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1989

DIAMOND DRILLING REPORT ON THE MILL 1 & MILL 2 CLAIMS B.C.

by

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Project Geologist

for

UNITED KENO HILL MINES LIMITED

GEOLOGICAL BRANCH
ASSESSMENT REPORT

20,032

NTS: 104 M/15
Atlin Mining Division
Latitude 59°57' Longitude 134°42'
Date: March, 1990

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INTRODUCTION

A detailed mapping, prospecting, and sampling program was carried out on the MILL 1 claim in B.C. by a two to four man crew during the period June 7th to July 9th and August 21st to August 31st, 1989. Mapping was carried out at a scale of 1:5,000. Several large multi-element soil anomalies were outlined on the property toward Tutshi Lake. The anomalies were situated between the carbonate units and also across the units along structurally controlled pathways. Strong copper mineralization had been discovered related to the felsic intrusions cropping out on the southeastern portion of the property. Previous drilling indicated that mineralization and alteration increased with depth and that the felsic dykes in the area carried anomalous values in arsenic and gold.

It was decided that a fence of diamond drill holes across stratigraphy would be the best way to determine: i) lithology of units at depth; ii) the extent of mineralization within the felsic intrusives and iii) any mineralization within the conglomerates situated between the carbonate units. The drilling program commenced on October 29 and was completed by November 13. Two holes were drilled before the program was stopped due to the lack of funds. The drilling was done by E. Caron Diamond Drilling Limited.

LOCATION AND ACCESS

The MILL 1 and MILL 2 claims are located in northern B.C., at the Venus Mill site, at latitude 59°57' and longitude 134°42' on N.T.S. map sheet 104 M/15 (figure 1). The South Klondike Highway cuts through the north end of the property, which is located about 32 km south of Carcross, Yukon Territory. The claims extend from Tutshi Lake at its south end to 2.5 km to the north, across the highway.

The MILL 1 claim consists of 5 units south by 3 units to the west and MILL 2 consists of three units on the eastern boundary of the MILL 1. Access to the property is from the highway.

PROPERTY AND HISTORY

The Mill property consists of two claims comprised of fifteen units and three units each (Figure 2).

Claim	Record Number	Location Date	Recording Date	Expiry Date	NTS
MILL 1	3110 (2)	Feb. 7, 1988	Feb. 10, 1988	Feb. 10, 1994	104 M/15
MILL 2	3793	Sept. 28, 1989	Sept. 28, 1989	Sept. 28, 1990	104 M/15

Previous work in the area, before United Keno Hill Mines staked it, consists of an adit into altered conglomerate and limestone, which dates from the seventies, and was blasted for copper. At least seven other pits were located (figure 4), one occurring north of the highway in limestone and containing copper mineralization. All the others were either in conglomerate

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WHITEHORSE — YUKON

FIGURE I

MILL CLAIM PROPERTY LOCATION MAP

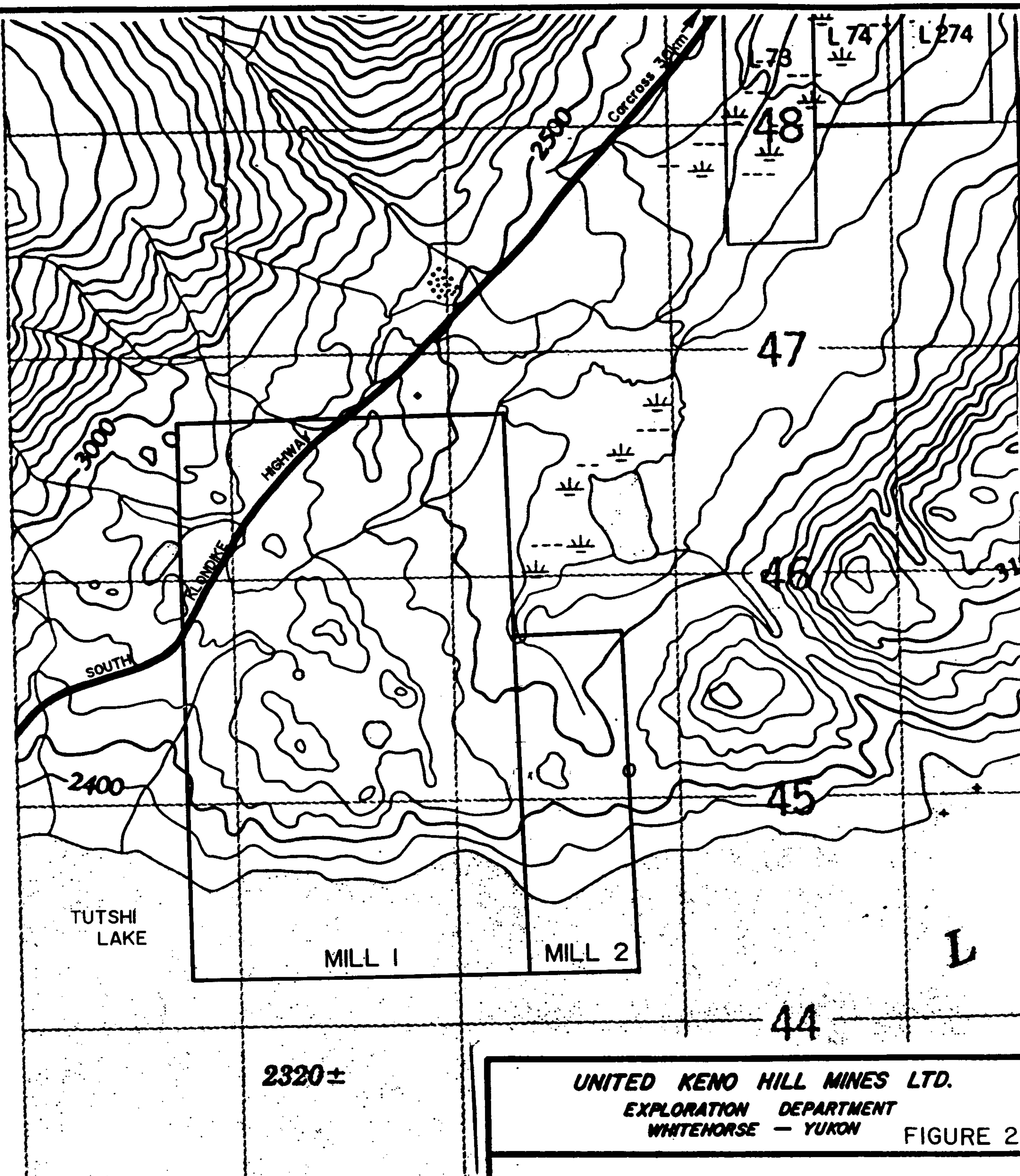
Mining District WHITEHORSE

N.T.S. Sheet No. 105-D/2

Scale

Drawn by H.D.P.	*Date* 88/02/29

BCIL - 3042 - U.K.H.M.



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EXPLORATION DEPARTMENT
WHITEHORSE — YUKON

FIGURE 2

MILL CLAIM
CLAIM LOCATION MAP

SCALE
250m 0 250m 500m 1km

Mining District	ATLIN
N.T.S. Sheet No.	104-M/15
Scale 1 : 25,000	1cm=250m
Drawn by H.D.S.	**Date** 90/03/07

or a fine-grained felsic intrusive and contained copper-zinc-lead mineralization. The pits seem to follow the contact between the intrusive and the altered conglomerate unit. The oldest work on the property was at the turn of the century, when the ridges were prospected for Venus vein type occurrences. Many of the pits seem to date from this period.

The showings on the MILL 1 claim were discovered in May of 1987, by UKHM, during a prospecting traverse to examine the carbonate bluffs. A copper showing was encountered in the strongly altered conglomerate unit adjacent to a carbonate ridge. Assays indicated low values of gold and copper. Subsequent work included a geochemical and geological survey done over an area 450 metres by 250 metres. This survey outlined several anomalous areas, consisting of arsenic, gold, and copper, and lead and zinc, and the MILL 1 claim was subsequently staked in 1987, consisting of 15 contiguous units. MILL 2 was staked in the summer of 1989 to cover ground to the east of the large anomalies.

A geophysical survey, consisting of proton magnetometer and two VLF stations, was performed in the area from the highway to 300 meters southeast of the tailings structure in the fall of 1987. Geology and structure were further delineated, and in May of 1988 drilling commenced in the tailings pond area. Fifteen hundred feet of diamond drilling was completed. The drilling indicated that alteration (skarn) of the conglomerate units increases substantially with depth. Clast replacement with pyrite, pyrrhotite and chalcopyrite along with epidote, chlorite, and carbonate minerals increased with depth. Also, Porphyry dykes were encountered which were not previously mapped on surface. The dykes were strongly altered to clays and contained varying amounts of arsenopyrite filled fractures and stockworks.

PHYSIOGRAPHY

The property is defined by two major northwest-trending ridges and one lesser one to the north, in between which there exists low swampy alder covered ground, as well as poplar and aspen, with small ponds. The southern most ridge is bounded by a large stream which lies to the southwest of it, and drains into Tutshi Lake. Other creeks in the northern and eastern part of the property drain areas from the east, south, and west. Elevations on the property vary from 2300 feet at lake level to 3000 feet on the north end. Ridge tops are grass covered with stunted spruce. North slopes are covered in heavy timber, thick bush and dead-fall, while south slopes are slightly less vegetated with poplar and aspen, grasses, and alders.

GEOLOGY

Introduction

In the summer of 1989 mapping on the MILL 1 claim was carried out at a scale of 1:5,000. The goal of the mapping and sampling program was to determine if the alteration of the conglomerate unit extended southeast along strike to Tutshi Lake as well as to the northwest.

Results of the program were positive. The existence of the altered conglomerate was proven.

Tectonic Setting

The study area occurs in Stikinia terrane which is dominated by rocks of the Whitehorse Trough (Wheeler, 1961). The trough consists of Mesozoic forearc basin rocks which, along with the Paleozoic Cache Creek terrane, are part of an island arc assemblage called Terrane I (Monger et al., 1982). This assemblage collided with and was obducted over the North America craton during the mid-Jurassic. The boundary is marked by the Teslin suture zone, approximately 90 km to the east of the project area. The Cache Creek terrane is juxtaposed against the Stikinia terrane by a northwest trending extension of the Nahlin fault, just to the east of the project area. The western boundary of Stikinia is marked by a major dextral transcurrent fault, the Llewellyn fault, which is considered to be an extension of the King Salmon fault (Mihalynuk and Rouse, 1988). This fault marks the contact with Upper Paleozoic and older amphibolite to greenschist facies metamorphic rocks, and plutons of the Coast Plutonic Complex.

Rock Units

A general geology map compiled from Mihalynuk and Rouse (1988) and Hart and Pelletier (1989) is shown in Figure 3. The geology has been updated from Wheeler (1961) and Christie (1957).

Rock units encountered on the MILL 1 claim consist of Stuhini Group Upper Triassic volcanics, volcanic sediments, limestone, interbedded siltstones and argillites, and conglomerate. This Group is referred to as "Lewes River Group" rocks on the Whitehorse map sheet. The eastern most carbonate unit, which extends from south of Tutshi Lake and continues through the Mill area and to the Rigel claims, marks the boundary with overlying lower Jurassic Laberge Group, Inklin Formation rocks, the contact of which varies from conformable to unconformable (Hart and Pelletier, 1989).

The Laberge Group consists of conglomerate, greywackes, sandstones, siltstones, and argillites, interbedded in various combinations. Generally the conglomerate and sandstone occur together as massive beds, while the siltstones and argillites form thinnly bedded units.

Coast Plutonic Complex plutons and stocks intrude older Whitehorse Trough rocks near the study area, across Tutshi Lake. Two small satellite stocks occur on the southwestern end of the Mill property. The predominant rock type is a fine-grained rhyolitic to feldspar-porphyry intrusive which is usually silicified. Compositionally the rock is very felsic, with less than 5% mafics present.

Felsic intrusions encountered in the 1988 diamond drilling program were located as surface outcroppings. Two small intrusive bodies were encountered, as well as several intrusive dykes, all in the southeast corner of the property. The dykes consist of feldspar-quartz porphyry, which strike north to northwest, west striking quartz-feldspar porphyry dykes, and west to northwest striking quartz diorite dykes. The two intrusive bodies occur towards the southeast end of the property, and can be described as aphanitic siliceous felsic intrusives, which displayed slightly coarser-grained phases at their centers consisting of feldspar porphyritic felsic intrusives. Essentially the intrusives are rhyodacitic in composition.

The following table summarizes the units on the MILL claims.

LATE AND MIDDLE CRETACEOUS(?)
(Possibly younger)

-Feldspar porphyry dyke
-Quartz-feldspar porphyry dyke
-Quartz diorite dyke

3 Siliceous rhyodacitic intrusive
-3a aphanitic
-3b feldspar porphyritic

LOWER JURASSIC

2 LABERGE GROUP
INKLIN FORMATION

-2a Siltstone and argillite
-2b Conglomerates and arenaceous wackes

UPPER TRIASSIC

1 STUHINI GROUP

-1a Norian Carbonates
-1b Conglomerate; volcanic and intrusive clasts
-1c Siltstone, argillites and mudstone
-1d Undifferentiated volcanics and sediments
-1e Hornblende phyric lapilli ash tuffs and tuffites
-1f Green pyroxene feldspar porphyritic tuffs and breccias
-1g Conglomerate; intrusive clasts
-1h Variegated feldspar-phyric tuffs and lesser flows

Structure

The Llewellyn Fault is a major dextral transcurrent extension of the King Salmon fault. On the north end, displacement is east side up, while on the south end the displacement is west side up indicating a rotating scissor type motion. The fault is a major zone of structural weakness along which felsic intrusive bodies have been emplaced.

On a regional scale contacts between the units strike northwesterly, as does the foliation. Bedding on a local scale is also northwest striking, and dips steeply to the northeast. Minor folding was outlined in the Stuhini Group volcanics, but in general the units on the property have not been affected by extensive folding.

The contact between the altered conglomerate unit and the lower limestone unit appears to be fault controlled. In all cases the conglomerate unit is severely strained at this contact, such that the clasts are flattened and the matrix is altered to limonite and associated iron oxides. Minor microscale carbonate-quartz veinlets in the carbonate unit trend northwest as well. The faulting appears to be brittle-ductile and transcurrent. The contact of the conglomerate unit with the upper limestone also appears to be faulted in several places, as the limestone is brecciated within a metre from this contact, contains abundant iron carbonate weathering, and the conglomerate unit displays some minor flattening of clasts. The faults would appear to be a locus for mineralizing fluids. Microscale structures, such as quartz and calcite veinlets in the limestone are always offset dextrally along northwest trending slip surfaces. This agrees with the regional movement on the Llewellyn Fault.

Later northeast trending faults are common throughout the area. They offset the carbonate and conglomerate units, and appear to be later than the alteration, the northwest faulting, and mineralization. However, the intersection of the northeast and northwest faults could be important for reconcentration of ore. Movement on the northeast faults is both dextral and sinistral, in general the more northeast trending ones demonstrate dextral movement while the east-northeasterly striking faults display sinistral movement. There is also a dip slip component of rotation on these faults as the units change thicknesses across the fault contacts (figure 4).

Dykes in the area generally strike north to northwesterly, and a few strike westerly. They seem to parallel rock unit contacts and fault structures. The north striking dykes are reflected in small brittle faults which are seen on the mesoscale in most of the units, and have a north to north-northwest trend. As well, small east trending faults and microslips are observed in the carbonates and Triassic sediments, although their timing is unknown. All these faults are minor, with no associated large scale movement, but suggest that the dykes intruded along earlier fault surfaces and contacts.

1989 DIAMOND DRILLING RESULTS

The geology encountered in the drilling varied considerably from the surface. Argillites and tuffs, cherts and wackes were the predominant rock types intersected. The LaBerge Group clastic sediments held no surprises and consisted of interbedded conglomerates and sandstones with the occasional mudstone unit. The LaBerge rocks became finer grained as the Norian carbonates were approached. Mudstones and siltstones become prevalent near the contact. The rocks were generally unaltered and displayed only moderate deformation consistent with regional structure. Some sections were broken and contained minor quartz veinlets with pyrite and occasionally minor amounts of chalcopyrite. The rocks predictably became more calcareous toward the contact with the carbonates.

The black and gray Norian carbonates appear to have taken the brunt of deformational stresses and expressed the forces as shearing and brecciation with abundant graphite filled fractures paralleling the contacts. Internal sections of the carbonate contain stylolites. Primary features are rare and vague at best. Lower contacts are far more deformed than the upper with meters of totally recrystallized calcite and calcite veining.

The rocks intersected below the carbonate in hole M89-1 were strongly altered and mineralized at the contact and became less altered and mineralized away from the carbonate contact. The abundant epidote and chlorite alteration imparts a green colour to the rock which gradually gives way to a gray colour with depth. The rocks have undergone severe structural deformation as the existence of breccia zones and abundant quartz veining would imply. As the alteration decreases, the fracturing diminishes and fracture filling becomes calcite with pyrite as opposed to quartz with chalcopyrite. The majority of the mineralization present occurs as sulphide replacement of clasts and matrix. Chalcopyrite, pyrite and pyrrhotite occur in varying amounts to 30% or more of the total rock in a 4.5 foot section from 694.5 to 699. This intersection averages 1.58% Cu, 1.20 opt Ag and 0.06 opt Au. The entire 14.5 foot intersection averages 0.855% Cu, 0.7 opt Ag and 0.03 opt Au.

Hole M89-2 presented an almost entirely different geological picture. The conglomerate intersected below the carbonate in the previous hole was not present. In its place was a green mottled looking fine grained siliceous material with relic laminations visible. The laminations became more prominent as the hole progressed and eventually revealed itself as finely banded tuffs and cherts. Occasional conglomerate beds were encountered. The conglomerates are predominantly andesite pebble in composition and may actually be variegated feldspar phyric tuffs and flows. Although a carbonate intersection was predicted the unit was never intersected. In its place was a calcareous shale or argillite which, in places, is strongly fractured and silicified.

Felsic dykes were encountered in all of the units. Host units are invariably brecciated as are the dykes themselves. Mineralization within the dykes is restricted to occasional pyrite in stringers. The arsenopyrite within the dykes encountered so frequently in the 1988 drilling does not appear in the dykes intersected during this program.

CONCLUSIONS AND RECOMMENDATIONS

The appearance of the tuff and chert units between the two carbonate units indicates that the down dip stratigraphy of the units exposed on surface changes considerably. The presence of the volcanic material increases the likelihood of the presence of massive sulphides on the property. The copper mineralization occurs as replacement blebs within a strongly altered chloritic rock of questionable lithology. Immediately above the copper mineralization is a carbonate unit and stratigraphically below is a thick succession of calcareous argillites and siliceous tuffs containing abundant hematite and pyrite respectively. Also, some stibnite was located on fracture surfaces in hole M89-2. No satisfactory explanation has been found for the large zinc and arsenic anomalies located on the property.

The carbonates grade into argillites down dip indicating a change in depositional environment. Volcaniclastic units consisting of volcaniclastic pebble conglomerate, wacke and felsic tuffs become increasingly prevalent at depth suggesting a foreshore or shallow basin depositional environment.

Logging conditions during the drill program were very poor. It is recommended that the core be relogged to differentiate between volcaniclastic and sedimentary units, primarily between conglomerates, and feldspar phyric tuffs and flows. Thin sections of the mineralized core should be made to determine the host rock and the style of mineralization. Polished sections could be used to determine ore petrology.

The larger of the geochemical anomalies should be diamond drilled to determine their source. The holes should be drilled in the same manner as the present program. Fences should be spaced at 50 meter intervals. Also, some holes should be drilled in a northwest direction in an attempt to intersect cross faulting structures to determine if they have acted as dams for remobilized fluids. Hand trenching on some of the smaller anomalies located near surface may be advisable as a beginning.

Bore Hole Pulse EM could be used in conjunction with the diamond drilling to further facilitate target location.

CORE STORED AT THE VENUS MILLSITE

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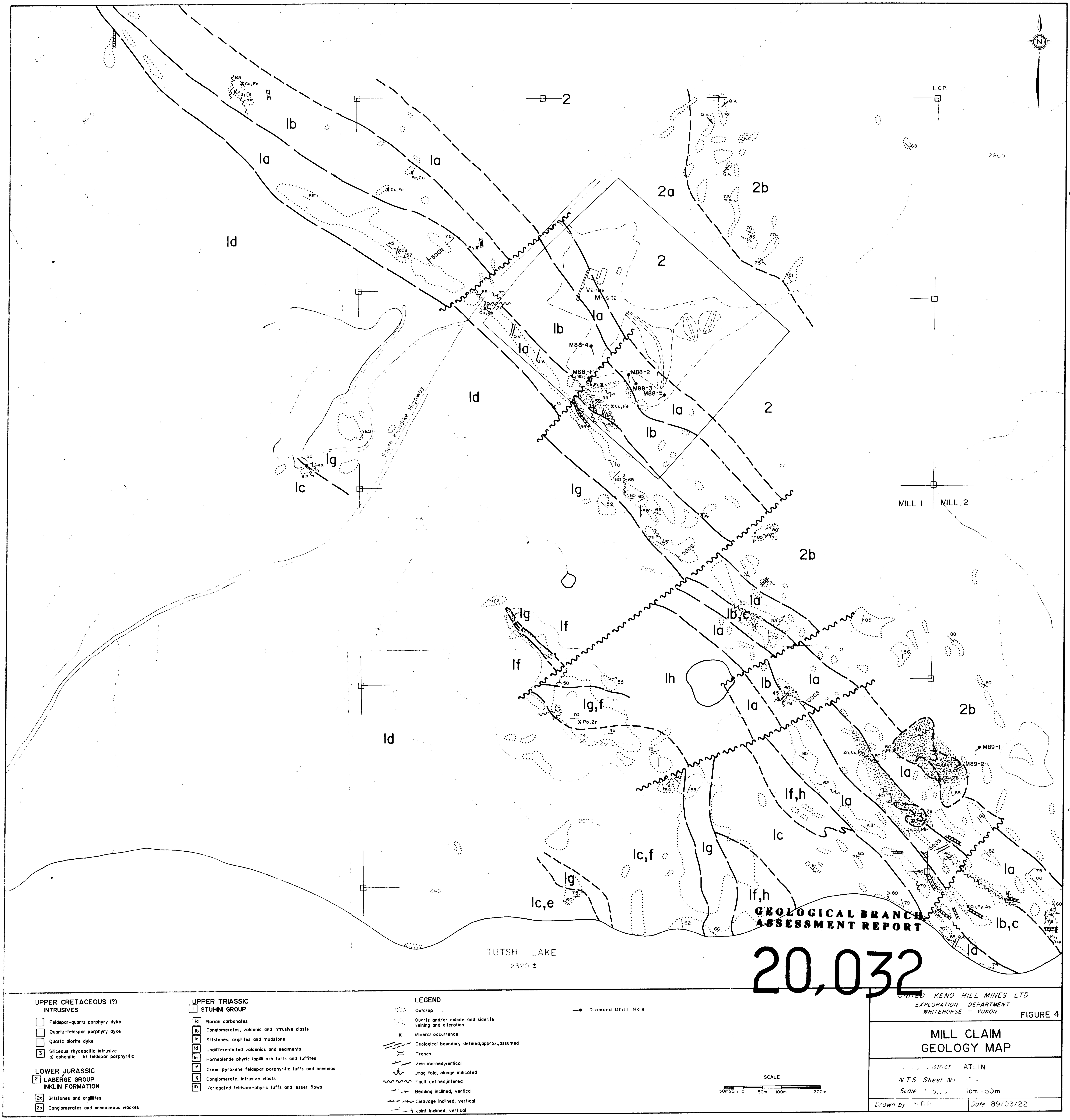

L.C.P.
Venus Millsite
South Klondike Highway
M88-1
M88-2
M88-3
M88-4
M88-5
M89-1
M89-2
MILL I
MILL 2
TUTSHI LAKE
2320 ±
GEOLOGICAL BRANCH
ASSESSMENT REPORT
20,032
UPPER CRETACEOUS (?)
INTRUSIVES
Feldspar-quartz porphyry dyke
Quartz-feldspar porphyry dyke
Quartz diorite dyke
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1b Conglomerates, volcanic and intrusive clasts
1c Siltstones, argillites and mudstone
1d Undifferentiated volcanics and sediments
1e Horneblende phyric lapilli ash tuffs and tuffites
1f Green pyroxene feldspar porphyritic tuffs and breccias
1g Conglomerate, intrusive clasts
1h Variegated feldspar-phyric tuffs and lesser flows
LEGEND
Outcrop
Quartz and/or calcite and siderite veining and alteration
Mineral occurrence
Geological boundary defined,approx.,assumed
Trench
Vein inclined,vertical
Drag fold, plunge indicated
Fault defined,infered
Bedding inclined, vertical
Cleavage inclined, vertical
Joint inclined, vertical
Diamond Drill Hole
SCALE
50m 25m 0 50m 100m 200m
UNITED KENO HILL MINES LTD.
EXPLORATION DEPARTMENT
WHITEHORSE — YUKON
FIGURE 4
MILL CLAIM
GEOLOGY MAP
District ATLIN
N.T.S. Sheet No
Scale 1:5,000 1cm = 50m
Drawn by HDF
Date 89/03/22

BC Ministry of Energy, Mines and Petroleum Resources

GEOLOGICAL SURVEY BRANCH

OPEN FILE MAP 1988–5 (SHEET 1 OF 2)

GEOLOGY OF THE TUTSHI LAKE AREA

NTS 104M/15

MITCHELL MIHALYNUK AND JONATHAN ROUSE

SCALE: 1:50 000

LEGEND

LAYERED ROCKS

QUATERNARY

Qal — *Unconsolidated glacial till and poorly sorted alluvium*

UPPER CRETACEOUS(?)

MONTANA MOUNTAIN VOLCANICS

uKMV — *Intermediate to felsic pyroclastics and flows; typically altered and orange weathering; crosscut by 64Ma* intrusive*

MIDDLE TO UPPER JURASSIC (?)

muJv — *Variegated pyroclastic lapilli tuffs; bladed feldspar porphyry flows*

muJc — *Clast-supported conglomerate derived primarily from Inklin Formation siltstones and argillites*

LOWER JURASSIC

LABERGE GROUP, INKLIN FORMATION (where undivided denoted as lJLi)

lJLig — *Siltstones, arenaceous wackes (greywackes); may contain macrofossils*

lJLia — *Argillites (may be silty)*

lJLic — *Conglomerates; rarely contain macrofossils*

UPPER TRIASSIC

STUHINI GROUP (where undivided denoted as uTs)

uTsv — *Variegated feldspar-phyric tuffs and lesser flows*

uTsp — *Green pyroxene-feldspar porphyry tuffs and breccias characteristic of this group*

uTsc — *Conglomerates and associated sediments*

uTsh — *Hornblende-phyric lapilli ash tuffs and tuffites (may include conglomerates)*

uTss — *Norian carbonates commonly displaying strong internal deformation enclosed within conglomerates and argillites*

PALEOZOIC (?) TO UPPERMOST TRIASSIC

PTc — *Conglomerates, mainly clast-supported, composed primarily of PPMS and PTgd*

PALEOZOIC TO PROTEROZOIC (?)

BOUNDARY RANGES METAMORPHICS (where undivided denoted as PPM)

PPM — *A polydeformed metamorphic terrane of uncertain origin; variably metamorphosed to upper greenschist grade within the map area, and reported up to amphibolite grade to the south.** Protoliths in approximate order of abundance are:*

PPMS — *Argillaceous siltstones, feldspathic wackes and lesser felsic pyroclasts and carbonates (carbonate bands diagonally hatched).*

PPMP — *Altered pyroxenites, foliated gabbros and mafic flow successions*

MISSISSIPPIAN

NAKINA FORMATION(?)

MN — *Massive, greenschist-altered basic flows and tuffaceous sediments*

INTRUSIVE ROCKS

UPPER CRETACEOUS

COAST INTRUSIONS (where undivided denoted as uKg)

uKg1 — *Medium to coarse-grained hornblende and biotite granites are most characteristic of the Coast Intrusive rocks; with local gradations to potassium metasomatized alkaline granite (denoted "A") and lesser granodiorite (uKgd). Rare zones with diffuse boundaries contain medium grained garnet (gnt) ± muscovite (mus). Typically containing 2 to 5 centimetre, perthitic potassium feldspar megacrysts. Chilled contacts are quartz-eye feldspar porphyries. K Ar dated at 89.5 ± 2.6 Ma and 77.9 ± 1.6 Ma***.*

uKg2 — *Equigranular uKg1 – lacking megacrystalline potassium feldspar with minor localized exceptions*

uKgd, qm, d — *Granodiorite, quartz monzonite and diorite as compositional variants of uKg1,2*

CRETACEOUS

Kgd, qm, g, d — *Granodiorite, quartz monzonite, granite and diorite. Medium to coarse grained and typically more altered than uKg; may rarely be crosscut by ?uKg1,2. Commonly grades rapidly from one phase to another*

MIDDLE TO UPPER JURASSIC

muJa — *Hypabyssal andesites; medium grained andesitic feldspar porphyries commonly containing hornblende. Grey to green, weakly to strongly altered; probably coeval with muJv*

TRIASSIC (?)

Tgd, qm — *Porphyritic granodiorite to quartz monzonite; foliated with potassium feldspar phenocrysts and hornblende up to 20 per cent. Minor secondary chlorite, epidote and quartz*

MESOZOIC

Mgd — *Granodiorite; altered, sheared and brecciated felsic intrusive rocks primarily confined to the Llewellyn fault zone. May in part include rocks of PTgd*

PALEOZOIC? TO TRIASSIC

PTgd — *Altered and deformed intrusives. Typically altered and/or deformed weakly to strongly. Composition variable to leucogranite and quartz-diorite; may be silicified.*

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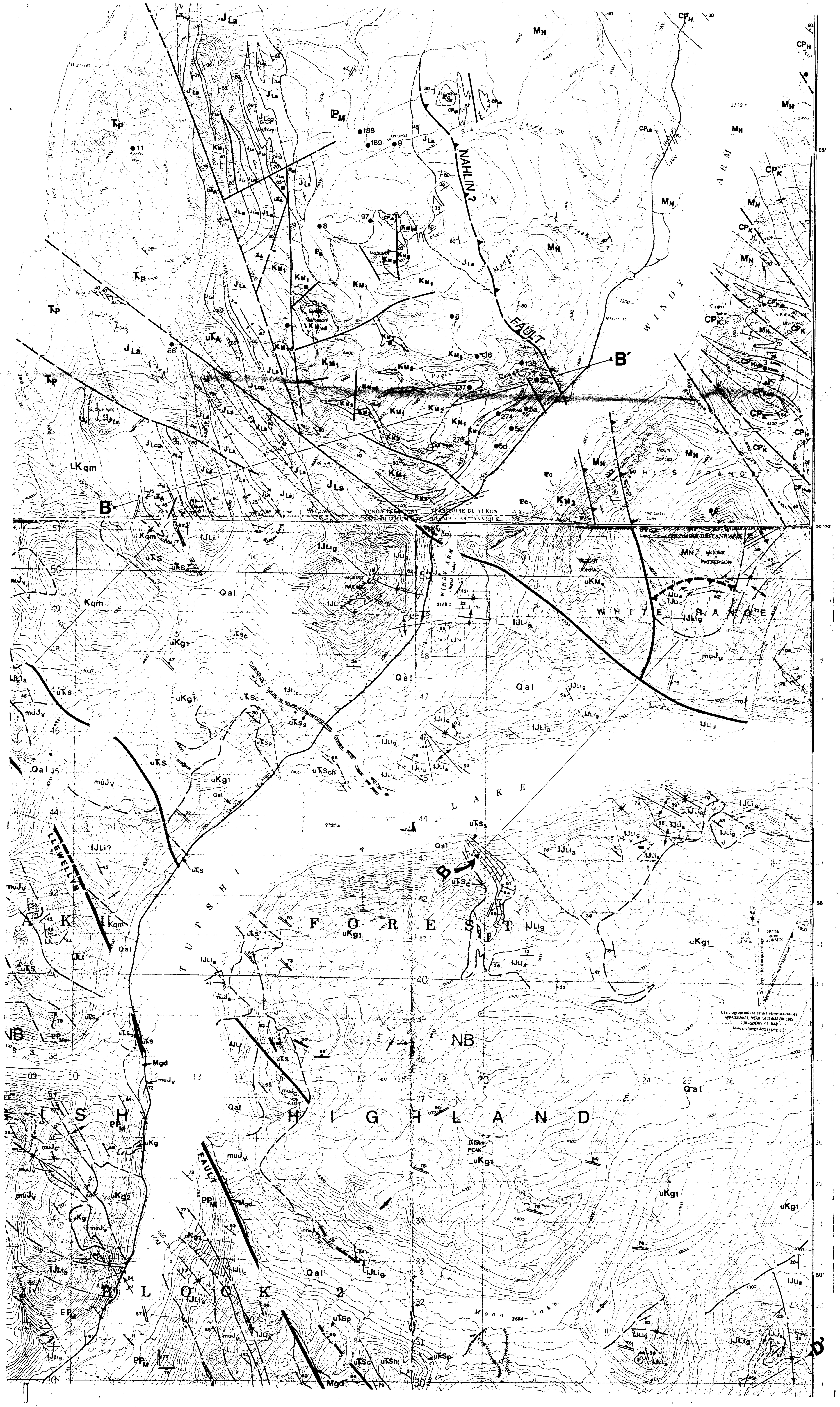
SYMBOLS

- Geological boundaries (known, approximate, assumed)
- Unconformity (defined, assumed)
- Bedding (inclined, vertical)
- Schistosity, foliation (inclined, vertical)
- Joint (inclined, vertical)
- Dyke (inclined, vertical)
- Anticline (defined, approximate, assumed)
- Syncline (defined, approximate, assumed)
- Minor fold hingeline
- High angle fault (defined, approximate, assumed)
- Thrust fault (defined, approximate, assumed)
- Shear zone
- Drumlinoid features (probable ice movement direction shown)
- Eskers (flow direction known, unknown)
- Lineament (from air photograph)
- Cross section line — A A'
- Fossil locality



LEGEND

QUATERNARY

Qe — Unconsolidated eolian sands and sand dunes

Qf — Unconsolidated gravel, sand and silt of fluvial or glaciofluvial origin

Ql — Unconsolidated gravel, sand, silt and varved clay of lacustrine or glaciolacustrine origin

Qg — Unconsolidated glacial moraine, kame, esker and drift material

TERTIARY

PALEOCENE

Pc — **Carcross Pluton:** Fine- to medium-grained, biotite-hornblende granite to granodiorite with white porphyritic potassium feldspar (64 Ma[2])

PM — Montana Phase: Light weathering, medium-grained, pink-mauve, potash feldspar-rich quartz monzonite to granite; southern border phase of quartz-rich aplite and quartz-eye rhyolite

Tgr — **Finger Mountain Granite:** Pale orange weathering, medium- to coarse-grained, red-pink granite to quartz monzonite with slightly altered, pale green hornblende

CRETACEOUS

LATE CRETACEOUS

LKgr — **Pennington Granite:** Grey weathering, coarse-grained biotite-hornblende granite with pink megacrystic potash feldspar; leucocratic to pink quartz monzonite phases

LATE AND MIDDLE CRETACEOUS(?)

Kr — Orange weathering, recessive, cream coloured, fine-grained rhyolite and feldspar porphyry plugs

Kv — Dark green and maroon, resistant, aphanitic to porphyritic andesite to dacite flows, heterolithic breccia, agglomerate and associated epiclastic rocks; minor light coloured felsic flows and pyroclastic rocks

Kv1 — Massive to poorly bedded, dark grey, aphanitic to porphyritic, vitreous dacite (?) and associated pyroclastic rocks

MIDDLE CRETACEOUS

MONTANA MOUNTAIN VOLCANICS (94 Ma[1])

KMvd — Massive to brecciated, dark green to grey andesite plug domes and dykes; locally porphyritic

KM2 — Orange weathering, massive to locally flow banded, rhyolite tuff, pyroclastic and rhyolite flows

KM1 — Massive to poorly bedded, dark weathering, dark to pale green andesite and dacite flows, autoclastic and epiclastic breccia; locally feldspar-phyric or with chlorite amygdules

Ky — Coarse-grained, medium grey to orange-pink, anorthositic, hornblende quartz syenite

Kgd — Dark grey weathering, medium- to coarse-grained biotite granodiorite; local porphyritic biotite

CRETACEOUS AND JURASSIC

JKgd — **Wheaton Valley Granodiorite:** Dark grey weathering, medium- to coarse-grained, weakly foliated, typically fractured and altered hornblende granodiorite

JKcg — Recessive, clast-supported, immature, polymictic, poorly sorted, angular pebble conglomerate; well indurated exposures are dark purple to dark red weathering with distinctive red metamorphic quartz; poorly indurated exposures are tan to light grey weathering and granular in nature; clasts are composed of quartz-mica schist > granite gneiss > intermediate volcanic rocks > quartz and quartzite

TRIASSIC

Tgr — Resistant, medium grey weathering, medium-grained, pink megacrystic potash feldspar, hornblende granite and granodiorite (220 Ma[3])

MESOZOIC

Mmz — Medium- to coarse-grained, massive, grey weathering pyroxene monzodiorite and diorite, pervasive alteration of mafic minerals to chlorite

PERMIAN(?)

Pvs — Resistant, pale to dark green and black, massive to variably sheared and foliated intermediate to felsic pyroclastic rocks, basic lava flows, lithic greywacke, argillite, angular pebble conglomerate, hornfels and rare green pyroxenite, all metamorphosed to lower greenschist facies

WHITEHORSE TROUGH

JURASSIC

MIDDLE AND UPPER JURASSIC(?)

JLan — Slightly rusty weathering, pale green to grey, medium-grained, hypabyssal andesite feldspar porphyry and hornblende-feldspar porphyry

LOWER AND MIDDLE JURASSIC

LABERGE GROUP (HETTANGIAN TO AALENIAN)

JLcg — Brown-orange weathering, resistant, massive, thick bedded, clast- and matrix supported, well-rounded granitic and volcanic cobble conglomerate; clasts of granodiorite and Lewes River Group volcanics with lesser metamorphic, quartz, limestone and sedimentary clasts, granitic clast dominant higher in section; interbedded greywacke, sandstone and argillite

JLs — Pale to dark orange weathering, dark grey, massive, thick to medium bedded, coarse-grained, feldspathic and lithic greywacke with lesser arkose and quartz-rich grits; interbedded conglomerate and argillite

JLa — Dark red-brown weathering, rhythmically and thin bedded, tawny to dark green and grey, silty argillite, shale, siltstone and hornfels; contains amminoid fossils; minor interbedded massive sandstone and conglomerate; JLm - resistant, grey to brown, finely laminated phyllite

UPPER TRIASSIC TO JURASSIC

LEWES RIVER GROUP (KARNIAN TO SINEMURIAN)

uTH — **Hancock Member** (Norian): Resistant, white to light grey weathering, massive and thick bedded limestone, bioclastic limestone and marble; minor sooty black limestone and pale yellow dolostone: uTH1 resistant, thin, well bedded, interlaminated white limestone and tan weathering, dark grey siltstone

uTA — **Annie Member** (Karnian to Norian): Resistant, massive to moderately well bedded, red, purple and green matrix (and clast) supported pebble conglomerate, agglomerate and debris flows; clasts of augite porphyry and subvolcanic dacite porphyry with crystal-rich wacke matrix; interbedded arenite and minor waterlain tuff; uTA1 - dacite-andesite feldspar (and hornblende) porphyry flows, agglomerate and breccia; minor red siltstone; uTA2 - massive, grey, white to pink (often sheared or recrystallized) limestone and limestone breccia; located near the base of this member

Tp — **Povoas Formation** (Karnian (and older?)): Resistant, massive, light to dark green weathering, dark green to black, basalt and basaltic andesite flows and breccia, commonly altered ; minor well indurated dark grey greywacke, agglomerate, tuff and associated epiclastic rocks with thin carbonate beds: Tp1 - resistant, massive dark green to black, variably altered, augite porphyry basalt and breccia, commonly with coeval(?) hornblendite; Tpm - chlorite and chlorite-augite schists, augite-plagioclase gneiss and other variably metamorphosed equivalents of this Formation

ATLIN TERRANE

CARBONIFEROUS AND PERMIAN

CACHE CREEK GROUP

CPub — **Ultramafic rocks:** Massive to foliated, dark green to black irregular bodies of serpentinized dunite and peridotite with lesser microgabbro and diabase; may be Mississippian in age and coeval with MN

CPH — **Horsefeed Formation:** Massive, fine- to medium-grained, white to pale yellow limestone and crinoidal bioclastic limestone; rare dolostone

CPHvb — Massive, dark green, altered (spilitized), aphanitic and amygdaloidal basalt sills and local dark brown pillow basalts

CPK — **Kedahda Formation:** Resistant, well bedded, grey, black, red and brown chert, with lesser cherty sandstone and siltstone; rare thin limestone beds

MISSISSIPPIAN TO PERMIAN (?)

MN — **Nakina Formation:** Resistant, massive, dark weathering, pervasively altered, fine-grained, dark green metabasite and metadiorite with variable thicknesses of grey chert and irregular occurrences of ultramafic rocks

REFERENCES

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2 MORRISON, G.W., GODWIN, C.I. ARMSTRONG, R.L., 1979. Interpretation of isotopic ages and $^{87}Sr/^{86}Sr$ initial ratios for plutonic rocks in the Whitehorse map area, Yukon; Can. Jour. Earth Sci., Vol. 16, p. 1988-1997.

3 DOHERTY, R.A and HART, C.J.R., 1988. Preliminary Geology of Fenwick Creek (105D/3) and Alligator Lake (105D/6) map areas; Indian and Northern Affairs Canada Yukon Region, Open File 1988-2.

COMPILATION SOURCES

CAIRNES, D.D., 1912. Wheaton District, Yukon Territory; Geol. Surv. Can., Memoir 31.

MONGER, J.W.H., 1975. Upper Paleozoic Rocks of the Atlin Terrane, Northwestern British Columbia; Geol. Surv. Can., Paper 74-47.

ROOTS, C.F., 1981. Geology of the Montana Mountain area, Yukon; Unpublished M.Sc. thesis, Carelton University, Ottawa.

WHEELER, J.O., 1961. Whitehorse map-area, Yukon Territory; Geol. Surv. Can. Memoir 312 (includes Map 1093).

Scale 1 : 50,000

105-D/2 & 104-M/15

GEOLOGICAL BRANCH ASSESSMENT REPORT

20,032

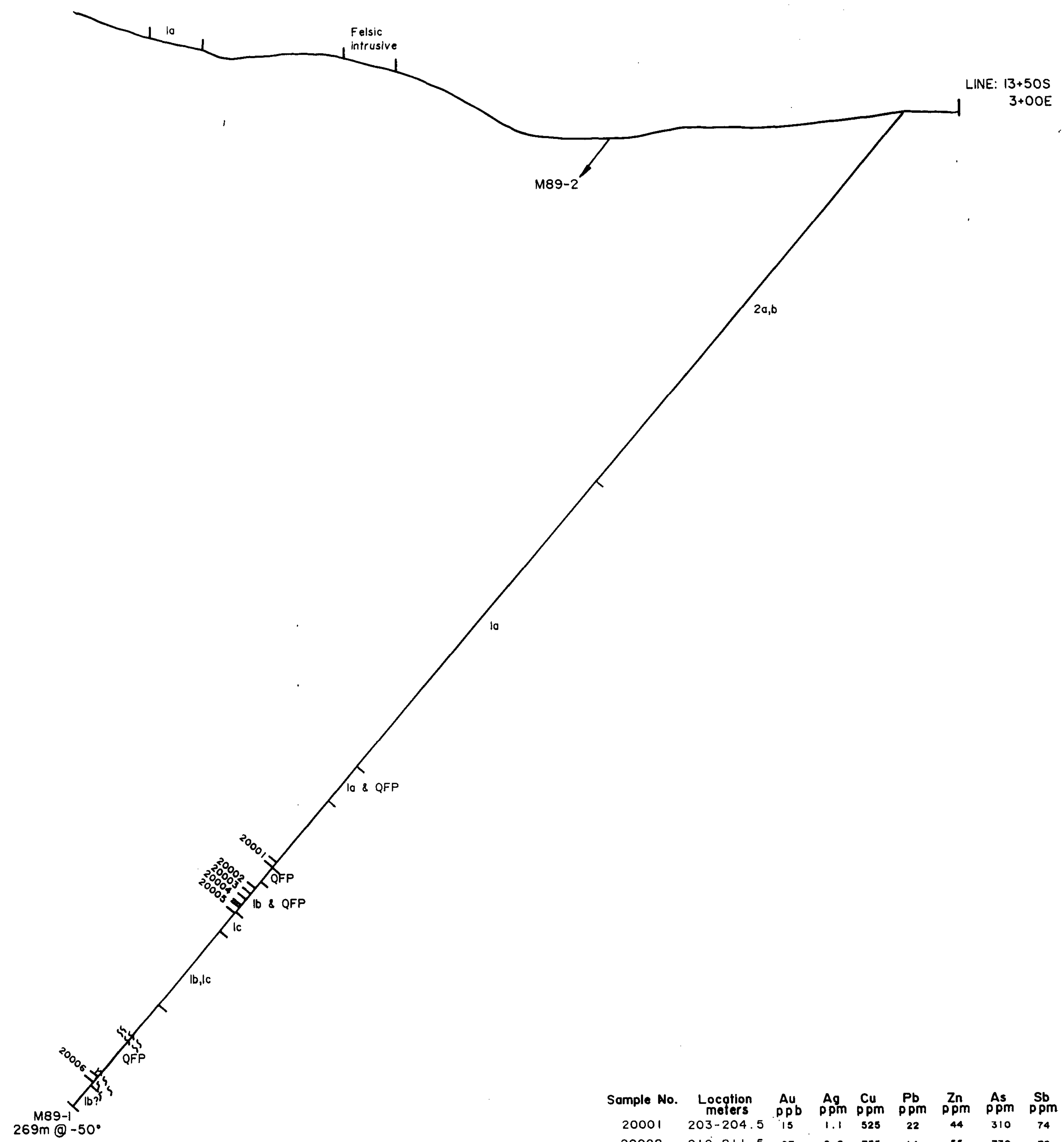
UNITED KENO HILL MINES LTD.

Geology of the Windy Arm – Tutshi Lake Area

COMPILATION GENERAL GEOLOGY

After Mihalynuk, M., Rouse, J., and Hart, C., Pelletier, K.

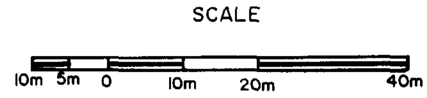
FIGURE 3



Sample No.	Location meters	Au ppb	Ag ppm	Cu ppm	Pb ppm	Zn ppm	As ppm	Sb ppm
20001	203-204.5	15	1.1	525	22	44	310	74
20002	210-211.5	97	2.8	755	14	55	730	72
20003	211.5-213	1517	29.7	11860	7	247	550	55
20004	213-214.5	573	11.0	3726	6	119	300	76
20005	215-216.5	678	19.5	6861	9	197	430	83
20006	261-262.5	68	2.0	120	23	80	440	72

NOTES: Azimuth 231°
View looking northwest.

SCALE



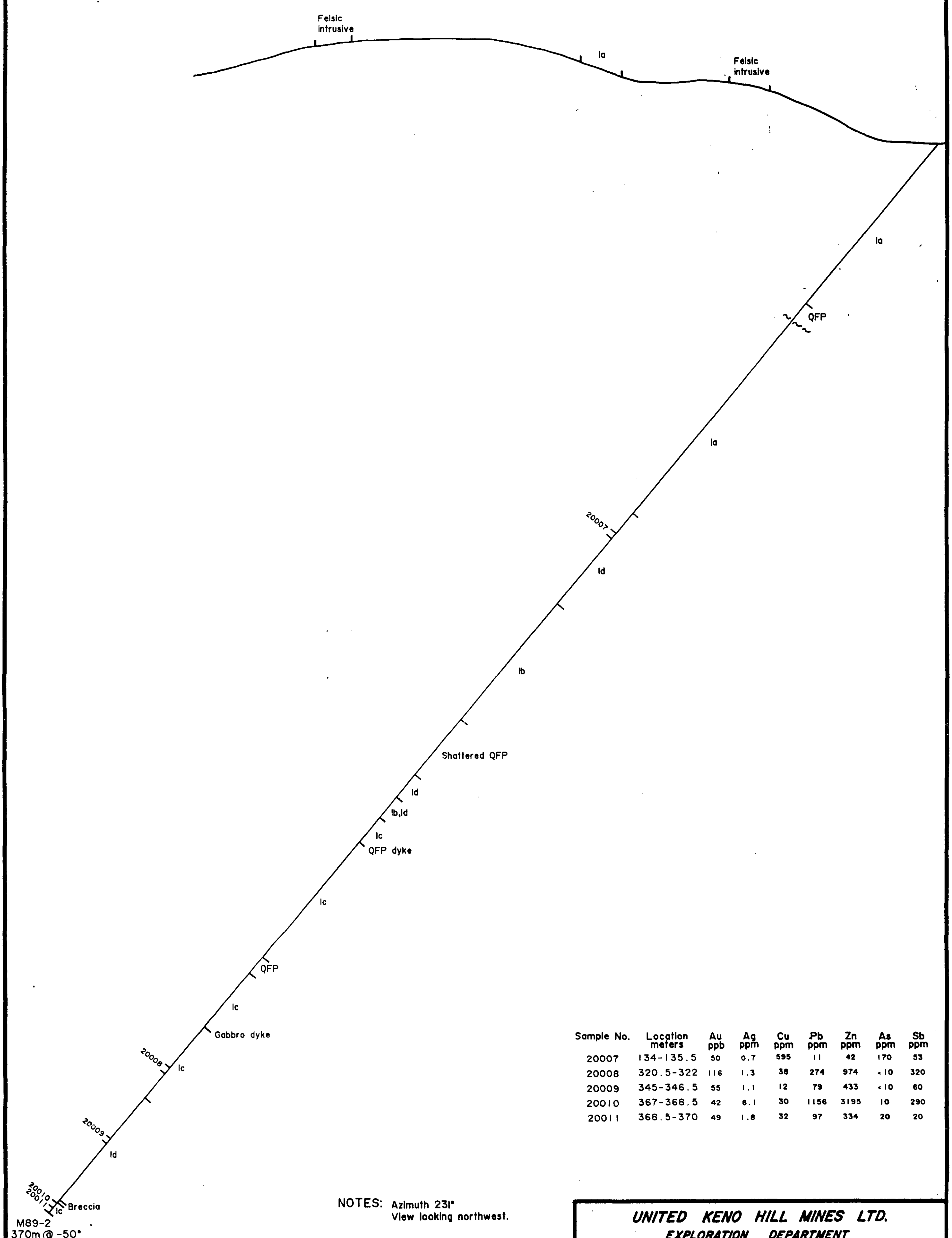
UNITED KENO HILL MINES LTD.

EXPLORATION DEPARTMENT
WHITEHORSE — YUKON

MILL CLAIM
D.D. SECTION M89-1

Mining District ATLIN
N.T.S. Sheet No. 104-M/15
Scale 1 : 1,000 1cm=10m

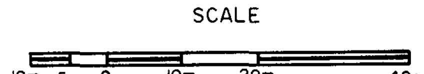
Drawn by H.D.S. ***Date*** 90/03/20



Sample No.	Location meters	Au ppb	Ag ppm	Cu ppm	Pb ppm	Zn ppm	As ppm	Sb ppm
20007	134-135.5	50	0.7	595	11	42	170	53
20008	320.5-322	116	1.3	38	274	974	<10	320
20009	345-346.5	55	1.1	12	79	433	<10	60
20010	367-368.5	42	8.1	30	1156	3195	10	290
20011	368.5-370	49	1.8	32	97	334	20	20

NOTES: Azimuth 231°
View looking northwest.

SCALE



UNITED KENO HILL MINES LTD.
EXPLORATION DEPARTMENT
WHITEHORSE — YUKON

MILL CLAIM
D.D. SECTION M89-2

Mining District ATLIN
N.T.S. Sheet No. 104-M/15
Scale 1 : 1,000 1cm=10m

Drawn by H.D.S. ***Date*** 90/03/20

UNITED KENO HILL MINES LIMITED
EXPLORATION DEPARTMENT - 409 BLACK - WHITEHORSE

DIAMOND DRILL LOG

MILL Claims

HOLE # M89-1 LOGGED BY Ouellette PROPERTY MILL 2 LOCATION CASING SIZE HWL CORE SIZE HQ

STARTED oct 29 COMPLETED november 5 SECTION NORTHING L13+50S EASTING ST2+88E ELEVATION

BEARING 226az DEPTH 881 feet DIP(collar) -50° DIP SURVEYS 881--50°

FOOTAGE from	FOOTAGE to	MINOR UNITS from	MINOR UNITS to	DESCRIPTION	AU ppb	AG ppm	CU ppm	AS ppm	ZN ppm	MINERALIZATION
0	10.6			casing						
10.6	324			conglomerate. Fine grained siliceous matrix						
				subangular to subrounded clasts with minor rip						
				up clasts. Qtz 10-15%; vol 45-50%; other 5-10%						
				Includes occasional mudstone to sandstone beds						
				up to five feet in width.						
		320	324	Tan v.f.g. highly fractured felsic dyke?						
				Graphite in fractures. No sulphides.						
324	583			Carbonate. Recrystallized limestone. Very						
				little primary features. Strongly fractured						pyrite
				and foliated along strike. Includes narrow						
				bands of graphitic carbonaceous shale.						
		537	538	Carbonate breccia with pyrite in fractures						
583	590			Green latite porphyry. F-spar laths to 1/4inch						
				Sericitized.						
590	617			Black carbonate with porphyry dykes to 50%.						
617	653			Light recrystallized fractured carbonate with						
				pyrite and minor chalcopyrite in fractures(<2%)						pyrite, chalco
653	654			Conglomerate? Very altered with abu cpy sph?						cpy, sphalerite
664	667			Above mixed with calcite, py, minor cpy.						py, minor cpy
667	671			Fine grained tuff? wth andesite clasts 3-5%	15	1.1	525	310	44	<1% cpy in bleb
				Sheared with py in fine cubes. 2-3% pyrr blebs						py, pyrr #20001
671	683.5			Tan QFP? abundant pyrite. Well fractured with						py, sb
			676	stibnite crystals on fracture surface.						
683.5	686.5			Conglomerate? Very broken.						
686.5	689			QFP						
689	689.5			Sandstone? Abundant pyrite and pyrrhotite						py, pyrrhotite
689.5	791			Interbedded conglomerate, wacke, tuff? with						
				abundant calcite veinlets. Some sections repl.						
				with chlorite, epidote and sulphides. Alterat-						
				ion decreases to lower contact. Colour changes						py, pyrr, cpy
				from green to grey as chl. and epidote decrease						hematite
		689.5	694.5	Green strongly altered/replaced with chlorite	97	2.8	755	730	55	py, pyrr, cpy
				and epidote. Non silicified						#20002(210-217m)

UNITED KENO HILL MINES LIMITED
EXPLORATION DEPARTMENT - 409 BLACK - WHITEHORSE

D I A M O N D D R I L L L O G

MILL Claims

HOLE #	LOGGED BY	PROPERTY	LOCATION	CASING SIZE	CORE SIZE
STARTED	COMPLETED	SECTION	NORTHING	EASTING	ELEVATION
BEARING	DEPTH	DIP(collar)	DIP SURVEYS		

FOOTAGE from	FOOTAGE to	MINOR UNITS from	MINOR UNITS to	DESCRIPTION	AU ppb	AG ppm	CU ppm	AS ppm	ZN ppm	MINERALIZATION
694.5	699			Green chlorite, epidote with 25-30 sulphides						
				as replacement. Two samples were taken. One	3566	70.1	29580	120	980	#14239 cpy,pyrr
				is one foot, the other is the remaining 3.5 ft.	1517	29.7	11860	550	247	#20003 pyrr,cpy
				One foot section is best of run with cpy as						
				dominant sulphide. Other 3.5 feet has less cpy.						
699	704			Same as previous but less sulphide. Pyrrhotite	573	11.0	3726	300	119	#20004 pyrr,cpy
				in large blebs. Very magnetic.						to 20%
704	711			Dark green very fine grained with several						
				calcite veinlets and abundant pyrrhotite. Some						
				chalcopyrite in sections less than one foot.						
		706	711	Includes one foot section with chalcopyrite to	678	19.5	6861	430	197	#20005 cpy,pyrr
				10% (?)						pyrite.
711	791			Green conglomerate/wacke interbedded with carb						
				clasts replaced with sulphides. Rock becomes						pyrite,
				progressively more grey less green with depth.						pyrrhotite,
				Rocks become carbonaceous with colour change.						minor cpy.
791	862			Latite porphyry and breccia/fault zones in						
				porphyry. Calcite fills some matrix between						
				siliceous green clasts. Abundant green chrome						
				mica or green chalcedony. Some chalcedonic						
				cement. Sulphides in cement are pyrite and						
				possible arsenopyrite. Sulphides are <2%.						
		818	827	Fault gouge and sheared porphyry with pyrite						
				and arsenopyrite(?).						
		827	837	QFP						
		837	862	Fault zone up core axis with extensive breccia.						
		856	861	Character sample with abu green mica.	68	2.0	120	440	80	#20006,py,aspy?
862	881			Shattered conglomerate with ca vlts up axis.						
				Clasts 1-2 inch or less. Pred vol. Py in blebs.						END OF HOLE

UNITED KENO HILL MINES LIMITED
EXPLORATION DEPARTMENT - 409 BLACK - WHITEHORSE

D I A M O N D   D R I L L   L O G

MILL Claims

HOLE # M89-2   LOGGED BY Ouellette   PROPERTY MILL 2   LOCATION   CASING SIZE HWL   CORE SIZE NQ

STARTED nov. 5   COMPLETED november 12   SECTION   NORTHING L13+50S   EASTING ST1+90E   ELEVATION ~15' lower

BEARING az231   DEPTH 1216 feet   DIP(collar) -50°   DIP SURVEYS 861 -50° 1216 -46°

FOOTAGE from	FOOTAGE to	MINOR UNITS from	MINOR UNITS to	DESCRIPTION	AU ppb	AG ppm	CU ppm	AS ppm	ZN ppm	MINERALIZATION
0	20			casing						
20	417			Carbonate. Black limestone with very little primary features. Very broken in places. Sheared along faults and in some large sections with abundant black graphite along shears. Very minor pyrite.						
		176.5	177.5	QFP dyke						
		177.5	178	Carbonate						
		178	228	QFP pale green with <2% pyrite. Steep contact at 50-60° to axis.						
		195	197	Black fault gouge.						
		390	395	Carbonate breccia						
		395	400.5	QFP leached/altered to clay with abu py on fractures.						
		400	411	Black graphitic carbonate.						
		411	417	Mixed carbonate and very fine silt or tuff? Pyrite as fine cubes.						
417	1216			Mixed sediments and volcanics with occasional QFP dykes cutting core.						
		417	438	Green fine grained turbated sediment. Previous fine laminations visible as alternating light and dark green bands.						
		438	454	Very fine grained siliceous green laminated tuff? Pyrite in dendritic pattern up from bed contacts. By 454 is chert.						
		454	459	**Breccia with calcite cement.**						
		459	463	Gray-green conglomerate? Volcanic?						
		463	481	Gray-green banded tuff? Reacts mod to HCl.						

UNITED KENO HILL MINES LIMITED
EXPLORATION DEPARTMENT - 409 BLACK - WHITEHORSE

D I A M O N D D R I L L L O G

MILL Claims

HOLE # LOGGED BY PROPERTY LOCATION CASING SIZE CORE SIZE /

STARTED COMPLETED SECTION NORTHING EASTING ELEVATION /

BEARING DEPTH DIP(collar) DIP SURVEYS /

FOOTAGE from	FOOTAGE to	MINOR UNITS from	MINOR UNITS to	DESCRIPTION	AU ppb	AG ppm	CU ppm	AS ppm	ZN ppm	MINERALIZATION
		481	517	Fine bedded chert and varigated feldspar-phyric tuffs. Chlorite alteration of clasts and alteration along fractures. Chert contains pyrite in blebs and fractures. Cherts and tuffs are tan.						pyrite
		517	570	Breccia equivalent of above. Pyrite as replacement in areas. Rocks are dark green. Fractures are calcite filled.						
		570	575	Marble.						
		575	585	Andesite pebble conglomerate with carbonate clasts and chert bands.						
		585	588	Fault zone. Breccia equiv. of above.						
		588	633	Conglomerate as before with more andesite clasts and less carb. clasts. Carb clasts replaced with pyrite. Rocks become leached and f-spars alt to green clay (saussuritization).						pyrite
		633	639	Fault zone. Clay gouge with some altered relic felsic clasts. Carb. clasts replaced with py and hematite.						
		650	708	Shattered QFP?						
		708	713	Tan vfg chert and cong. as before.						
		713	720	Shattered QFP						
		720	743	Alternating tan and black very fine grained siliceous siltstone? chert?.						
		743	765	Conglomerate with vfg siltstone bands. Clasts are altered andesite + carb?. Rxs are tan.						

UNITED KENO HILL MINES LIMITED
EXPLORATION DEPARTMENT - 409 BLACK - WHITEHORSE

D I A M O N D D R I L L L O G

MILL Claims

HOLE # | LOGGED BY | PROPERTY | LOCATION | CASING SIZE | CORE SIZE

STARTED | COMPLETED | SECTION | NORTHING | EASTING | ELEVATION

BEARING | DEPTH | DIP(collar) | DIP SURVEYS

FOOTAGE from	FOOTAGE to	MINOR UNITS from	MINOR UNITS to	DESCRIPTION	AU ppb	AG ppm	CU ppm	AS ppm	ZN ppm	MINERALIZATION
		765	796	As before. Black vfg siltstone well fractured with calcite in fractures. Becomes black carbonaceous shale.						
		796	797.5	QFP dyke						
		797.5	927	Black carbonaceous shale. Becomes very broken with abundant pyrite.						pyrite
		927	943	QFP						
		943	957	Black calcareous shale. Very broken.						
		957	963	Non calcareous fine grained black wacke?						
		963	1008	Black pyritic shale with some pyrrhotite. Non calcareous.						
		1008	1010	Brown slightly magnetic gabbro dyke.						
		1010	1068	Black broken shale with calcite and hematite.						
		1052	1057	character sample	116	1.3	38	320	974	#20008
		1068	1086	Dark gray to black siltstone with blue quartz filling fractures.						
		1086	1101	As above but brown.						
		1101	1103	Leached wacke non calcareous.						
		1103	1119	Wacke.						
		1119	1205	Dark green finer grained equiv. of above?						
		1133	1138	character sample	55	1.1	12	60	433	#20009
			1205	4" breccia						

UNITED KENO HILL MINES LIMITED
EXPLORATION DEPARTMENT - 409 BLACK - WHITEHORSE

D I A M O N D D R I L L L O G

MILL Claims

HOLE #	LOGGED BY	PROPERTY	LOCATION	CASING SIZE	CORE SIZE
STARTED	COMPLETED	SECTION	NORTHING	EASTING	ELEVATION
BEARING	DEPTH	DIP(collar)	DIP SURVEYS		

FOOTAGE from	FOOTAGE to	MINOR UNITS from	MINOR UNITS to	DESCRIPTION	AU ppb	AG ppm	CU ppm	AS ppm	ZN ppm	MINERALIZATION
		1205	1210	Brecciated shale 10-15% py; 3-5% pyrr; 15-20%	42	8.1	30	290	3195	Pb 1156
				hematite; + aspy, gn?						#20010
		1210	1214	Wacke?						
		1210	1216	character sample	49	1.8	32	20	334	#20011
		1214	1216	Mislatch. Black chert with pyrite in fractures.						
				END OF HOLE						

Northern Analytical Laboratories ltd.

November 6, 1989

United Keno Hill Mines Ltd.
409 Black St.
Whitehorse, Yukon
Y1A 2N2

ASSAY CERTIFICATE FOR SAMPLES PROVIDED

WORK ORDER # 34521

Sample	ppb Au	ppm Ag	ppm Cu	ppm Zn	ppm As	ppm Ni
14239	3566	70.1	29580	980	120	31

Au -- 15g Fire Assay/AAS
Metals -- Aqua Regia Digestion/AAS

Applied Science Technologists and Technicians of British Columbia
6992
GERALD F. HAYES
A.Sc.T.

105 Copper Road, Whitehorse, YT, Y1A 2Z7 Ph: (403) 668-4968 Fax: (403) 668-4890

NAL Northern Analytical Laboratories ltd.

November 16, 1989

United Keno Hill Mines Limited

ASSAY CERTIFICATE FOR SAMPLES PROVIDED

WORK ORDER # 34524

Sample	ppb Au	ppm Ag	ppm Cu	ppm Pb	ppm Zn	ppm As	ppm Sb
20001	15	1.1	525	22	44	310	74
20002	97	2.8	755	14	55	730	72
20003	1517	29.7	11860	7	247	550	55
20004	573	11.0	3726	6	119	300	76
20005	678	19.5	6861	9	197	430	83
20006	68	2.0	120	23	80	440	72
20007	50	0.7	595	11	42	170	53

Au -- 15g Fire Assay/AAS
Metals -- Aqua Regia Digestion/AAS

Applied Science Technologists and Technicians of British Columbia
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GERALD F. HAYES
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105 Copper Road, Whitehorse, YT, Y1A 2Z7 Ph: (403) 668-4968 Fax: (403) 668-4890

Northern Analytical Laboratories ltd.

December 11, 1989

United Keno Hill Mines

ASSAY CERTIFICATE FOR SAMPLES PROVIDED

Work Order # 34535 File # 34535b

Sample	ppb Au	ppm Ag	ppm Cu	ppm Pb	ppm Zn	ppm Sb	ppm As
20008	116	1.3	38	274	974	<10	320
20009	55	1.1	12	79	433	<10	60
20010	42	8.1	30	1156	3195	10	290
20011	49	1.8	32	97	334	20	20
20012	22	0.3	146	15	51	90	<10

Au -- 15g Fire Assay/AAS
Metals -- Aqua Regia Digestion/AAS

Applied Science Technologists and Technicians of British Columbia
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105 Copper Road, Whitehorse, YT, Y1A 2Z7 Ph: (403) 668-4968 Fax: (403) 668-4890

APPENDIX IV

STATEMENT OF COSTS

Diamond drilling	$83,366
Equipment	$582
Assay	$129
Wages: Geologist	
26 days @ 150/day	$3,900
Assistant	
6 days @ 100/day	$600
Lodging	$4,322
Vehicle	$1,785
TOTAL	$94,684

CERTIFICATE OF QUALIFICATIONS

I, Dennis J. Ouellette, with business address

United Keno Hill Mines Limited
409 Black Street
Whitehorse, Yukon
Y1A 2N2

do hereby certify that:

1. I am a practicing geologist.

2. I hold a Bachelor of Science (Specialization) Degree (1984) in Geology from Brandon University.

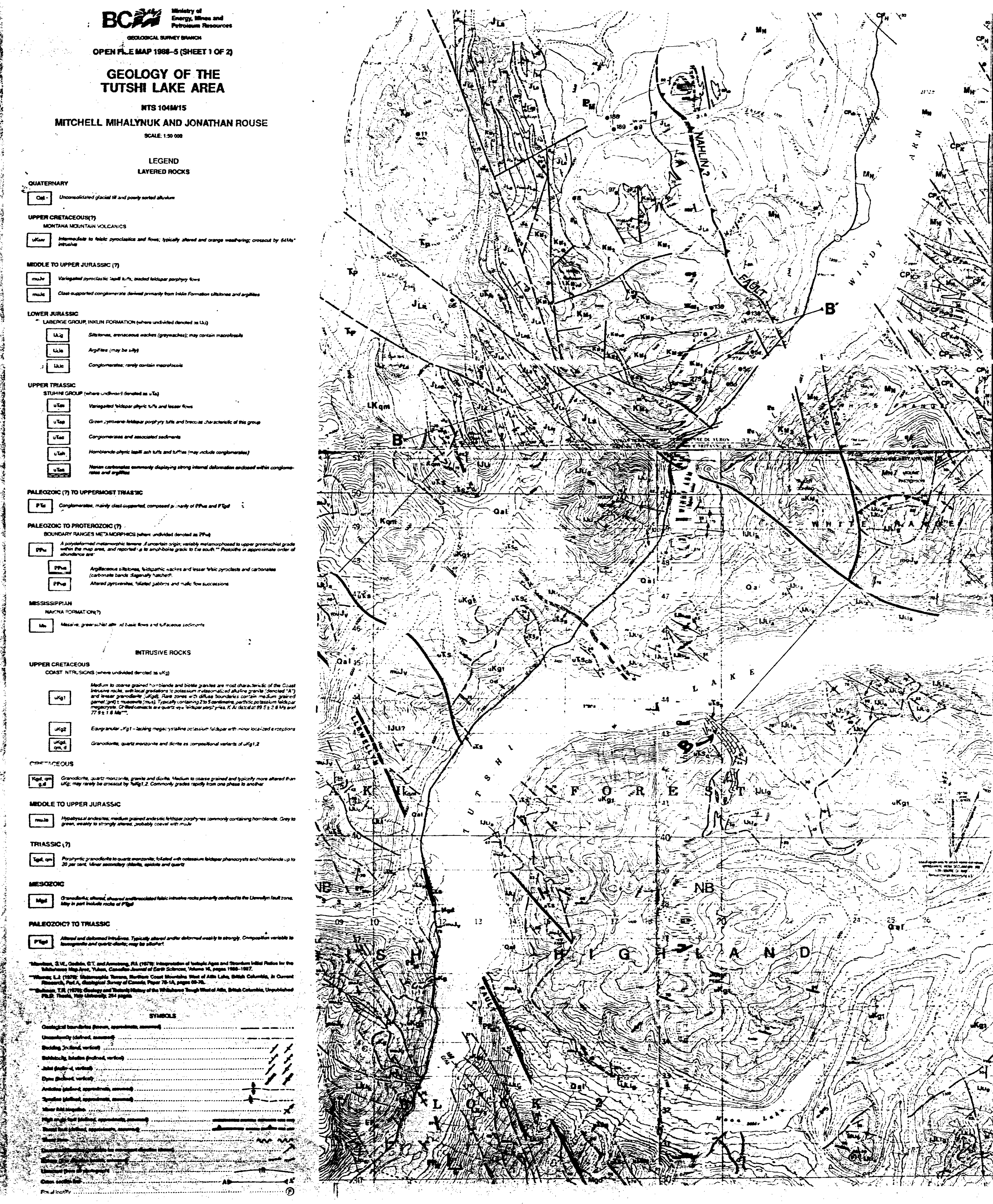
3. I have been working in the field of mineral exploration since May, 1977.

4. This report, entitled "1989 Diamond Drilling Report on the MILL 1 Claim, B.C.," is based on work done on the property in October/November, 1989.

5. I have not received, nor do I expect to receive, any interest, either directly or indirectly, in the property concerned in this report.

Respectfully submitted,

Dennis J. Ouellette, B.Sc.



LEGEND

QUATERNARY

Q_e	Unconsolidated eolian sands and sand dunes
Q_f	Unconsolidated gravel, sand and silt of fluvial or glaciofluvial origin
Q_l	Unconsolidated gravel, sand, silt and varved clay of lacustrine or glaciolacustrine origin
Q_g	Unconsolidated glacial moraine, kame, esker and drift material

TERTIARY

PALEOCENE

P_c	**Carcross Pluton:** Fine- to medium-grained, biotite-hornblende granite to granodiorite with white porphyritic potassium feldspar (64 Ma[2])
P_M	Montana Phase: Light weathering, medium-grained, pink-mauve, ... phase of quartz-rich aplite and quartz-eye rhyolite
T_{gr}	**Finger Mountain Granite:** Pale orange weathering, medium- to coarse-grained, red-pink granite to quartz monzonite with slightly altered pale green hornblende

CRETACEOUS

LATE CRETACEOUS

LK_{gr}	**Pennington Granite:** Grey weathering, coarse-grained biotite-hornblende granite with pink megacrystic potash feldspar; leucocratic to pink quartz monzonite phases

LATE AND MIDDLE CRETACEOUS(?)

K_r	Orange weathering, recessive, cream coloured, fine-grained rhyolite and feldspar porphyry plugs
K_v	Dark green and maroon, resistant, aphanitic to porphyritic andesite to dacite flows, heterolithic breccia, agglomerate and associated epiclastic rocks; minor light coloured felsic flows and pyroclastic rocks
K_{v_1}	Massive to poorly bedded, dark grey, aphanitic to porphyritic, vitreous dacite (?) and associated pyroclastic rocks

MIDDLE CRETACEOUS

MONTANA MOUNTAIN VOLCANICS (94 Ma[1])

KM_{vd}	Massive to brecciated, dark green to grey andesitic plug domes and dykes; locally porphyritic
KM_2	Orange weathering, massive to locally flow banded, rhyolite tuff, pyroclastic and rhyolite flows
KM_1	Massive to poorly bedded, dark weathering, dark to pale green andesite and dacite flows, autoclastic and epiclastic breccia; locally feldspar-phyric or with chlorite amygdules
K_y	Coarse-grained, medium grey to orange-pink, anorthositic, hornblende quartz syenite
K_{gd}	Dark grey weathering, medium- to coarse-grained biotite granodiorite; local porphyritic biotite

CRETACEOUS AND JURASSIC

JK_{gd}	**Wheaton Valley Granodiorite:** Dark grey weathering, medium- to coarse-grained, weakly foliated, typically fractured and altered hornblende granodiorite
JK_{cg}	Recessive, clast-supported, immature, polymictic, poorly sorted, angular pebble conglomerate; well indurated exposures are dark purple to dark red weathering with distinctive red metamorphic quartz; poorly indurated exposures are tan to light grey weathering and granular in nature; clasts are composed of quartz-mica schist > granite gneiss > intermediate volcanic rocks > quartz and quartzite

TRIASSIC

T_{gr}	Resistant, medium grey weathering, medium-grained, pink megacrystic potash feldspar, hornblende granite and granodiorite (220 Ma[3])

MESOZOIC

M_{mz}	Medium- to coarse-grained, massive, grey weathering pyroxene monzodiorite and diorite, pervasive alteration of mafic minerals to chlorite

PERMIAN(?)

P	Resistant, pale to dark green and black, massive to ... and ... lithic greywacke, argillite, angular pebble conglomerate, hornfels and rare green pyroxenite, all metamorphosed to lower greenschist facies

WHITEHORSE TROUGH

JURASSIC

MIDDLE AND UPPER JURASSIC(?)

J_{Lap}	Slightly rusty weathering, pale green to grey, medium-grained, hypabyssal andesite feldspar porphyry and hornblende-feldspar porphyry

LOWER AND MIDDLE JURASSIC

LABERGE GROUP (HETTANGIAN TO AALENIAN)

J_{Lcg}	Brown-orange weathering, resistant, massive, thick bedded, clast- and matrix supported, well-rounded granitic and volcanic cobble conglomerate; clasts of granodiorite and Lewes River Group volcanics with lesser metamorphic, quartz, limestone and sedimentary clasts; granitic clast dominant higher in section; interbedded greywacke, sandstone and argillite
J_{Ls}	Pale to dark orange weathering, dark grey, massive, thick to medium bedded, coarse-grained, feldspathic and lithic greywacke with lesser arkose and quartz-rich grits; interbedded conglomerate and argillite
J_{La}	Dark red-brown weathering, rhythmically and thin bedded, tawny to dark green and grey, silty argillite, shale, siltstone and hornfels; contains ammonoid fossils; minor interbedded massive sandstone and conglomerate; J_{Lsa} - resistant, grey to brown, finely laminated argillite

UPPER TRIASSIC TO JURASSIC

LEWES RIVER GROUP (KARNIAN TO SINEMURIAN)

uT_H	**Hancock Member** (Norian): Resistant, white to light grey weathering, massive and thick bedded limestone, bioclastic limestone and marble; minor sooty black limestone and pale yellow dolostone; uT_{Hs} - resistant, thin, well bedded, interlaminated white limestone and tan weathering, dark grey siltstone
uT_A	... Member (Karnian to Norian): Resistant, massive to moderately well bedded, red, purple and green matrix (and clast) supported pebble conglomerate, agglomerate and debris flows; clasts of augite porphyry and subvolcanic dacite porphyry with crystal-rich wacke matrix; interbedded arenite and minor waterlain tuff; uT_{A_1} - dacite-andesite feldspar (and hornblende) porphyry flows, agglomerate and breccia; minor red siltstone; uT_{A_2} - massive, grey, white to pink (often sheared or recrystallized) limestone and limestone breccia; located near the base of this member
	... Formation (Karnian (and older?)): Resistant, massive, light to dark green weathering, dark green to black, basalt and basaltic andesite flows and breccia, commonly altered; minor well indurated dark grey greywacke, agglomerate, tuff and associated epiclastic rocks with thin carbonate beds; T_{P_1} - resistant, massive dark green to black, variably altered, augite porphyry basalt and breccia, ... augite schists, augite-plagioclase gneiss and other variably metamorphosed equivalents of this Formation

ATLIN TERRANE

CARBONIFEROUS AND PERMIAN

CACHE CREEK GROUP

CP_{ub}	**Ultramafic rocks:** Massive to foliated, dark green to black irregular bodies of serpentinized dunite and peridotite with lesser microgabbro
CP_H	**Horsefeed Formation:** Massive, fine- to medium-grained, white to pale yellow limestone and crinoidal bioclastic limestone; rare dolostone
CP_{Hvb}	Massive, dark green, altered (spilitized), aphanitic and amygdaloidal basalt sills and local dark brown pillow basalts
CP_K	**Kedahda Formation:** Resistant, well bedded, grey, black, red and brown chert, with lesser cherty sandstone and siltstone; rare thin limestone beds

MISSISSIPPIAN TO PERMIAN (?)

M_N	**Nakina Formation:** Resistant, massive, dark weathering, pervasively altered, fine-grained, dark green metabasite and metadiorite with variable thicknesses of grey chert and irregular occurrences of ultramafic rocks

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Scale 1 : 50,000

105-D/2 & 104-M/15

Geology of the Windy Arm – Tutshi Lake Area

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COMPILATION
GENERAL GEOLOGY

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FIGURE 3