1975 EXPLORATION PROGRAMME

EAGLE CLAIM GROUP
Latitude 61° 08'
Longitude 131° 10'

WATSON LAKE MINING DIVISION
Yukon Territory
N.T.S. Sheet 105-C-3

for

TINTINA SILVER MINES LTD.
Toronto, Ontario

by

R.G. HILKER LIMITED
Whitehorse, Yukon Territory

May 1, 1975

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INTRODUCTION

In the early part of the summer, 1961, Nels Hals, a prospector for Conwest Exploration, discovered a surface showing of silver-lead-zinc mineralization within a cirque in the southern part of the St. Cyr mountain range. The Eagle Claim Group was staked to cover the showing and a surface exploration programme commenced immediately. As a consequence of this work, the decision was made to explore the most promising showings by means of an underground adit, which was collared in January 1962. During the following summer, detailed geological mapping was conducted by Dr. W. W. Moorehouse over the claim group.

The underground exploration programme failed to intersect significant mineralization in 1962, and all work on the property was ceased. Tintina Silver Mines Ltd. was re-organized by a Toronto group of mining businessmen and Conwest Exploration ceased its involvement with the company. In 1968 a geochemical survey was conducted over the Eagle claim group for the purpose of assessment work.

A total of twenty-six surface showings have been outlined over the property, many with very high grades of silver, lead and zinc mineralization. The initial 1962 exploration programme tested only a very limited number of the showings, and a surface diamond drilling programme was planned by the directors of Tintina Silver Mines to more fully investigate the size and continuity of the mineralized showings.

A diamond drilling programme utilizing a Longyear BBS-1 wireline drill and a portable Morex EX-drill was carried out during the months of June, July and August of 1974. During this programme, a total of 10,322 feet of BQ core and 1,577 feet of EX core were drilled, testing ten of the surface showings in the main cirque area. In conjunction with the drill programme work, a small amount of surface exploration, including trenching and

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geochemical soil and rock chip sampling, was completed. The diamond drilling was conducted on sections surveyed from three baselines, established from a transit survey. The drilling was done at an elevation of 5000 to 5500 feet in a north facing cirque.

Tintina Silver Mines Ltd., intend on conducting a surface exploration programme in 1975, on the Eagle Claims Group, prior to a major diamond drill programme.

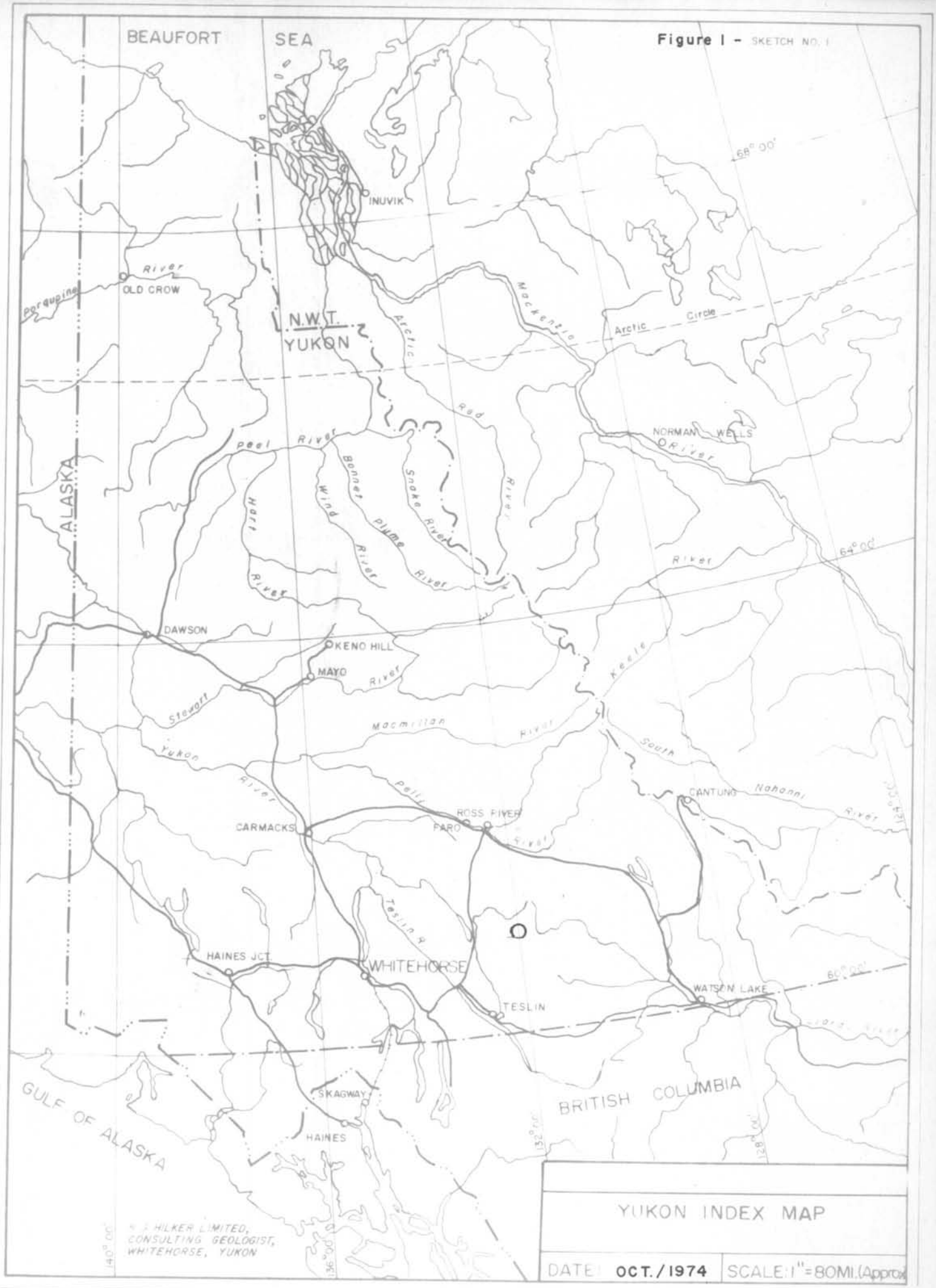
Figure I - SKETCH NO. I
BEAUFORT SEA
INUVIK
68° 00'
Porcupine River
OLD CROW
N.W.T.
YUKON
Arctic
Mackenzie
Arctic Circle
Red River
NORMAN WELLS
Peel River
Bonnet Plume River
Snake River
Wind River
Hart River
ALASKA
River
64° 00'
DAWSON
KENO HILL
MAYO
Stewart River
Macmillan River
Keele
South Nahanni River
Yukon River
Pelly
CANTUNG
ROSS RIVER
FARO
CARMACKS
Teslin R.
HAINES JCT.
WHITEHORSE
WATSON LAKE
60° 00'
TESLIN
GULF OF ALASKA
SKAGWAY
HAINES
BRITISH COLUMBIA
132° 00'
128° 00'
140° 00'
136° 00'
HILKER LIMITED,
CONSULTING GEOLOGIST,
WHITEHORSE, YUKON
YUKON INDEX MAP
DATE: OCT./1974
SCALE: 1" = 80MI. (Approx)

LOCATION AND ACCESS

The Eagle claim group is situated in the southern St. Cyr mountains, at the headwaters of the Liard River, in the southeastern Yukon Territory, N.T.S. sheet 105-G-3. The property is approximately 110 miles northwest of Watson Lake, 140 miles east of Whitehorse and 75 miles southeast of Ross River.

An airstrip presently in useable condition, was built five miles southwest of the property to service the 1962 exploration programme. A winter road was also constructed, from mile 790 on the Alaska highway, approximately 110 miles into the property.

From the present programme, much of the fuel and equipment was mobilized from Ross River to the airstrip during the winter using fixed wing aircraft on skis. Personnel and the drill were transported directly to the work site from the Campbell highway near the Hoole River bridge using a Sikorsky S-55T helicopter. The camp was served during the summer from Whitehorse, material being trucked to Ross River and flown to the camp by helicopter or fixed wing aircraft and helicopter. The drill and camp were demobilized using a helicopter from the camp to the airstrip and fixed wing aircraft from the airstrip to Ross River.

Best access to the property with an all weather road would be from the Campbell highway. At present, a tractor trail exists from the highway, approximately 35 miles southeast of the town of Ross River, to the Hoole River, a distance of about 25 miles. This trail would require upgrading, and its extension to the property would entail another 25 miles of road. (see Access sketch).

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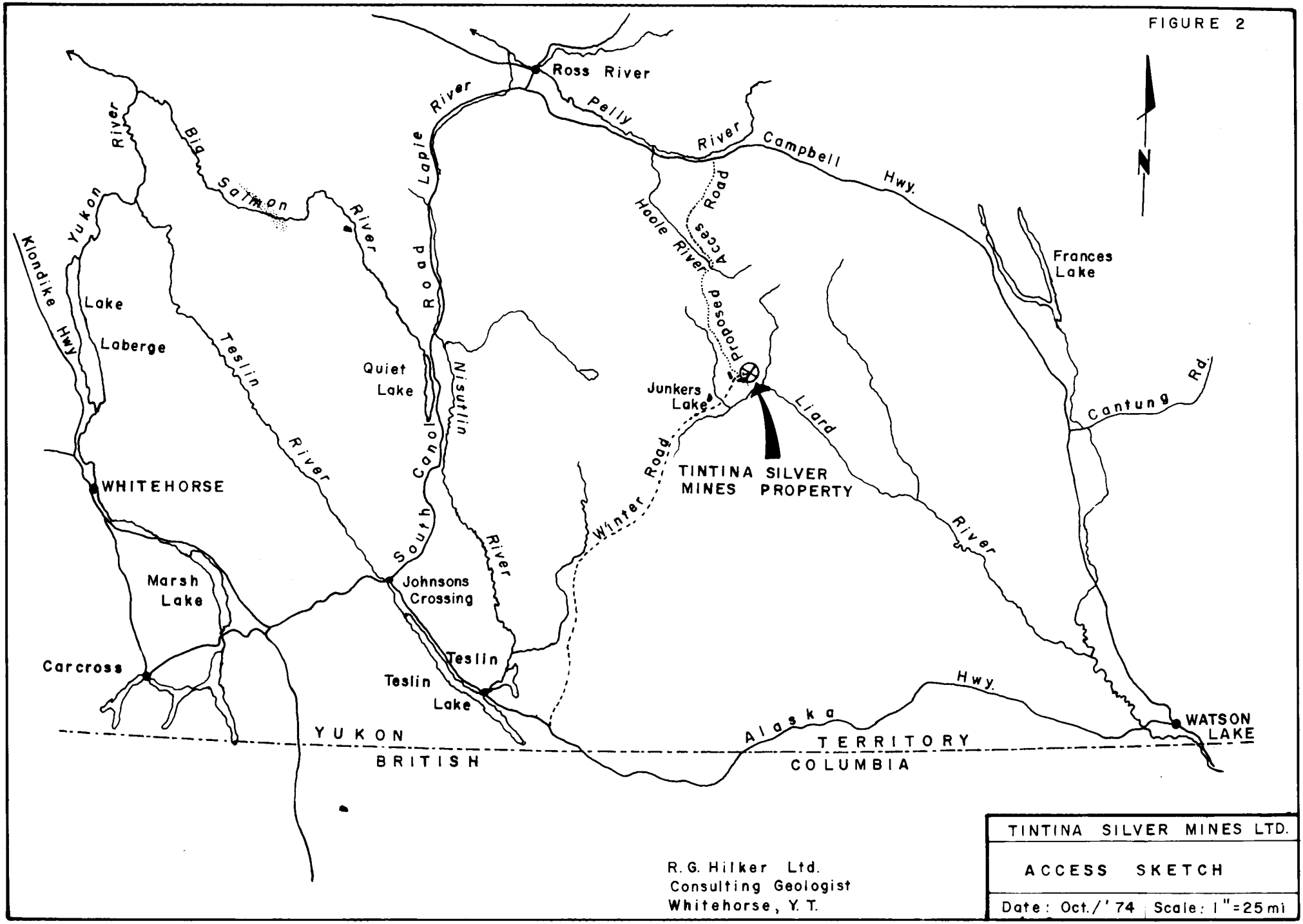
FIGURE 2



R.G. Hilker Ltd.
Consulting Geologist
Whitehorse, Y.T.

TINTINA SILVER MINES LTD.	
ACCESS SKETCH	
Date: Oct./'74	Scale: 1"=25 mi

CLAIMS

The Eagle claim group is located in the Watson Lake Mining District, Yukon Territory claim sheet 105-G-3, and centred at 131° 10' west longitude and 61° 08' north latitude.

NAME CLAIM	GRANT NUMBER	ANNIVERSARY DATE
Eagle 1 - 8	76323 - 76330	July 15, 1980
9 - 16	76331 - 76338	July 15, 1980
17 - 24	76339 - 76346	July 15, 1980
25 - 32	76347 - 76354	July 15, 1980
33 - 40	76355 - 76362	July 15, 1980
41 - 48	76363 - 76370	July 15, 1980
49 - 50	76371 - 76372	July 15, 1980
57 - 58	76379 - 76380	July 15, 1980
66	76414	July 15, 1980
73 - 74	76421 - 76422	July 15, 1980
77 - 78	76425 - 76426	July 15, 1980
81 - 85	76429 - 76433	July 15, 1980
115 - 122	76463 - 76470	July 15, 1980
123 - 138	Y83391-Y83406	Sept. 23, 1975

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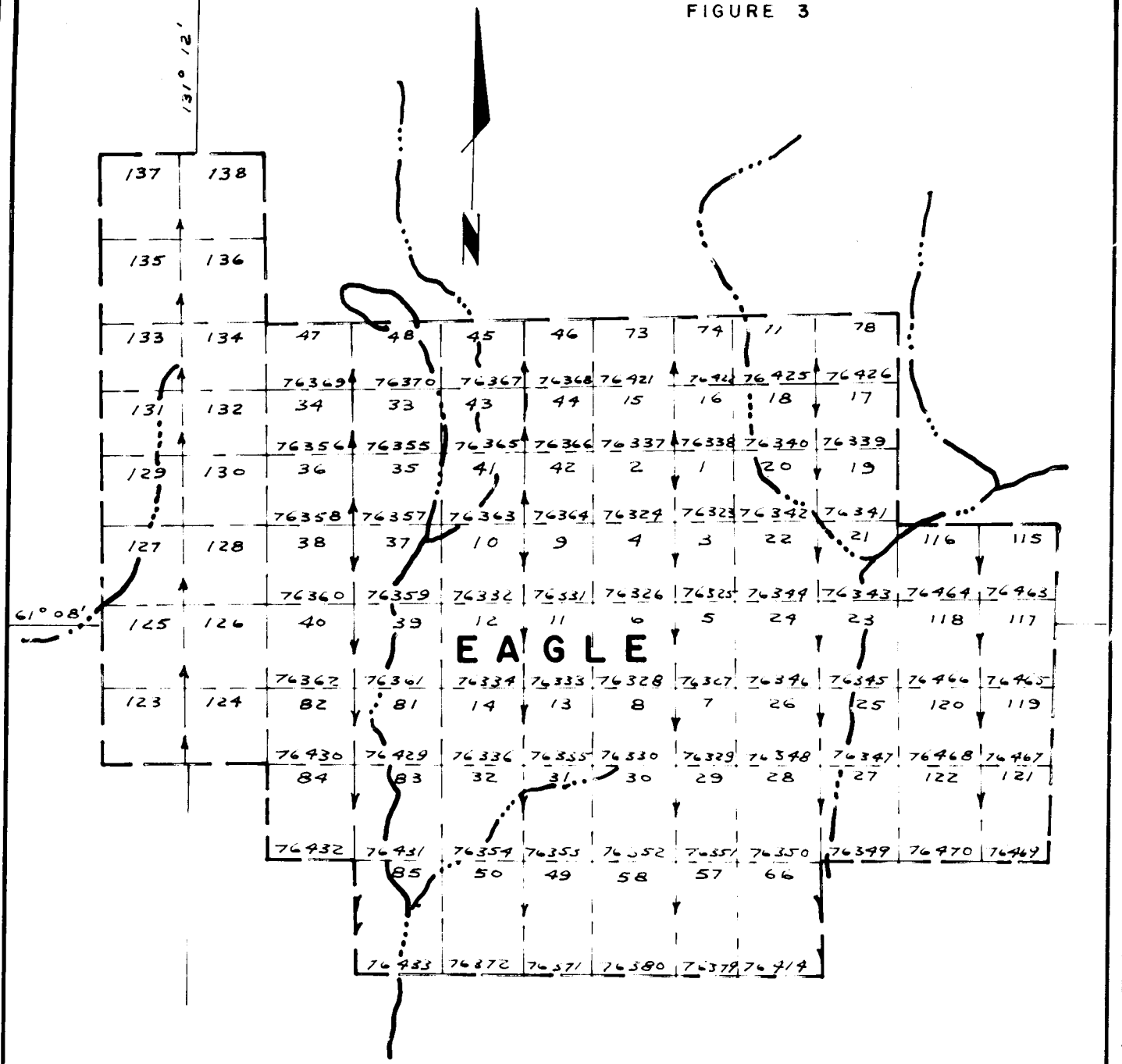
FIGURE 3



NTS SHEET No. 105-G-3

TINTINA SILVER MINES LTD.	
LOCATION PLAN EAGLE CLAIM GROUP	
DATE: Oct./1974	SCALE: 1" = ½ mi

R.G. HILKER LTD.
CONSULTING GEOLOGIST
WHITEHORSE, Y.T.

GEOLOGY

REGIONAL GEOLOGY

The Eagle claims are located at the southern end of the St. Cyr mountain range, within the Pelly Mountains. This range trends northwest and is bounded on the southwest by the Nisutlin Plateau and on the northeast by the Tintina Valley, a strong, northwest trending fault zone which is a continuation of the Rocky Mountain Trench. The claims are within a mountainous terrain, elevations ranging from 4,000 feet to peak 7,393 just north of the claim group.

Reconnaissance mapping by the Geological Survey of Canada has shown the mountains in this area to consist of folded and faulted sediments, of early Paleozoic age, which have been intruded by Jurassic and/or Cretaceous granitic rocks. The geology in the vicinity of the claim group is shown on Figure 3.

The oldest rock in the area, Unit 1, is a sequence of Lower Cambrian quartzite, phyllite and limestone. This unit, and in particular the limestone, forms the host rocks for the Tintina Silver property mineralization. These rocks are overlain, often on southwesterly dipping thrust planes, by Unit 2, a thick sequence of Middle and Upper Cambrian (?) phyllites, with some interbedded dolomite, greenstone and chert. Adjjacent to granitic intrusive bodies, this rock is frequently altered to hornfels (unit 2a).

Overlying Unit 2, mainly to the northwest of the property, is a middle Paleozoic sequence of thick bedded dolomite, with minor chert and sandy and silty dolomite, and overlain locally by slate, shale, chert and minor greywacke (unit 4). These rocks have been intruded by granitic rocks (Unit 5), mainly biotite granodiorite.

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A roughly circular granodiorite plug, approximately 1½ miles in diameter, forms the northern boundary of the property and cuts rocks of both units 1 and 2.

Pleistocene glaciation has covered the entire area, moving towards the northwest, and subsequent alpine glaciation has sculpted the mountains, determining the present topography. Unit 12, unconsolidated glacial and alluvial deposits, fill the valleys and cover most slopes to between 4,000 and 5,000 feet elevation.

Structure in the area is dominated by the northwest striking Tintina fault. The most important feature in the area of the Eagle claims is an anticlinal structure which trends parallel to the Tintina Fault. Small scale folding associated with this structure is abundant, as is small scale cross faulting. Age relations between the various sedimentary units are often uncertain due to the thrust faulting from the southwest, as many of the major contacts are thrust fault planes.

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GEOLOGY AFTER G.S.C. MAP 8-1960

FIGURE 4

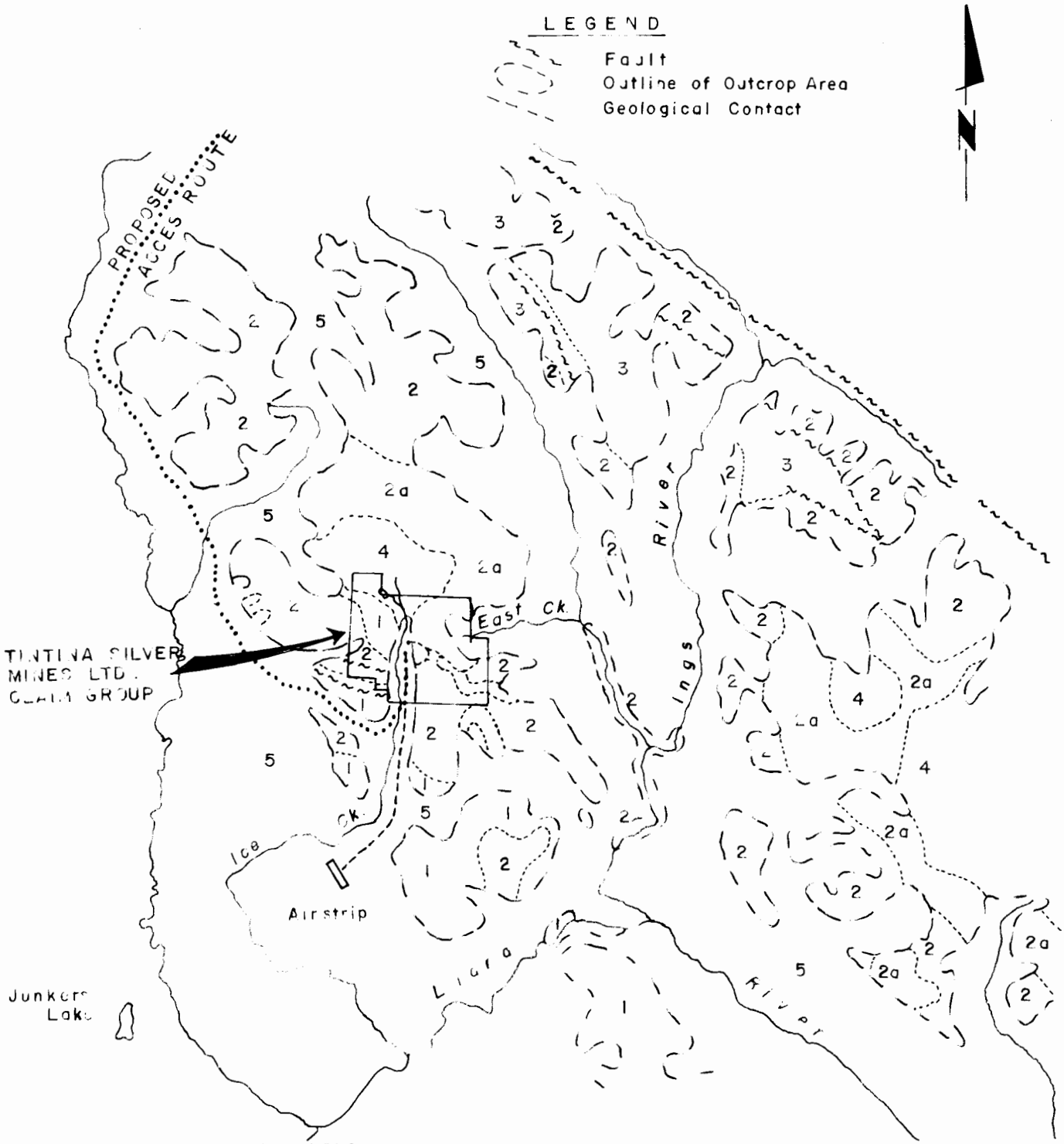

TABLE OF FORMATIONS

QUATERNARY

[5] Unconsolidated glacial and alluvial deposits

MESOZOIC

Jurassic and/or Cretaceous

[4] Biotite Granodiorite, Quartz Monzonite

PALEOZOIC

Silurian and Devonian

[3] Dolomite, Chert, Quartzite, Slate, Shale

Middle and Upper Cambrian

[2] Phillite, Dolomite, Greenstone, Chert
2a - altered to Hornfels

Lower Cambrian

[1] Quartzite, Phillite, Limestone

R.G. Hilker Ltd.
Consulting Geologist
Whitehorse, Y.T.

NTS SHEET 105 - G - 3

TINTINA SILVER MINES LTD.	
REGIONAL GEOLOGY SKETCH	
DATE: Oct./'74	SCALE: 1" = 3 mi

1972 G.S.C. REGIONAL GEOLOGY

During the recent geological mapping in the Anvil Range area by D.J. Tempelman-Kluit, 1972, of the Geological Survey of Canada, a different age has been given to the Anvil Range Group than what was previously mapped by R. B. Campbell, 1949-1954 and J. O. Wheeler 1956 on Geology Map 1221-A Glenlyon. The phyllite and schist host rocks, that contain the lead-zinc ore deposits in the Anvil district, are thought to be Proterozoic and Paleozoic strata that is in the Hadrynian (?), Cambrian (?) and Ordovician (?) period. The difference in the age classification is due to the additional geological information available since 1966 to the present with the increased mining activity that has occurred since the mapping in 1949-1956 by Campbell and Wheeler. Thousands of feet of diamond drilling and the subsequent core recovery and the Anvil Mines open pit mining operation has made available to Tempelman-Kluit abundant rock specimens for examination and study.

Tempelman-Kluit on Geology Map 1261-A has assigned an age of Upper Pennsylvanian and Permian to the Anvil Range Group - Unit 8. Campbell previously mapped the Anvil Range Group - Unit 15 as Mississipian or Later in age. A similar unit to Campbell's unit 15 has been mapped by J. A. Roddick, 1958, 1960 and L. H. Green, 1960 on the Tay River Geology Map 13 - 1961 of which adjoins the Glenlyon sheet. On the Tay River sheet the Mississippian (?) and/or later (?) aged rocks are identified as Unit 9. In addition, Tempelman-Kluit has differentiated between the group and units that were previously combined in Campbell's Unit 15. The changes in the recent geology maps issued by the Geological Survey of Canada can be considered to be updating and detailed geology due to additional information from areas of orebodies. Therefore, the writer will follow the age and detail of units assigned by Tempelman-Kluit to the Anvil Range Group and Anvil area mineralized host rocks for the purpose of preparing this report.

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"The core of Anvil Range is underlain by granodiorite and porphyritic quartz monzonite that form the Anvil Batholith, intruded in Mesozoic time. A sequence of Proterozoic and the Paleozoic strata, similar to that found extensively elsewhere in Selwyn Basin, flanks the Anvil Batholith. This sequence includes two regional unconformities, one beneath Devono-Mississippian strata and another below Pennsylvanian-Permian succession. The older Paleozoic rocks, dominated by thick Cambrian (?) and Devono-Mississippian sequences are mainly metamorphic and sedimentary, whereas the Pennsylvanian-Permian rocks are largely volcanic.

Paleozoic beds have an aggregate thickness of about 15,000 feet. Small intrusions of Paleozoic or Mesozoic 'alpine' periodotite are associated with Permian volcanic rocks. A thick, post-Permian conglomerate lies along an important fault parallel to the Tintina Trench. Acid and Basic Tertiary volcanic rocks occur locally."

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REGIONAL GEOLOGY

TABLE OF FORMATIONS

CENOZOIC

Quaternary

5 Unconsolidated glacial and alluvial deposits

MESOZOIC

Jurassic and/or Cretaceous

4 Biotite granodiorite; quartz monzonite

PALEOZOIC

Silurian and Devonian

3 Dolomite; chert, quartzite, slate, shale

Middle and Upper Cambrian

2 Phyllite; dolomite, greenstone, chert

Lower Cambrian

1 Quartzite, phyllite, limestone

After J. O. Wheeler - Map 8 - 1960

1972 G.S.C.

TABLE OF FORMATIONS

CENOZOIC

Tertiary

12 - sandstone, shale, and conglomerate

MESOZOIC

Cretaceous

11 - mensonite and granodiorite

Triassic

10 - conglomerate with fragments of schist (unit 1), basalt (unit 8), serpentinite (unit 9), sandstone, slate and limestone

Triassic and (?) Upper Permian

9 - serpentinite and peridotite

PALEOZOIC

Pennsylvanian and Permian - Anvil Range Group

8 - chert, basalt and limestone

Devonian and Mississippian

7 - slate, chert, greywacke, chert-pebble conglomerate, and limestone

Middle Devonian

6 - limestone and dolomite

Devonian and Silurian

5 - quartzite

Ordovician and Silurian

4 - slate and chert

Hadrynian, Cambrian and (?) Ordovician

3 - phyllite, schist, amphibolite (Anvil Range lead-zinc deposits host rocks)

Hadrynian (?) and (?) Cambrian

2 - skarn, schist, amphibolite, marble

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Hadrynian

1 - gritty quartzite

Geology after D. J. Tempelman-Kluit - G.S.C. Bulletin 208

REFERENCE TO GEOLOGY AND GEOPHYSICS

1. Geological Survey of Canada Bulletin 208 - Geology and Origin of the Faro, Vangorda, and Swim Concordant Zinc-Lead Deposits, Central Yukon Territory by D. J. Tempelman-Kluit 1972.

2. Geophysics Paper 7006 G - Airborne Magnetics Finlayson Lake Y. T. Sheet 105-G, Scale 1 inch = 4 miles.

   Geophysics Paper 7838 G - Airborne Magnetics Sheldon Lake, Y. T. Sheet 105-J, Scale 1 inch = 4 miles.

   Geophysics Paper 7005 G - Airborne Magnetics Quiet Lake, Y. T. Sheet 105-F, Scale 1 inch = 4 miles.

   Geophysics Paper 7839 G - Airborne Magnetics Tay River, Y. T. Sheet 105-K, Scale 1 inch = 4 miles.

3. Dr. Aarho E. Aho - The Northern Miner October 17, 1974.

4. Geological Survey of Canada - Memoir 247, Physiography of the Canadian Cordillera with Special References to the Area North of the Fifty-Fifth Parallel - by H. S. Bostock 1948.

5. Geological Survey of Canada - Geology Sheets:

   Finlayson Lake, Y. T. - Sheet 105-G.

   Sheldon Lake, Y. T. - Sheet 105-J.

   Quiet Lake, Y. T. - Sheet 105-F.

   Tay River, Y. T. - Sheet 105-K.

6. Western Miner - Exploration methods in Yukon with Special Reference to Anvil District - A. E. Aho, April 1966.

7. Sixth Commonwealth Mining and Metallurgy Congress - Geophysical Exploration of a Lead-Zinc Deposit in Yukon Territory - F. O. Chisholm - 1957.

..../12

8. Geology Finalyson Lake, Y. T. - Map 8 - 1960, Sheet 105-G Scale 1 inch = 4 miles - by J. O. Wheeler, 1958, 1959; L. H. Green and J. A. Roddick, 1959 - Geological Survey of Canada.

9. Report of Work on Eagle Claims, Yukon Territory, by P. R. Heenan, P. Eng., May 10, 1962.

10. Geological Report on Tintina Silver Mines Limited, by W. W. Moorehouse, Ph.D., April 19, 1963.

11. Report on Tintina Silver Mines Limited, Eagle Claims, in the Yukon Territory, by K. J. Christie, B.Sc., P. Eng., March 1968.

12. 1968 Exploration Programme, Eagle Property and Area, Tintina Silver Mines Limited, A.R. Archer, October 25, 1968.

13. Report on the Eagle Claims, Tintina Silver Mines Limited, Yukon Territory, by W. G. Hainsworth, P. Eng., November 8, 1973.

14. Geology Report on the 1974 Diamond Drill Programme, Tintina Silver Mines Limited, Yukon Territory; by G. G. Carlson, P. Eng., and R. G. Hilker, P. Eng., October 17, 1974.

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EAGLE CLAIMS GEOLOGY

The geology within the Eagle claim group has been described in detail by Moorehouse, and reference should be made to his accounts of the property for an in depth discussion of the structure and stratigraphy. The following section describes the local stratigraphy and structure, with reference to mineral deposits, as encountered and interpreted from the results of the 1974 drilling programme.

The host rocks for the mineralization are the Lower Cambrian Unit 1 on the Regional Geology Sketch (Figure 4), and here named the Tintina series. The uppermost member of this series is a thick unit of argillaceous limestone, which probably belongs to Unit 2 on the Regional Geology sketch.

The Tintina series consists of a basal argillite member, the Lower Argillite (Unit 1), overlain successively by the Lower Limestone (Unit 2), Middle Argillite (Unit 3), Upper Limestone (Unit 4), Black Argillite (Unit 5) and Argillaceous Limestone (Unit 6). The following is a description of each of the above rock units. The complete Table of Formations is listed on Table 4.

Lower Argillite - Unit 1

This unit was intersected only locally in drilling on the D-grid, and appears as a rather massive brown to purplish brown argillite with minor disseminated pyrrhotite. According to Moorehouse, this unit is at least 300 feet in thickness, but since its base has not been observed, total thickness is not known.

Lower Limestone - Unit 2

This limestone unit is generally mottled or streaky and is locally argillaceous. Contact with Unit 1 is rather gradational, resulting in interlayered lime and argillite rich sections. Extreme deformation has given rise to log-shaped boudins of limestone in

argillaceous limestone, frequently with a breccia appearance. Locally within the limestone are zones rich in white rings and cylindrical bodies described by Moorehouse as fossils, which suggest that this is a reef structure of Lower Cambrian age. Thickness of this unit is variable, from 25 to 50 feet on the East slope to over 100 feet in the D-grid and adit area and approximately 250 feet in the north of the claim group. Variations are quite probably due to sedimentary thinning, but the effects of folding and shearing are also likely causes at least in part.

Middle Argillite - Unit 3

This argillite member, separating the two main limestone units, has been well documented in outcrop and in the drill holes, in particular in the A-grid drilling its thickness is again quite variable, ranging from less than 50 feet to over 150 feet.

It is strongly foliated grey to brown coloured rock, rich in pyrrhotite, pyrite and locally arsenopyrite, and frequently with abundant secondary quartz in stringers and patches. Lighter coloured massive, siliceous bands, up to three feet thick, have a tuffaceous appearance. Contacts between these quartzitic sections and the argillite and also between the argillite and overlying limestone, Unit 4, are very characteristic in that they usually consist of approximately six inches of very fine grained siliceous rock, of cherty appearance but lightly foliated, and an associated band of massive pyrrhotite, usually less than one inch thick, but locally two to three inches in thickness.

Upper Limestone - Unit 4

This limestone exhibits a mottled texture similar to that of Unit 2, but it is much more homogeneous, with only minor argillite content. It is not so thick as Unit 2, and the variable thickness is indicated in the drill sections from Grid A. This local thickness variability is due to folding and probably

associated faulting. Sedimentary thinning, both to the north and the south, is also apparent, and thicknesses encountered vary from less than 10 feet to over 50 feet.

The mottled texture is due to secondary stringers and patches of white calcite and, to a lesser extent, quartz. At least two and possibly more ages of calcite stringers are observed. Unit 4 is the most important host for silver-lead-zinc sulfide mineralization noted to date on the property. Where this Unit is barren of silver-lead-zinc mineralization, iron sulfides are also absent.

Black Argillite - Unit 5

Overlying the Upper Limestone is a black, carbonaceous, sulfide-rich argillite which is visibly the most conspicuous rock unit in the area due to its colour, rusty and readily weathered appearance. Shearing has disrupted most primary features in the rock, and cleavage is strongly developed. Pyrite and pyrrhotite are present, forming up to 10 percent of the rock, and a distinct H_2S odour is detectable when drilling through this unit. Secondary quartz stringers and patches are usually present and are typically oriented obliquely to the main foliation or cleavage.

Moorehouse has observed that the Black Argillite has been a very active structural zone. It appears to have provided the locus of most of the major thrust faulting, and its lower contact with Unit 4 is frequently marked by quartz veins. Its spatial distribution is quite irregular, due to this structural deformation. Thrusting of younger sediments from the southwest appears to have scraped much of this argillite off the southeast limb of the Moorehouse anticline; thicknesses are greater on the northeast limb. (See Geology and Surface Showing Plan with Sections - Pocket).

Argillaceous Limestone - Unit 6

This is an extremely thick unit of bedded and strongly sheared and folded argillaceous limestone and is the youngest rock unit observed in the central area of the claim group. It is thin to thick bedded, with a strong cleavage which cuts the bedding, and it varies in composition from very limy argillite, and locally limestone beds, to thin bedded, platy siltstone. To the south it is overlain by the peak Limestone, consisting of massive limestone and dolomite with argillite.

Structure within the claim group is dominated by a northwest trending anticline, here named the Moorehouse Anticline. The crest area of this fold is complicated by the thrust block of argilleceous limestone (Unit 6) from the southwest. The major folding is also complicated by an undulating fold pattern on its crest, drag folding along its flanks, and abundant smaller scale thrust and cross faulting. An interpretation of this structure, relative to the mineral deposits, has been made in Geology 'Sections A-A', B-B and C-C' on the Geology and Surface Showings Plan with Sections (see Pocket).

It is felt that the major structure may pre-date emplacement of the granodiorite intrusive, as certain of the intrusive-sediment contacts observed on steep slopes are very sharp, with negligible warping of sediments in the contact zone.

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EAGLE CLAIMS

TABLE OF FORMATIONS

MESOZOIC

Jurassic and/or Cretaceous

G - Granodiorite, quartz monzonite

L - Biotite lamprophyre

PALEOZOIC

Cambrian - TINTINA SERIES

6 - Argillaceous Limestone - lime phyllite, silty limestone, thin to thick bedded, thick unit.

5 - Black Argillite - 10% pyrite and pyrrhotite, black colour, carbonaceous, weathers rusty colour.

4 Upper Limestone - mottled due to stringers and patches of white calcite, minor argillite; host rock for silver, galena and sphalerite sulfides; irregularly drag folded.

3 Middle Argillite - grey to brown colour, light coloured siliceous bands with tuff appearance, pyrrhotite and pyrite.

2 Lower Limestone - locally argillaceous, strongly sheared, breccia appearance; fossils (?) - white rings and cylindrical shapes, reef structure (?).

1 Lower Argillite - limy bands, brownish-purple colour, minor pyrrhotite.

S Sulfide Zone - silver, lead and zinc sulfide, mainly galena, sphalerite and tetrahedrite, from trace amounts to massive mineralization.

By G. G. Carlson, geologist, R. G. Hiler Limited.

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ECONOMIC GEOLOGY - Anvil Range Mineral Deposits

Three massive types of lead-zinc deposits with 80 million tons of proven ore reserves are located in the Anvil Range area. The Faro, Vangorda and Swim Lake deposits are contained in the phyllites and schists of the Late Proterozoic or in the period of Ordovician (?), Cambrian (?) and/or Hadrynian. A brief description follows on the type of occurrence and sulphide minerals present in the deposits, for the purpose of exploration in the region.

Swim Lake Massive Zinc-Lead Deposit

The Swim Lake Deposit is an irregular, digitate, tabular zone of sulphide minerals in a quartzite gangue surrounded by a partial mantle of creamy white phyllitic rocks. The sulphide zone contains about 50 percent sulphide minerals in a gangue of granular grey quartz with minor muscovite. The Swim Lake zone is a discontinuous, roughly tabular, elongated mass about 1,500 feet long and nearly 500 feet wide that trends northwest and dips northeast at 25 degrees. The average thickness of the orebody is nearly 70 feet and maximum thickness is 280 feet. Published figures (Northern Miner, March 9, 1967) indicate the presence of 5 million tons of mineralized host rock containing about 9.5 percent combined zinc and lead with 1.5 ounces of silver per ton and minor copper and gold. Zinc is the predominant base metal. Metallic minerals that occur in order of abundance are; pyrite, sphalerite, galena, pyrrhotite, marcasite, chalcopyrite, with minor arsenopyrite, magnetite and tetrahedrite. The magnetic response over the Swim Lake orebody was fairly good and gravimetric results over the deposit delineated the sulphide body accurately.

Vangorda Creek Massive Zinc-Lead Deposit

The Vangorda deposit, is an irregular tabular mass of sulphide minerals with a granular quartz gangue, that is partly surrounded by a narrow zone of pale coloured phyllite and in turn enclosed by phyllitic rocks. The sulphide rich body at Vangorda Creek contains about 50 percent metallic minerals in a gangue of granular grey quartz with minor muscovite. The Vangorda

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mineralized zone is tabular and flat lying; the long axis trends northwest and is about 2,500 feet long, its width is about 500 feet and the average thickness is about 70 feet. Published tonnage and grade figures for the Vangorda body (Chisholm 1957) are 9.4 million tons with 3.1 percent lead, 4.96 percent zinc, 0.27 percent copper, and 1.76 ounces per ton silver; 12.6 million tons of nearly barren sulphides are reported in addition to the bass metal zone. About 50 percent of the zone is sulphides with pyrite being the most dominant metallic mineral. Metallic minerals present in order of abundance are as follows: sphalerite, galena, pyrrhotite, chalcopyrite, and minor constituents are magnetite and marcasite. The average specific gravity of the Vangorda sulphide ore is about 4.4 and the host rocks are 2.8.

It is noted by E. O. Chisholm (1957) that there was no correlation between magnetics, aeromagnetics, and self potential anomalies in the vicinity of the Vangorda deposit. He established that a general relationship does exist between soil geochemical anomalies in the area of the Vangorda sulphide deposit.

Faro Massive Zinc-Lead Deposit

The Faro orebody is a gently dipping tabular lens of sulphide minerals in a granular quartz gangue enclosed by an irregular zone of pale coloured schists within a quartz-mica schist. Sulphide minerals make up about 50 percent of the Faro ore zone of which pyrite constitutes about one quarter of the volume of the deposit. In order of abundance the metallic minerals present are: sphalerite, galena, pyrrhotite, chalcopyrite, and marcasite; minor metallic sulphides are magnetitie, arsenopyrite, bournonite and tetrahedrite. The Faro orebody is a regular and continuous, southwest dipping tabular lens with the long northwest trending axis 4,800 feet long. The deposit is 1,200 feet wide with an average thickness of 120 feet. The depth of the mineralized zone beneath the surface ranges between 600 feet at

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its centre and 200 feet near the northwest and southeast ends. The main sulphide body interfingers with and terminates against granitic rocks on the northwest end. A second zone of sulphide mineralization, the Faro #2, is smaller and less extensive than the main orebody, lies 1,500 feet southeast of the southeast end of the Faro #1 zone. Published figures indicate the presence of 63.5 million tons of ore with 3.405 percent lead, 5.721 percent zinc, and 1.196 ounces of silver per ton; in parts the deposit contains 0.15 percent copper.

Dr. A. E. Aha (1966) reports that soil geochemical surveys and gravimetric surveys are the best tools for defining and delineating of massive sulphide zones in the Faro deposits area.

EAGLE CLAIMS - Mineral Deposits

Although previous studies have shown the relatively varied character of the mineral deposits encountered within the Eagle claim group, the present work has revealed a continuity between the deposits which strongly suggests a common origin and mode of emplacement of mineralization throughout the area. Variations now apparent between the various types of deposit may be attributed to their subsequent structural and metamorphic history. The Upper Limestone (Unit 4), which shows the least indication of internal deformation, is host to sulphide deposits with the greatest extent and continuity yet observed on the property.

The genesis of the deposits is uncertain at this time. The most favourable hypothesis is that the deposits are replacement type in favourable limestone horizons by solutions associated with the emplacement of the granodiorite plug to the northwest. Further, if emplacement of the sulphides occurred after folding, channelways for the mineralizing solutions can be envisioned within permeable limestone horizons, with entrapment and precipitation of sulphides in the nose of small folds; the black argillite forming an impermeable boundar. This reasoning is supported by the stratiform nature of the mineralization in the major deposits within limestone, sulphide textures which frequently suggest replacement, and the localization of sulphides in small drag folds on the limb of the Moorehouse Anticline, as observed particularly in the A grid area and the number 10 mineralized zone.

A second possibility which should be considered, however, is that the deposit is syngentic and that the sulphides may be associated with volcanic activity within the basin at the time of formation of sediments. Such an origin would be disguised by subsequent metamorphism, recrystallizing and possibly remobilizing both sulphides and host rocks, and associated or later structural activity. The character of the sulphides, in particular sphalerite,

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within the limestone, is very similar to the secondary calcite, suggesting a metamorphic origin for the sulphide textrue. Copper-lead-zinc ratios within the deposits are typical of those encountered in volcanogenic massive sulphide deposits throughout the world, and certain of the rocks in close spatial association with the mineralization in particular within the Middle Argillite, Unit 3, may be of volcanic origin. If the mineralization indeed pre-dates the intrusion of the granitic rocks, then a hypothesis such as this is favoured.

Regardless of origin, it is likely that most, if not all sulphides were originally deposited within one of the two main limestone units, (units 2 and 4) and subsequent alteration has produced three major deposit types.

The first type of deposit, and at present the most imprtant, is the massive to disseminated sphalerite - galena - friebergite mineralization within the Upper Limestone (Unit 4), as encountered in the A-grid area and also the number 10 zone on the west slope. This mineralization has undergone relatively little alteration except possibly recrystallization and very local scale remobilization. An important association with this type of deposit is the overlying black argillite, which often forms the direct hangingwall of the mineralization. As previously mentioned, this rock unit might provide an impermeable boundary to mineralizing solutions causing precipitation of sulphides. It may also contribute chemically to the deposits, perhaps in the form of sulfur or iron. Sphalerite in these deposits, according to its colour, is more iron rich than sphalerite in deposits within the Lower Limestone (Unit 2). The most important feature of these deposits is that they are associated with small scale drag folding near the crest of the Moorehouse Anticline. They have to date been observed only on the northeast limb of the fold, possibly due to

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the lack of exposure on the southwest limb.

A second type of deposit is that occurring in the Lower Limestone (Unit 2) and consisting of small pods of massive galena with friebergite and more widespread massive to disseminated sphalerite with lesser amounts of galena. This mineralization is rather similar to that encountered in the Upper Limestone (Unit 4) but, as encountered in the D-grid drilling (No. 5, 6 and 7 zones) and on the surface in the 11, 12, 13 and 15 zones, it is less continuous and apprently less extensive. The reason for this difference may be that although the deposits were originally identical in form, the greater thickness and inhomogeneity of the Lower Limestone unit has resulted in a higher degree of shearing and deformation both of the rock unit itself and of sulphide bodies contained therein.

The third type of deposit, typified by the B-grid (No. 8 zone), C-grid (No. 9 zone) and the west mountain zone, is associated with the base of the Argillaceous Limestone (Unit 6) thrust sheets. They are again similar to the Upper Limestone deposits but they are very discontinuous. It is possible that they also were similar in form to the Upper Limestone deposits but they became incorporated into the thrust sheet, from the UPper Limestone, during deformation.

The three deposit examples mentioned occur adjacent to the truncation of the Upper Limestone unit by thrust faulting. The number 9 zone is above the number 4 zone within the Upper Limestone in the A-grid area. It is possible that the number 8 zone is indicative of mineralization within the underlying Upper Limestone unit on the southwest limb of the anticline. Massive galena occurs in pods or discontinuous lenses with sharp, shear contacts. Sphalerite is also present in these deposits and is usually associated with secondary calcite and quartz veining.

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Typical settings for the three major deposit types have been indicated on the projected Geology Sections (see Geology and Surface Showing Plan with Sections - Pocket).

A fourth, and so far insignificant type of mineralization is that encountered mainly in the Argillaceous Limestone (Unit 6) and consisting of minor copper mineralization quartz veins, such as that encountered near the sidehill and ridge zones. The east boundary showing is similar but contains silver, lead, zinc and gold values with the copper. This type of mineralization is believed to be similar to the thrust plane mineralization, and potentially indicative of more significant mineralization in the underlying limestone.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

A diamond drilling programme on the Tintina Silver Mines Limited silver-lead-zinc Eagle Claim Group was initiated during 1974 to test a portion of the surface showings through the claim group. The property is located in the southeastern Yukon, between Ross River and Watson Lake and a short distance southwest of the Tintina Valley.

Silver-lead-zinc sulphide mineralization is localized largely within Lower Cambrian Limestones and is for the most part stratiform. The Paleozoic host rocks have been intruded by a Mesozoic granodiorite plug. The mineralized strata have a strong spatial association with a major, northwest tending anticline. Other major structural features include thrusting of younger sediments from southwest over the mineralized sedimentary sequence and relatively small scale northeast trending cross faults.

Genesis of the sulphide mineral deposits on the Eagle claims is uncertain, although the most obvious explanation would be that they are replacements of favourable limestone horizons by mineralizing solutions associated with the emplacement of the granodiorite to the northwest. However, another possibility is that they formed cotemporally with their host rocks, possibly as volcanogenic sulphides, altered by subsequent metamorphism and deformation. Possible tuffs, cherts, and bands of massive pyrrhotite observed within the middle argillite unit 3 indicate a favourable depositional environment for syngenetic metallic sulphide minerals.

Sulphide mineralization within the Lower Limestone (Unit 2) and along the thrust fault planes has been strongly deformed and, as a result, the sulphides are of a discontinuous nature. The Upper Limestone (Unit 4) is more homogeneous and less vulnerable to extreme internal structural deformation.

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Sulphide bodies, such as the A-grid deposit within the Upper Limestone (Unit 4), have been affected very little by shearing and are therefore more continuous bodies. The association of the black argillite (Unit 5), containing abundant sulfur in the form of pyrrhotite and pyrite, caps the Upper Limestone (Unit 4) and may be important to the formation of a substantial high grade deposit and is a key horizon for mineralization.

The East Boundary zone may be indicative of underlying minerlization in one of the limestone units. The geology, extrapolated from the A-grid and observed in the eastern area of the claim group, and the strong geochemical anomaly east of the east slope area as defined by the 1968 survey, suggest that the area between the A-grid and the east boundary zone holds more potential than has yet been recognized.

A-Grid Conclusions

Drilling over the A-grid has proven the existence of relatively continuous and high grade silver-lead-zinc mineralization within the Upper Limestone (Unit 4) and associated with an irregular drag fold on the northeastern limb of the main anticline. The deposit is exposed on the floor of a lower cirque, and due to steep mountainous terrain on either end of the deposit, exploration by drilling was limited to a 300 foot strike length during the 1974 programme. The A-grid mineralization appears to strike northwest to the number 10 mineralized showing and southeast under the east ridge. The strike distance to the number 10 mineralization is 2,000 feet along 298° azimuth, following the favourable irregularly drag folded Upper Limestone (Unit 4) bed. The number ten showing was trenched into bedrock and assays of surface grab samples are similar in grade to the silver-lead-zinc sulphides delineated in the A-grid diamond drilling. Geochemical soil samples taken adjacent to the number 10 showing indicate a silver-lead-zinc anomaly over and downslope from the Upper Limestone (Unit 4).

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The number 10 zone mineralization occupies a position stratigraphically and structurally similar to the A-grid sulphide mineralization. Argillaceous Limestone (Unit 6) and Black Argillite (Unit 5) overlie the mineralized Upper Limestone (Unit 4) bed along the number 10 zone and A-grid structure. The terrain between section 8+00E and about section 5+75E - A-grid is steep, and difficulty would be encountered for drill set-ups. However, the terrain from section 5+75E - A-grid to the number 10 mineralized showing is relatively flat (see Geology Section C-C Scale 1 inch = 400 feet). Offsets of the mineralized horizon, along its projected strike length, by cross faults, such as the Mineral Fault, are not expected to be extremely significant. The A-grid sulphide mineralization appears to strike southeast under the east ridge. The East ridge rises steeply from Cascada Creek at section 11+00E of A-grid. Sulphide mineralization was intersected on section 11+00E and the favourable host Upper Limestone (Unit 4) continues to the southeast. Geochemical soil or rock "grit" samples were collected on the east slope and three anomalous areas were delineated. The Upper Limestone (Unit 4) is overlain here by a thick sequence of Black Argillite (Unit 5) and isolated fault wedges of Argillaceous Limestone (Unit 6). The geochemical anomalies along the East Slope are associated with the Upper Limestone (Unit 4) and Black Argillite (Unit 5) contact, and extend over 1,500 feet southeast of section 11+00E drilling on A-grid.

Recommendations

The 1974 A-grid diamond drilling has proven the existence of sulphide mineralization along a 300 feet strike length and therefore the potential of the Upper Limestone unit as a favourable host rock to deposition of economic mineralization has been established. The A-grid deposit drilling along a strike length of 300 feet has indicated possible mineralization extension 2000 feet

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to the northwest, and 1,500 feet to the southeast, within the Upper Limestone Unit 4 horizon. The Upper Limestone has been geological mapped on the property and sphalerite/galena sulphide mineralization occurs at surface at the number 10 showing within the favourable limestone unit rock type. The number 10 showing is located 2,000 feet along a northwest strike direction from the A-grid delineated sulphide mineralization. This area is considered to be an extension of the galena/sphalerite mineralization within the favourable horizon of the Upper Limestone unit. The Upper Limestone has been shown to contain economic galena/sphalerite with silver mineralization and is the most important rock unit on the Eagle claims to search for further mineralization. The Upper Limestone is thought to dip under the east ridge and therefore the mineralization may continue from the A-grid area for at least 1,500 feet to the southeast. Therefore, further exploration should be continued along the 3,500 feet strike length to the northwest and southeast of the A-grid mineralization within the favourable and key horizon of the Upper Limestone. This concept of minerlaization within the Upper Limestone is further represented by Section B-B on the extrapolated structural cross section plan in the October 17, 1974 report.

Reference is made to the recommendation of an expenditure of $347,000.00 for a diamond drilling programme on the Eagle claim group in the October 17th, 1974 Geological Report. Due to senior financing arrangements, Tintina Silver Mines Limited, are unable to proceed with the diamond drill programme in 1975, but intend on doing the drilling another year. The company therefore wants to collect further field data during the 1975 field season and finalize the drilling financing.

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TINTINA SILVER MINES - 1975 Exploration Programme

It is recommended that a combined geological mapping, geochemical and trenching surface exploration programme be conducted on the Eagle Claim Group, N.T.S. sheet 105-G-3, Yukon Territory. Detailed geological mapping is recommended adjacent to all located surface showings, and the general area between the #10 showing - A-grid - East slope. More information should be collected concerning the thickness, lithology, and occurrence of the Upper Limestone - Unit 4. The Upper Limestone, located on the east side of the east slope, requires detailed geology mapping and sampling by rock chip samples and/or soil samples. In conjunction with the geology mapping, structural details of the Moorehouse Anticline and the drag-folding of the Upper Limestone should be carefully compiled.

A detailed geochemical rock-chips and soil sampling should be conducted between the #10 showing and the east side of the east slope. A geochemical survey should be extended along the valley of the west slope, and surface showings on zones #10-11-12-13-14 and 15. The geochemical survey should extend south of zone #10 in the valley to check the terrain below. Cornice Ridge (see Geology and Surface Showings Plan).

Trenching should be conducted, by drilling and blasting, on surface showings zones #10-11-12-13-14 and 15. Fresh mineralized rock samples should be assayed for zinc-silver-lead. It is suggested to purchase a plugger and steel in Whitehorse for the trenching part of the project.

The following expenditures are recommended to further delineate the Tintina Silver showings:

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EXPENDITURES

Linegrid - 40 linemiles		$ 5,000.00
Geology Mapping		5,000.00
Geochemical Sampling		3,000.00
Geochemical Determinations - 2100 @ 2.25		4,800.00
Trenching		4,000.00
Maruzen Min - 75 drill & Steel	1,500.00	
Powder	1,000.00	
Driller	1,500.00	
Assaying		2,000.00
Camp Rental		1,500.00
Camp Supplies and Food		2,500.00
Helicopter flying - 15 hrs. @ 330./hr.		5,000.00
Geological Field Equipment		500.00
Radio		300.00
Geology Report and Drafting		1,500.00
Transportation - Mobilization & Demobilization		1,000.00
TOTAL PROGRAMME		$36,100.00

R. G. Hilker, P. Eng.,
May 1/1975.

Association of Professional Engineers of the Yukon Territory
R. G. HILKER
GEOLOGICAL
ENGINEER

I, ROBERT G. HILKER, of #6 Chalet Crescent, Hillcrest, in the City of Whitehorse, in the Yukon Territory, DO HEREBY CERTIFY:

1. THAT I am a Consulting Geologist, with an office located at #8 Northern Metalic Building and Postal Address P.O. Box 4008, in the City of Whitehorse, in the Yukon Territory.

2. THAT I am a graduate of the Michigan Technological University located at Houghton, Michigan, U.S.A., where I obtained a Bachelor of Science Degree in Geological Engineering (Exploration Option) in 1962.

3. THAT I am a registered member in good standing of The Association of Professional Engineers of the Yukon Territory, a Fellow of the Geological Association of Canada, and registered with the Association of Professional Engineers of British Columbia.

4. THAT I have practiced my profession as an engineer and geologist for the past thirteen years.

5. THAT I have no direct or indirect interests in any of the mineral claims, or in any of the securities held by Tintina Silver Mines Limited, nor do I expect to receive any.

DATED this 1st day May, A.D. 1975, in the City Whitehorse, Yukon Territory.

Association of Professional Engineers of the Yukon Territory
R. G. HILKER
GEOLOGICAL
ENGINEER

R. G. Hilker

R. G. Hilker, P. Eng.

NTS SHEET 105-G-3

TINTINA SILVER MINES LIMITED

EAST HALF SHEET

DATE: JULY/AUGUST 1975

SCALE: 1" = 200 ft.

R. G. HILKER LIMITED
CONSULTING GEOLOGIST
WHITEHORSE, Y.T.