POTENTIAL FOR GOLD EXPLORATION

WHITEHORSE COPPER BELT

YUKON

A. HUREAU

APRIL 1985

CONTENTS

SUMMARY

Gold on the Whitehorse Copper Belt occurs as free gold in copper bearing skarns. The best gold values were obtained from magnetite serpentine skarns in the central part of the Belt. Arctic Chief zones had the highest gold grades; a grade of 0.05 to 0.1 opt gold and 1 opt silver is indicated there for a 2% copper grade.

No significant gold bearing skarn zones have been found outside copper mineralized zones. Known remaining reserves on all deposits on the Belt are well below economic limits at current metal prices.

A grade of 0.04 opt gold is considered a conservative estimate for the undiluted reserve grade of the Little Chief deposit which contained 2.32% copper and 0.042 opt silver. An estimated 50,000 oz. gold are considered to be contained in approximately 10 million tons of tailings.

The North Star and Arctic Chief pendants are considered to have potential at depth for large (> 10 million tons) deposits with copper grades similar to that of Little Chief. Mineralization at North Star had gold grades comparable to that of Little Chief. The depth to potential discoveries is believed to be in the order of 1400' at North Star and 1500 to 2000' at Arctic Chief.

Gold grades at Arctic Chief could be substantiated by sampling remnants of ore in the pits and reassaying drill core. The cost of sampling and assaying would be in the order of $2500. A 2000' drill hole to check the favourable contact would cost approximately $50,000.

A mean gold grade of 0.02 to 0.03 is indicated at Grafter, one intersection there (GR-8) of 29' at 1.29% Cu, 0.026 opt Au and 0.38 opt Ag at at depth of 1000' has not been followed up.

A hole (BC-46) under the Spring Creek showing intersected traces of oxide copper (0.12%) and 0.036 Au over 5.5' at a depth of 200' (vertical) on the skarn-quartzite contact. Higher grades may be present deeper in the pendant.

A large pendant south of the small Copper Cliff showing has not been drilled.

Potential north of Pubelo and south of the Copper Cliff pendant is considered to be low while that in the area between Spring Creek and Pueblo is still largely unknown owing to extensive deep overburden cover.

The vein potential is considered to be low.

RECOMMENDATIONS

If a grade of 2% copper, 0.05 to 0.1 gold and 1 oz silver for 10 million tons at a depth of 1500' to 2000' is deemed to be attractive, the hole layed out on Arctic Chief section 9850 should be drilled. Further drilling would be contingent on results. An estimated 10,000' of drilling would be required to test the pendant at depth.

If metal prices improve to make Little Chief grades (2% cu, 0.04 Au, 0.4 Ag) attractive the North Star pendant should be drilled to follow up earlier intersections.

Mapping and a mag survey should be completed over the Copper Cliff pendant and mineralization at Coppper Cliff should be assayed for gold.

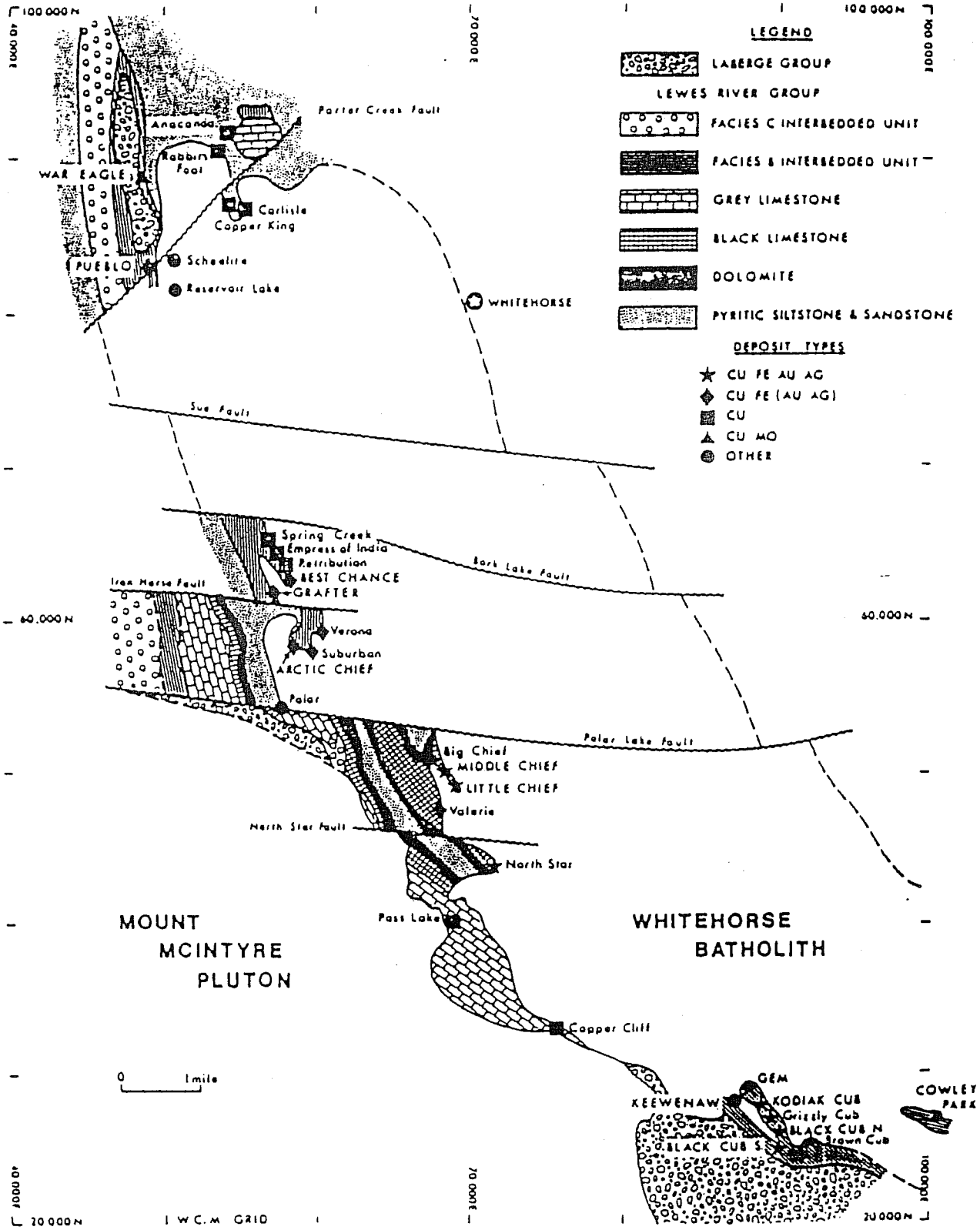

100 000 N
LEGEND
LABERGE GROUP
LEWES RIVER GROUP
FACIES C INTERBEDDED UNIT
FACIES B INTERBEDDED UNIT
GREY LIMESTONE
BLACK LIMESTONE
DOLOMITE
PYRITIC SILTSTONE & SANDSTONE
DEPOSIT TYPES
CU FE AU AG
CU FE (AU AG)
CU
CU MO
OTHER
Porter Creek Fault
Anaconda
Rabbit Foot
WAR EAGLE
Carlisle
Copper King
PUEBLO
Scheelite
Reservoir Lake
WHITEHORSE
Sue Fault
Spring Creek
Empress of India
Retribution
BEST CHANCE
GRAFTER
Iron Horse Fault
Bark Lake Fault
60.000 N
Verona
Suburban
ARCTIC CHIEF
Polar
Polar Lake Fault
Big Chief
MIDDLE CHIEF
LITTLE CHIEF
Valerie
North Star Fault
North Star
Pass Lake
MOUNT
MCINTYRE
PLUTON
WHITEHORSE
BATHOLITH
Copper Cliff
0
1 mile
GEM
KEEWENAW
KODIAK CUB
Grizzly Cub
BLACK CUB N
Brown Cub
BLACK CUB S
COWLEY
PARK
20 000 N
I.W.C.M. GRID

FIGURE 1

TABLE I

ANNUAL COPPER - GOLD PRODUCTION RATIO

YEAR	MINE	TONS MILLED	LBS Cu/OZ Au	MILLGRADE % Cu	RECOVERD OPT Au
1967	Little Chief Pit	453,046	836	1.17	0.019
1968	Little Chief Pit	557,613			
	Arctic Chief Pit	174,482			
	Total -	732,095	732	1.03	0.023
1969	Little Chief Pit	334,048			
	Arctic Chief Pit	124,511			
	War Eagle Pit	346,960			
	Total -	805,519	1042	1.09	0.018
1970	Little Chief Pit	27,838			
	War Eagle Pit	793,633			
	Black Cub South Pit	30,991			
	Total -	852,461	2883	1.04	0.007
1971	War Eagle Pit	27,610			
	Black Cub South Pit	174,461			
	Keewenaw Pit	135,687			
	Total -	337,758	1436	1.02	0.011
1972	Little Chief U. G.	10,707	1553	1.92	0.021
1973	Little Chief U. G.	700,054	1552	1.83	0.020
1974	Little Chief U. G.	626,541	1174	1.84	0.028
1975	Little Chief U. G.	738,062	1093	1.52	0.025
1976	Little Chief U. G.	800,836	1313	1.69	0.023
1977	Little Chief U. G.	901,459	1095	1.65	0.027
1978	Little Chief U. G.	863,093	1075	1.40	0.023
1979	Little Chief U. G.	914,060	1103	1.12	0.017
1980	Little Chief U. G.	854,306	1091	1.38	0.025
1981	Little Chief	485,862			
	Middle Chief	314,516			
	Subtotal -	800,378	1271	1.58	0.020
1982	Middle Chief	627,366	1702	1.42	0.015

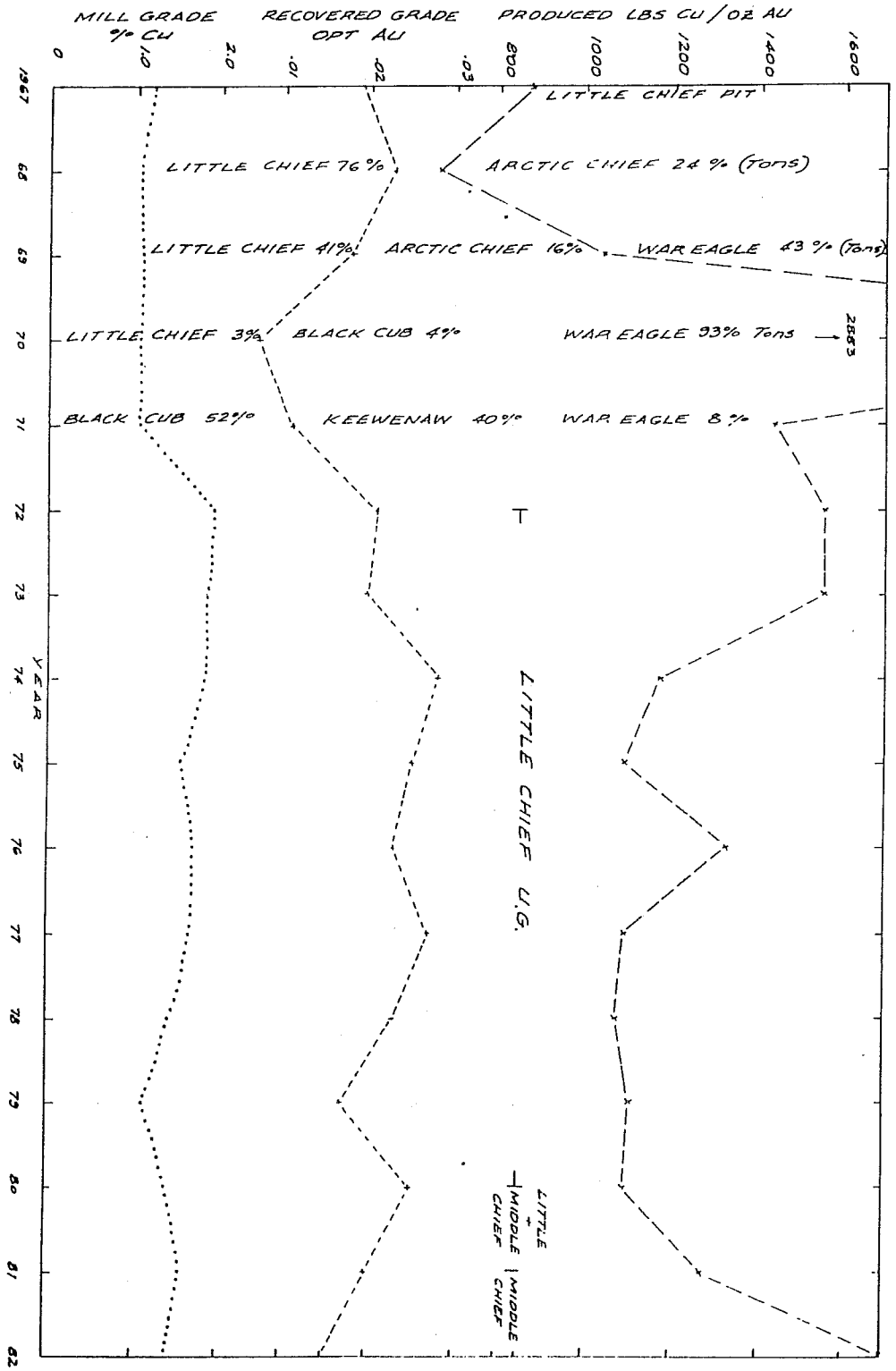
TABLE II

LITTLE CHIEF UNDERGROUND

YEAR	TONS MILLED	MILL GRADE	PRODUCED LBS Cu	PRODUCED OZS Au	RECOVERED OPT Au
1973	700,054	1.83	21,563,064	13,888	0.020
1974	626,541	1.84	20,810,768	17,731	0.028
1975	738,062	1.52	20.062,161	18,630	0.025
1976	800,836	1.69	24,364,262	18,550	0.023
1977	901,459	1.65	26,340,682	24,058	0.027
1978	863,093	1.40	20,923,050	19,443	0.023
1979	914,060	1.12	17,494,036	15,868	0.017
1980	854,306	1.58	23,651,040	21,677	0.025
1981	485,862	1.47	12,564,678	9,883	0.020
Total -	6,884,273	1.55	187,773,741	159,728	0.023

	RESERVE GRADE	TONS MILLED	MILL GRADE	DILUTION GRADE FACTOR	PRODUCED	MILL/SMELTER RECOVERY FACTOR	RECOVERD GRADE % - OPT
Cu	2.32 %	6,884,273	1.55	0.668	187,773,741 lbs.	0.878	1.36 %
Au	(.039)	6,884,273	(.026)	0.668	159,738 ozs.	0.878	0.023
Au	(.042)	6,884,273	(.028)	0.668	159,738 ozs.	(0.82)	0.023

( ) = estimated


MILL GRADE % Cu
RECOVERED GRADE OPT AU
PRODUCED LBS CU / OZ AU
0
1.0
2.0
.01
.02
.03
800
1000
1200
1400
1600
1967
65
69
70
71
72
73
74
75
76
77
78
79
80
81
82
YEAR
LITTLE CHIEF PIT
LITTLE CHIEF 76%
ARCTIC CHIEF 24% (Tons)
LITTLE CHIEF 41%
ARCTIC CHIEF 16%
WAR EAGLE 43% (Tons)
LITTLE CHIEF 3%
BLACK CUB 4%
WAR EAGLE 93% Tons
2883
BLACK CUB 52%
KEEWENAW 40%
WAR EAGLE 8%
LITTLE CHIEF U/G.
LITTLE + MIDDLE CHIEF
MIDDLE CHIEF

INTRODUCTION

Approximately 267,490930 lbs. (133745 tons) Copper, 224,565 oz. gold and 2,837,631 oz. silver were recovered from 11,017,738 tons of ore from skarn deposits on the Whitehorse Copper Belt from 1967 to 1982 by New Imperial Mines Ltd. and Whitehorse Copper Mines Ltd. The Little Chief - Middle Chief deposit produced 88% of the copper; 93% of the gold and 87% of the silver from 84% of the tons milled. At April '85 prices Canadian (Cu $.92/lb, Au $430/oz, Ag $9.20/oz) the respective values of production of the metals is 67% for copper 26% for gold and 7% for silver. Known remaining low grade reserves are well below economic limits at current metal prices. The Cowley Park deposit (837,622 tons at 0.93% Cu, 0.004 gold and 0.025 silver) and the remainder of the Keewenaw deposit (300,000 tons at 1.06% copper, 0.02 gold and 0.2 silver) which were to be mined by open pit methods were considered to be the most attractive in the last years the company operated.

The general geology of the area, that of the deposits and production statistics have been summarized by D. Tenney 1981. The origin and setting of the deposits was the subject of a PhD thesis by Morrison 1981. Information on small occurrences on which little work was done N. I. M. or W. C. M has been reported by Kindle 1964.

ORE CONTROLS

Exploration and mining on the Copper Belt have established the following ore control parameters:

1. Mineralized skarn occurs in carbonate and clastic rocks in pendants within the margin of the Whitehorse Batholith. The pendant shape is believed to provide a restricted zone of circulation of ore forming fluids resulting in more pervasive skarnification and mineralization that at normal sediment - batholith contacts.

2. Skarn is generally restricted to a zone within 400' of the batholith contact.

3. The most extensive ore zones have been developed on a limestone-quartzite contact where it is parallel or nearly parallel to the intrusive contact.

4. The magnetite-serpentine skarns which contain higher gold values occur in skarn derived from dolomite and dolomitic limestone. Calc-silicate skarns with lower gold and higher molybdenum values are developed in limestone, dolomitic limestone or interbedded limestone-siltstone.

GOLD - OCCURRENCE, DISTRIBUTION AND RECOVERY

Generally, considering the present value of gold recovered, there is a lack of primary data on the content and distribution of gold in the deposits. This results from the fact that much of the exploration and mining was done primarily for copper and the relative value of copper produced to that of the precious metals was much higher than it would be at present.

Drill core intersections were not assayed for gold on a routine basis and when assaying was done on drill core or composites of drill core, procedures were followed which ignored the presence of coarse gold. Mill heads and tails were not assayed for gold so that only recovered figures are available.

Gold content is highest in the magnetite serpentine skarn deposits in the central part of the Belt (recovered 0.023 opt Little Chief) and lowest at the north (War Eagle - est. 0.003 opt recovered) and south (Cowley Park est. reserve 0.004 opt) ends. While there is a good positive correlation between copper grade and silver grade of individual deposits the correlation of gold assays to copper assays is poor. Gold was generally free in the ores and coarse visible gold has been seen in samples of average copper grade. Rarely, however, have significant gold assays been obtained from skarns which are barren or very low in copper content and it is felt that, generally, limits of gold bearing skarns would conform to outlines of significant copper mineralization. Correlation factors of up to 0.6 were obtained in a few holes by linear regression analysis of copper to gold content in 5' samples from the ore zones drilled in 1980. It is possible that the apparent lack of correlation of copper to gold content for earlier work may have resulted from inadequate assay procedures for samples of low gold content.

Figure 2 and Table 1 show the annual recovered grade of gold production, mill grade and the ratio of produced lbs. of copper to produced oz. gold. The lowest copper to gold ratio in 1968 is believed to result from Arctic Chief production which has higher gold content. Separate production figures for Arctic Chief were not available and the high gold content contributed by Arctic Chief in 1969 would not be apparent owing to the low gold grade of ore from War Eagle.

LITTLE CHIEF

Drilling and production data were reviewed to determine a hypothetical reserve grade for the deposit and to assess recovery and copper correlation factors which may be applied to potential discoveries.

Diamond Drill Hole Data

Gold and copper assays are available from composite samples of 119 intersections in the ore zone below the 2050 level. They represented 60% of the holes drilled in the lower two thirds of the ore body. These composites were made by combining equal volumes of pulps from 5' samples within the limits of the ore zone. The composites represented an average width of 70'

with a range of 10' to 190'. No steps were taken to determine the presence of coarse gold in the original samples. Rarely a high composite assay was obtained and subsequent assaying of individual samples revealed the presence of visible gold in one of them.

The mean weighted (Σw x assay/Σw) content of the composites was 0.029 opt with a mean weighted copper content of 2.36% copper. The undiluted reserve copper grade was 2.32%. Plotting of the composite gold values on a contoured long section of width x % copper showed no correlation of high gold values to rich copper zones nor did they show any area to be enriched in gold. However, no significant gold values were found outside the copper zone.

Linear regression analysis of values showed no correlation; the results obtained by D. Tenney (Fig. 20 Bulletin 1) which gives a correlation factor of 0.43 for 96 holes could not be duplicated. The resulting line of the latter study would give a grade of 0.016 gold for the mill grade of 1.55 copper. This figure is obviously too low; the recovered grade was 0.023 opt.

Production Statistics

The variation in mill head grade from 1972 to 1982 (Fig. 2 - Table 1 and 2) reflects more the variable dilution of the mining sequence than changes in the grade of the ore body. The apparent correlation of gold to copper grade reflects excessive dilution which results in a grade factor of 0.65 for long hole open stoping. VCR mining reduced dilution from 1980; the VCR grade factor was 0.80

Hypothetical undiluted reserve grades are calculated in table 2. Using the same recovery factors as those calculated for copper, results in a reserve grade of 0.038 opt. L. Betteridge (Mill Superintendent) estimated in 1981 that 80 to 85% of the gold was being recovered. This was at a time when the coarse gold recovery process had been considerably improved over that of earlier years. A 0.82 recovery factor would result in a reserve grade of 0.042. A tailings sample taken from 50' from the decant in 1975 assayed 0.17 opt gold. The mean of four other samples from 150 to 400' from the decant was 0.008.

An undiluted reserve grade of 0.04 opt gold is considered to be a conservative estimate.

A study of gold occurrence and recovery is believed to have been done by Canmet (Engergy Mines and Resources) in 1978. A search is in progress to obtain the results of the study.

ARCTIC CHIEF

Arctic Chief east and west pits contained a total reserve of 219,598 tons at 1.78% copper. A total of 298,993 tons was milled from these deposits in 1968 and 1969. Production figures for those years include ore from Little Chief and War Eagle and the mill grade of Arctic Chief is not known.

The following figures support the belief that Arctic Chief contained the highest gold grade of the deposits on the Belt.

a. Early Production - Arctic Chief West

The following figures for smelter returns for select shipments are reported by Kindle:

Year	Tons	% Cu	opt Au	opt Ag
1904	140	7.22	0.39	2.5
1907	83	5.37	0.18	2.0

Assays to 2 oz gold were reported but did not bear a direct relationship to copper content.

b. The mean values of 39 samples from underground workings at Arctic Chief West in 1916 were 2.28% Cu, 0.065 Au and 2.23 oz Ag.

c. Kindle's sample of "typical ore" assayed 1.52% Cu, 0.065 Au and 2.23 Ag.

d. The mean values for 58 samples from drill core for which copper, gold and silver assays were available were 1.65% Cu, 0.056 Au and 0.036 Ag. Assays of 22' at 3.19% Cu, 0.0995 Au and 0.44 Ag and 1.5' at 3.46% Cu, 0.148 Au and 1.08 Ag were obtained in 1980 drilling.

e. The year in which Arctic Chief ore was milled with Little Chief ore, had the lowest copper to gold ratio of all years of NIM-WCM operation.

f. D. Tenney stated that a list of concentrate shipments indicated that Arctic Chief ore had a much higher gold content - possibly twice that of Little Chief.

Sampling and assaying of remnants of ore in the pits and drill hole intersections could attest to the high gold content. It is also possible that concentrate shipment records and monthly mill production figures could still be found which would establish true metal ratios of the ore mined.

No reserves exist at Arctic Chief nor do any of the zones intersected near surface appear to have the tonnage potential to warrant further drilling. The zones mined or intersected to date are small and irregular, being controlled by an irregular intrusive contact, faults and dykes. A reactive quartzite - carbonate contact which was a major control at Little Chief has been intersected in two holes below the pits but where intersected was too far from the intrusive contact for significant skarn development. The Arctic Chief pendant is much larger and extends deeper than that of Little Chief. All known parameters of ore control on the Belt appear to be satisfied at a depth of approximately 1500 to 2000'. It is felt that potential exists in the lower part of the pendant for a zone of greater than 10 million tons at 2% copper, 0.05 to 0.1 gold and 1 oz silver. The potential for ore within 1000' of surface is believed to be poor.

Drilling of a 2000'hole layed out by the writer in 1982 to check the projected quartzite-carbonate contact at a depth of 1500' would cost approximately $50,000.

NORTH STAR

The presence of copper-gold bearing skarn with grades similar to those of Little Chief has been established in the large North Star pendant one mile south of Little Chief. The depth of the favourable horizon is generally 1400'. Potential exists for a large tonnage with grades similar to those of Little Chief.

GRAFTER - BEST CHANCE - SPRING CREEK

The mean values of eight drill hole intersections at Grafter are 3.07% Cu, 0.031 Au and 0.94 Ag. An intersection in GR-8 of 29' at 1.48% Cu, 0.026 Au and 0.38 Ag, at a depth of 1000' has not been followed up. Only trace to 0.005 opt gold assays were obtained from several good copper grade intersections on Best Chance. Drilling indicates that the Grafter and Best Chance skarns probably join at a depth of 1000'.

Hole BC-46 drilled in 1980 under the Spring Creek showing intersected oxide copper (0.12%) and 0.036 opt Au over 5.5' at the skarn quartzite contact at a vertical depth of 200'. A hole layed out to test the pendant at depth was not drilled.

SPRING CREEK TO PUEBLO

From Spring Creek to Pueblo - a distance of 3 miles the favourable contact is concealed by heavy overburden. Various geophysical methods used have failed to produce good drill targets. A hole is planned later this year to check a limestone intrusive contact in a pendant postulated from magnetic data.

NORTH OF PUEBLO

All production and exploration data indicate a gold grade of trace to 0.005 opt gold for showings and mines in this area.

COPPER CLIFF

A large limestone pendant occurs south of the small Copper Cliff showing. A Reconnaissance I. P. survey over the pendant produced no anomalies. No gold values are reported from the Copper Cliff showing. Mapping and a mag survey should be done to delineate the pendant.

COPPER CLIFF TO COWLEY PARK

Deposits in the Keewenaw - Gem - Black Cub area are drilled off. Gold values for the deposits are estimated to be 0.02 opt. The Gem deposit which is the largest, has a reseve of 700,000 tons at 1.01% copper.

The Cowley Park deposit has a reseve grade of 0.004 opt Au.

VEIN GOLD - SILVER POTENTIAL

Veins in the skarn zones generally occur as discontinuous veinlets. Pervasive quartz -K feldspar veining is present in the Keewenaw endoskarn where approximately 0.02 opt gold was recovered during the mining of the deposit in 1971. No significant values have been reported from veins sampled in diamond drill holes. One Brown Cub hole (BLC-57) contained a low angle 8' quartz - carbonate vein intersection in a fault zone in an andesite dyke. The vein assayed 1.57% Pb, 2.98% Zn, 0.210 opt Ag and

less than 0.003 opt Au.

At Little Chief one narrow 0.1' quartz vein was reported by P. Daum (Mine Geologist - pers. comm.) to have assayed several opt gold. Mining resulted in the caving of the area shortly after it was discoverd making it inaccessible.

A silver bearing tetrhedrite vein was intersected at Arctic Chief west in pre 1907 development. This vein was reported to be 5" to 24" wide and assayed up to 147 opt silver. A sample from the vein in 1956 assayed 83 opt over 5". R. Kenway NIM Manager when Arctic Chief west pit was mined (1968-1969) reported (pers comm) that assays of 200 to 300 opt silver were obtained from the vein when it was mined with the pit.

At Grafter a small quartz veinlet was reported (Kindle P 32) to have been intersected while sinking the shaft.

The only quartz vein explored in the area was on the Golcando - Flornce M claim on the east side of the Whitehorse Batholith on which a 100' shaft was sunk before 1910. A sample taken in 1974 from a 5' quartz vein north of the shaft assayed 0.05 opt Au. A sample from the dump contained only a trace gold.

Quartz veins containing sphalerite occur in clastic sediments north of War Eagle east of Haekel Hill. No high precious metal values have been obtained from them.

REFERENCES

KINDLE, ED 1964 — Copper & Iron Resources, Whitehorse Copper Belt Yukon Territory.

MORRISON, G.W. 1981 — Setting & Origin of Skarn Deposits in the Whitehorse Copper Belt

TENNEY, D. 1981 — The Whitehorse Copper Belt: Mining, Exploration & Geology (1967 - 1980)

APPENDIX I

Arctic Chief-Verona

The Arctic Chief pendant has approximately twice the dimensions of the Little Chief pendant (Fig. 2). Work to date has been concentrated on mining of and exploring the small good grade zones near the west contact of the pendant. Some potential still exists for establishing small tonnage reserves north and south of the pits. Hole AC 49 on sect. 102N could possibly be deepened by reducing to AQ core, to determine whether mineralized magnetite skarn continues below the intersections in AC 47 & AC 48. Drilling to the south was hampered by the existence of numerous irregular dykes which strike perpendicular to the sections and were intersected in critical areas at very low angles to the core. Any drilling program in the area should include provision for directional wedging if dykes are intersected in critical areas.

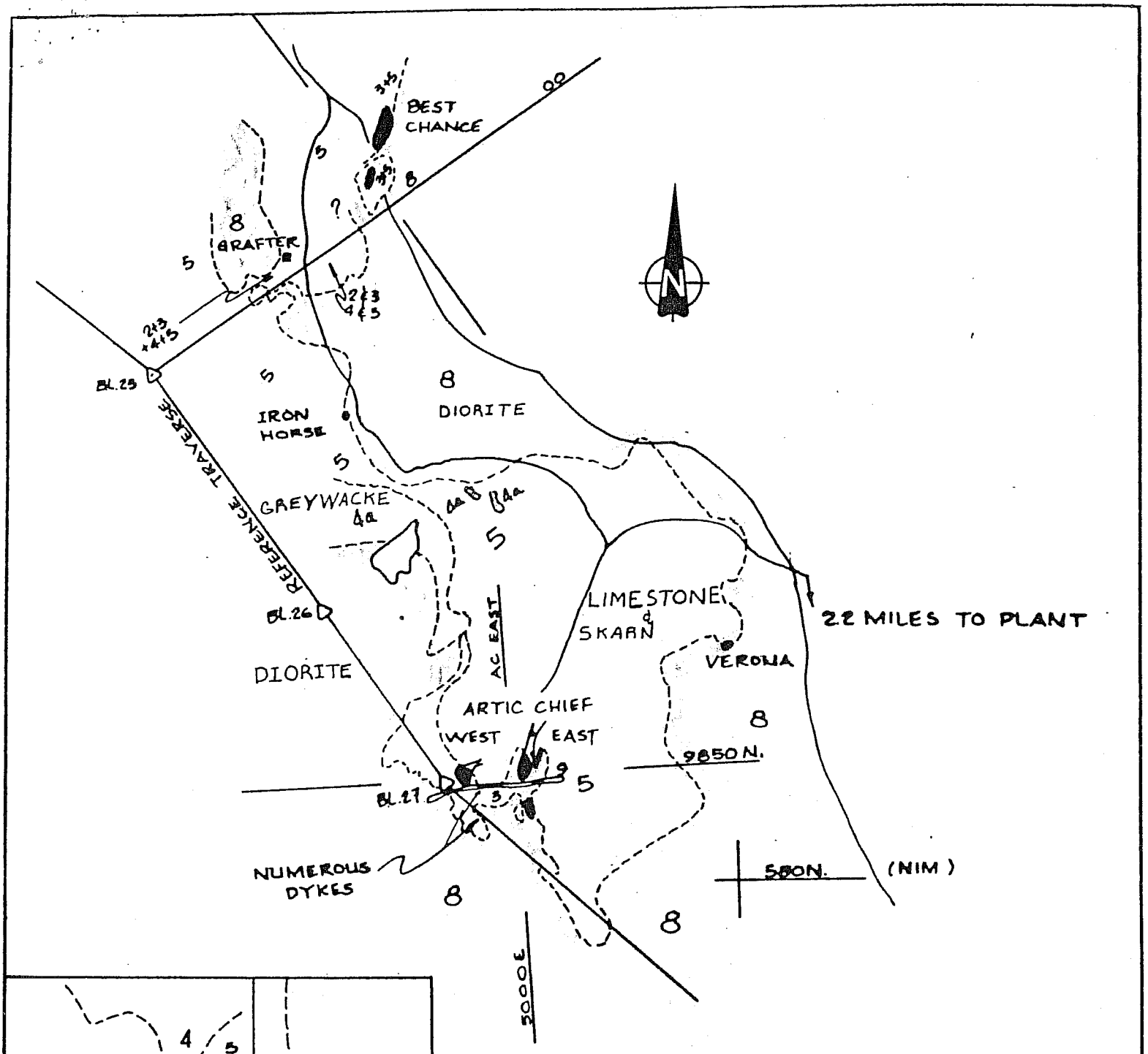
Four holes have been drilled to test the east contact of the pendant. Results indicate that: (1) the intrusive contact is steep and may be dipping to the east; (2) the footwall quartzite steepens and may parallel the intrusive contact; (3) dolomitic limestone and skarn extend to depths in excess of 2300' below surface.

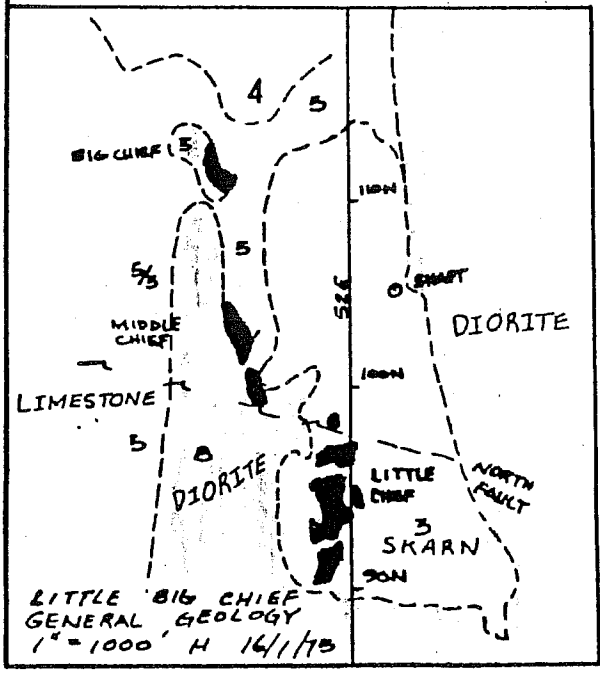
A comparison with Little Chief geology (Fig. 3) suggests that the depth at which the limestone quartzite contact is sufficiently near the intrusive to be skarnified may, unfortunately, be in the order of 2000'. However, the available strike and dip distances of the contact, the nature of the Arctic Chief mineralization (similar to Little Chief & with good gold content) and the location, two miles from the plant could still make exploration of this contact attractive.

Drilling to establish at depth the dip of the F.W. quartzite on sect. 9850 N or 108 N is recommended as the first step in evaluating the east side of the pendant. One of the two holes suggested on sect. 9850 N should establish both the dip of the quartzite-limestone contact and that of the diorite to the east. Hole AC 58 sect. 108 N, is open to 2040' and could probably be deepended by: (1) reaming the hole to 900' past bad ground and water courses from 750' to 850', (2) putting down N casing to 900', (3) putting in a bypass wedge at 2040' and continuing to drill NQ. The hole could be reduced to BQ if further difficulty is encountered. Wedging the hole to flatten it should be considered if the quartzite is not reached after several hundred feet.

Hole AC 58 passed through 50' of dioritized clastic sediments from bedrock before entering limestone. Much of the dioritized clastic sediments mapped in the Verona area may be underlain by limestone and skarn. A magnetic anomaly 250' long and 100' wide exists around the Verona trenches. The mag survey was done on lines near parallel to the zone. The survey should be redone using north-south lines. Banding in quartzite 400' SW of Verona strikes NE & dips 70° SE. A hole drilled to the north from approximatley 105 N, 6575 E, is suggested to check the Verona mineralization which may extend to the southwest, under the clastic sediments. Drilling in this area may be helpful in establishing the dip of the intrusive contact on sect. 108 N.

A.H. MAY 82



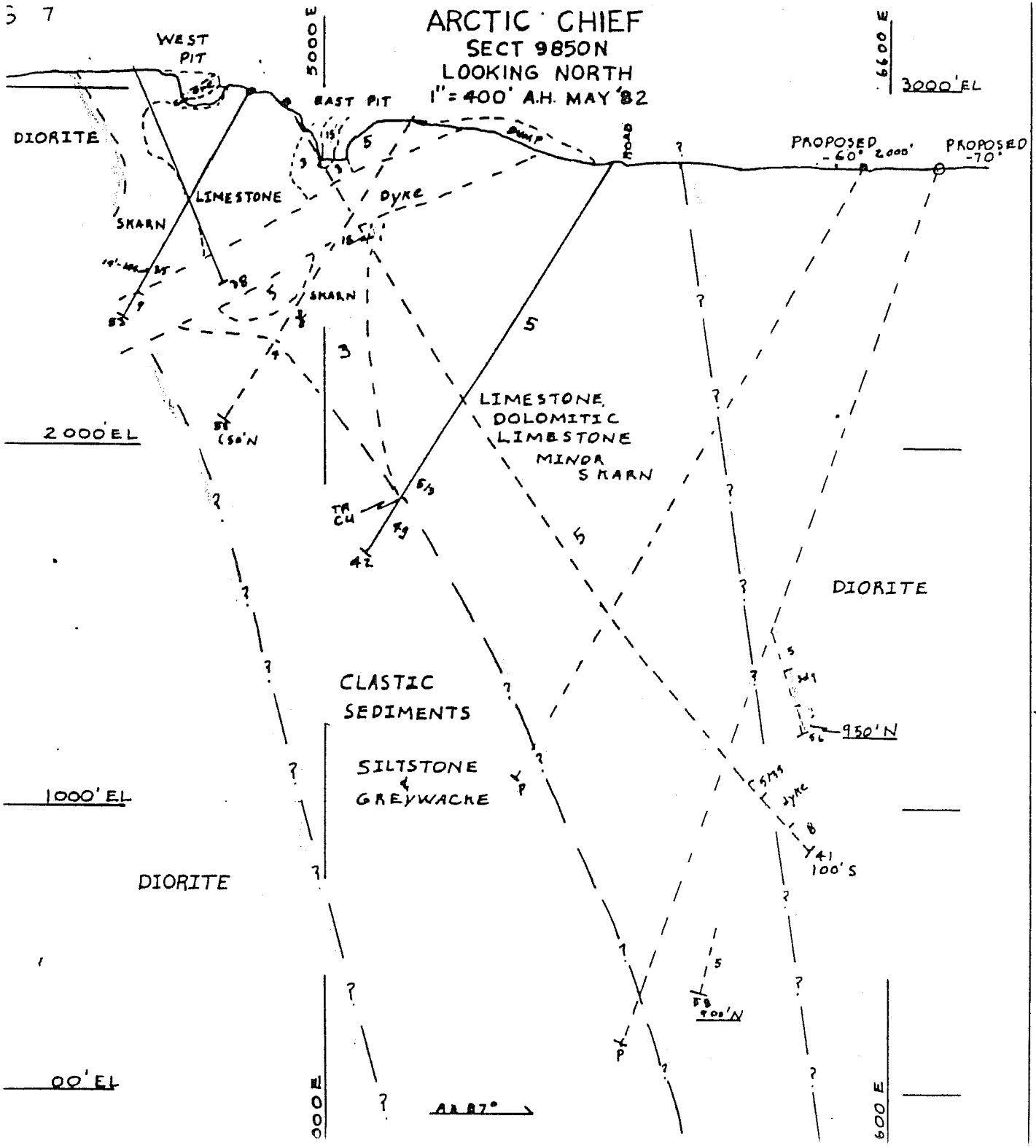


WHITEHORSE COPPER MINES
ARCTIC CHIEF - BEST CHANCE
GENERAL GEOLOGY

1"= 1000' A.H. MAY '82

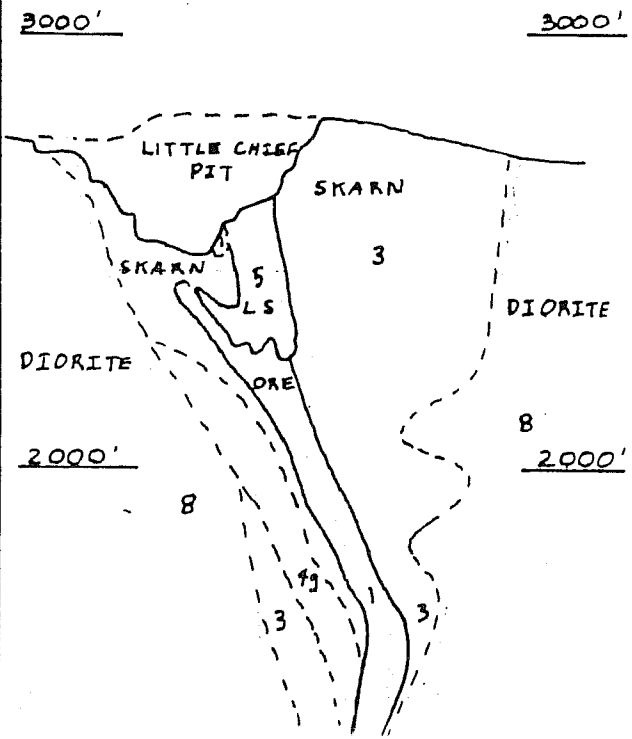
SCALE: 0 500 1000'

ARCTIC CHIEF
SECT 9850N
LOOKING NORTH
1" = 400' A.H. MAY '82



LITTLE CHIEF
SECT. 9250
LOOKING NORTH
1" = 400' A.H MAY 82

SCALE : 0 200' 400'



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A DIVISION OF HUDSON BAY MINING AND SMELTING CO., LTD

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MEMORANDUM

Date: October 28th, 1981.

TO: Doug Linzey

FROM: Les Betteridge

RE: GOLD AT WHITEHORSE COPPER MINES

At Whitehorse Copper Mines, gold is present as native gold and is recovered in the Mill. Approximately 75% of the gold is recovered in the copper concentrate. Another 5% - 10% is recovered in the following areas:

1) grinding area pump boxes
2) behind rod and ball mill liners
3) riffles installed in rod and ball mill launders
4) grinding area sump.

The gold laden material recovered from these areas is stored in locked 45 gallon drums. These areas with the exception of behind the rod and ball mill liners, are generally cleaned whenever the Mill is shut down. During this period, there is a supervisor on hand to ensure that the gold laden material is collected and stored in the locked drums.

Periodically, this material is screened on a set of Sweco screens (3, 6, 11, 30 mesh), prior to its being concentrated on a Deister concentrating table. During these two operations, staff personnel are on hand continually and perform the required steps with assistance from hourly personnel called out for overtime duty.

The concentrated size fractions are then taken to the lab. Here they are stored in locked 45 gallon drums in a separate locked room.

In the past, these concentrated fractions were either hand picked and leached or sent to Johnson Matthey refiners for further concentrating.

The coarser gold (+3 mesh) is still hand picked but the leaching process with nitric acid has been discontinued due to dissolution and loss of any silver present. Negotiations are being finalized with Technational Research in Whitehorse for refining all the gold recovered from these areas.

..2..

Technational's process involves dissolution of the entire sample and then selective precipitation of the precious metals. This process yields 999.9 gold in whatever form desired (wafer, bar or granular). There are no losses in the slag as no doree bar is poured when refining Whitehorse Copper Mine gold.

Presently, a gold concentrating cone is installed on a rental-purchase basis in the Whitehorse Copper Mill. Recovery of gold from the Mill tailings being the purpose for its installation. Theoretically, there should be about 6 oz. of gold per day being discarded in the tailings, (2100 TPD x .003 oz/ton). Installation of a small trial unit on the tailings for only a short period (3 hours) recovered a noticable amount of gold. Also a sampler and sluice box on the tailings line recovered a small amount of the gold in the tailings, (material recovered in the sluice assayed 0.30 oz/ton).

The cone has only been installed for a few days and no data has been collected in order to evaluate its performance to date.

Daily extraction of material in the riffle area outside the ball mill is highly desirable. At present, this riffle area plugs with steel chips, native copper and sludge. Once it is plugged, it is no longer effective in recovering coarse gold. A bypass pipe will be installed under the ball mill trommel screen which will direct the flow directly into the pump boxes and out of the riffle area. This will allow daily cleaning of this gold collection area.

Concentrating of the finer fractions on the Whitehorse Copper Mine Deister table is very time consuming. Technational Research has a huge concentrating table that will do as good if not better job in a fraction of the time. Using their table for these finer fractions, will greatly reduce the labour costs now experienced at Whitehorse Copper Mine in this area.

Any material sent to Technational Research is first weighed and assayed by Hudson Bay Mining and Smelting personnel so an accurate accounting of the gold can be maintained.

Security of gold at Whitehorse Copper Mine doesn't appear to be a problem. Only a limited number of people have access to the gold area. Most of the gold deposition areas in the Mill are relatively inaccessible. Most of the gold on hand is in a non-saleable form. Once the gold has been hand picked to a concentrated form or refined it is quickly removed from the property to bank facilities. Security now patrols the areas where gold is stored to ensure all the gold containing drums are locked. Spot checks of lunch boxes and cars are done on a regular basis at the main gate.

Les Betteridge

c.c. J. Janssens
E. Treadwell

1 oz/T 31g

1 Kg - 1000g

10

1000 Kg
1,000 000g

.001 343 ppb

343

1 mK - 34.2857gK

31g / 100,000 / 1,000g

34,000 ppb

1oz/t .34 .2568oz/t

15469 / ~~1,000,000~~

.01

.001

Marion

Trish.
633-5082

0.1 34 ppm

1 oz/t 343

343 ppb

1360 ppb

13,600 ppb

.01 343

81 369/T

1 oz 34 ppm

1 oz 34 000 ppb