PROJECT REPORT, 1968 HESS RIVER AREA

BY:

M. E . Coates

ATLAS EXPLORATIONS LIMITED

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By:

M. E. (Tim) COATES

Project Manager

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SUMMARY

Geological mapping in the 1968 season succeeded in determining the gross structural features of the area. The area of contact between Proterozoic and Paleozoic rocks was mapped in greatest detail. Several new granodiorite - quartz - monzonite stocks were discovered and the contacts of previously known intrusions were more accurately delineated.

Geochemical drainage surveys have equipped us with a regional standard for comparison and statistical evaluation of results. A large number of geochemical anomalies have been discovered, many of which merit further study. A research program has been embarked upon to explain the local abundance of zinc in the Bob Group - Mt. Aho Area.

Prospecting work has made possible the correlation of geochemical data with actual mineralization. Descriptions of the showings examined are included in this report.

CONCLUSIONS

Reconnaissance geological coverage has been adequate to provide a regional control for silt sampling. Geochemical work has revealed anomalous results in proximity to intrusive rocks or linear features of regional extent. Work in the vicinity of properties staked in the 1967 season has proven our approach to be a valid one. Proterozoic to Cambrian rocks, intrusive stocks, as well as northeast and northwest trending lineaments and faults are good guides to mineralization. Continued comprehensive coverage and systematic evaluation of results should bring our explorations to fruition.

RECOMMENDATIONS

Further geological and geochemical work should be done in the Emerald - Arrowhead Lakes Area (105-O-11). Geological mapping of the intrusive contacts and structures, coupled with prospecting and a district-wide stream-sediment survey should be effected. Geochemical anomalies detected in the 1967-68 season should be tested at that time. This work should be completed by a 17 man crew in approximately 15 days (June 21 - July 5).

Subsequently, work should be initiated in the Bob Group - Mount Aho Area, utilizing a 5 man crew. Approximately 18 days (July 6 - July 24) would be required to complete this work. During this period, geochemical anomalies discovered during the 1968 field season (see "Geochemistry") should be re-examined from a base camp at Swan Lake (see detailed budgets for cost estimates).

Some work would be done in the western parts of the Vole Creek Area in the latter part of the season. This would be work connected with continued reconnaissance and would be based at Big Kalzas Lake.

INTRODUCTION

The reconnaissance study of the Hess River area took place in the spring and summer of 1968. Active exploration work was begun on May 28 and continued until August 10. The exploration crew consisted of three prospecting parties (P. Dean - M. Ladue; H. Bordell - R. Etzel; and T. Skonseng - J. Acklack), three geological assistants (K. Heinanen, G. Sanford and P. Claridge), draftsman (P. Vlasveld), cook (George Gray), helicopter crew (Vandenboss and Waugh, T.N.T.A.), and two to four temporary samplers from Ross River. Supervision of field work and reconnaissance geological mapping was by the writer.

In conjunction with the reconnaissance work being done in the Hess River area, some follow-up work was done on properties staked in the latter part of the 1967 field season (see Fig. 1). This work was done independently under the supervision of T. Adamson, geologist, and four to ten assistants. The results of his work are summarized in this report (Appendix I).

Explorationsin the Hess River area were conducted along the following geological guidelines:

1. An east-west trending belt of granodiorite stocks which passes through the northern part of the Hess River area has previously been found to have associated base-metal, molybdenum, tungsten, tin and silver mineralization.

2. Northwest trending belt of quartz-monzonite (?) stocks has an association with base-metal and silver mineralization.

3. Proterozoic rocks, by virtue of their greater competence, are a favourable host for deposits of vein-type as well as replacement deposits.

4. An association of economic base-metal mineralization with faults of northwest trend (i.e. Tintina trench) as well as predominent set of northeast trending cross-faults has been noted.

5. Limestone beds occur at various intervals throughout the Proterozoic and Ordovician - Devonian sections; these horizons are worthy of prospection in areas of sulphide mineralization.

6. Geological mapping on a regional basis was absent in the area of study; mapping required to outline structure and detect zones of flat-lying rocks (fold crests etc.) favourable to the stratigraphic entrapment of ore-bearing solutions.

Wherever it has been possible to find a coincidence of the above parameters, as in the case of intrusions into rocks of Proterozoic age, an exhaustive coverage, geological, geochemical and prospecting, has been effected.

Work on the properties staked in the 1967 season has in most cases (with the exception of the Lad Group) been calculated to explain the existence of high Zn geochemical anomalies revealed in the course of soil sampling done late in the 1967 season.

LOCATION AND ACCESS

The main area surveyed is enclosed by latitudes 63°00' and 64°00' and longitudes 132°00' and 134°00' corresponding to N.T.S. area 105-N. The northern and western boundary of the explored area is formed by the Lansing and Stewart Rivers; the southern boundary of the area treated in this report is formed by the Macmillan River and its northern tributary. Some work has been done to the east in adjoining N.T.S. area 105-O and geological and geochemical maps of this area are included in this report. The base camp for this work was located at Swan Lake (105-N-10) approximately 200 miles northeast of Whitehorse and 110 miles north of Ross River.

The area is accessible by float-equipped aircraft or helicopter from Ross River. The helicopter trip from there takes about 1.7 hours using a Bell B-1 machine. Several lakes in the area are large enough for access by float-equipped aircraft.

TOPOGRAPHY AND GROUND CONDITIONS

The Hess River area is mountainous with local relief up to 5,000 feet. The base camp at Swan Lake is at approximately 2,300 feet, while the Mount Joy, 14 miles to the north, has an elevation of 7,333.

Tree-line is approximately at 4,500 feet in the region; this elevation coincides with the limit of the last glaciation. Slopes below 4,500 feet are drift covered. The intermontane areas are broad U-shaped valleys lined with pitted outwash, kames, kame terraces and drumlinoid ridges.

Areas covered by glacial drift sustain a stunted growth of black spruce, pine, dwarf birch and mountain alder. In areas of heavy overburden - as in the Hess and Macmillan River valleys- tall stands of spruce and the occasional poplar grove are found.

GENERAL GEOLOGY

The Hess River area is underlain by rocks which range from Proterozoic to Mesozoic in age. The regional attitude of the rocks is northwest-southeast dipping at moderate angles to the northeast. Exceptions to the rule occur locally. The Proterozoic rocks, generally referred to as the "Yukon Group" (Bostock, 1946) constitute a metamorphic complex which occurs as a west-northwest trending axis. Exposures of Precambrian rock begin several miles to the south of Swan Lake and form the bedrock to the southern extremities of the mapped area. The "Yukon Group" is composed mainly of poorly sorted, medium-grained, buff to grey weathering quartzites with lesser amounts of phyllite, chlorite-mica-schists and slate. Thin beds of limestone and lenses of intraformational conglomerate occur at various intervals in the sequence.

The contact between the Yukon Group and the younger rocks of the Ordovician-Devonian sequence, marked by an unconformity or faulting or northwest trend, coincides with a regional topographic depression over most of its length. Passing beneath the Stewart River about 12 miles below Lansing, it extends in an easterly direction to Pleasant Lake. Immediately south of Swan Lake the contact swings abruptly to the south for several miles and then commences a southeasterly trend through Fairweather Lake to Mount Selous. In the vicinity of the Hess River, the contact has been displaced along north-east trending faults. En echelon faulting of east-west trends in the vicinity of Fairweather Lake has resulted in the preservation of several outliers of Devonian - Mississippian rocks.

Ordovician-Silurian cherts, slates and argillites are found in the Emerald Lake area.

The Devonian - Mississippian sequence is largely composed of clastic eugeosynclinal-type sedimentary rocks. The predominent unit is carbonaceous; largely chert, argillite and slate with wedges of greywacke and coarsely varved chert-pebble conglomerate. The lower member of the sequence, near the Proterozoic contact, are mainly varicoloured slates with lesser amounts of fine-grained grey quartzite and minor argillaceous limestone.

During the Cretaceous period the rocks of the region were intruded by granitic rocks (granodiorite, quartz monzonite etc.) and later by diabase. Subsequent erosion unroofed many of the intrusive bodies.

The youngest consolidated deposits in the area are limonite and calcium carbonate cemented conglomerates of Paleocene (?) age.

TABLE OF FORMATIONS

CENOZOIC

Paleocene (?)

Limonite and calcium carbonate cemented conglomerate

Unconformity

MESOZOIC

Cretaceous (?)

Late mafic intrusive rocks: Diabase dikes

Intrusive Contact

Felsic Intrusive Rocks: Granodiorite, quartz monzonite, diorite, syenite, feldspar porphyry, aplite

Intrusive Contact

PALEOZOIC

Devonian-Mississippian (?)

Carbonaceous rocks, cherts, slates, quartzite, phyllite, greywacke, limestone, minor alkalic basalt

Ordovician-Silurian

Varicoloured slates, green chert, argillite, siltstone, hornfels, etc.

Great Unconformity

PRECAMBRIAN
PROTEROZOIC

Quartzite, phyllite, limestone, chlorite, schist, serecite schist, conglomerate, slates, etc.

Proterozoic

Yukon Quartzite (1a)

The "Yukon Quartzites" are the most abundant type throughout the Proterozoic rocks in the Hess River area. The quartzite is usually medium-grained and weathers buff to grey. In most places the quartzites have a moderately well developed schistosity; bedding plane fault-zones are represented by intense schistosity, developed locally. The most common type contains 70% to 90% rounded quartz grains, minor amounts of feldspar and serecite with limonite or pyrite interstitially. Characteristically, the quartz grains in the Proterozoic rocks have a bluish cast.

Limestone (1b)

These limestones are white to grey, argillaceous to finely crystalline, and seldom exceed 100 to 200 ft. in thickness. One band (Vole Creek area - 105-N-11) has a thickness of about 1500 ft. The limey beds are highly fractured and weathered surfaces are criss-crossed by numerous cream-coloured calcite veins. These limestones generally contain less argillaceous material than those of the Devonian-Mississippian sequence.

At several localities south and west of Swan Lake, buff to white limey beds contain up to 10% round white quartz grains. This unit weathers recessively to yield an unusual pebbly weathered surface.

Phyllite and Serecitic Schists (1c)

These rocks are found interlayered with the "Yukon Quartzite". (1a). Phyllite or schist bands, which are usually less than 200 ft. wide, weather recessively and give outcrops of Proterozoic rocks a corrugated appearance. In hand specimen, the phyllites are buff to light grey, platy, and have a micaceous sheen. These "phyllitic" layers contain variable amounts of arenaceous material, grading into a schistose quartzite at the extreme. Throughout much of the area studied the phyllite layers parallel the strike of the metamorphic foliation as well as the proposed regional trend of transcurrent faulting. Much regional adjustment has undoubtedly taken place along these planes of weakness.

Conglomerate (1d)

Conglomerate appears as intraformational lenses within the "Yukon Quartzites" (1a). The maximum bed thickness measured was approximately 100 ft. The conglomerates are oligomictic with well rounded, white to grey pebbles of vein-type quartz up to 1 inch in diameter. Quartz pebbles are usually closely packed, interstices being occupied by grit and minor pyrite.

Schists (1e)

This unit contains less quartzite than the preceding groups and has a laminated appearance. Beds range from one-half inch to several feet in thickness. The most characteristic rock-type is a dark grey, occasionally rusty, phyllite. It is very platy, strongly lineated and usually shows well developed kink-banding.

Interbedded with the phyllites are layers of biotite quartzite, clean buff quartzite, chlorite-serecite schist and grey slates. The type exposure of this unit is in N.T.S. area 105-N-6 north of the Hess River.

Ordovician-Silurian (?)

The lithology of the rocks in the Emerald Lake area (105-O-11) has not been studied in detail. Geological work in the area should continue in the 1969 field season. Work done to date, though limited, is shown in Fig.   The rock-types encountered in the area are distinctly different from those found in other parts of the region. The stated age is after the G.S.C. (Map #1048A, 1957). The major sedimentary rock-types are as follows:

(a) Massive, blocky weathering, locally hornfelsed, grey argillite and siltstone.

(b) Brilliant green, massive, opaline chert.

(c) Red, green and grey slates.

Devonian-Mississippian (?)

The carbonaceous rocks (3a) are the most widely distributed and diagnostic type of this sequence. The unit is composed of graphitic, argillaceous sediments indurated to various degrees - and poorly sorted felspathic quartzites (greywackes). One type of greywacke contains a conspicuous fraction of angular black chert fragments and feldspar grains in a fine-grained graphitic matrix. This unit appears to have gross similarity to the "Mississippian clastic unit" of Tempelman-Kluit (1968?).

Limestones in (3b) are usually dark grey, fractured and criss-crossed by calcite veinlets. Most of the limestone layers contain some argillaceous material and many grade into calcareous argillites. At one locality, north of Fido Creek (105-N-9), a limestone layer containing one-quarter inch pebbles of black chert was discovered. Grey-green to brown argillaceous dolomite occurs as a minor constituent, and has been included in this unit.

Phyllite (3c) encompasses laminated, light brown, green or grey argillaceous rocks with or without a noticeable micaceous sheen or cleavage surfaces. Graphite is conspicuously absent.

Chert-pebble conglomerate (3d) occurs in lenses and "shoe-strings" at various levels in the sedimentary sequence. The conglomerates are polymictic with pebbles and cobbles of chert, quartzite and argillite. In most areas the weathered surfaces are light brown to grey; some very clean deposits are light grey to white.

Alkalic basalt (3e) mapped by Smith (1967) was not encountered by the present writer. Hand specimens collected by Smith in the area east of Fairweather Lake indicate that the unit is indeed of igneous origin. Rocks are dark grey to green, porphyritic, with up to 10% stubby feldspar phenocrysts - (up to one-half inch across) set in a massive, very fine-grained groundmass.

Grey Chert (3f)

It was not possible to determine definite strike continuity for this unit. It appears to differ from the cherts mapped as 3a in carbon content only. This chert is coarsely laminated or bedded at intervals of 2" to 14". It may well be the stratigraphic equivalent of the more graphitic varieties but was deposited in surroundings poor in organic materials.

Red and Green Slates (3g)

These slates are relatively rare in the Devonian-Mississippian section; they occur in thin beds associated with phyllite (3c). No definite stratigraphic position has been assigned to them, but it is thought that they may well be equivalent to Ordovician-Silurian rocks (2c).

Banded Chert (3h)

This unit is composed of very fine-grained quartzose, laminated rocks interbedded with grey slates. The quartzose members are highly folded and fractured. This formation is possibly equivalent to banded cherts which occur on Pay claims as it appears to be quite similar in hand specimen.

Felsic Intrusive Rocks

Granodiorite (11a)

A belt of intrusions, average composition granodiorite, trends east-west across the northern parts of the Hess River area. This group of intrusions includes stocks in the Emerald Lake area, near the Art Claim Group, and in the Lansing Range.

In hand specimen the rock is light grey, medium-grained and massive. It is made up of 10% to 25% hornblende with minor biotite, 10% to 30% quartz and the remainder feldspar. Less than 10% of the feldspathic fraction is K-spar. Pyrite and apatite occur as accessories.

Quartz-Monzonite

Stocks in the southern parts of the Hess River area (Mount Armstrong, Mount Brock, Mount Selous and Mount Heinanen) are more granitic in character than those of the northern belt, averaging quartz-monzonite in composition. Texturally similar to the granodiorites, these rocks generally contain less dark minerals and a higher proportion of biotite to hornblende.

Orthoclase Porphyry

Orthoclase porphyry rocks, syenite to quartz-syenite, in composition are found as small stocks in the Emerald Lake area. These rocks have a trachytoidal texture and are almost totally composed of platy, buff to red, crystals of orthoclase cryptoperthite in simple carlsba twins. Grain-size is medium to coarse. Mafic minerals (Sodic amphibole?) constitute less than 5%; quartz, normally absent, may constitute 10% of the rock.

Grey Augite-Hornblende Diorite

This rock-type is strongly porphyritic with medium-grained phenocrysts of feldspar and mafic minerals making up about 15% of the rock. The groundmass of the rock is medium grey and fine-grained. It occurs mainly as dikes in the Emerald Lake area and is thought - by the present writer - to be equivalent to other "feldspar porphyry" dikes in the region.

Quartz-Muscovite Porphyry

Quartz-muscovite porphyry or "aplite" occurs as dikes and sills up to 100 ft. thick. These "aplites" are the most frequently encountered dike-type.

The rock is buff to white, very fine-grained, with a sugary texture. Phenocrysts of quartz, muscovite, and pyrrhotite with rusty haloes, are diagnostic and are almost always present.

Cretaceous

Diabase Dikes - small, dark green mafic dikes, usually less than two feet in thickness are found at various places in the area (notably the Bob Group and Lad Group). The largest dikes of this type measured approximately 15 feet in thickness and were fine to medium grained. The narrower dikes are very fine-grained and occasionally slightly porphyritic with ovoid phenocrysts of feldspar.

No definite age relationship has been established; the dikes are tentatively being regarded as Cretaceous.

Cenozoic

Conglomerate (13)

Numerous occurrences of rusty, limonite-cemented, conglomerate are found in the Hess River area. Usually these deposits are situated at the base of mountain slopes, valley margins, or at the banks of streams. The conglomerates are comprised of glacial and fluvial deposits cemented by solutions rich in iron oxide derived from nearby pyritic beds. In certain localities (Scot Group and Mt. Selous area) the cementing material is rusty calcareous tufa or travertine and is thought to have been derived from nearby limestone beds.

STRUCTURAL GEOLOGY

The regional attitude of the rocks is northwest-southeast, dips being moderate to the northeast. Exceptions to the rule occur locally.

The most prominent structure in the Proterozoic rocks is the metamorphic foliation (schistosity) effected during the Laramide orogeny. The Precambrian rocks are poorly bedded but appear to be buckled into fairly open folds with axes plunging northwest at angles of 10 to 30 degrees. Phyllitic layers in the Yukon Group give evidence of at least three periods of deformation (opposing lineations and kink-banding). Where bedding was definitely determineable (layering or pebble concentrations) no top determinations were possible.

In the Ordovician-Devonian bedding is more readily determineable in zones of compositional layering. Greywacke beds which could yield excellent top determinations were not seen in place. Folding in these rocks appears to be more complex than in the Proterozoic; a consequence of penecontemporaneous deformation and the superposition of the regional fold pattern over local intraformational folding.

Faulting: Four major fault trends have been observed:

1. Northwest-southeast; this set is the most dominant regional trend. It parallels the Tintina rift zone and, in the Hess River area, the regional strike. In zones of minor movement which adjoin the regional fault valleys, the only evidence of movement is an unusually strong schistosity developed over narrow zones.

2. Northeast-southwest; This set, developed almost orthogonal to set (1) is paralleled by a strong joint set and has effected minor displacements in rock contacts.

3. North-south; An earlier fracture system modified by (1) and (2). Numerous rust seepages occur along faults of this trend (i.e. Long Lakes Fault).

4. East-west; En echelon faults of this set, in the vicinity of Fairweather Lake.

Most of the major fault zones have "buried themselves"; they are manifested by a grid-like development of linear features, regional in extent.

ECONOMIC GEOLOGY

The mineral occurrences examined in the Hess River area, classified according to metal and geological environment, fell within the following groups:

1. Shear zone impregnations, usually stratiform, in proximity to granodiorite or quartz-monzonite stocks of Cretaceous (?) age. (Pyrrhotite, quartz, and minor chalcopyrite).

2. Cross-cutting veins (Arsenopyrite pyrite, quartz and very minor chalcopyrite or bornite).

3. Quartz-Arsenopyrite-pyrite-scorodite-galena veins. Discordant. These veins have given assays of up to 1% Pb.

4. Quartz-molybdenite-erythrite veinlets associated with granodioritic intrusions. Veinlets occur in the periphery of the intrusion or immediately outside the pluton in the collar rocks.

5. Pyrrhotite-chalcopyrite fracture filling in association with quartz-monzonite to granodiorite stocks (porphyry copper-type mineralization).

6. Quartz-calcite-galena veinlets, minor copper (malochite) variable lead-silver ratios.

7. Chalcopyrite-pyrrhotite-scheelite in calc-silicate rocks (garnet-diopside skarn) at the contacts of diorite dikes with limestone beds.

Brief descriptions of the various showings are given below:

<u>105-N-5 Scheelite</u> (Occurrence No. 1)

This showing has been prospected in detail by Peter Dean and Mack Ladue August 1968.

The mineralization (pyrrhotite, chalcopyrite and minor scheelite) is restricted to a zone 3" to 5" in width at the contact of a dioritic dike with a limestone bed. Several dikes are present in the showing area but all are small, ranging in thickness from 1 foot to 5 feet. The limestone bed is only 20 feet thick in the vicinity of the mineralization. Assays of the mineralized portion of the skarn yielded the following values:

REF.	Au	Ag	Pb	Zn	Cu	WO3
H-125	Tr.	.18 oz/t	.04	.05	.06	.02

This occurrence appears to be of minor significance; no further work is recommended in the immediate area.

105-N-7 Copper (Showings No. 2, 3 and 4).

These showings were thoroughly prospected by Hugo Brodell and Robert Etzel during the month of July, 1968.

Small amounts of chalcopyrite are found in association with quartz and pyrrhotite. The sulphides occur as shear zone impregnations roughly conformable to the schistosity of the Proterozoic quartzites which host them. All specimens were examined under ultra-violet light to determine the presence or absence of tungsten. Results were negative.

The following assays are from representative grab samples taken from showing No. 2

	Cu	Pb	Zn	Ag	Ni
H-201	.02	.03	.015	.40oz/t	.01
H-207	.015	.015	.006	ND	ND
H-208	.05	.01	.004	ND	ND
H-209	.01	.017	.006	ND	ND
H-210	.003	.004	.003	ND	ND
H-211	.056	.01	.004	ND	ND
H-212	.108	.005	.004	ND	ND
H-213	.01	.007	.005	ND	ND
H-214	.01	.011	.033	ND	ND

It has been decided that these occurrences show no economic potential. No further work will be done in the immediate area.

105-N-7 Lead (Showing No. 5)

Stream pebbles of quartz-vein derivation carry small amounts of galena. Prospecting in the surrounding area failed to turn up any mineralization in place.

105-N-10 Lead (Showing No. 6)

This showing was examined by Peter Dean in July, 1968. He was unable to find any mineralization of significance. The mineralization he did see consisted of trace amounts of galena in small quartz-filled shears in the aureole of Mt. Claridge.

105-N-10 Copper (Showings No. 7 and 8)

These occurrences were discovered by Peter Dean in the process of prospecting the South flank of the Lansing Range, July, 1968. Showing No. 7 consisted of a small veinlet of quartz with minor chalcopyrite. This occurrence was within the granodiorite but near to the contact zone. Showing No. 8 was mineralization of a similar type but was not seen in place. Several boulders in the stream bottom contained chalcopyrite bearing quartz veins. Neither occurrence is of economic significance.

105-N-15 Molybdenum (Showing Nos. 9, 10, 11 and 12)

These showings were discovered by Ted Skonseng while prospecting the northern flank of the Lansing Range in July, 1968. At each showing the mineralization consists mainly of coarse grained molbydenite in vein quartz. Occurrences numbered 11 and 12 also have minor amounts of erythrite (cobalt bloom) associated with the mineralization. These two occurrences are found within a body of granodiorite.

105-N-15 Copper (Showings Nos. 13 and 14) Ted Skonseng, July, 1968

These two occurrences each consist of several narrow fracture-fillings in graodiorite. Sulphides are pyrrhotite with minor chalcopyrite (no economic significance).

105-N-15 Lead (Showings No. 15) Ted Skonseng, July, 1968

Very small occurrence. Galena and minor erythrite (cobalt bloom) along a fracture in granodiorite. No economic significance.

105-O-11 Copper (Showing No. 16)

This showing was examined by Ted Skonseng and Heinanen in June 1968. The following is a copy of K. Heinanen's report on the occurrence.

Assay samples collected from the mineralized zone yielded the following values:

	Cu	Pb	Zn
H-202	.014	.009	.224
H-203	.006	.012	.088
H-204	.007	.011	.042
H-205	.012	.110	.410
H-206	.049	.045	.870

In view of the discouraging geological observations and the sub-marginal assay results, it is recommended that no further work be done on the occurrence.

REPORT ON ARROWHEAD PASS COPPER SHOWING

FOR ATLAS EXPLORATIONS

June, 1968

By

Kyosti Heinanen
Geologist

LOCATION

The showing concerned is located in the SW end of Arrowhead Pass about three-quarters of a mile from Old Cabin Creek, in the SE wall of a canyon.

PREVIOUS WORK DONE

The showing was previously examined by M. O. Hampton of Dynasty Syndicate in September, 1963.

The writer was accompanied to the area by T. Skonseng, prospector. In all, 10 days (June 21 to June 30) were spent in the area.

TOPOGRAPHY

Topographic relief in the area is approximately 3000 feet. The canyon has a width of 30 feet, and the height of the SW wall is 20 feet.

GEOLOGY

The most common rocks in the area are black and grey chert and cherty argellite. The rocks are folded with about southeast trending axes. General strike is NE-SW dipping northerly. In the bottom of the canyon dip is 60-70, but higher up in the NW wall it is 20-30. About one-half mile from the showing there is a gossan above which there are granodiorite outcrops. Mineralization is in light coloured, fine grained quartzite which is a narrow (6 feet) sheet in black chert. Foliation in the quartzite is at right angles to the general strike. Similar rusty quartzite is also about 1000 feet SW from the showing.

MINERALIZATION

Pyrite is very common in the quartzite and also at some places in the chert. Copper mineralization is confined to four veins about 1 foot in width and 50 feet in length. The veins are composed of about 25% quartz and 75% sulphides. Sulphides present are chalcopyrite and bornite with minor arsenopyrite. All copper samples are taken from one vein. The other three veins, which occur higher up in the rock wall, were not accessible without mountain-climbing equipment and, consequently, were not examined.

GEOCHEMISTRY

In the early stages of the Hess Project (1967 season) soil sampling at or near the base-of-slope was the primary reconnaissance method utilized. Traverses were made along contours at a sample spacing of approximately 300 ft.

It was found that this method, in addition to being slow, gave results which were difficult to compare on a regional basis. As a consequence, it was decided to revert to the conventional stream-sediment sampling technique as a primary method. Stream sediment samples have been collected at intervals of approximately 1000 ft., mainly from tertiary and quaternary drainages.

These silt samples have been analyzed by Atomic Absorption Spectrometer methods and compared with an internal standard for Cu, Pb and Zn content, measured in parts-per-million. Using these data cumulative frequency distributions were drawn up for representative areas underlain by the various lithologic groups. In accordance with the findings of Wennervirta (1968) threshold values were set at the 80% cumulative frequency level for values of each of the elements concerned. "Significant concentrations" have been assumed to be those values which fall above the 95% cumulative frequency level.

In order to give a quantitative interpretation of the data the following system was adopted:

1. Each "significant concentration" has been assigned an arbitrary weighting factor of three (3).

2. Each concentration falling below the 95% cumulative frequency level but above the 90% level has been

assigned an arbitrary weighting factor of two (2) <u>if</u> on the same drainage system as a "significant concentration".

3. Each concentration falling between the 80% and 90% cumulative frequency levels has been assigned an arbitrary weighting factor of two (2) <u>if</u> on the same drainage system as a "significant concentration".

Following the assignment of weighted values, the factors were summed for each element in every area having a "significant concentration" of copper, lead or zinc. The totals so derived have been numbered and shown on the map-faces of all geochemical sheets in this report. A tabulation of element cumulative frequency values for various N.T.S. areas is shown in Appendix III.

The following is a critical evaluation of the various geochemical anomalies and includes recommendations for further work.

105-N-1 <u>Anomalies 1 and 2</u>:

- detected during soil sampling in 1967 field season. No immediate work is recommended on these anomalies.

105-N-2 <u>Anomalies 3 to 5</u>:

- detected during soil sampling in the 1967 field season. These areas should be examined in conjunction with prospecting work in the area, early in the 1969 season. Several factors make these high values particularly attractive:
  - (a) Proximity to a quartz-monzonite stock.
  - (b) They are at or near the Proterozoic-Paleozoic contact.

(c) Presence of high Pb values in the vicinity of anomaly 3 (650 ppm), suggests that it may be "in situ".

105-N-3 Anomalies 20 and 21:

- anomaly #20 was detected through soil sampling in 1967 field season. No examination recommended.
- anomaly #21 is situated at the contact of, or within, the Mount Armstrong stock. This area could be examined in conjunction with the examination of anomalous areas in 105-N-6.

105-N-5 Anomalies 22 to 31:

- detected by means of stream sediment surveys during the 1968 field season.
- of immediate interest are the areas #22 to #26 inclusive. High Pb values around area #24 further minor drainage surveys and soil sampling are necessary to accurately define the source area.
- spot check work might be advisable in the vicinity of Cu and Pb anomalies in area #27, #28 and #30.
- no work is recommended in the other areas at this time.

105-N-6 Anomalies 32 to 41:

- detected by means of stream sediment surveys during the 1968 field season.
- further consideration should be given to anomalous areas #34 and #36 as they share the following attributes:
  - (a) Proximity to a quartz-monzonite stock.
  - (b) Both have high magnitude Cu and Pb values.
  - (c) Each is comprised of a group of re-enforcing anomalous values.
- no immediate work is recommended in the other anomalous areas in 105-N-6.

105-N-7 <u>Anomalies 42 to 57</u>:

- all detected by means of sediment surveys in the 1968 field season.
- the areas surrounding anomalies 42, 43, 50 and 51 have been thoroughly prospected and the only mineralization seen was disseminated pyrite and some pyrrhotite veins with minor chalcopyrite. No further work is recommended in the immediate area.

<u>Anomalies 44 to 49 and 53 to 57</u>:

- are of low order. No work is planned in their vicinity in the 1969 season.

<u>Anomaly 52</u>:

- was checked during the 1968 field season by placing several contour soil sample traverses across the valley bottom. The area should be examined by a geologist and prospector in the 1969 field season.

105-N-8 <u>Anomalies 58 to 60</u>:

- are low magnitude copper anomalies. No work is planned in the immediate area in the 1969 field season. Drainages to the north should be sampled to provide a comprehensive regional coverage. This could be done in conjunction with work in the Bob Group area.

<u>Anomalies 61 and 62</u>:

- are dominately high magnitude Zn values. These are in close enough proximity to the Bob Group to be considered a part of the same anomalous district. Work in the vicinity of these drainages will hinge on results of work in the Bob Group - Mt. Aho area in the 1969 season.

105-N-9 Anomalies 63 to 65:

- No further work is planned until work in the Bob Group - Mt. Aho area is completed.

Anomalies 66 to 80:

- Cu-Pb-Zn anomalies collectively considered as the Bob Group - Mt. Aho area. Further detailed work is planned to determine source area of the anomalous samples (see Bob Group - Mt. Aho Area Report).

Anomalies 81 and 82:

- No further work in these areas is planned at the present time (contingent on results of work in the Bob Group - Mt. Aho area).

105-N-10 Anomaly 83:

- should be examined briefly on the ground. As well, minor drainages in the area between the Rogue River and Swan Lake should be sampled.

Anomaly 84:

- No work planned in this area at present.

Anomaly 85, 86 and 88:

- more contour soil sampling, geology and prospecting, particularly in the vicinity of Anomaly 85.

Anomaly 87:

- some work is planned in the area between Anomaly 87 and Anomaly 90. No work slated for the immediate area as there is no correspondence of Cu-Pb-Zn values.

Anomaly 89:

- no work planned in the immediate area during the 1969 season.

Anomaly 90:

- further soil and minor drainage sampling in the vicinity of the anomaly. Geology of the surrounding area in greater detail. Prospecting of the surrounding area. Geophysical (Magnetometer and possibly EM) of the anomaly area.

105-N-11 Anomalies 108, 110, 111, 112, 113 and 115:

- No work planned for these sites at the present time.

Anomaly 109:

- Check work and prospecting in the immediate anomaly area.

Anomaly 114:

- Contour soil sampling and prospecting of the immediate anomaly area.

105-N-12 Anomaly 116:

- Should be checked and other drainages in the area should be silt sampled to provide a reliable coverage.

Anomaly 117:

- Has been checked and found to be localized in the vicinity of arsenopyrite, galena, scorodite viens.

Anomaly 118:

- No further work is planned in the vicinity of this anomaly in the 1969 season. Low magnitude Zn anomaly.

105-N-14 Anomaly 119:

- No work planned in the vicinity of this anomaly (isolated, low magnitude anomaly).

105-N-15 Anomalies 121 to 123:

- Have been thoroughly prospected. No further work is planned in the area.

105-O-3 <u>Anomalies 124 and 125</u>:

- Low anomalous values near the Tom Group (dropped). No work is planned in the vicinity in the 1969 season.

105-O-6 <u>Anomaly 126</u>:

- West of granodiorite intrusive at Art Group (dropped). No work is planned for the area in the 1969 season.

105-O-7 <u>Anomalies 127 and 128</u>:

- Low anomalous copper values lie on proximity to suspected granodiorite plug. No further work is planned in the vicinity.

105-O-11 <u>Anomalies 129 to 149</u>:

- Anomalies 129 to 132 lie immediately to the south of a large diorite-granodiorite intrusion. Rock exposure in the vicinity is good. Prospecting and geological mapping should be done in the vicinity of the high values.
- Anomaly 133 is at or near the contact of the intrusion. Stream sediment samples should be taken from the associated drainage.
- Anomalies 134, 135, 140 and 141 - No definite follow-up work planned in these areas.
- Anomaly 136 - Prospecting in th vicinity of the high Pb value and silt sampling of the stream.
- Anomaly 137 and 138: No further work planned.
- Anomaly 139: Sampling of minor drainages, geology and prospecting (brief examination).
- Anomalies 142 to 144: The area to the south has been thoroughly prospected. Some soil and minor drainage sampling recommended in the vicinity of Anomaly 143 and northeast toward Arrowhead Lake.

105-O-11 (Cont'd.) - Anomalies 145 to 149: At present no plans for further follow-up on these anomalies (low order).

APPENDIX I

PROPERTY EXAMINATIONS

The following is a brief summary of the results of the property evaluation program in the Hess area during the 1968 field season:

SCOT GROUP

In September, 1967, on the results of a reconnaissance geochemical program, the Scot 1-24 mineral claims were staked. They covered an area of high zinc values in soils.

Follow-up work was done on the Scot Group in the period June 21 to July 15, 1968. During this time, a grid was cut over the area of interest (total footage 67,200 ft.). Work done on this grid consisted of geologic mapping and prospecting, geochemical sampling, and magnetic and electromagnetic geophysical surveying. Silt sampling was done on all drainages in the area.

The Scot Group is within a thick, steeply dipping Ordovician-Devonian section composed mainly of black chert, black shales, and slates and minor limestone, quartzite and phyllite. In the grid area, outcrop is very limit d. Only one small sulphide showing has been found. It consists of very minor tetrahedrite in a narrow quartz-calcite vein. The vein cuts black cherts, shales and limestone.

In the eastern grid area is an area of about 400 ft. by 500 ft.

in which carbonate rich ground water has emerged to the surface, depositing a light, porous chemical sediment of calcium carbonate (travertine). Travertine float was found over a wide area on the eastern portion of the grid.

Silt samples were taken from all drainages in the claim group area. A zone of very high zinc values (to 8000 ppm) was found in drainages on the slope east of the creek draining Jake Lake, in the eastern grid area.

The results of the soil sampling survey outlined a strong, well defined zinc anomaly in the eastern grid area. East of the creek a zone of about 1600 ft. by 2400 ft. has values of between 5000 ppm and 35,000 ppm zinc.

There is no outcrop within the anomalous area. The carbonate seepage area mentioned above is within the anomaly. Travertine float was found close to nearly all high zinc geochemical results. In a rock geochemical determination, the travertine ran 9000 ppm zinc.

The geophysical surveys were not successful in defining any economically significant targets. The magnetic responses were all of a very "flat" nature and the elctromagnetic results were very irregular and chaotic, which is thought to be due to the high and varying percentage of graphite in the Ordovician-Devonian sediments.

A large unexplained zinc geochemical anomaly was outlined by soil and silt sampling. Because of this anomaly, and because of the indicated presence of a host rock suitable for replacement (carbonate), the following additional work is recommended:

1. Line cutting to reduce the line spacing to 400 ft. in the anomalous zone.

2. Soil sampling on the above lines.
3. Detailed search for outcrop in the anomalous zone, and the sinking of test pits on the geochemical "highs".
4. Bulldozer trenching or diamond drilling contingent on the results of the above additional work.

ART GROUP

The Art group was evaluated by the Hess Properties crew during the period of June 6 to July 15, 1968. The crew consisted of a geologist, 2 student assistants, 2 linecutters and a cook.

The Art Group was staked in 1967 on the basis of high copper, lead and zinc values in soils obtained on a reconnaissance soil sample traverse along the valley bottom.

In July, 1968, a grid was cut over the area of interest (800 foot line spacing, total footage 41,000 ft.). Over this grid geology was mapped and soil samples were collected at 100 ft. intervals on all grid lines. Magnetic and electromagnetic surveys were also run.

Regionally, the claim group is within a thick Ordovician-Devonian section composed mainly of black chert, black shales and slates and minor limestone, quartzite, argillite and phyllite.

The sediments are quite uniformly steeply dipping, and strike in an easterly to southeasterly direction.

The grid area is underlain by Ordovician-Devonian, unit 3a. This unit has been broken down to include:

3a - (i) Dark grey to black graphitic chert.
3a - (ii) Light to dark grey massively bedded argillite.

The general strike is about 115^{o} and dipping steeply to the north or south. A number of aplitic sills have intruded the above units. A small granitic intrusive is located just west of the grid area. The granitic intrusive has produced strong hornfelsic alteration in the western grid area. The hornfels is thinly banded, light to dark grey and very siliceous. The black cherts tend to become bleached and re-crystallized near the intrusive contact. In places the hornfels is quite pyrite-rich and rusty. Other than pyrite in the hornfels, no sulphides were seen in the area.

A total of 326 soil samples were taken at 100 ft. intervals on the grid with 800 ft. line spacing. Copper and zinc values were found to be quite high in the hornfelsed northwest section of the grid. A small coincident copper-zinc anomaly centred at line 72W, 5+00S is in an area of highly fractured black chert laced with small quartz veinlets, again, no sulphides other than very minor pyrite was noted. In other places on the grid there are a few small random high copper and zinc values but none that are coincident.

A magnetometer survey was run over the grid. The area of hornfelsic alteration is all above magnetic background. A large overburden covered anomalous area is located in the south-central grid area. The causative structure of this anomaly is possibly a small intrusive plug. The magnetic anomaly does not coincide with any of the geochemical anomalies.

Crone EM (JEM) horizontal loop was also run over the grid. The only positive results recorded could be attributed to high pyrite content in the hornfels.

No significant sulphide mineralization was seen in the area, either in place or as float. Outcrop over the best coincident copper and zinc geochemistry consists of fractured graphitic chert laced with quartz stringers. No coincidence is apparent between geophysical and geochemical responses. On the basis of the above, the Art mineral claims are being allowed to lapse.

TOM GROUP

The Tom Group of mineral claims was evaluated during the period of July 16 to July 21, 1968. The crew working on the property consisted of a geologist and two student assistant prospectors.

The claim group was staked last year to cover a gossan zone discovered by aerial reconnaissance. Regional soil and gossan sampling in the vicinity produced some anomalous copper and zinc values. Also last year, one small piece of mineralized float, vein quartz containing tetrahedrite which assayed 66.8 oz/ton silver, was found on the property.

The work done on the claims this year consisted of geological mapping and prospecting. The claim group is above timberline and outcrop exposure is close to 100 percent throughout. Because of this, no geochemical or geophysical work was considered necessary for preliminary evaluation.

The claim group is within a thick Ordovician-Devonian section of black cherts and shales, chert pebble conglomerate and minor graphitic dolomite, grey argillite and grey shale. The regional strike is from 120° to 140° and dips are moderate to steep to the southwest.

A Cretaceous granitic intrusive is found just to the northeast of the claim group. Intense hornfelsic alteration was noted in a wide halo around this intrusive. In this area, bedding attitudes are very variable. The hornfels is banded, pyrite-rich, and very siliceous. The black cherts have been somewhat bleached and re-crystallized. Weathered surfaces of the hornfels are rusty. No sulphides, other than pyrite, were seen in this area.

The southwest half of the claim group is underlain by a thick section of chert pebble conglomerate (unit 3d). This rock is very clean, compact, massive and highly resistant to weathering. The northeast section of the claim group is underlain mainly by black shale and chert, with minor grey argillite and graphitic dolomite.

A number of fine to medium-grained intrusive dikes were noted around the pluton, but no sulphide mineralization was associated with them.

A barite vein, and a number of narrow quartz-calcite veins were found east of the claim group, but, again, no associated sulphide mineralization was seen.

CONCLUSIONS AND RECOMMENDATIONS

The area was mapped and prospected in detail. There were no encouraging results of any kind.

It is thought that the gossans in the streams in this area are a product of the high pyrite content in the hornfelsic halo around the pluton.

The Tom group of mineral claims is being allowed to lapse.

APPENDIX II

GEOLOGICAL AND GEOCHEMICAL REPORT

BOB MINERAL CLAIM GROUP
(Bob 1-4)

By: M. E. Coates

The Bob Group of mineral claims was staked in October, 1967 (See Fig. 1 and maps for 105-N-9 for location). Three large gossans, spotted during aerial reconnaissance of the area, yielded high zinc values. Four claims were staked to cover the area immediately surrounding the gossans. Ground follow-up in 1967 consisted mainly of geochemical sampling of the gossans and several contour soil-sample traverses along the hillside.

In the 1968 season it was decided that additional work should be done in the general vicinity to more accurately define the size and location of the anomalous source. Stream sediment sampling was done on all the nearby drainages and the area was mapped geologically.

Late in the 1968 season it was decided the four existing claims would be dropped. Staking of alternative sites will depend on the results of research into the rock geochemistry of the area. These results will be incorporated into the Bob Group Report, as soon as interpretation has been completed.

APPENDIX III

TABULATION OF CUMULA IVE FREQUENCY LEVELS

Cu, Pb, Zn

HESS RIVER AREA

N.T.S. Area	Cumulative Frequency Level	Element	Concentration in ppm	Age of Sub-crop	Sample Population
105-N-7	95%	Cu	40	Proterozoic	316
	90%	Cu	30	Proterozoic	316
	80%	Cu	25	Proterozoic	316
105-N-2, 3, 5, 6 & 7	95%	Pb	44	Proterozoic	500
	90%	Pb	37	Proterozoic	500
	80%	Pb	28	Proterozoic	500
105-N-7	95%	Zn	150	Proterozoic	316
	90%	Zn	110	Proterozoic	316
	80%	Zn	80	Proterozoic	316
105-N-10 & 11	95%	Cu	90	Ordovician-Mississippian	635
	90%	Cu	65	Ordovician-Mississippian	635
	80%	Cu	50	Ordovician-Mississippian	635
105-N-10 & 11	95%	Pb	55	Ordovician-Mississippian	526
	90%	Pb	49	Ordovician-Mississippian	526
	80%	Pb	40	Ordovician-Mississippian	526
105-N-10 & 11	95%	Zn	600	Ordovician-Mississippian	562
	90%	Zn	350	Ordovician-Mississippian	562
	80%	Zn	225	Ordovician-Mississippian	562

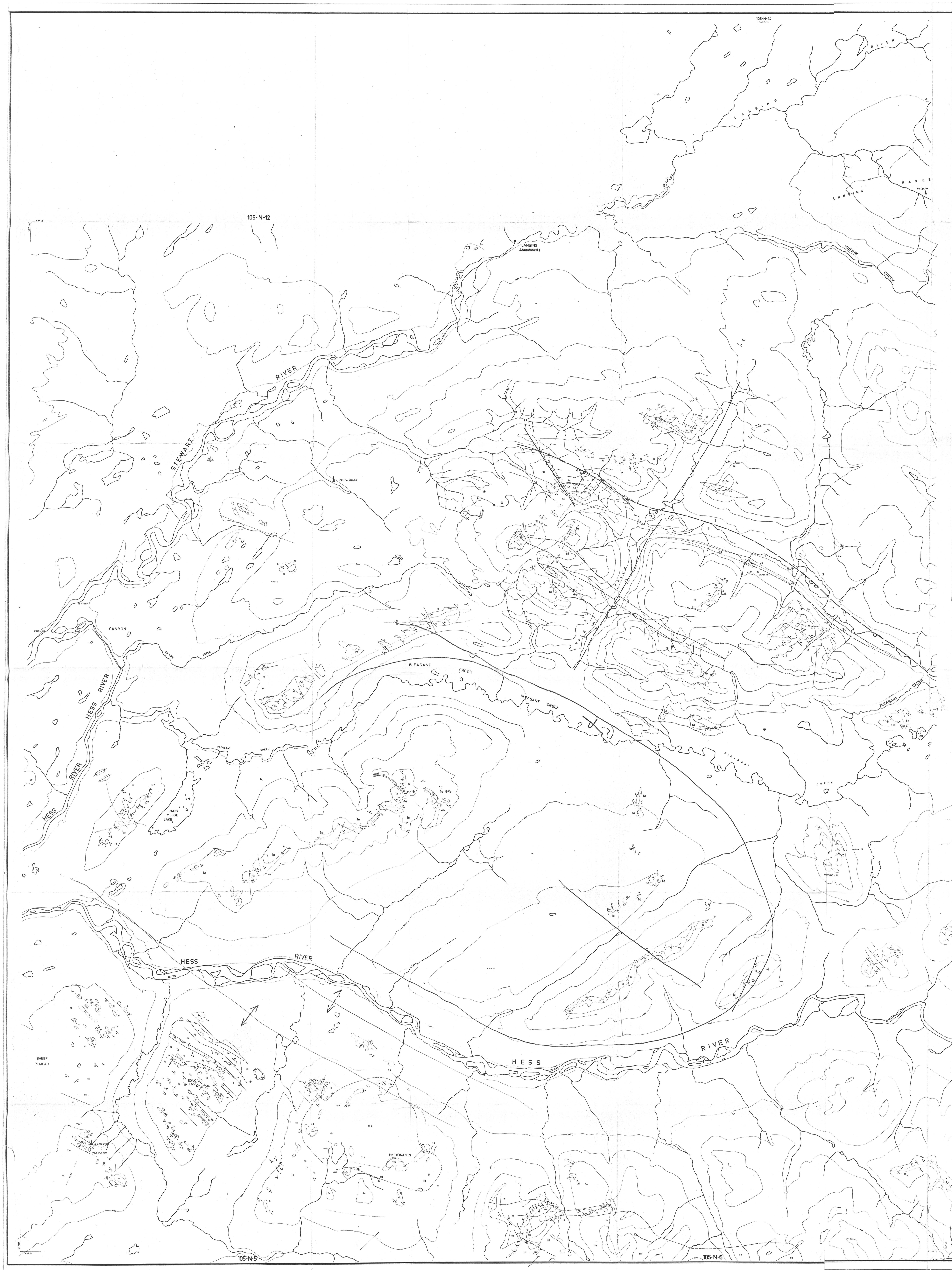
N.T.S. Area	Cumulative Frequency Level	Element	Concentration in ppm	Age of Sub-crop	Sample Population
105-O-11	95%	Cu	210	Ordovician-Silurian	306
	90%	Cu	165	Ordovician-Silurian	306
	80%	Cu	120	Ordovician-Silurian	306
105-O-11	95%	Pb	145	Ordovician-Silurian	216
	90%	Pb	93	Ordovician-Silurian	216
	80%	Pb	45	Ordovician-Silurian	216
105-O-11	95%	Zn	475	Ordovician-Silurian	262
	90%	Zn	330	Ordovician-Silurian	262
	80%	Zn	195	Ordovician-Silurian	262

Figure 1 Index Map of Hess Region
105 J, K, L, M, N, O, P
1" = 8 miles

Figure 2 Area — Geological Map Swan Lake
105 N-7, 8, 9, 10,15
1" = 1 mile

Figure 3 Geological Map Vole Creek Area
105 N-5, 6, 11, 12, 14
1" = 1 mile

FIG. 3



ATLAS EXPLORATIONS LIMITED

(Ross River, Yukon Territory)

HESS PROJECT

Geological Map
of

VOLE CREEK AREA

N.T.S. 105-N-5, 6, 11 12 & 14 (partly)

LEGEND

CENOZOIC

Paleocene

13	13a	Brown and red, limonite cemented conglomerate, plant remains, slide materials and glacial debris.
	13b	Rusty calcareous seepages; varying amounts of enclosed clastic material (travertine or calcareous tufa).

------------- Unconformity -------------

MESOZOIC

Cretaceous (?)

12	12a	"Diabase" dikes; fine to medium grained, dark green, massive to slightly foliated plagioclase-rich rocks.

----------- Intrusive Contact -----------

11	11a	Granodiorite; medium-grained granitoid plutonic rocks, varying amounts of biotite and hornblende (minor augite).
	11b	Quartz-monzonite; medium to coarse grained plutonic rocks; biotite and minor hornblende.
	11c	Orthoclase porphyry; medium to coarse grained plutonic rocks; granitic to syenitic.
	11d	Grey augite-hornblende diorite; fine to medium-grained, plutonic and dike equivalents.
	11e	Quartz-muscovite porphyry; "Aplite"; dike rocks.

----------- Intrusive Contact -----------

PALEOZOIC

Devonian-Mississippian (?)

3	3h	Chert; finely laminated, green and white chert and associated slates, green chert (Upper Devonian?).
	3g	Red and green slates
	3f	Grey bedded chert (Upper Devonian?)
	3e	Alkalic basalt (?)
	3d	Chert-pebble conglomerate, minor quartzite (Upper Devonian?)
	3c	Phyllite, grey to green, indurated slates.
	3b	Calcareous rocks; limestone, crystalline and argillaceous; calcareous argillite, chert-pebble limestone minor dolomite.
	3a	Carbonaceous rocks; graphitic slates; black chert; graphitic argillite; poorly sorted feldspathic quartzites (graphitic greywacke) (Mississippian (?) in part; clastic unit).

Ordovician-Silurian (?) (Emerald Lake Area)

2	2c	Varicoloured slates
	2b	Black, grey or green chert
	2a	Grey argillite (cherty argillite) siltstone, minor quartzite hornfels.

-------Unconformity or Fault Contact-------

PRECAMBRIAN

Proterozoic

1	1e	Chloritic schists, biotite quartzite, phyllite with interbeds of buff sandstone and quartzite.
	1d	Conglomerate; massive, quartz pebbles.
"Yukon Group" *Bostock	1c	Phyllite and serecitic schists; occasionally gritty.
	1b	Limestone; finely crystalline, banded to massive; minor quartz-pebble limestone.
	1a	Quartzite, feldspathic quartzite, minor serecite schist, phyllite and slate.

Note: Alphabetical designations ascribed to the various rock-units have no time or sequential significance.

MINERAL OCCURRENCES REFERENCE

(By Mineral)

Metallic		Non-metallic	
Arsenopyrite	Apy	Apatite	Ap
Cassiterite	Cass	Barite	Bar
Chalcopyrite	Cpy	Calcite	Cal
Galena	Gal	Chlorite	Chl
Malachite	Mal	Corundum	Cor
Bornite	Bor	Erythrite	Ery
Tetrahedrite	Tet	Quartz	Qtz
Sphalerite	Sph	Scheelite	Sch
Pyrite	Py	Scorodite	Scor
Pyrrhotite	Po	Siderite	Sid
Molybdenite	Moly	Tourmaline	Tour
		Vesuvianite	Ves

(By Element)

Cobalt	Co
Copper	Cu
Gold	Au
Lead	Pb
Molybdenum	Mo
Nickel	Ni
Silver	Ag
Tin	Sn
Tungsten	W
Zinc	Zn

LIST OF SYMBOLS

- Glacial striae
- Esker
- Small bedrock outcrop
- Area of bedrock outcrop
- Bedding, top unknown; (inclined, vertical)
- Bedding, top indicated by arrow; (inclined, vertical, overturned)
- Bedding, top (arrow) from grain gradation (inclined, vertical, overturned)
- Schistosity; (horizontal, inclined, vertical)
- Lineation with plunge
- Geological boundary, observed
- Geological boundary, position interpreted
- Fault; (observed, assumed) spot indicates downthrow side, arrows indicate horizontal movement
- Lineament
- Drag-fold with plunge
- Anticline, syncline with plunge
- MA Magnetic attraction
- Attitude of slaty cleavage, (horizontal, inclined, vertical)
- Gossan and rust seepage
- Zone of rusty alteration

Geology By:
M. E. Coates & Assistants
1968

1 1/2 0 1 2 3
SCALE IN MILES

PV

Figure 4	Geological Map Emerald
Lake Area	105 O-11
	1" = 1 mile

FIG. 4


105-0-11
6481
ARROWHEAD LAKE
ARROWHEAD PASS
OLD CABIN CREEK
KYOSTI CREEK
ROGUE RIVER
HORN PEAK
EMERALD LAKE
105-0-11
GEOLOGY OF CLAIM MAP 105-0-11
SCALE
inches
centimetres
This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.
Yukon Geological Survey

Figure 5 Geochemical Map Swan Lake
Area 105 N-7,8,9, 10,15
1" = 1 mile


FIG. 5
LANSING
RANGE
MOUNT JOY
MURRAY
CREEK
CREEK
ROGUE
RIVER
ROGUE RIVER
105-N-9
MOUNT AHO
SWAN
LAKE
PLEASANT
LAKE
PLEASANT
CREEK
ROGUE
CREEK
HESS
RIVER
HESS
RIVER
DOGBONE LAKE
FAIRWEATHER
LAKE
105-N-8
See Back For Pleasant
Creek Gossan
ATLAS EXPLORATIONS LIMITED
ROSS RIVER (Y.T.)
HESS PROJECT
GEOCHEMICAL RESULTS AND CLAIM GROUP MAP
OF SWAN LAKE AREA
105-N-7,8,9,10 & 15 (PARTLY)
INTERPRETED BY: M.E.COATES
DRAWN BY: P.J.F.VLASVELD
DATE: JANUARY 6,1969
SYMBOLS
GEOCHEMICAL ANOMALY GIVING
QUANTITATIVE ESTIMATE OF ANOMALOUS
VALUES PRESENT.
Cu,Pb,Zn CONTENT SHOWN IN
PARTS PER MILLION
BOB GROUP
18-10-67
(DROPPED)
CLAIM GROUP SHOWING DATE RECORDED
AND STATUS OF PROPERTY.
inches
centimetres
This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.
YUKON GEOLOGICAL SURVEY

Figure 6   Geochemical Map Vole Creek
Area   105 N-5, 6, 11, 12, 14
1" = 1 mile


ATLAS EXPLORATIONS LIMITED
ROSS RIVER (Y.T.)
HESS PROJECT
GEOCHEMICAL RESULTS AND CLAIM GROUP MAP
OF VOLE CREEK AREA
105-N-5, 6, 11, 12 & 14 (PARTLY)
INTERPRETED BY: M.E. COATES
DRAWN BY: P.J.F. VLASVELD
DATE: JANUARY 6, 1969
SYMBOLS
GEOCHEMICAL ANOMALY GIVING QUANTITATIVE ESTIMATE OF ANOMALOUS VALUES PRESENT.
Cu, Pb, Zn CONTENT SHOWN IN PARTS PER MILLION
BOB GROUP
7-11-67
(DROPPED)
CLAIM GROUP SHOWING DATE RECORDED AND STATUS OF PROPERTY.
inches
centimetres
This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.
YUKON GEOLOGICAL SURVEY
SEVEN MILE
CANYON
LANSING
(Abandoned)
LANSING
RIVER
LANSING RANGE
MURRAY
CREEK
STEWART
RIVER
CANYON
HESS RIVER
HESS
RIVER
PLEASANT
CREEK
VOLE
CREEK
PLEASANT CREEK
HESS
RIVER
HESS
RIVER

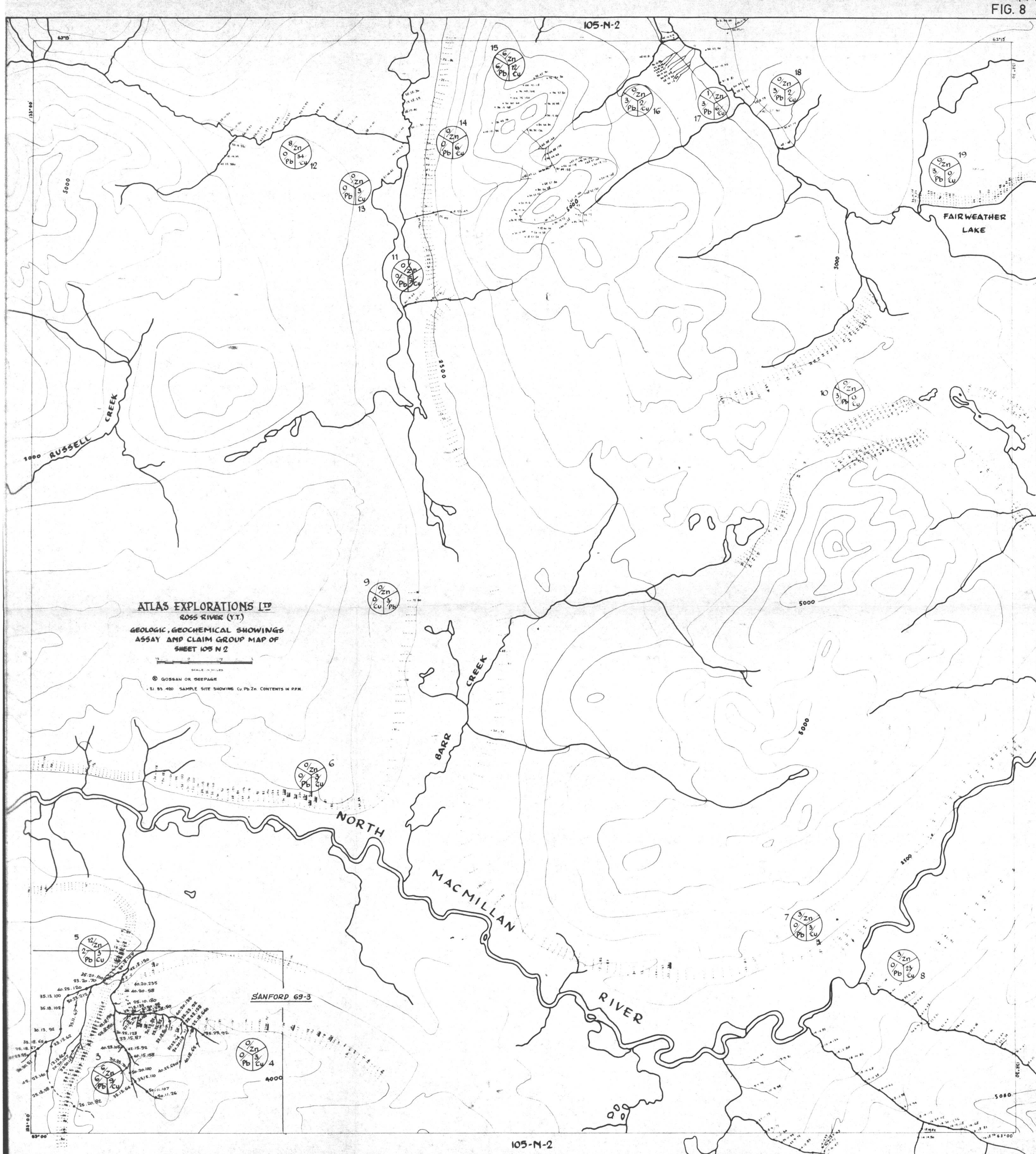
PLEASANT CREEK GOSSAN
Scale 1" = 1/4 Mi
N
PLEASANT CREEK
3000
4000
5000
inches
0 1 2
0 1 2 3 4 5
centimetres
YUKON GEOLOGICAL SURVEY
This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

Figure 7 Geochemical Map
105 N-1
1" = 1 mile

105-N-2
105-N-1
ATLAS EXPLORATIONS LTD
ROSS RIVER (Y.T.)
GEOLOGIC, GEOCHEMICAL SHOWINGS ASSAY AND CLAIM GROUP MAP OF SHEET 105 N 2
SCALE IN MILES
GOSSAN OR SEEPAGE
• 21. 83. 420 SAMPLE SITE SHOWING Cu. Pb. Zn. CONTENTS IN P.P.M.
ATLAS EXPLORATIONS LTD.
ROSS RIVER (Y.T.)
GEOCHEMICAL RESULTS AND CLAIM GROUP MAP OF SHEET 105-N-1
SCALE IN MILES
GOSSAN OR SEEPAGE
• 18. 23. 572 SAMPLE SITE SHOWING Cu.Pb.Zn CONTENT IN P.P.M.
inches
centimetres
This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.
YUKON GEOLOGICAL SURVEY
FAIRWEATHER LAKE
RUSSELL CREEK
BARR CREEK
NORTH MACMILLAN RIVER
HUSKY DOG CREEK
CLEARWATER CREEK
ART LAKE SOIL SAMPLE GRID

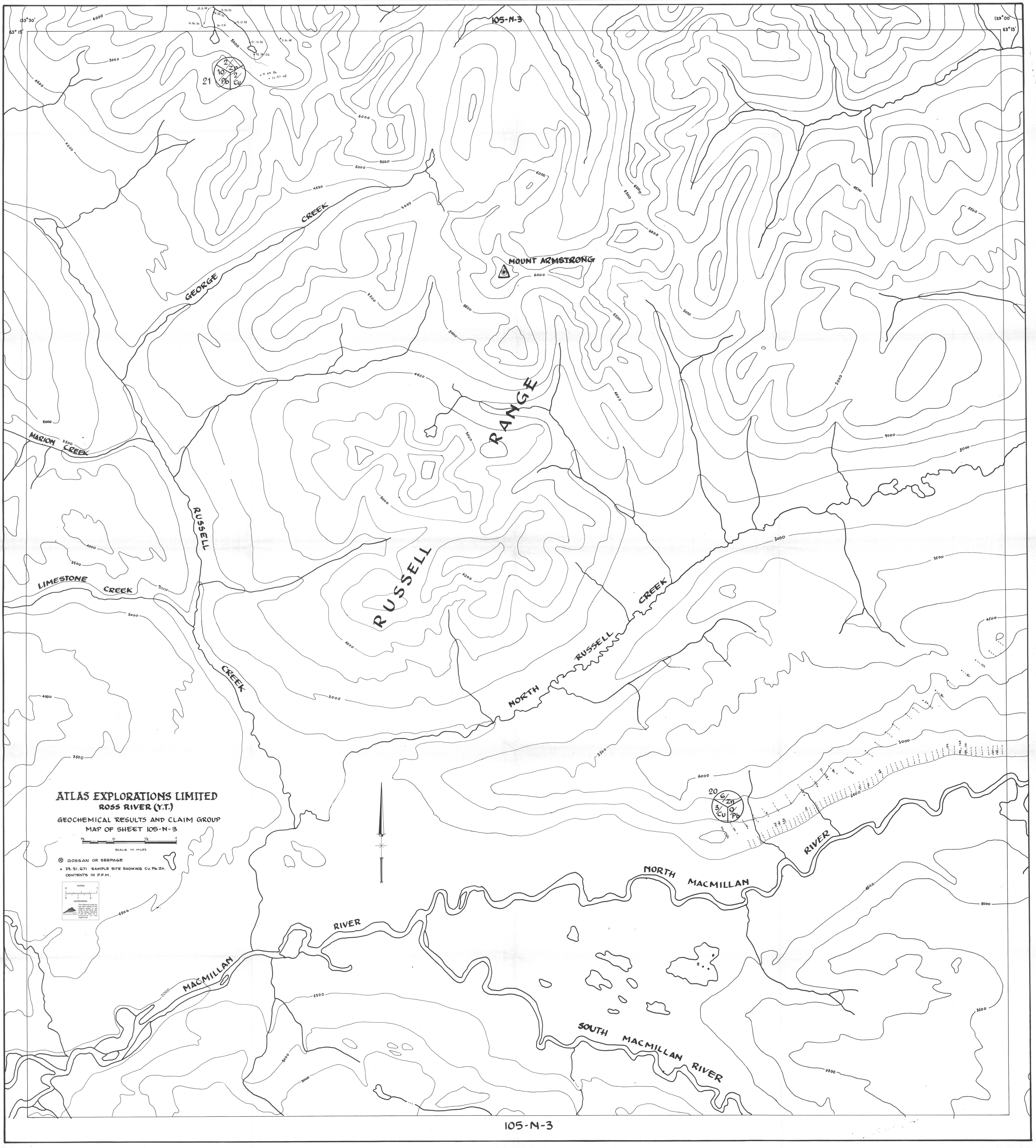
Figure 8 Geochemical Map
105 N-2
1" = 1 mile

FIG. 8



105 N/2
Geochemistry

Figure 9 Geochemical Map
105 N-3
1" = 1 mile



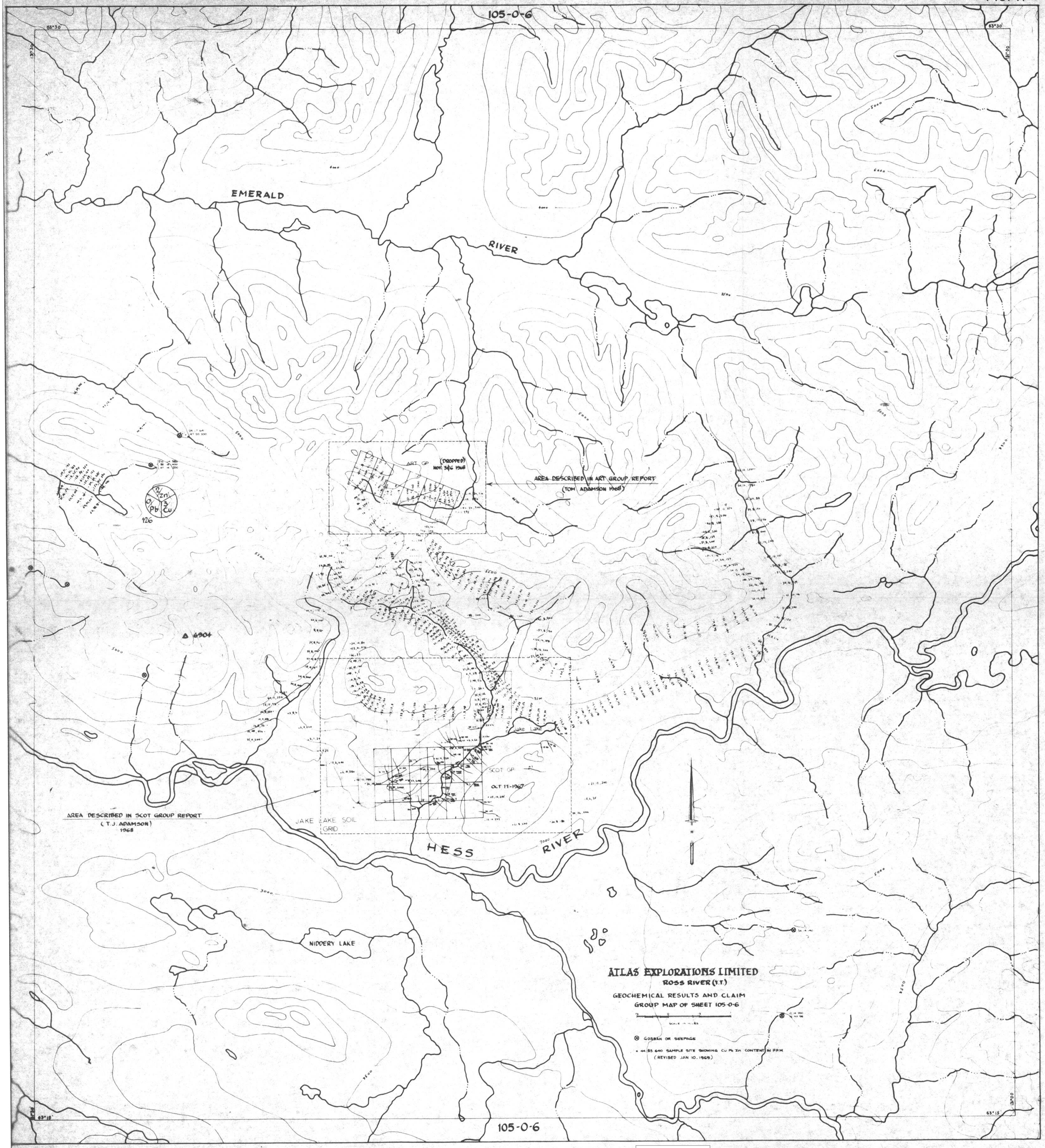
105-N-3
ATLAS EXPLORATIONS LIMITED
ROSS RIVER (Y.T.)
GEOCHEMICAL RESULTS AND CLAIM GROUP
MAP OF SHEET 105-N-3
SCALE IN MILES
GOSSAN OR SEEPAGE
23.51.671 SAMPLE SITE SHOWING Cu. Pb. Zn. CONTENTS IN P.P.M.
inches
centimetres
This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.
YUKON GEOLOGICAL SURVEY
MOUNT ARMSTRONG
RUSSELL RANGE
GEORGE CREEK
MARION CREEK
LIMESTONE CREEK
RUSSELL CREEK
NORTH RUSSELL CREEK
NORTH MACMILLAN RIVER
MACMILLAN RIVER
SOUTH MACMILLAN RIVER
105-N-3

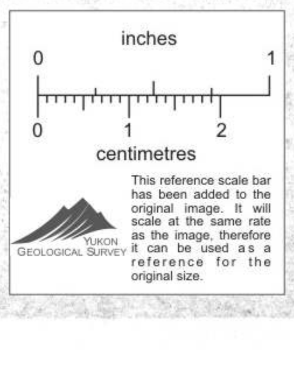
Figure 10   Geochemical Map
105 O-3
1" = 1 mile


105-0-3
ATLAS EXPLORATIONS LIMITED
ROSS RIVER (Y.T.)
GEOCHEMICAL RESULTS AND CLAIM GROUP
MAP OF SHEET 105-0-3
SCALE IN MILES
GOSSAN OR SEEPAGE
AREA EXAMINED BY:
T. J. ADAMSON 1968
BOB CREEK
TOM-GE
(DROPPED)
NOV. 3 & 8 1967
Zn
Pb
Cu
125
124
NORTH MACMILLAN RIVER
GOLD RIVER
5000
6000
4000
105-0-3

Figure 11 Geochemical Map
105 O-6
1" = 1 mile

FIG. 11

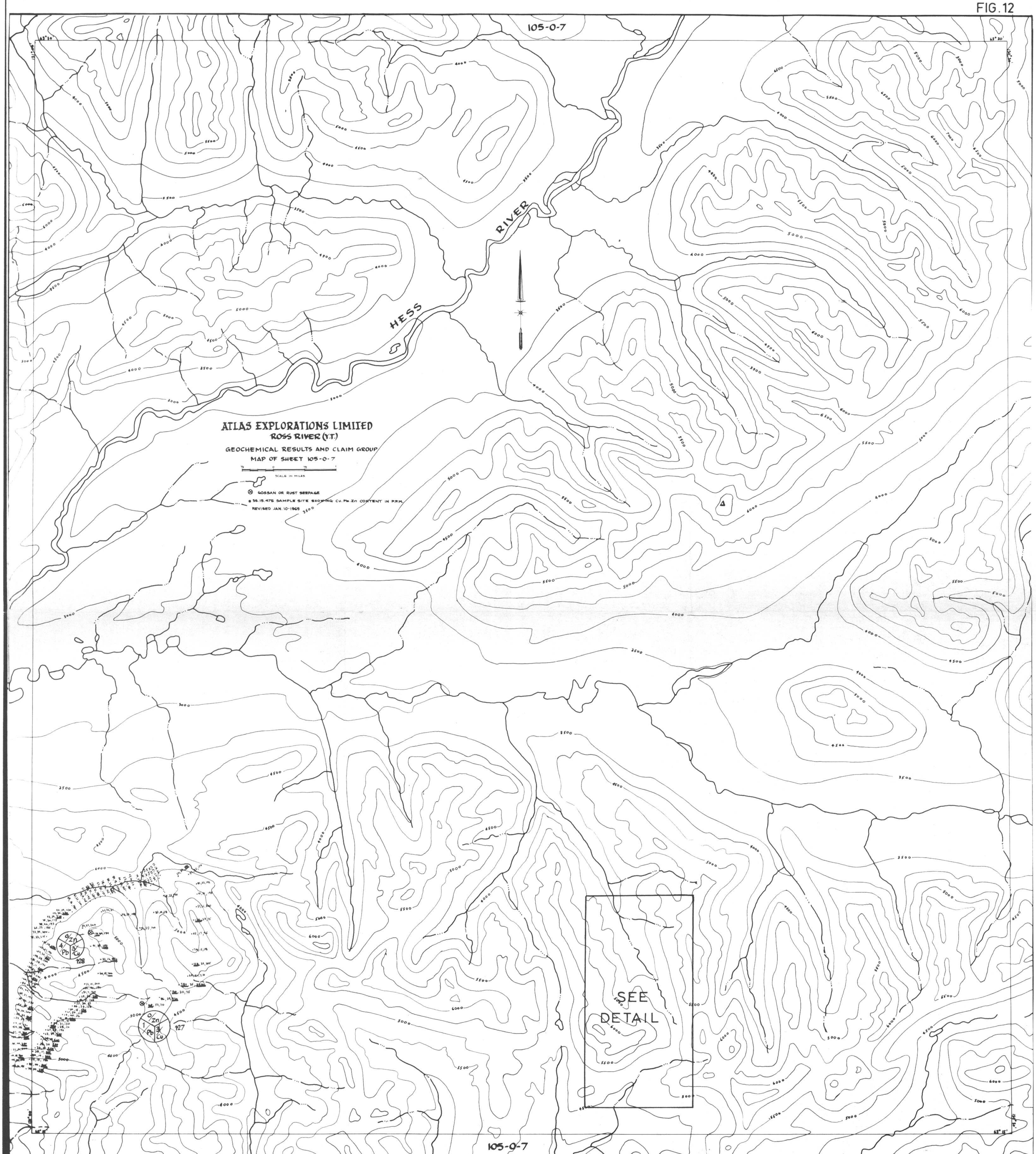




Topo 105-0/6

Figure 12 Geochemical Map
105 0-7
1" = 1 mile

FIG. 12



inches
0 1
0 1 2
centimetres
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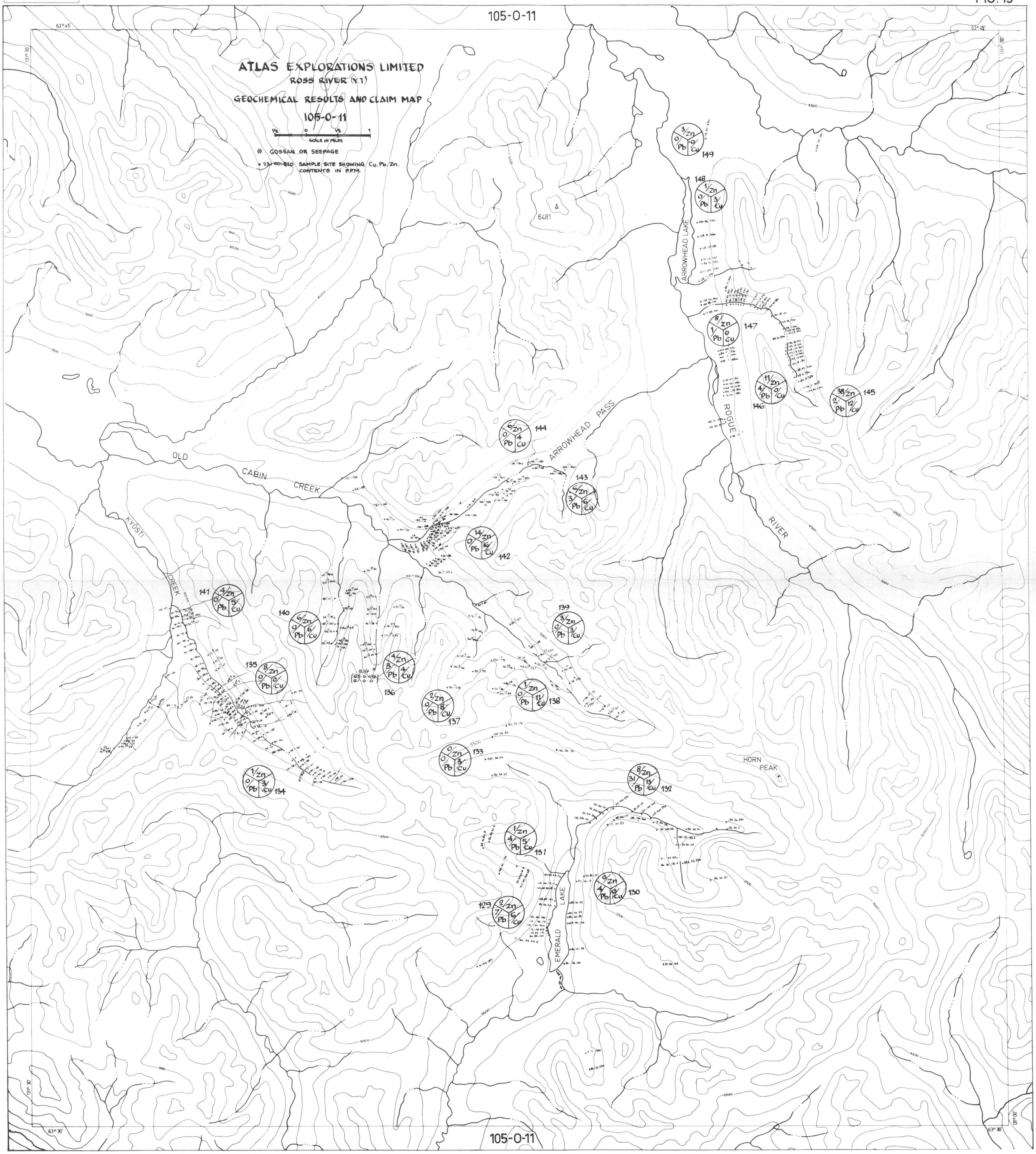
Yukon Geological Survey

TOPO. 105

Figure 13 Geochemical Map
105 0-11
1" = 1 mile

inches
0 1
0 1 2
centimetres
This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.
Yukon Geological Survey

FIG. 13



Geochem. 105 O/11