

The company is redesigning its drifts to a height of 12 ft to increase average grade and reduce mining costs. With 12 ft drifts, the average grade per cubic yard would increase because almost all the gold is in the bottom 6 ft of the section.

The average gold concentration in reserve block 'A' would increase to 0.044 oz/yd^3 and the average value of the pay gravel mined would be increased to about \$19.36/yd^3 with the lower drifts.

Reserve block 'A' covers an area of about 6000 yd^2 resulting in its containing about 24,000 yd^3 of gravel. If 14% of the block is left in pillars during mining, as is the current practice on the property, a total of about 20,640 yd^3 of gravel would be mined from the block. It would be worth about \$399,520.

All of reserve block 'A' is in permafrost. No ground stability problems are anticipated during mining of that block.

Reserve block 'D' is the smallest but probably the highest grade block of the three. It covers an area of about 3100 yd^2 near the centre of the pay channel (Figure 6).

Sampling data from 1989 indicate that reserve block 'D' contains gravel with an average gold concentration of about 0.07 oz/yd^3 in the lowest 12 ft of the section. That gravel would have an average value of \$30.74/yd^3. This block contains a total of 12,400 yd^3 of pay gravel of which 86% or 10,664 yd^3 could be mined with current methods. This would be worth about \$327,800.

Reserve block 'D' is completely in permafrost. No ground stability problems are anticipated during mining in reserve block 'D'.

Reserve block 'H' is the largest of the three reserve blocks, covering an area of about 17,000 yd^2 (Figure 6). It is located in the eastern part of the pay channel where recovered gold concentrations have been comparatively low; about 0.03 oz/yd^3 in drifts of variable height

(page 28, this report).

During the 1988-9 mining season, drifts advanced south of the area of permafrost into unfrozen ground. In the unfrozen areas, some of the drift ceilings developed cupolas as much as 30 ft (9.1 m) high. Mucking these, greatly increased dilution and decreased average grade for the area.

The writer anticipates similar problems in mining the southern half of reserve block 'H' unless time is taken to freeze gravel ahead of mining. This could be done by alternately advancing into newly frozen ground and mining out permafrost areas.

Timbering is not an acceptable alternative to freezing ahead of mining. Although logs can be bought from local saw mills at a truck-load rate of $30/log, the total cost of supporting large 12 x 15 ft tunnels would be from $350 to $500/ft advance. This cost is prohibitive.

If the miners could maintain 12 ft high drifts and mine out 80% of the total 68,000 yd^3 volume of reserve block 'H', then 54,400 yd^3 of pay gravel could be mined with an average gold concentration of 0.038 oz/yd^3 worth about $16.50/$yd^3$ for a total vlaue of $909,480.

The minable volumes, gold concentrations and estimated values of pay gravels are summarized as follow:

Reserve Block	Volume yd3	Grade Au Placer oz (.836 fine)	Grade Au Troy oz (.999 fine)	Tl. Au Content Troy oz	Tl Value Au=$440 CDN	Value/yd^3 Au=$440 CDN
'A' (86% vol)	20,640	0.053	0.044	908	$399,520	$19.36
'D' (86% vol)	10,664	0.084	0.07	745	$327,800	$30.74
'H' (80% vol)	54,400	0.045	0.038	2067	$909,480	$16,50

The average mining cost of mining White Channel gravel in permanently frozen ground during the 1988-9 mining season was about $10/yd^3 (A. Skerlec, pers. comm.).

Sluicing costs, as mentioned previously, are about $2.50/yd^3.

Production cost projections for reserve blocks 'A', 'D' and 'H' are as follow:

	Reserve Block 'A' Value 0.044 oz/yd^3	Reserve Block 'D' Value 0.07 oz/yd^3	Reserve Block 'H' Value 0.038 oz/yd^3
Revenue: gold @ $440 CDN/oz	$399,520	$327,800	$909,480
silver @ $6.17 CDN/oz	$ 1,098	$ 901	$ 2,499
Total Revenue	$400,618	$328,701	$911,979
Costs:			
Underground mining @ $10/yd^3	$206,400	$106,640	$544,000
Sluicing costs @ $2.50/yd^3	$ 51,600	$ 26,660	$136,000
10% royalty to Heitmann and Hinnek	$ 40,062	$ 32,870	$ 91,198
Yukon royalty $0.375/oz	$ 341	$ 280	$ 775
Bullion tspt 0.60/oz	$ 545	$ 447	$ 1,240
Refining:$200+2%Au+4%Ag	$ 8,234	$ 6,801	$ 18,490
Total Costs:	$307,182	$173,698	$791,703
Profit:	$ 93,436	$155,003	$120,276

6.3 Gold-bearing Pay Gravel in Lower Jackson Creek

The 1987 drilling confirmed that undisturbed Jackson Creek pay gravel existed on the north-central part of the property (Figure 5). Drill Hole No.2 intersected 6 ft (1.8 m) of gravel containing an average gold concentration of about $78.15/yd^3 at Au=$440 CDN at depths from about 71 to 77 ft (21.6 to 23.5 m).

Before the dumping of sluice tailings and dredging, Jackson Creek flowed westward toward Klondike River (Figures 2 and 5). It eroded the

White Channel gravel and redeposited the gold in its own sediments.

Drilling proved that not all of the lower Jackson Creek pay gravel was dredged.

It is possible that Jackson Creek pay gravels extend across the northern part of the claims in a 6 ft thick zone covering up to 208,000 yd^2 containing about 416,000 yd^3 of pay gravel. If the $78.15 value from the drill hole is representitive of gold values throughout the whole block then the block contains an average of 0.178 oz/yd^3 gold. At that grade, the block would contain about 74050 troy oz of gold worth about $32,581,120.

If this block is burried beneath an average of 75 ft (22.8 m) of tailings and other unfrozen sediments. It would be comparitively inexpensive to strip and mine with scrapers.

In the writer's opinion, the lower Jackson Creek pay gravel is the most exciting exploration target on the Jackson Hill property.

7.0 CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

The Jackson Hill property contains an active underground placer drift mine. The mine exploits an old high-level channel of Bonanza Creek containing a large quantity of Tertiary-age White Channel gravel.

Gold recovered from this gravel is flakes and nuggets averaging about 4 mm in length with an average fineness of about 0.836.

Mining plant and equipment on the property include: a pump and water pipeline, sluicing plant, heavy mining machinery and light trucks, camp and supplies. The current in-place value of these assets on the property is $1,215,657. Replacement cost would be much higher.

The drift mine was operated from 1982 until 1986 by Universal Explorations Ltd. of Calgary, Alberta and from 1986 until 1989 by Jackson Hill Mining Limited of Vancouver, B.C. These companies mined a total of 290,488 yd^3 of gravel yeilding 14,852.5 ounces of placer gold (.836 fine) containing 12,417 troy ounces of .999 fine gold. At today's prices, about $440 CDN/oz Au, the 1982-9 gold production from the mine would be worth about $5,463,480.

Reserves within the drift mine workings are located in three blocks that contain a total estimated recoverable volume of about 55,700 yd^3 of gravel containing about 3720 troy ounces of gold worth about $1,636,800. These reserves may be larger if the southern boundary of the property is farther south than extrapolated by the writer. The underground reserves can be mined at a profit if 12 ft high drifts are maintained.

The most lucrative reserves in the mine-area may be located in an apron of White Channel pay gravel that can be mined inexpensively by surface stripping. The apron may contain 16,000 yd^3 of pay gravel containing from 1070 to 2720 troy ounces of gold worth from $471,680 to $1,196,800.

A large reserve of gold-bearing lower Jackson Creek gravel may be present beneath the north-central part of the claims. This exploration target may possibly contain up to 416,000 yd^3 of pay gravel containing up to 74050 troy ounces of gold worth an estimated $32,581,120 at current prices.

All the permits required to mine on the property are in place.

7.2 Recommendations

Surface stripping on the property is much less expensive than drift mining. The writer generally recommends that reserves minable by surface stripping should be actively explored and developed to maximize profitability.

The highest priority exploration and development targets on the property should be the apron of White Channel pay gravel in the hydraulic pit and the undisturbed lower Jackson Creek pay gravel in the northern part of the property.

Both of these areas should be tested by a drill program during spring, 1990 so that stripping and sluicing can commence in summer, 1990.

Assuming success during drilling, the apron in the hydraulic pit should be developed first. It comprises up to 16,000 yd^3 of pay gravel containing as much as 2720 troy ounces of gold. It is covered by a small mound of slump gravel about 25 ft thick that could be inexpensively stripped. After stripping and sluicing costs, the apron could provide the company with an immediate net cash flow of up to about $920,000.

While gravel from the apron is being sluiced, the lower Jackson Creek gravel could be stripped in preparation for sluicing, or the two programs could be conducted concurrently depending on the company's priorities.

The lower Jackson Creek gravel is the largest potential production target on the property comprising as much as 416,000 yd^3 of pay gravel that could contain in excess of 74,050 troy ounces of gold worth about $32,581,120 at $440 CDN/oz. This pay gravel is overlain by about 75 ft (22.8 m) of tailings and sediment. If its full projected extent is proven, this target would require several seasons to mine out.

7.3 Recommended Program

PHASE 1:Churn Drilling

A total of 1400 ft of churn drilling should be conducted on the pay gravel apron in the hydraulic pit and near 1987 drill hole No.2 in the lower Jackson Creek area. Drill hole footage should be divided between the two areas as follows

Apron in the Hydraulic Pit:	225 ft of drilling comprising 3 drill holes, each being about 75 ft deep
Lower Jackson Creek:	1175 ft of drilling comprising 10 drill 10 drill holes drilled in a 2 x 5 hole grid

A truck mounted drill can be used on the property to facilitate moving between holes.

PHASE 2:Production of the Pay Gravel from the Hydraulic Pit

If reasonable encouragement results from the reserves inferred by the drilling on the apron during PHASE 1, then the company should proceed to strip and sluice the pay gravel apron in the pit.

PHASE 3:Production of the Pay Gravel from lower Jackson Creek

If reasonable encouragement results from the reserves inferred by the drilling on the apron during PHASE 1, then the company should proceed to strip and sluice the pay gravel from lower Jackson Creek.

Phases 2 and 3 could be done concurrently depending on the local availability of machinery in the Dawson area and the company's desired sluicing schedule.

7.4 Estimated Cost of Recommended Program

PHASE 1: 1400 ft of Drilling

1400 ft of Churn Drilling from a truck mounted rig including mobilization and moving between drill sites $40/ft (standard contract price in Dawson City)	$56,000
1 geologist or engineer 30 days @ $250/day	$ 7,500
geo. costs in transit hotel,meals, air fare etc.	$ 4,000
Assay and sampling	$ 500
Report production	$ 2,000
	$70,000
Contingency	5,000
PHASE 1 Total Cost:	$75,000

PHASE 2: Production from the Pay Gravel of the Hydraulic Apron

Production cost analyses reproduced from page 39, this report

	1989 Trench Value 0.067 oz/yd^3	Average Value 0.12 oz/yd^3	Crofton T. Value 0.17 oz/yd^3
Revenue: gold @ $440 CDN/oz	$ 471,680	$ 848,800	$1,196,800
silver @ $6.17 CDN/oz	$ 1,296	$ 1,974	$ 3,294
Total Revenue	$ 472,976	$ 850,774	$1,200,094
Costs:			
Stripping 80,000 yd^3 slump gravel	$ 80,000	$ 80,000	$ 80,000
Tspt. of 16,000 yd^3 pay gravel to sluice plant	$ 16,000	$ 16,000	$ 16,000
Sluicing 16,000 yd^3 pay gravel	$ 40,000	$ 40,000	$ 40,000
10% royalty to Heitmann and Hinnek	$ 47,298	$ 85,077	$ 120,009
Yukon royalty $0.375/oz	$ 402	$ 648	$ 918
Bullion tspt $0.60/oz	$ 643	$ 1,152	$ 1,632
Refining: $200+2% Au+4%Ag	$ 8,739	$ 15,490	$ 21,860
Total Cost:	$ 193,082	$ 238,367	$ 280,419
Profit:	$ 279,894	$ 612,407	$ 919,675

The writer believes that if half of the gold indicated in the 1989 trench value is actually drill-proven in the hydraulic pit apron, that would give sufficient encouragement to proceed with the production of the pay gravel apron.

PHASE 3: Production from the Lower Jackson Pay Gravel

The actual cost of production from the lower Jackson Creek area will depend on parametres such as size and shape of the pay gravel body, gold concentration within it, depth of burial and the contiguity of the gold -bearing sections. These parametres should be sufficiently defined at the conclusion of PHASE 1 drilling to make a production cost estimate.

Vancouver, British Columbia; November 7, 1989

John Ostler; M.Sc., P.Geol.
Consulting Geologist

8.0 REFERENCES

Bostock, H.S.; 1957: Yukon Territory; Selected Field Reports of the Geological Survey of Canada 1898 to 1933; Geol. Surv. Canada, Mem. 284.

Bostock, H.S.; 1948: Physiography of the Canadian Cordillera, with Special Reference to the Area North of the Fifty-Fifth Parallel; Geol. Surv. Canada, Mem. 247, pp. 69-71.

Bostock, H.S.; 1942:Ogilvie; Geol. Surv. Canada, Map 711A.

Clarkson, R.; 1989: Site J Preliminary Tailings Sample Analysis; Private letter from New Era Engineering Ltd.

Cairnes, D.D.; 1914: The Yukon-Alaska International Boundary, between Porcupine and Yukon Rivers; Geol. Surv. Canada, Mem. 67.

Cockfield, W.E.; 1921: Sixtymile and Ladue Rivers area, Yukon; Geol. Surv. Canada; Mem. 123.

Green, L.H.; 1972: Geology of the Nash Creek, Larsen Creek, and Dawson map-areas, Yukon Territory; Geol. Surv. Canada; Mem. 364.

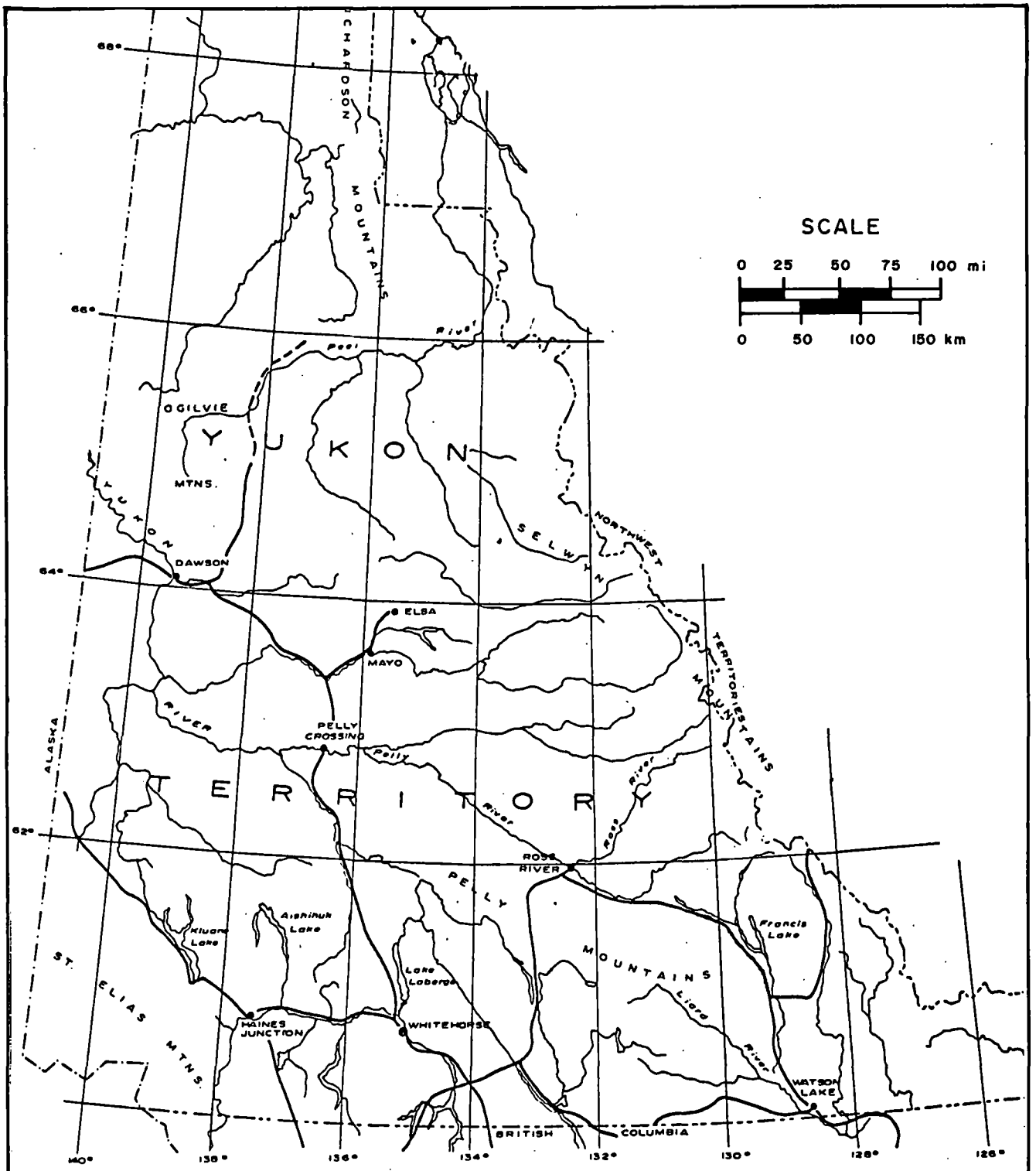
Hilker, R.G.; 1987: Exploration and Development Placer Gold Report, Klondike Gold District, Yukon Territory, Canada, on Jackson Hill High Level Auriferous White Channel Bench Gravels Left Limit Klondike River Valley Yukon Placer Creek and Bench Claims; Report for Jackson Hill Mining Limited.

McConnel, R.G.; 1907: Report on gold values in the Klondike high level gravels; Geol. Surv. Canada, Pub. No. 979; reprinted in Bostock,1957; pp. 217-238.

McConnel, R.G.; 1905: Report on the Klondike gold fields; Geol. Surv. Canada, Ann. Rept. (New Series), Vol. XIV, 1901, Pt. B.

Mortensen, J.K.; 1988: Geology of southwestern Dawson map-area, Yukon Territory; Geol. Surv. Canada, Open File 1927.

Simcox, Jim and Craig, D.B.; 1987: Report on White Channel Underground Mining Limited; Private Company Report.



N.

John Ostler

Figure 1

CASSIAR EAST YUKON EXP. LTD.

CHEERS INTERNATIONAL TELEMARKETING LTD.

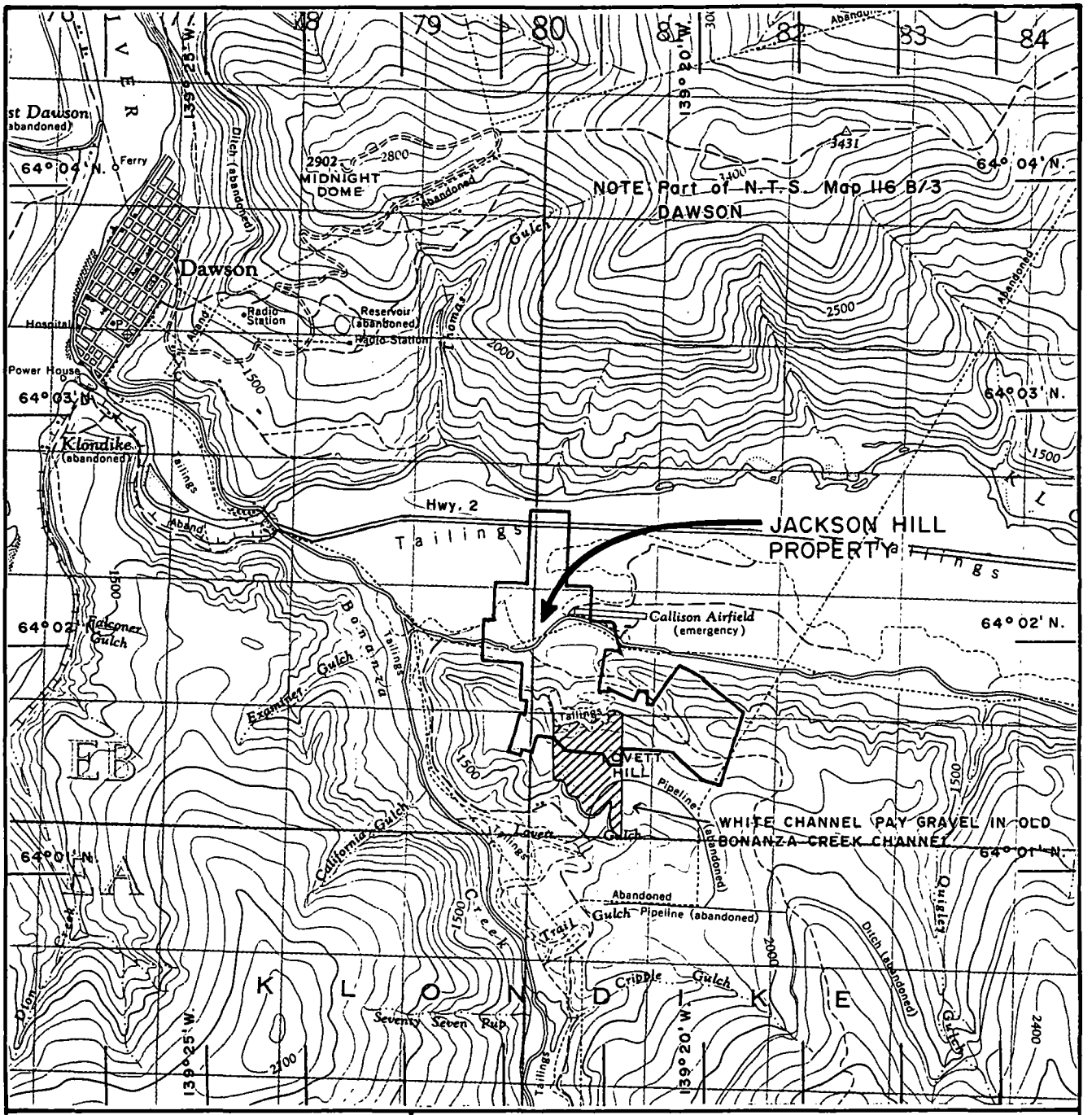
GENERAL LOCATION

JACKSON HILL PROPERTY

64° 1.5' N., 139° 21.5' W.

DAWSON M.D., YUKON N.T.S. 116 B/3

JOHN OSTLER; M.Sc., P.Geol. NOVEMBER, 1989



N.

John Ostler

30°18' N. mag.

as of Dec. 1, 1989

Figure 2

CASSIAR EAST YUKON EXP. LTD.

SCALE

0 1 2 3 km

0 1 2 mi

CHEERS INTERNATIONAL TELEMARKETING LTD.

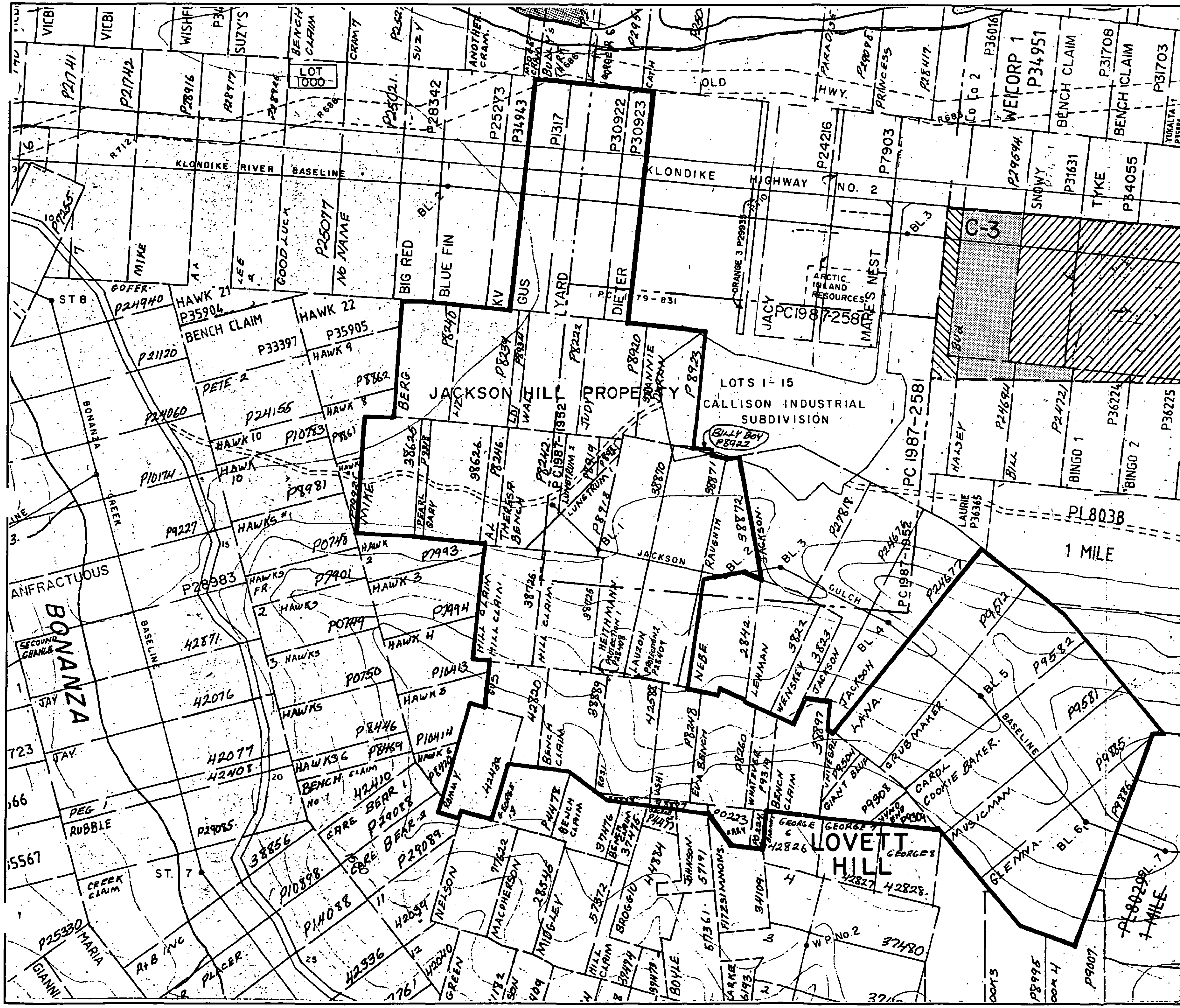
LOCATION and TERRAIN

JACKSON HILL PROPERTY

64°1.5'N., 139°21.5'W.

DAWSON M.D., YUKON N.T.S. 116 B/3

JOHN OSTLER; M.Sc., P.Geol. NOVEMBER, 1989



NOTE: This figure is from part of Indian and Northern Affairs Canada, Placer Sheet 116 B-3c.

SCALE

0 100 200 300 400 500 600 700 800 900 m.

0 500 1000 1500 2000 2500 3000 ft.

N.

30°18' N. mag.

Magnetic declination for the southern part of N.T.S. Map 116 B/3 as of Dec.1, 1989. Declination decreases 3.5' annually.

John Ostler

Figure 3

CASSIAR EAST YUKON EXP. LTD.

CHEERS INTERNATIONAL TELEMARKETING LTD.

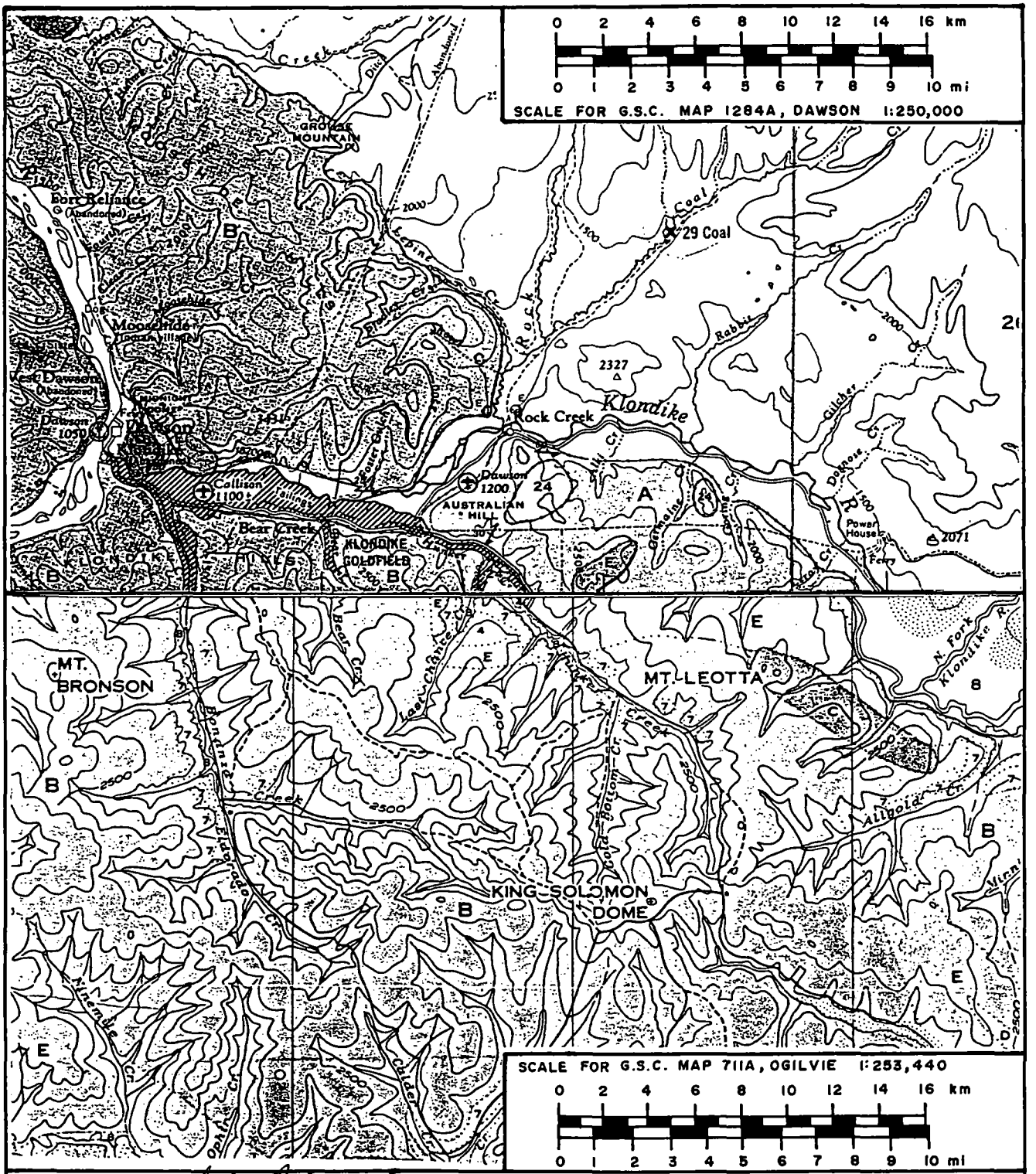
PLACER CLAIM MAP

JACKSON HILL PROPERTY

64°1.5'N., 139°21.5'W.

DAWSON M.D., YUKON — N.T.S. 116 B/3

JOHN OSTLER; M.Sc., P.Geol. — NOVEMBER, 1989



N.

30°18' N. mag.

as of Dec. 1, 1989

Figure 4

CASSIAR EAST YUKON EXP. LTD.

CHEERS INTERNATIONAL TELEMARKETING LTD.

GEOLOGY from G.S.C. MAPS 711A and 1284A

JACKSON HILL PROPERTY

64°1.5'N., 139°21.5'W.

DAWSON M.D., YUKON N.T.S. 116 B/3

JOHN OSTLER; M.Sc., P.Geol. NOVEMBER, 1989

FIGURE 4A

LEGENDS FOR FIGURE 4

Fig.4 South Half
G.S.C. Map 711A

Fig.4 North Half
G.S.C. Map 1284A

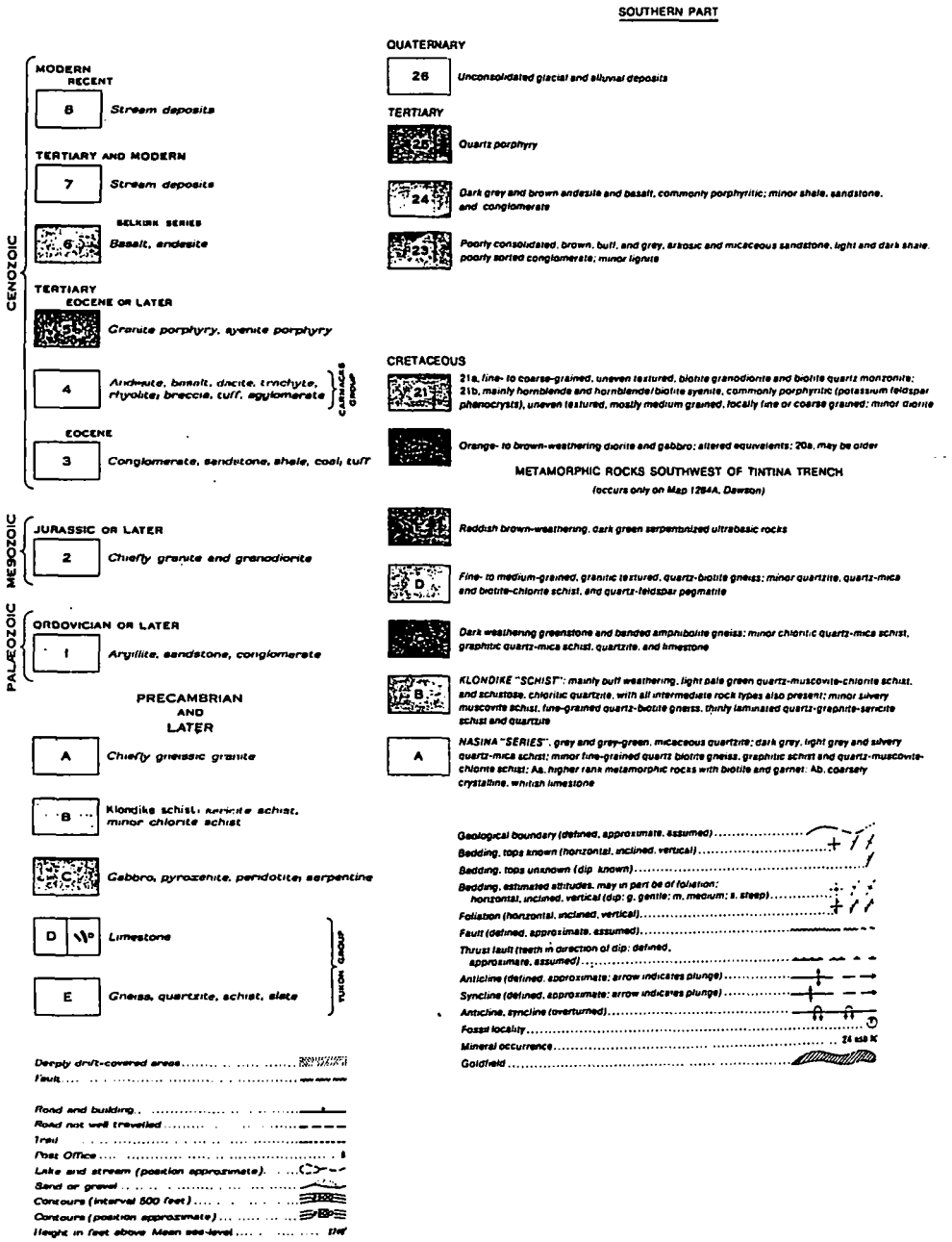
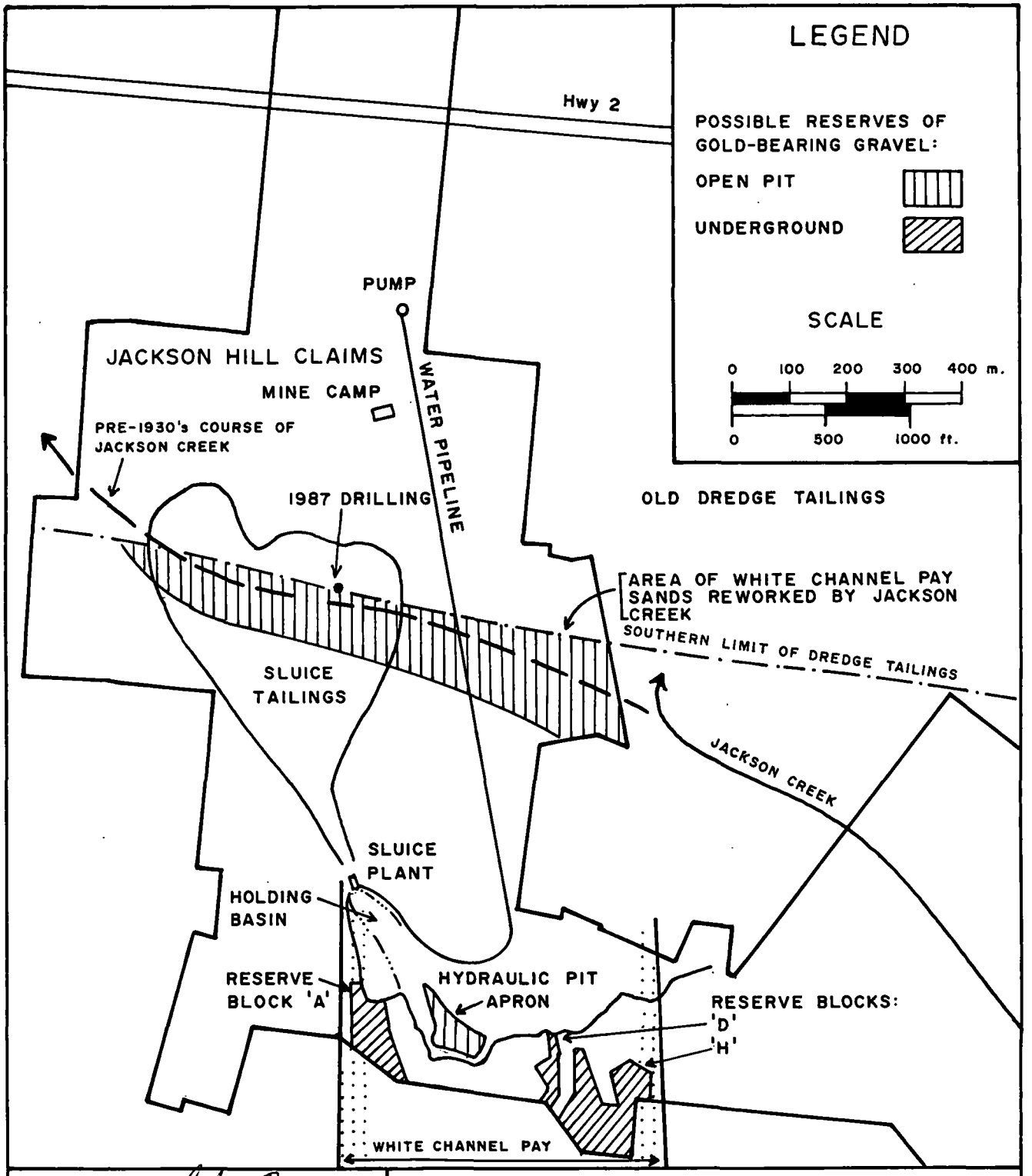


TABLE OF UNITS

SOUTHWEST PART (Southwest of Tintina Trench)		
PERIOD OR EPOCH	MAP-UNIT, GROUP, FORMATION, THICKNESS IN FEET	LITHOLOGY
PLEISTOCENE AND RECENT	26	Unconsolidated glacial and alluvial deposits
Unconformity		
TERTIARY	25	Quartz porphyry
Relationship unknown		
TERTIARY 2000+	24	Andesite and basalt; minor shale, sandstone and conglomerate
Relationship unknown		
TERTIARY	23	Sandstone, shale, and conglomerate; minor lignite
Unconformity		
CRETACEOUS	21	Syenite, granodiorite and quartz monzonite
Intrusive contact		
	E	Serpentinized ultrabasic rock
Intrusive contact		
	D	Gneiss; minor quartzite, schist and pegmatite
	C	Greenstone and amphibolite gneiss
	B; Klondike "Schist"	White mica-rich schist; minor gneiss
	A; Nasina "Series"	Quartzite and schist; minor gneiss and limestone

Compiled by L.H. Green

To accompany GSC Memoir 364, by L. H. Green



N.

30°18' N. mag.

as of Dec. 1, 1989

Figure 5

CASSIAR EAST YUKON EXP. LTD.

CHEERS INTERNATIONAL TELEMARKETING LTD.

LOCATION of WORKINGS and RESERVES

JACKSON HILL PROPERTY

64°1.5'N., 139°21.5'W.

DAWSON M.D., YUKON N.T.S. 116 B/3

JOHN OSTLER; M.Sc., P.Geol. NOVEMBER, 1989

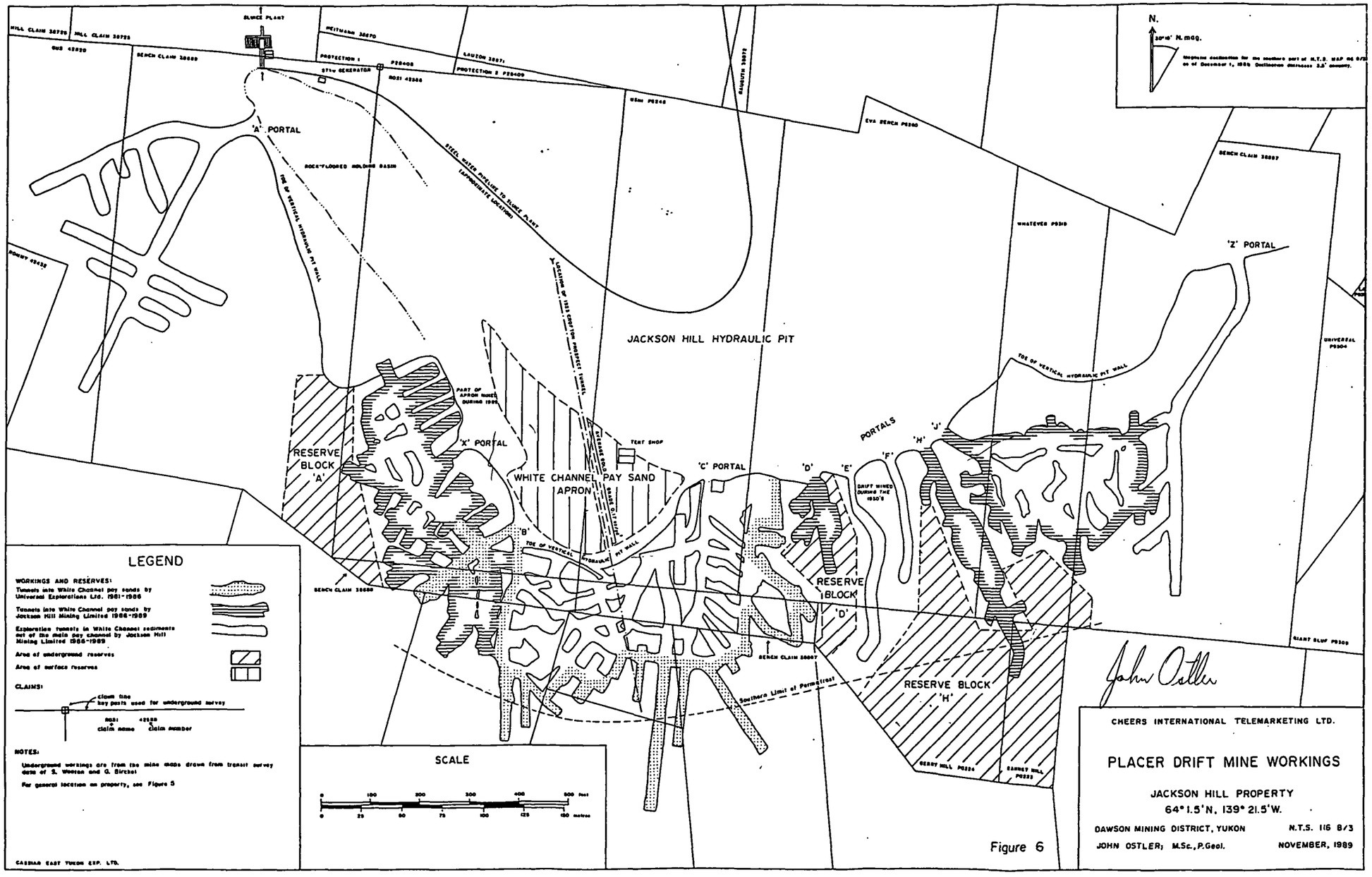

SLUICE PLANT
HILL CLAIM 38726
HILL CLAIM 38725
BENCH CLAIM 38688
PROTECTION 1
PROTECTION 2
STEEL WATER PIPELINE TO SLUICE PLANT (APPROXIMATE LOCATION)
'A' PORTAL
ROCK-FLOORED HOLDING BASIN
TOE OF VERTICAL HYDRAULIC PIT WALL
LOCATION OF 1935 CROSS-PROSPECT TUNNEL
JACKSON HILL HYDRAULIC PIT
PART OF APRON MINED DURING 1935
'X' PORTAL
RESERVE BLOCK 'A'
WHITE CHANNEL PAY SAND APRON
TEST SHOP
'C' PORTAL
'D'
'E'
'F'
'H'
'J'
PORTALS
DRIFT MINED DURING THE 1930'S
RESERVE BLOCK 'D'
RESERVE BLOCK 'H'
Southern Limit of Permafrost
BENCH CLAIM 38687
'Z' PORTAL
WHATEVER POND
UNIVERSAL PS304
GIANT BLUFF PS309
BERRY HILL PS324
BARNEY HILL PS323
N.
20°45' N. (MAG.)
LEGEND
WORKINGS AND RESERVES:
Tunnels into White Channel pay sands by Universal Explorations Ltd. 1981-1986
Tunnels into White Channel pay sands by Jackson Hill Mining Limited 1986-1989
Exploration tunnels in White Channel sediments out of the main pay channel by Jackson Hill Mining Limited 1986-1989
Area of underground reserves
Area of surface reserves
CLAIMS:
claim line
hay posts used for underground survey
claim name
claim number
NOTES:
Underground workings are from the mine maps drawn from transit survey data of S. Weeran and G. Birckel
For general location on property, see Figure 5
CASSIAR EAST YUKON EXP. LTD.
SCALE
0 100 200 300 400 500 feet
0 25 50 75 100 125 150 metres
CHEERS INTERNATIONAL TELEMARKETING LTD.
PLACER DRIFT MINE WORKINGS
JACKSON HILL PROPERTY
64°1.5'N, 139°21.5'W.
DAWSON MINING DISTRICT, YUKON
N.T.S. 116 B/3
JOHN OSTLER; M.Sc., P.Geol.
NOVEMBER, 1989

Figure 6

APPENDIX 'A'

CERTIFICATE OF QUALIFICATION

I, John Ostler, of 2224 Jefferson Avenue in the City of West Vancouver, Province of British Columbia do hereby certify:

That I am a consulting geologist with business address at 1016-470 Granville Street, Vancouver, British Columbia;

That I am a graduate of the University of Guelph of Guelph, Ontario where I obtained my Bachelor of Arts degree in Geography (geomorphology) and Geology in 1973 and that I am a graduate of Carleton University of Ottawa, Ontario shere I obtained my Master of Science degree in Geology in 1977;

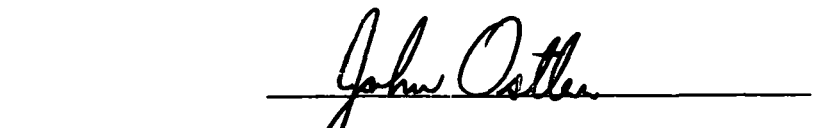
That I am licenced to practice as a Professional Geologist by the Association of Professional Engineers, Geologists and Geophysicists of Alberta, that I am a Fellow of the Geological Association of Canada, and that I am a member of the Yukon Professional Geoscientists Association;

That I have been engaged in the study and practice of the geological profession for over 15 years;

That this report is based on data in literature available for public inspection, and an examination conducted by me on the Jackson Hill proeprty from October 18 to 20, 1989;

That I have no interest in the Jackson Hill property or in the securities of Cheers International Telemarketing Ltd. nor do I expect to receive any.

Dated at Vancouver, British Columbia this 7th day of November, 1989.



John Ostler; M.Sc., P.Geol.
Consulting Geologist