| | | | |
|---|---|---|---|
| **MAP NO.:** 105 C 5 | **ASSESSMENT REPORT** X<br>**PROSPECTUS**<br>**CONFIDENTIAL** X<br>**OPEN FILE** | **DOCUMENT NO:**<br>**MINING DISTRICT:**<br>**TYPE OF WORK:** | 092762<br>Whitehorse<br>Geological, Blast trenching |

**REPORT FILED UNDER:** E.H. Johnson

**DATE PERFORMED:** June-October, 1988, May-June 1989 **DATE FILED:** 4 October, 1989

**LOCATION:** **LAT.:** 60°22'N **AREA:** Jake's Corner

**LONG.:** 133°55'W **VALUE $:** 10 625.00

**CLAIM NAME & NO.:** EAGLE 1-27 (YB20183-90,382-87,645-6,679-86,YB21212-14);
NEST 1-30 (YB20067-74,378-81,647-50,687-94,719-723,YB20219-11)

**WORK DONE BY:** E.H. Johnson

**WORK DONE FOR:** E.H. Johnson

**DATE TO GOOD STANDING:**

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**REMARKS:** #44 EAGLE NEST
Metavolcanic rocks and chert of the Cache Creek underlie the property which is cut by a northeast-trending fault. Sulphides in silicified greenstone along the northeast lineament occur with trace amounts of gold (up to 0.41 g/t Au) and silver (up to 2.4 g/t). Extensive blast trenching and prospecting was done on the property in 1988 and 1989.

RECEIVED
OCT - 3 1989
MINING RECORDERS OFFICE
WHITEHORSE, Y.T.

# EAGLE NEST CLAIMS

Assessment Report 1989

Discovery document:

"Giving anomalous lithology,
local habitation and a name"

by

Eric H. Johnson
Prospector and Geologist

P.O. Box 4521
Whitehorse, Yukon
Y1A 2R8

Copy # 2



Signature:
Eric H. Johnson
Eric H. Johnson

This report has been examined by the Geological Evaluation Unit under Section 53 (4) Yukon Quartz Mining Act and is allowed as representation work in the amount of $ 10 625.00 .

for Regional Manager, Exploration and Geological Services for Commissioner of Yukon Territory.

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## LOCATION AND ACCESS

The Eagle Nest Claims are located immediately north of the Alaska Highway between kilometre posts 1390 to 1380, NTS 105C 5, longitude 133°55', latitude 60°22'. Whitehorse is 100 km north; the nearest services are at Jake's Corner 10 km west. Claim lines are subparallel to the highway and the valley of Little Atlin Creek. An abandoned section of highway is covered by Eagle Claims. Peak 5540' is north of the claims at the head of Post Creek.

Accessibility is good, but limited by steep topography and vegetation. A climb of one hour duration from the road to mineralization includes 1000 vertical feet. A cut line constructed for a pipeline corridor survey transects the property near the highway. Several trails have been constructed leading up to mineralization and claim lines.

Soil, gravel and broken rock are available in the mineralized area for construction. Due to steep, south facing slopes, the area is clear of snow in early May. Icy conditions in October restrict access. Factors of location, transportation and social infrastructure can be considered favourable for future exploration and development.

## PREVIOUS WORK

The area covered by Eagle Nest Claims was withdrawn from staking from 1976 until 1984 due to a pipeline corridor. Some geotechnical surveys were made during this period by Foothills Pipeline company. No prior claim posts have been encountered. At several locations near the highway and along the creeks, flagging tape marks sample sites. Broken rock, paper and cans indicate some recent prospecting activity. Two claim groups, now lapsed, were staked by Noranda Exploration Ltd. The writer is aware that Noranda geologists conducted geological and geochemical investigations in the area which resulted in the discovery of sulfide mineralization and anomalous geochemistry. This followed a discovery of visible gold in quartz a few miles east on the JUBE claims.

The writer has heard reports from other prospectors and geologists concerning the presence of gold in quartz and gravel in the area. These stories may have been founded upon identification of sulfides. Work necessary to confirm the extent of mineralization or the presence of gold has never before been undertaken.

In Geologic Survey of Canada Memoir 326 on the Teslin Map Area (105C), Robert Mulligan comments upon the rocks south of peak 5540', noting the unusual appearance and structure of greenstones and cherts. Plate IVA shows the trace of the Eagle Nest fault in a photograph taken of Mt. White from a ridge to the east. GSC geologists have inferred a fault under the valley floor. Prospecting in the region ultimately leads to the fault zone which is obscured by associated mineralization. Regional tectonic concepts depending upon age relationships established in GSC memoirs were discussed by Mulligan as being unclear and contradictory to field evidence.

## PHYSIOGRAPHY

The valley parallel to the property forms a pass and a divide between the Teslin River drainage to the north and the Atlin drainage to the south. These drainages converge lower in the Yukon River system. Reversals of drainage have been proposed on geomorphic and biological evidence. A rare subspecies of whitefish, the "Squanga," exists in several lakes to the east. Biologists have interpreted the existence of this fish as evidence for drainage changes associated with interglacial episodes when large lakes with Pacific Ocean drainage existed.

Extensive glacial sediments to the east and west differ in thickness and composition from those at Eagle Nest. There are abundant talus and soils upon the slopes and no cirques exist on the property. The geomorphology does not suggest extensive scour. Erratic rocks are present, but not abundant, at higher elevations.

The most interesting aspect of the physiography is the relationship between relief, faulting and mineralization. The dominant feature is a northeast trending lineament which exhibits alternating relief, breaks in slopes and notches. Changes in topography related to faults crossing the main lineament, silicifications and other lithological and structural features can be observed. Talus slopes and scree are formed of jointed fractured rocks adjacent to the main break at about 3500' elevation. Eagles nest in the crags above the talus.

Familiarity with the physiographic expression of lithology and structure can guide exploration. Glacial deposits can be distinguished from locally derived soils by composition and texture. Geochemical response may depend upon this distinction. Recessive areas produced by faulting are often infilled with rock and soil derived from adjacent exposures of greenstone. Where faults and veins are parallel to the slope, they tend to be covered so derived rock is captured by the recessive topography. Veins and faults at angles to the northeast trend allow erosional forces to act upon the rocks differentially. The relief in heavily mineralized areas is often so steep as to inhibit access.

Permafrost does not occur in the area covered by Eagle Nest Claims. Some small creeks and springs flow in winter and produce "glaciers" of ice. Groundwater along the trace of faults contributes to a characteristic vegetation pattern including Cottonwood Poplar and Alpine Fir. In contrast, some slopes are denuded of vegetation and may be subject to infertility due to carbonates, sulfates or metals associated with mineralization. Steep siliceous outcrops have colourful lichen which are lithologically distinctive in some cases. Wind has obviously had a strong influence on vegetation and soils of the slopes. In sheltered areas, vegetation is more abundant and diverse, reducing outcrop.

Formation of talus depends upon fractured rock in and adjacent to faults. Intersections of minor faults crossing the dominant northeast structure favour talus and vein formation. Determining the original location of various rock types seen in talus is often difficult due to steep chutes and fans extending above and below outcrops. Extensive talus slopes are uncommon elsewhere in the region, except for Mt. White. This suggests both mountains have been involved in a similar tectonic and geomorphic history. Coincident elevation of peaks and ridges in dissimilar lithology supports the contention. Slopes appear to have been spared the extensive scour common in glaciated regions. Stagnant ice conditions and lakes developed during glaciation may have minimized erosional effects.

Slopes of the Eagle Nest property viewed from the Alaska Highway show an outcrop pattern and relief which reflect active tectonic and metamorphic processes involved in formation. Close observation of the lithology does not immediately lead to accurate conclusions. Rock identity, mineralization, alteration and structure are intimately genetically interrelated; a fact reflected in the complex physiography. Some predictability, based upon an understanding of this complex relationship, is useful for exploration. A pleistocene hydrologic regime different from the present dry well-drained slopes has left marks on the topography. Extensive secondary alteration of fractured rocks may be due to earlier environments.

## GENERAL GEOLOGY

The Eagle Nest Claims are located in an orogenic region where the spilite keratophyre igneous assemblage, marine sediments, basic and ultrabasic intrusives and related serpentinites form a characteristic lithology. Rocks were originally formed in a eugeosynclinal marine environment thought to have existed from Upper Paleozoic until Middle Mesozoic time. Tectonic and metamorphic events of unknown age and duration have produced silicified greenstones, quartz feldspar porphyry and silica carbonate veins. Metamorphic assemblages of this type are host to mineral deposits in many ages of geologic formation, particularly the Archean of the Canadian Shield. Shear zones in greenstones are dealt with extensively in literature referred to by R. W. Boyle in GSC Bulletin 280, "the geochemistry of gold and its deposits."

At Eagle Nest, the greenstones, which dominate the lithology of the mountains, are unusual in appearance due to fluidal silicification and sulfide formation producing stripes and spots. The controlling structural component is a northeast (50°) trending fault zone which may have existed since Paleozoic time. Field evidence indicates that faults have been active intermittently over a long time period and still represent the major tectonic element in the region.

The leucocratic igneous rocks, named keratophyres or quartz feldspar porphyry dykes, are of uncertain age, contemporaneous with or younger than the spilite. Appearance of the rocks within this unit varies due to alteration, recrystallization and deformation of the originally heterogeneous igneous parent. The distribution of these dykes is generally subparallel to the structure, steep dip and northeast trend. An irregular distribution extends beyond limits of the property to the north, east and west. Questions concerning age, origin and economic value of the QFP dykes cannot be resolved at present. Silicification and carbonatization in association with sulfide mineralization of the host greenstones are extensive in the QFP dykes, yet do not alter the cross cutting lamprophyres. The relative age relationship is not certain due to possible multiple ages of the intrusives, but an inference of pre-Tertiary mineralization seems reasonable.

The silicified greenstones are products of separate yet interrelated metamorphic processes. Low grade greenschist facies regional metamorphism produced a mineral assemblage characterized by the minerals; chlorite, serpentine, quartz, carbonates, sericite epidote and feldspar. Superimposed upon the regional metamorphic facies are the distinctive hydrothermal alterations and mineralizations located in the shear zone and surrounding wall rocks. Processes of silicification, carbonatization, chloritization and serpentinization and sulfide mineralization have been most intense near fault structures, but the rocks do not differ in basic mineralogy from the regional metamorphic facies.

An important aspect of the local hydrothermal metamorphism is mobility of mineral components, particularly silica, carbonate, water and sulfur. Altered mineralized greenstones, dykes and veins are end products of a complex metamorphic system involving movement and exchange of mineral components on scales from molecular size up to the vast dimensions of the orogen. Micro-environments, where metallic minerals have concentrated, occur in the local metamorphic rocks associated with faults. Veins and large scale stockworks of chalcedonic silica and carbonates have been formed which are similar to minor and partially developed veins and silicifications, therefore, it is inferred that the metamorphic processes acted on the entire spilite keratophyre assemblage during one orogenic event. The Upper Mesozoic orogen is dominant in the region. It seems reasonable to assign a similar age to the metamorphism and mineralization. The meso-thermal type of ore mineralogy observed supports the inference.

In summary, the geology at Eagle Nest consists of Paleozoic metaigneous rocks which were faulted, then metamorphosed during the Mesozoic orogen. Minor intrusives, such as lamprophyre, and basic dykes of uncertain later age are present. Intense silicification and vein formation have occurred in and adjacent to fault structures. Anomalous rock types are present. Precise age relationships remain unknown.

## STRUCTURAL GEOLOGY

Faulting, related to the regional tectonic environment, controls the local structure of the mineralized zones. The Eagle Nest fault trends northeast (50°) and dips steeply (80°) southeast, nearly orthogonal to the northwest (320°) regional structure. Numerous small faults at steep attitudes parallel to the main trends or on resultant planes such as north or west can be observed directly in outcrops. Jointing within wall rock greenstones reflects stress and motion. Limonite cemented breccias of quartz fragments have been found in talus near cross faults. Rocks occupying fault zones are sheared, brecciated, jointed, mylonized and otherwise deformed in degrees related to lithology and structural position.

Some greenstones adjacent to the faults are sheared and jointed with slickenside surfaces that can be measured. In general, the latest motion of rocks north of the main fault shows uplift. Relative motion on cross faults can be predicted, based upon topography and intensity of mineralization. Lithologic control, using the QFP dykes as markers, shows complex deformation. Extensive fracturing of rocks occurred prior to mineralization and is seen in greenstones and keratophyres at Jake's Corner.

The main fault appears to be splayed and imbricated into multiple planes and attitudes shown in some outcrops. To the east of Eagle Nest Claims, where the fault zone has not been heavily mineralized, a topographic notch about 50 metres wide extends for many miles. The dimensions of the shear zone reflected in topography and outcrop and the extreme linear structure indicate that it represents a major tectonic component of the geologic past. Quartz breccia filled faults and vein faults indicate several generations of reactivation within the pre-existing zone of weakness and permeability produced by the Eagle Nest shear.

## ORE MINERALIZATION AND VEIN FORMATION

Silicification and sulfide mineralization appear to be related to fault structures because of intensity proportionate to distance. The relationship is complex in detail but, in general, silica content of the wall rock greenstones is reduced immediately adjacent to vein structures, then increases rapidly to dissipate gradually away from the faults. Steep rock faces result from differences in induration related to silica. Reductions in silica content appear as increases in carbonate, chlorite or serpentine components, causing changes in rock colour, hardness and structure. Understanding that components are mobile within the structures and the host resolves some of the lithologic complexity observed in the field. Ore minerals are involved in the general metamorphic mobility forming distinctive assemblages in veins and wall rocks.

Existence of a fluid phase is inferred from field relationships and lithology of veins and wall rocks which are clearly exhibited in outcrop. Major components of the fluid remain in vein structures, forming rocks containing silica, carbonate, sulfate, chlorite, serpentine and metallic minerals. Wall rocks reacted with the fluid, forming sulfides, absorbing silica, carbonate, water and other components. From the greenstones, the veins acquired lithic and mineral components along with structure and containment. Anomalous confusing lithotypes, common in veins and wall rocks, represent products of active environments which were part of the local metamorphism.

The dominant sulfide present in the silicified greenstones is a pyrrhotite group mineral. On fresh surfaces, the pyrrhotites appear unusually silver white in colour and are weakly magnetic. Pyrrhotite is intergrown with chalcopyrite, pentlandite and other sulfides. Exsolution from pyrrhotite of copper, nickel, cobalt and other sulfides is inferred from observations. Weathered sulfides and secondary sulfides are commonly yellow in colour but without crystal form or other diagnostic characteristics. Nickel, cobalt and platinum that appear in geochemistry probably are constituents of the intergrown sulfides. Total sulfide content in the wall rock greenstones varies from a trace to a few percent using visual estimates, but the groundmass also contains fine sulfides. Excavation of samples proved that sulfide content is more abundant and widespread than surface observations indicate. The vein-like distribution, exsolution, groundmass content and many other subtle observations, as well as the variety and abundance of sulfides at Eagle Nest, are very important evidence helping to explain the system of mineralization. Sphalerite and arsenides are rare in wall rocks. Secondary pyrrhotite and marcasite are present in fractures. Other sulfide phases and oxides are present, but not resolvable optically.

Traces of silver and gold were detected by fire assay in two samples of fresh silicified greenstone. Platinum detected in fire assay is considered elevated background of unknown significance. Platinum content may interfere with gold geochemistry due to spectographic and chemical similarity.

Local metamorphism of the greenstones adjacent to faults is interpreted as wall rock alteration. Enriched silica content and distinctive sulfide assemblages, containing Ni, Co, Cu, Zn and traces of precious metals, are not sufficient evidence to ascertain this inference. Association with vein structures bearing similar ore minerals conformable within the greenstones is necessary to confirm the conclusion.

Minor veins of quartz and calcite associated with the greenstones and QFP dykes sometimes show visible gold and sulfides, pyrite and chalcopyrite. The first discovery of gold was in these minor veins. Field relations indicate that white quartz and calcite veins are late stage products of the wall rock metamorphism. The reason why these small veins carry gold is not fully understood, but it seems to support the idea that wall rock alteration has been part of a whole system of mineralization-depositing precious metals.

In order to describe the mineralized veins formed in association with faults, a new rock unit, "gopherite," is introduced. Gopherite is defined as silica carbonate based rock formed in vein structures and lodes on the Eagle Nest Claims. The appearance of gopherite is extremely variable and deceptive in outcrop. Colour phases include green, black, grey, brown, yellow to white, depending upon composition and alteration. Chalcedonic silica, quartz and carbonates with serpentine, chlorite and other hydrous minerals from the host greenstones fill vein structures and intergrow, infill and intergrade, forming complex rocks covered by the term "gopherite." Recognition of gopherite requires careful observation and experience with many samples.

Ore minerals occur in gopherite as characteristic assemblages which include sulfides, arsenides, tellurides, sulfosalts, oxides and native gold and silver. Generally these minerals are fine grained and difficult to see in altered rocks. Arsenides seem to be the best index minerals, due to acicular crystal form, alteration to scorodite, orpiment and realgar in association with interstitial surfaces and vugs in gopherite. Elongation of the arsenide crystals varies in differing facies or zones of gopherite; so do average size, colour, shape and other characteristics. Visible gold is common in gopherite in several characteristic modes of occurrence. The gold in gopherite is never coarse in size but is free or contained in ore minerals, silica or carbonate minerals, and secondary minerals as fine colours, grains, films and patinas observable under direct natural lighting conditions. Sphalerite, pyrite, magnetite, chalcopyrite, pyrrhotite, nickel-cobalt arsenides, several sulfosalts, tellurides and other metallic minerals still unidentified are present in gopherite. A unique interesting chemistry and mineralogy in the gopherite veins is reflected in zoning not fully understood at this writing.

Minerals formed in the oxidation processes or supergene environments are always found in gopherite where samples have been obtained. Distinguishing hypogene from supergene minerals is often impossible. Secondary minerals impart colours to the gopherite which correlate with ore mineral content and make it resemble sulfide-bearing silicified greenstone. Staining of rocks from talus and outcrop indicate metal content in gopherite pervades carbonate and porous impure chalcedonic silica.

Field work during 1988 and 1989 has resulted in discovery of large volumes of gopherite. Chalcedonic silica-based cherts of sedimentary origin are indistinguishable from gopherite in soils, gravel and some outcrops. Careful mineralogical observations and field work with a large hammer and explosives are necessary to positively identify gopherite. Cherts of the region commonly contain pyrite, pyrrhotite, magnetite, hematite, manganese minerals and other metallic phases. Because silica has been mobilized during mineralization, problems of identity and origin become complex. Gopherite usually contains carbonates which effervesce and is bounded by sulfide-bearing greenstones.

The Eagle Nest Claims have been staked to cover mineralization extending along a fault zone for more than five kilometres. The sulfide-bearing silicified greenstones relate to gopherite veins in a complex, structurally-controlled metamorphism. Greenstones provide visible mineralization which guided the staking and prospecting. Blasting and trenching along 500 metres of the shear zone reveal unexpectedly abundant sulfide minealization similar to the wall rock assemblage adjacent to exposed gopherite veins. Inference leads to assumption that much gopherite remains undiscovered due to physiography and limited exploration.

## FUTURE WORK

Intensive chemical analysis is needed to define the value and extent of ore formation. Samples are being hand mined, using explosives, to evaluate surface showings. Large samples from several locations in the stockwork vein complex are necessary. An expert without financial interest in the property will be required to supervise assessments of grade and tonnage.

Exploration and development of the Eagle Nest property will require roads, trenches, cut lines, location surveys, geological, geochemical and geophysical work leading to diamond drilling. Due to the location of the property, work can be relatively low cost, but will require extensive capital and technical expertise. Socio-economic and environmental factors must be considered important in the next stages of exploration and development. Engineering and careful planning will be needed to protect the highway and the scenery.

## SUMMARY OF RESULTS

Prospecting discovered and defined the Eagle Nest fault zone and huge volumes of minor sulfide mineralization in silicified greenstones. Traces of gold, silver and platinoids exist in the sulfide mineralization, in addition to copper, nickel and cobalt in minor amounts. The sulfide mineralization of the metaigneous rocks represents the most extensive zone of a large hydrothermal system. The entire system includes faults, veins, wall rocks, dykes and other structures and lithologies involved in presumably deep rooted hypogene processes of mineralization. Inferring a system of magnitude and complexity has required extensive field observations, creative imagination and knowledge of the geology of ore deposits.

Certain observations are central to the interpretations and prediction value of the geological observations. First is the topographic expression of the Eagle Nest fault, containing fractured rocks, breccias, mylonites and anomalous lithotypes. Second is the large scale mobility of silica, carbonate and sulfide components associated with the fault zone, particularly the north or foot wall where an entire mountainside is altered. Discovery and definition of "gopherite" provides the most significant evidence. Gopherite represents the solidified product of a metal-bearing silica carbonate based hydrothermal fluid system. These three observable facts may be interpreted differently based upon more evidence which will follow; nevertheless, they provide strong support for the system concept.

Gopherite has many characteristic mineral assemblages and a variable appearance related to its alteration and the physio-chemical conditions existing during formation. Interaction of veins, faults and wall rocks during genesis of gopherite involved complex natural processes in a metamorphic environment which has concentrated ore minerals. The existence of gopherite in structurally controlled vein systems in a well-known orogenic environment leads to comparison with gold deposits documented in geologic literature.

Complex conditions of formation of gopherite will be reflected in its mineralogy and chemistry as in distribution and field relationships. The essential knowledge of tonnage and grade for the whole vein system cannot be easily arrived at. Mineral assemblages containing visible gold occur in gopherite from surface. This fact could lead to a misrepresentation the writer wishes to avoid. Knowledge of the complex diversity and large tonnages of gopherite is most important at this early stage of development in order to reduce errors in assessment of the system. Understanding metal distribution will be critical to future exploration. Assessment of the wall rock mineralization will be necessary in relationship to gopherite veins in order to determine optimum methods of development.

## CONCLUSIONS

The Eagle Nest Claims require a major exploration program, including tonnage and grade assessments. Prospecting and geological surveys have discovered an extensive metal-bearing lithology. Location and access favour development at low cost. Ownership of the property is simple and unencumbered. Potential exists for large tonnages of easily minable ore. No grade or tonnage estimates have been made. No ore has been defined chemically. Samples are being excavated during 1989 from vein structures and lodes. Samples contain visible gold which could cause error or bias in assessments of grade.

APPENDIX "A"
LITHOLOGIC UNITS

| UNIT NAMES | DESCRIPTION |
|---|---|
| spilite<br>greenstone<br>silicified greenstone<br>altered wall rock | Green, grey, black, fine grained, massive metaigneous, probable Paleozoic age. Orange, brown, black, grey, green, striped weathered surfaces, red-brown spots, contains quartz, carbonates, chlorites, serpentines, oxides, epidotes, amphiboles, feldspars, sericite, clays, sulfides. Fluidal groundmass. |
| keratophyre<br>quartz-feldspar<br>porphyry dykes | Luecocratic meta intrusive of volcanic. Buff to brown weathering, contains quartz, feldspar, calcite, serpentine, remnant amphibole and biotite, oxides, sulfides, white or light green when fresh, some dark coloured. |
| lamprophyre dykes<br>basic dykes | Melanocratic, green, brown, grey igneous intrusive dykes, minor volume, age unknown. |
| chert | Chalcedonic silica and quartz based sedimentary rock, all colours, sulfides and oxides minor, probable Paleozoic age. |
| gopherite<br>chalcedonite<br>vein quartz | Chalcedonic silica, carbonate, quartz-based metamorphic unit formed in vein faults. Colour from green, black, brown, grey, yellow to white. Impure with chlorite, serpentine, carbonates, sulfates, sulfides, arsenides, oxides, ore minerals. Age unknown, probably Mesozoic. |

## APPENDIX "B"
## GOPHERITE LITHOTYPES

| NAME | APPEARANCE AND INDEX MINERALS |
|---|---|
| black gopherite | Black to dark grey, vitreous to lustrous dull oxidized, impure chalcedonic silica, carbon, carbonates, sulfide, sulfates, acicular arsenopyrite, gold, sphalerite, pyrrhotite, ore minerals, calcite, siderite, limonite, scorodite, realgar, orpiment, tellurides rare, ore minerals present unidentified. |
| green gopherite | Green vitreous to dull olive impure chalcedonite, chlorite, serpentine, sulfates, carbonates, pyrrhotite, arsenides, pyrite, gold, sphalerite, ore minerals, limonite, scorodite, oxides, most common colour of gopherite, complex mineralogy. |
| grey mottled gopherite | Green, grey, black vitreous vein quartz commonly red stained, contains arsenides, sulfides and tellurides with visible gold granular masses, veins, isolated crystals of ore minerals. Elongated monoclinic arsenides. |
| magnetic gopherite | Light colours, granular appearance, iron stained, contains euhedral sulfides, arsenides and magnetic unusual minerals, pyrite, chalcopyrite, magnetite, hematite, sphalerite, carbonates rare, possible platinoid content, spinel group. |

**APPENDIX "B" (continued)**
**GOPHERITE LITHOTYPES**

| NAME | APPEARANCE AND INDEX MINERALS |
|---|---|
| chalco gopherite | Multicoloured chalcopyrite-bearing vein quartz, pyrrhotite, magnetite, pyrites, enargite, bornite, arsenides, blue green oxidation stain, rare, minor volume. |
| brown gopherite | Brown, red brown, grey, black silica carbonate vein rock, base metal sulfides, arsenides, carbonates, usually heavily altered, sphalerite and cerussite masses, unusual carbonates and secondary minerals. |
| white or yellow gopherite | Quartz, carbonate and chalcedonic silica relatively clean vein rock, some ore minerals, scorodite and limonite, visible gold rare. |
| carbo-gopherite | Carbonate dominated vein rock, chalcedonic silica, variable colour from white, green, to black, massive outcrops, heavy, contains soft sulfates and non-distinctive minerals which do not effervesce, veined appearance. |
| anomalous gopherite | Vein rocks of all colours and diverse mineralogy not yet defined in outcrops. This unit reflects unusual origin of gopherite and limited knowledge to date. |

## APPENDIX "C"
## ASSAY CERTIFICATES, GEOCHEMICAL ANALYSIS

Photocopies with notes included.

REPORT: V89-00379.4

PROJECT: EAGLE NEST PAGE 16-1

| SAMPLE NUMBER | | ELEMENT UNITS | Au OPT | Ag OPT | Te PCT |
|---|---|---|---|---|---|
| R2 79551 | Pika death | | <0.002 | 0.07 | <0.001 |
| R2 79552 | HARE B | | 0.012 | 0.02 | <0.001 |
| R2 79553 | chipmunk | | <0.002 | <0.02 | <0.001 |
| R2 79554 | Pika main | | <0.002 | <0.02 | <0.001 |
| R2 79555 | Pika B | | <0.002 | <0.02 | <0.001 |
| R2 79556 | chipmunk | | <0.002 | <0.02 | <0.001 |
| R2 79557 | Pika | | <0.002 | <0.02 | <0.001 |
| R2 79558 | Hare | | <0.002 | <0.02 | <0.001 |
| R2 79559 | chipmunk | | <0.002 | <0.02 | <0.001 |
| R2 79560 | Pika | | <0.002 | <0.02 | <0.001 |
| R2 79561 | Hare | | <0.002 | <0.02 | <0.001 |
| R2 79562 | chipmunk | | <0.002 | <0.02 | <0.001 |
| R2 79563 | Pika | | <0.002 | <0.02 | <0.001 |
| R2 79564 | Hare | | <0.002 | <0.02 | <0.001 |
| R2 79565 | | | <0.002 | <0.02 | <0.001 |
| R2 79566 | Chips | | <0.002 | <0.02 | <0.001 |
| R2 79567 | Trench | | <0.002 | <0.02 | <0.001 |
| R2 79568 | samples | | <0.002 | <0.02 | <0.001 |
| R2 79569 | | | <0.002 | <0.02 | <0.001 |
| R2 79570 | | | <0.002 | <0.02 | <0.001 |

?

R2 79551–79555: Silicified Greenstone with sulfides Visible Gold? From trenches

R2 79556–79565: Silicified Greenstone with Sulfide from trenches

R2 79566–79570: Silicified Greenstone no visible sulfides chips

| SAMPLE NUMBER | ELEMENT UNITS | Pt PPB | Pd PPB |
|---|---|---|---|
| R2 79551 | | <15 | <2 |
| R2 79552 | | 20 | <2 |
| R2 79553 | | 25 | <2 |
| R2 79554 | | <15 | <2 |
| R2 79555 | | <15 | <2 |
| R2 79556 | | 20 | <2 |
| R2 79557 | | 20 | <2 |
| R2 79558 | | 20 | <2 |
| R2 79559 | | <15 | <2 |
| R2 79560 | | 20 | <2 |
| R2 79561 | | <15 | 2 |
| R2 79562 | | 30 | 2 |
| R2 79563 | | <15 | <2 |
| R2 79564 | | 20 | 2 |
| R2 79565 | | <15 | 2 |
| R2 79566 | | 20 | 2 |
| R2 79567 | | <15 | 2 |
| R2 79568 | | <15 | 2 |
| R2 79569 | | <15 | 2 |
| R2 79570 | | <15 | 4 |

Pt, 15 PPB detection limit

Pd 2 PPB "

Silicified Greenstones from Trenches

?

ACME ANALYTICAL LABORATORIES LTD. 852 E. HASTINGS ST. VANCOUVER B.C. V6A 1R6 PHONE(604)253-3158 FAX(604)253-1716

# GEOCHEMICAL ANALYSIS CERTIFICATE



ICP - .500 GRAM SAMPLE IS DIGESTED WITH 3ML 3-1-2 HCL-HNO3-H2O AT 95 DEG. C FOR ONE HOUR AND IS DILUTED TO 10 ML WITH WATER.
THIS LEACH IS PARTIAL FOR MN FE SR CA P LA CR MG BA TI B W AND LIMITED FOR NA K AND AL. AU DETECTION LIMIT BY ICP IS 3 PPM.
- SAMPLE TYPE: ROCK AU* ANALYSIS BY ACID LEACH/AA FROM 10 GM SAMPLE. HG ANALYSIS BY FLAMLESS AA.

DATE RECEIVED: OCT 12 1988 DATE REPORT MAILED: Oct 20/88 SIGNED BY C. Leong ...D.TOYE, C.LEONG, B.CHAN, J.WANG; CERTIFIED B.C. ASSAYERS

NORANDA EXPLORATION PROJECT 8810-037 312 File # 88-5143

| SAMPLE# | Mo PPM | Cu PPM | Pb PPM | Zn PPM | Ag PPM | Ni PPM | Co PPM | Mn PPM | Fe % | As PPM | U PPM | Au PPM | Th PPM | Sr PPM | Cd PPM | Sb PPM | Bi PPM | V PPM | Ca % | P % | La PPM | Cr PPM | Mg % | Ba PPM | Ti % | B PPM | Al % | Na % | K % | W PPM | Au* PPB | Hg PPB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R 48526 | 1 | 59 | 9 | 62 | .1 | 49 | 23 | 604 | 4.98 | 5 | 5 | ND | 1 | 33 | 1 | 3 | 2 | 132 | 3.62 | .028 | 2 | 53 | 1.80 | 12 | .35 | 5 | 3.29 | .01 | .02 | 1 | 1 | 5 |
| R 48527 | 1 | 58 | 2 | 62 | .1 | 50 | 25 | 663 | 5.37 | 4 | 5 | ND | 1 | 21 | 1 | 2 | 2 | 119 | 1.72 | .040 | 3 | 43 | 2.24 | 19 | .35 | 4 | 2.85 | .02 | .03 | 1 | 1 | 5 |
| R 48528 | 1 | 67 | 2 | 59 | .1 | 36 | 24 | 562 | 5.22 | 4 | 5 | ND | 1 | 19 | 1 | 2 | 2 | 112 | 2.24 | .051 | 2 | 24 | 1.86 | 6 | .35 | 5 | 2.83 | .02 | .01 | 1 | 2 | 10 |
| R 48529 | 1 | 47 | 2 | 54 | .1 | 69 | 22 | 479 | 4.51 | 2 | 5 | ND | 1 | 18 | 1 | 3 | 2 | 74 | 1.91 | .038 | 2 | 72 | 1.70 | 9 | .25 | 2 | 2.33 | .02 | .03 | 1 | 3 | 5 |
| R 48530 | 1 | 60 | 6 | 62 | .1 | 91 | 28 | 478 | 4.88 | 3 | 5 | ND | 1 | 37 | 1 | 3 | 2 | 85 | 3.30 | .035 | 2 | 110 | 1.47 | 8 | .28 | 8 | 2.47 | .02 | .02 | 1 | 2 | 5 |
| R 48531 | 1 | 53 | 2 | 52 | .1 | 52 | 21 | 413 | 3.95 | 3 | 5 | ND | 1 | 32 | 1 | 3 | 2 | 91 | 3.64 | .042 | 2 | 48 | 1.20 | 8 | .21 | 12 | 2.76 | .01 | .01 | 1 | 2 | 10 |
| R 48532 | 1 | 50 | 6 | 59 | .1 | 58 | 24 | 530 | 4.98 | 4 | 5 | ND | 1 | 37 | 1 | 3 | 2 | 115 | 3.91 | .039 | 2 | 79 | 1.79 | 7 | .27 | 10 | 3.25 | .02 | .01 | 1 | 2 | 5 |
| R 48533 | 1 | 59 | 2 | 58 | .1 | 36 | 23 | 488 | 4.62 | 3 | 5 | ND | 1 | 15 | 1 | 3 | 2 | 93 | 2.10 | .049 | 2 | 19 | 1.67 | 8 | .28 | 8 | 2.63 | .02 | .01 | 1 | 2 | 5 |
| R 48534 | 1 | 56 | 5 | 67 | .1 | 52 | 26 | 555 | 5.31 | 7 | 5 | ND | 1 | 13 | 1 | 3 | 2 | 100 | 1.71 | .044 | 2 | 35 | 1.93 | 6 | .31 | 14 | 2.72 | .02 | .01 | 1 | 1 | 5 |
| STD C/AU-R | 19 | 61 | 42 | 132 | 6.8 | 69 | 31 | 1029 | 4.30 | 39 | 19 | 8 | 39 | 49 | 18 | 17 | 21 | 60 | .49 | .095 | 40 | 55 | .94 | 180 | .07 | 31 | 1.95 | .06 | .14 | 12 | 505 | 1300 |

?

8 ppm

ppb

Note: All Rocks from Trenches in Silicified Greenstone containing yellow minerals

## APPENDIX "D"
## DAYS OF WORK ELIGIBLE

| DATE | LABOUR | GEOLOGY |
|---|---|---|
| June 1988 | 2 days | 3 days |
| July 1988 | 6 days | 9 days |
| August 1988 | 10 days | 8 days |
| September 1988 | 14 days | 8 days |
| October 1988 | 7 days | 5 days |
| May 1989 | 5 days | 8 days |
| June 1989 | 0 days | 7 days |
| TOTAL | 44 days | 48 days |

REPORT PREPARATION 6 days
All work done by E. H. Johnson

| | | |
|---|---|---|
| RATE OF CHARGE | Labour | $ 50 per day |
| | Geology | $150 per day |
| | Report | $150 per day |

| | | |
|---|---|---|
| Labour: | 44 days @ $50 = | $ 2,200 |
| Geology and report preparation: | 54 days @ $150 = | $ 8,100 |

MANPOWER Total eligible costs $10,300

APPENDIX "E"
ELIGIBLE EXPENSES

| | |
|---|---|
| Manpower | $10,300.00 |
| Chemistry | 890.00 |
| Explosives | 1,257.00 |
| TOTAL | $12,447.00 |

**APPENDIX "F"**
**EXCAVATIONS**

(See map for locations)

| NAME | ROCK TYPE | VOLUME | CLAIM |
|---|---|---|---|
| Chipmunk lower boulder | greenstone | $1m^3$ | Nest #1 |
| Chipmunk outcrop A | greenstone | $1m^3$ | Nest #1 |
| Chipmunk discovery quartz vein | greenstone, vein quartz | $6m^3$ | Nest #1 |
| Chipmunk black oxide | greenstone, quartz, unknown | $4m^3$ | Nest #1 |
| Chipmunk main face | greenstone, quartz, unknown | $61m^3$ | Nest #1 |
| Chipmunk east face | greenstone | $2m^3$ | Nest #1 |
| Pika hoodoo | greenstone | $2m^3$ | Nest #1 |
| Pika main southwest face | greenstone, lamprophyre, QFP dyke | $96m^3$ | Nest #1 |
| Pika B lower face | greenstone | $2m^3$ | Nest #1 |
| Pika death west face | greenstone | $16m^3$ | Nest #3 |
| Pika death pit | greenstone, quartz | $18m^3$ | Nest #3 |
| Pika death lower east | greenstone | $8m^3$ | Nest #3 |

**APPENDIX "F" (continued)**
**EXCAVATIONS**

(See map for locations)

| NAME | ROCK TYPE | VOLUME | CLAIM |
|---|---|---|---|
| Hare west pit A | greenstone | $1m^3$ | Nest #3 |
| Hare west pit B | greenstone | $2m^3$ | Nest #3 |
| Hare hoodoo face | greenstone | $5m^3$ | Nest #3 |
| Hare main pit | greenstone | $60m^3$ | Nest #3 |
| Gopher poplar face | vein rock, gopherite | $8m^3$ | Eagle #11 |
| TOTAL VOLUME | | $293m^3$ | |
| | | $381yd^3$ | |

APPENDIX "G"
LIST OF CLAIMS AND GRANT NUMBERS

| NAME | GRANT NUMBER |
|---|---|
| EAGLE #1 | YB20183 |
| EAGLE #2 | YB20184 |
| EAGLE #3 | YB20185 |
| EAGLE #4 | YB20186 |
| EAGLE #5 | YB20187 |
| EAGLE #6 | YB20188 |
| EAGLE #7 | YB20189 |
| EAGLE #8 | YB20190 |
| EAGLE #9 | YB20382 |
| EAGLE #10 | YB20383 |
| EAGLE #11 | YB20384 |
| EAGLE #12 | YB20385 |
| EAGLE #13 | YB20386 |
| EAGLE #14 | YB20387 |
| EAGLE #15 | YB20645 |
| EAGLE #16 | YB20646 |
| EAGLE #17 | YB20679 |
| EAGLE #18 | YB20680 |
| EAGLE #19 | YB20681 |
| EAGLE #20 | YB20682 |
| EAGLE #21 | YB20683 |
| EAGLE #22 | YB20684 |
| EAGLE #23 | YB20685 |
| EAGLE #24 | YB20686 |
| EAGLE #25 | YB21212 |
| EAGLE #26 | YB21213 |
| EAGLE #27 | YB21214 |

APPENDIX "G" (continued)
LIST OF CLAIMS AND GRANT NUMBERS

| NAME | GRANT NUMBER |
|---|---|
| NEST #1 | YB20067 |
| NEST #2 | YB20068 |
| NEST #3 | YB20069 |
| NEST #4 | YB20070 |
| NEST #5 | YB20071 |
| NEST #6 | YB20072 |
| NEST #7 | YB20073 |
| NEST #8 | YB20074 |
| NEST #9 | YB20378 |
| NEST #10 | YB20379 |
| NEST #11 | YB20380 |
| NEST #12 | YB20381 |
| NEST #13 | YB20647 |
| NEST #14 | YB20648 |
| NEST #15 | YB20649 |
| NEST #16 | YB20650 |
| NEST #17 | YB20687 |
| NEST #18 | YB20688 |
| NEST #19 | YB20689 |
| NEST #20 | YB20690 |
| NEST #21 | YB20691 |
| NEST #22 | YB20692 |
| NEST #23 | YB20693 |
| NEST #24 | YB20694 |
| NEST #25 | YB20719 |
| NEST #26 | YB20720 |
| NEST #27 | YB20721 |
| NEST #28 | YB20722 |
| NEST #29 | YB20723 |
| NEST #30 | YB21209 |
| NEST #31 | YB21210 |
| NEST #32 | YB21211 |

APPENDIX "H"
STATEMENT OF QUALIFICATIONS AND OWNERSHIP

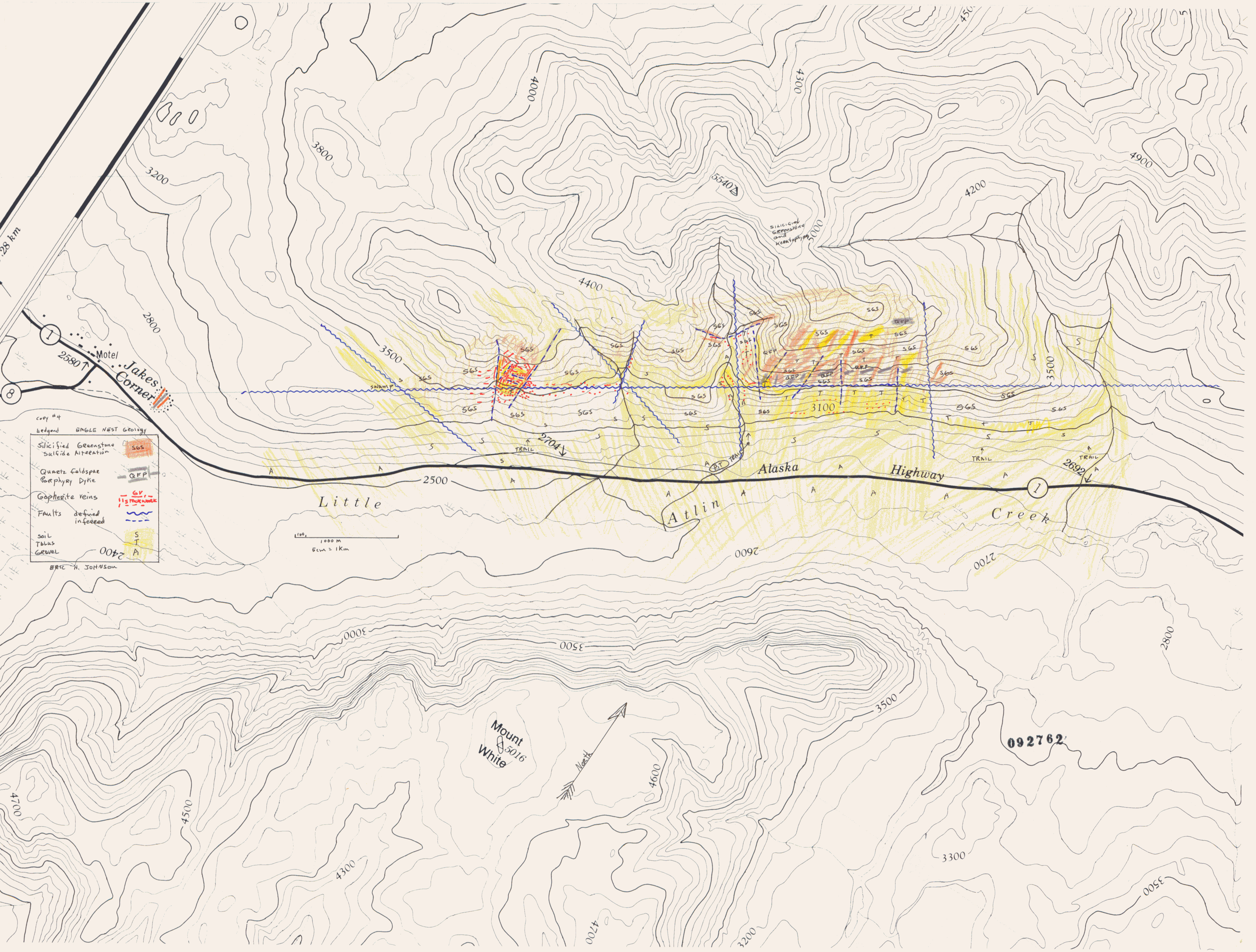
I, Eric Herbert Johnson, am the author of this report and owner of the Eagle Nest Claims as listed in Appendix "G." All work performed, claim staking and geological assessments have been performed by me during 1988 and 1989 as listed in Appendix "D."

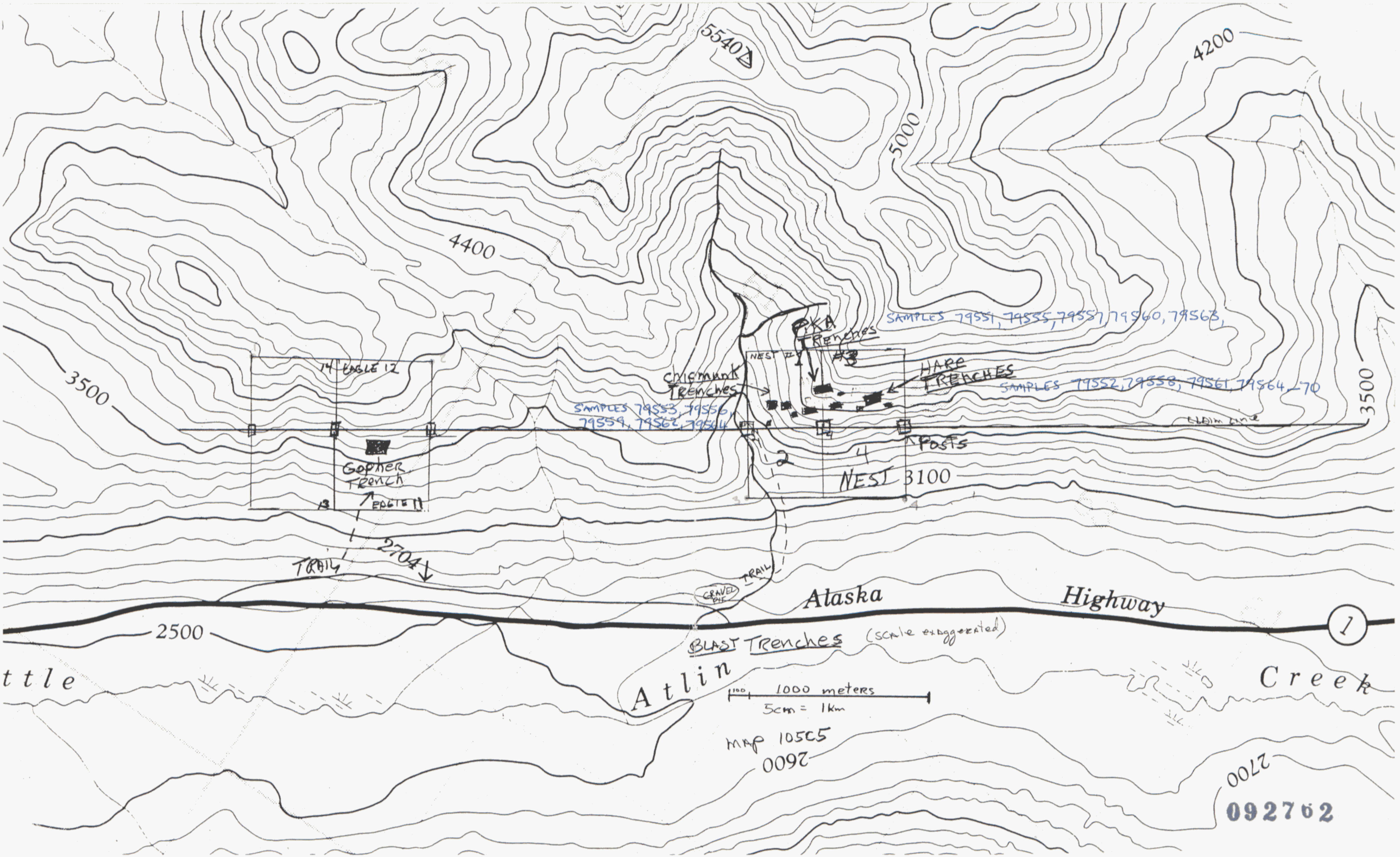
Educational qualifications include a Bachelor of Science degree from the University of California at Berkeley, granted by the Department of Geology and Geophysics in 1970. I attended the University of Calgary from 1970 to 1974 as a graduate student in Geology and worked as a teaching assistant. Igneous and metamorphic petrology and mineralogy were graduate level specializations. I have studied ore deposits and mineralization for more than twenty years.

Since 1974 I have lived in the Yukon Territory and worked in natural resource-related fields. Beginning in 1977, I have been self-employed as a prospector, geologist, trapper, writer and researcher. I have been a member of the Yukon Chamber of Mines for many years and hold a blasting permit for surface mineral exploration.

As author of this assessment report and discoverer of the mineralization, I fully realize that the property represents a rare and potentially valuable natural resource. No statements to misrepresent exist and I am responsible for errors, omissions and oversimplifications that may exist. The report represents an initial summary of a large system of mineralization and defines a new rock unit which may contain metals in economic concentrations. Ownership of the property limits my credibility in assessments of value and interpretations of geology, therefore, integrity and objectivity become important qualifications influencing assessment. Knowledge of the mineralization allows me to state that the value of the property cannot be determined from surface samples and a potential for gross misrepresentation exists. My qualifications include a dedicated intention to explore and develop Eagle Nest claims in cooperation with a mining corporation which is financially, socially and environmentally responsible and capable.

Jakes Corner
Motel
Little Atlin Creek
Highway
EAGLE NEST
Squan Lake
Mount White
5016
5540
2692
2580
2447
2704
1/50,000
20'
092702


copy #4
Ledgend EAGLE NEST Geology
Silicified Greenstone Sulfide Alteration
SGS
Quartz feldspar Porphyry Dyke
QFP
Gopherite veins
GV
STOCKWORK
Faults defined inferred
Soil
Talus
Gravel
S
T
A
ERIC H. JOHNSON
Jakes Corner
Motel
2580
Alaska Highway
Little Atlin Creek
2704
2692
2500
TRAIL
SWAMP
Mount White
5016
5540
North
1000 m
5cm = 1Km
092762
28 km



5540
4200
5000
4400
3500
3500
14 EAGLE 12
Gopher Trench
13 EAGLE 11
Chipmunk Trenches
SAMPLES 79553, 79556, 79559, 79562, 79564
NEST #1
PIKA Trenches
#3
SAMPLES 79551, 79555, 79557, 79560, 79563,
HARE TRENCHES
SAMPLES 79552, 79558, 79561, 79564_70
CLAIM LINE
Posts
2
4
NEST 3100
TRAIL
2704
TRAIL
GRAVEL PIT
Alaska Highway
1
2500
BLAST Trenches (scale exaggerated)
ttle
Atlin
Creek
100 1000 meters
5cm = 1km
map 105C5
2600
2700
092762