1450

MM PROJECT

SUMMARY REPORT

D. S. Jennings
CYPRUS ANVIL MINING CORPORATION
April 1976

105F7 FILE COPY

MM PROJECT

SUMMARY REPORT

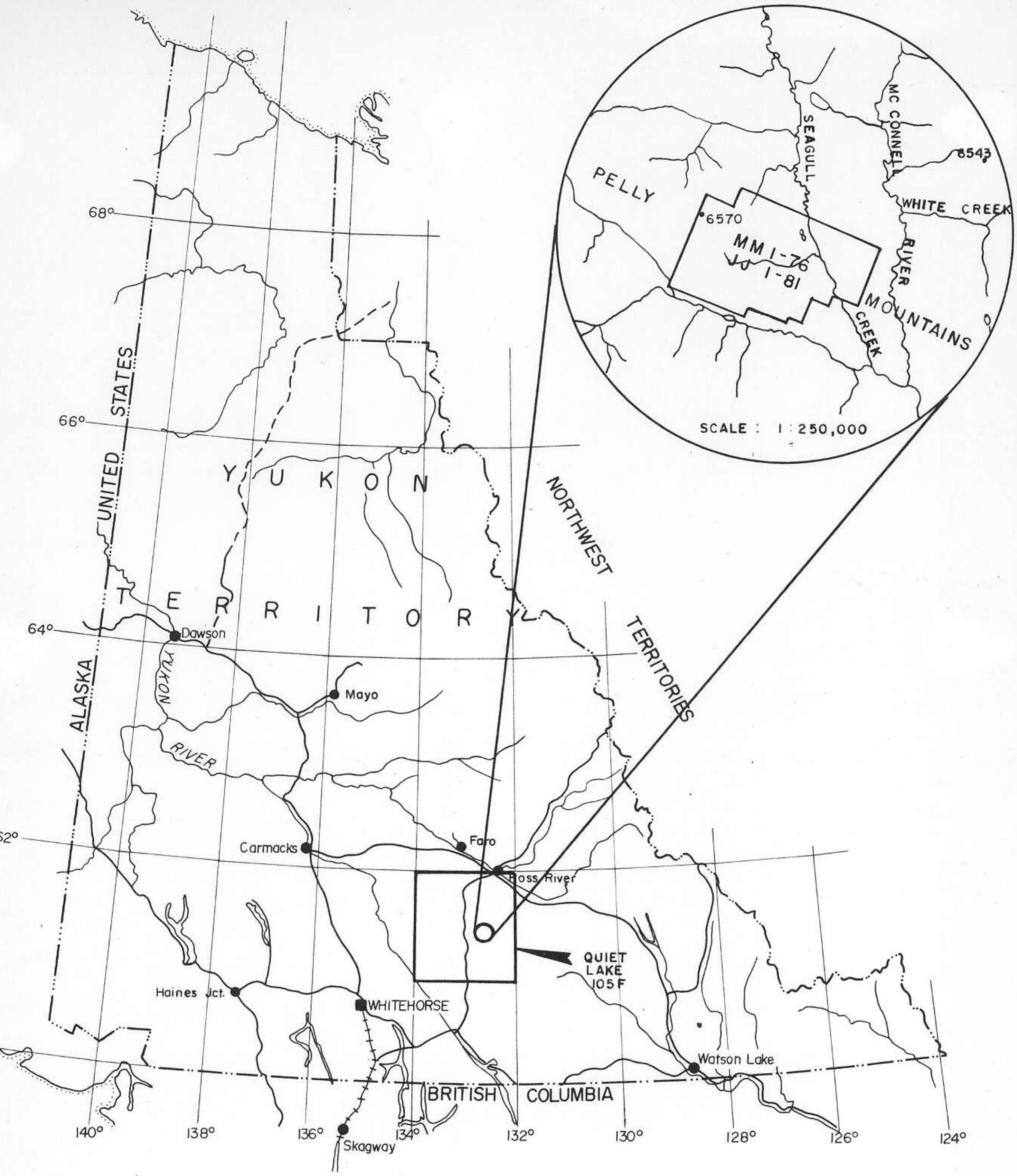
D. S. Jennings

Cyprus Anvil Mining Corporation

April, 1976

TABLE OF CONTENTS

FIGURES



CYPRUS ANVIL MINING CORPORATION

MM PROJECT

PROPERTY LOCATION MAP

YUKON

SCALE : 1" = 100 MILES

Figure: 1

INTRODUCTION

The MM and contiguous JJ claim groups are located in the core of Pelly Mountains on N.T.S. mapsheet 105 F 7 at approximate co-ordinates of 61°27' lat., 132°40' long. (Figure 1). The property, comprising 76 MM and 81 JJ mineral claims in good standing until 10 October, 1980, lies 36 miles south of Ross River and 14 miles east of the South Canol Road in the Watson Lake Mining District (Figure 2). The claim groups are largely above treeline in alpine terrain between 4,000' to 6,500'. Access to the property is by helicopter. A tote road through Upper Sheep Creek valley ends approximately 8 miles northwest of the claim groups.

The MM and JJ claims (Figure 3) were staked and recorded by Anvil Mining Corp. Ltd. during the 1973 field season to cover a strataform Pb/Zn occurrence formerly held by Spartan Explorations (Archer, Cathro and Assoc. Ltd., 1972). This occurrence was also identified as an isolated high on the federal aeromagnetic map of Quiet Lake map area (Department of Mines and Technical Surveys, 1961) during a 1973 program of regional aeromagnetic anomaly investigation in southern Yukon by Anvil personnel in rocks presumed to be lithologic equivalents to those of Anvil Range (Figure 4). The combination of these factors led to staking of the MM group (July 19, 1973) which was later surrounded with the JJ group (August 13, 1973). Spartan performed no evaluative work on their original 8 Zink claims covering one of the presently known massive sulfide showings.

Geological, geochemical, geophysical and diamond drilling programs were carried out on the property in 1973 and 1974. Demobilization of the drilling rig left on the property in 1974 was the only work performed in 1975. Expenditures to date on the claim blocks total $181,037.00 with $52,240.00 expended in 1973 and $123,043.00 applied in 1974.

GEOLOGIC SETTING

Regional Relationships

Unit 2 phyllites and related rocks assigned to the Middle and Upper Cambrian underlie the bulk of the MM/JJ claim block (Figure 2) with subordinate Silurian to Devonian dolomites and associated clastic rocks (Unit 4) shown in fault contact with this older sequence (Wheeler, Green and Roddick, 1960a). This lower to middle Paleozoic sequence lies northeast of an aerially extensive granitic welt and metamorphic core zone in Pelly Mountains (Wheeler, Green and Roddick, 1960a) embodying higher grade metamorphic equivalents of Upper Proterozoic and probable lower to at least Middle Paleozoic strata intruded by Mid-Cretaceous(?) granodiorites/monzonites and related anatectites (Figure 2). This core zone is herein termed the North Big Salmon Complex. Northeast of the MM/JJ block across the Seafull fault there is an extensive volcanic terrain of presumed Mississippian or earlier age (Figure 2). Preliminary investigations on the MM property and selected areas within this presumed Mississippian terrain resulted in the 1973 suggestion that the package of volcanic rocks containing the mineralized horizon on the MM is a probable correlative of this terrain. By this inference, unit 2, as mapped by Wheeler, Green and Roddick (1960a), might span most, if not all, of the Paleozoic section in Quiet Lake map area, in this way being grossly equivalent to the Paleozoic section of Anvil Range.

Recent regional mapping by Tempelman-Kluit (1976) in Pelly Mountains has provided a revised tectono-stratigraphic framework for much of the Quiet Lake and adjacent Finlayson map areas. Two contrasting stratigraphic sequences are recognized:

... 3

1. A succession of shales, sandstones and platform carbonate rocks ranging in age from late Proterozoic to Triassic probably representing a miogeoclinal accumulation along a stable (trailing?) continental margin, and

2. An Upper Paleozoic metamorphosed eugeoclinal assemblage of ultramafic rocks, basalts, siliceous tuffs and cherts (Tempelman-Kluit, 1976, p. 97).

The miogeoclinal package lies generally between the Tintina Trench and the North Big Salmon Complex, thereby including strata underlying the MM/JJ property and the Mississippian volcanic terrain, while the eugeoclinal package lies southwest of this complex in the Nisutlin Plateau (Figure 2).

Structurally, the eugeoclinal package forms an imbricated, allochthonous sheet above the autochthonous miogeoclinal pile (Tempelman-Kluit, 1976, p. 97). The miogeoclinal rocks have been exposed, in part, as a result of uplift and arching of the allochthon by the mid-Cretaceous(?) Big Salmon and North Big Salmon Complexes. Regional relations and distribution of the allochthonous eugeoclinal package are summarized in Figure 5.

Attention is drawn to the postulated allochthonous relationship of the Permo-Pennsylvanian Anvil Range Group (Tempelman-Kluit, 1972, pp. 12 - 17) and the probable correlation of Anvil Range Middle Devonian carbonate rocks (unit 5 of Tempelman-Kluit, 1972) underlying the postulated allochthon with Middle Devonian platform carbonates and clastics (Askin Group of Campbell (1967)) of the miogeoclinal succession in Pelly Mountains. The volcanic package on the MM bears an analogous stratigraphic relationship to the underlying platform carbonates. Its structural relation to these carbonates is less clear. Contrary to Tempelman-Kluits' (1976, p. 104) apparent proposal, the KD and Mag Mountain volcanic sequences on the north flank of Anvil Arch and their probable equivalent Menzie Creek sequence (105 L 9) do not necessarily have to be included in the proposed regional eugeoclinal allochthon on paleontologic grounds. The presence of Ordovician graptolite faunas in probable Road River argillites (unit 4, Tempelman-Kluit, 1972) immediately beneath the Mag Mountain sequence (Lewis, 1974; Tempelman Kluit, 1972), with no suggestion of structural discontinuity at their contact could imply a conformable depositional sequence with the Mag Mountain pile being post-Ordovician or Ordovician in age. These ages fit well with inferred ages of the Anvil Range volcano-sedimentary pile, therefore the KD/Mag Mountain/Menzie Creek sequence need not be obducted into/onto the pile. Further, Tempelman-Kluit (1976, p. 104) depicts all of the Anvil Range Group rocks (sense of Campbell, 1967) in Glenlyon map area as allochthonous. Reconnaissance mapping (Jennings, 1973) over this area demonstrates the continuation of typical Anvil district schists, phyllites and metavolcanic rocks into this package and the absence of Anvil Range Group rocks (sense of Tempelman-Kluit, 1972). It hardly seems reasonable, therefore, to include this package of rocks in the proposed Anvil-Campbell eugeoclinal allochthon.

It is interesting to note that Tempelman-Kluit (1976, p. 104) includes the Mississippian volcanic (eugeoclinal?) terrain in the miogeoclinal package while assigning similar (e.g. Sylvester Group in McDame map area) successions to the allochthonous eugeoclinal package (Figure 5). Presumably, this is because in much of Quiet Lake and Finlayson Lake map areas Mississippian black slate and orange weathered chert (lateral equivalents of Mississippian volcanic pile?) underlie the allochthon (Tempelman-Kluit, 1976, p. 100). In addition, Middle to Upper Triassic limestones (unit 8) overlie laminated, bioturbated shales and siltstones, in turn overlying the black slate/orange chert package (Tempelman-Kluit, 1976, pp. 98 - 99). Since emplacement of the allochthonous sheet postdates the Middle Triassic but predates the late Triassic (Tempelman-Kluit, 1976, p. 100), Tempelman-Kluit is lead to the conclusion that the Mississippian volcanic pile was deposited in/on the miogeoclinal succession prior to late Triassic over-thrusting of the allochthon.

Inspection of Figure 2 shows the Mississippian volcanic terrain (unit 6 - Upper Sylvester Group?) to be spatially distinct from and/or overlying the Lower Sylvester Group slates, shales and cherts (unit 5). Additionally, Middle to Upper Triassic rocks of unit 8 are nowhere seen to directly overlie unit 6 (as shown in Figure 21.1, Tempelman-Kluit, 1976, p. 98). It therefore seems possible (probable?) that this volcanic terrain (unit 6) allochthonously overlies Mississippian miogeoclinal(?) rocks (unit 5) forming a large klippe (possibly in fault contact with unit 8 rocks at the headwaters of Starr Creek) originally coextensive with the Anvil-Campbell-Big Salmon-Englishman's-Silvester allochthon (Figure 5). Assumed faults bounding parts of the northeastern and southwestern margins of the volcanic terrain (Wheeler, Green and Roddick, 1960a,b) may be traces of the allochthon sole. It is emphasized that this interpretation of the presently available geological data is only a "working hypothesis" needing further testing. If exposures of Triassic strata can be outlined stratigraphically and structurally above the unit 6 pile, Tempelman-Kluit's interpretation would be strengthened. If the above, alternative interpretation and the correlation of the MM mineralized strata with unit 6 are correct, the eugeoclinal package of volcanic lithologies would appear to offer excellent potential for "grassroots" exploration programs aimed at strataform, massive volcanogenic sulfide deposits.

Facies relations of the main stratigraphic units in miogeoclinal strata of Pelly Mountains are summarized in Figure 6. Tempelman-Kluit (personal communication) assigns Upper Cambrian through Mississippian ages to strata exposed on the MM/JJ claim block as shown (Figure 6). It is possible that the stratigraphically lowest calc-silicate phyllite unit on the property might, on compositional grounds, represent Lower to Middle Silurian brown platy dolomitic siltstones of the Askin Group(?) rather than the Cambro-Ordovician orange weathering calcareous Kechika Group phyllites as suggested. On the basis of regional comparisons, Tempelman-Kluit (1976, p. 105) assigns the mineralized mafic to intermediate metavolcanic rocks on the MM a Mississippian age correlating them with unit 6 of Wheeler, Green and Roddick (1960a,b).

Geology on the MM/JJ Claim Block

Preliminary structural and stratigraphic relations on the MM/JJ claim block are summarized in Figure 7. Adopting the above-noted stratigraphic age assignments of Tempelman-Kluit, weakly to non-calcareous, laminated and lenticularly banded, doubly foliated, dark brown grey weathering calc-silicate phyllites/schists (unit 2) and subordinate calcareous, medium gray-brown phyllites (unit 1) of the Kechika Group(?) form the base of the MM volcano-sedimentary pile.

These units are overlain in apparent conformity by graphitic schists (unit 3), fossiliferous carbonate rocks (unit 4) and carbonaceous orthoquartzites (unit 5) of Middle Devonian age. This sequence of platform quartzite-carbonate lithologies probably accumulated in a shallow marine environment at or near wave base as indicated by:

1. moderately well-sorted, medium-grained orthoquartzites (where only partially recrystallized?) and

2. disarticulated brachiopod faunas preserved as "chowder" accumulations.

The orthoquartzites are light to medium grey, variably carbonaceous, medium crystalline units generally under and overlying fossiliferous, finely to medium crystalline, light to dark grey to grey brown weathering dolomites and silicated calcitic marbles.

A complex pile of presumed Mississippian volcanic and derivative metasedimentary rocks (units 6 to 15) appear to conformably overlie the Middle Devonian platform carbonate sequence. This sequence is divisible into two lithologic packages:

1. Ultramafic rocks and related schists, phyllites, dolomites, cherts and orthoquartzites (units 6 to 10) and

2. Intermediate mafic (andesitic) to leucocratic (dacitic) volcanic granulites (textural sense) and schists with interbanded pyritic quartzites containing massive sulfide deposits and massive to disseminated barite deposits (units 11 to 15).

The ultramafic package lies at the base of the inferred Mississippian pile and may represent the sole of a pre-metamorphic allochthon. At present, there is no compelling evidence in support of this suggestion, other than the strong lithologic contrast between the platform carbonate and Mississippian volcanic sequences. Rocks included in the ultramafic package appear generally similar to unit 6a (Wheeler, Green, Roddick (1960 a, b), the presumed basal sequence of the Quiet Lake - Finlayson Lake Mississippian volcanic terrain. Little description of these units (6 to 10 inclusive) is offered beyond that in the legend because of their volumetric insignificance in the pile and the uncertain relationship of the ultramafic package on the eastern edge of the property to that in the main cirque. Careful attention should be given to the contact relations of the carbonate/ultramafic packages during completion of property mapping to ascertain whether these packages are in depositional or premetamorphic thrust fault contact. Rocks of the intermediate Mississippian pile include:

1. dark grey to black, medium to coarsely crystalline, two mica(?), graphitic schists (unit 11) immediately up inferred stratigraphic section from the ultramafic package,

2. medium to coarsely crystalline, medium grey brown, rusty weathering, doubly foliated, two mica schists (unit 14) of probable dacite bulk composition, and

3. dark green, weakly doubly foliated to massive, finely to medium crystalline, metavolcanic rocks (unit 15) of probable andesitic bulk composition having a finely granoblastic texture, mapped in the field as "granulites".

Distinctive, rusty weathering, buff colored to off-white, fine to medium crystalline, pyritic, variably micaceous quartzites (unit 13) are intercalated within this pile. Disseminated to massive pyrite and barite "lenses" are found within these quartzites, as are at least three (3) massive, strataform stratabound, pyrrhotitic, lead-zinc bearing, sulfide deposits (unit 12).

At least two mineralized horizons containing the known deposits are recognized on the property (Figure 7). The lower horizon lies approximately 400 feet stratigraphically above the top of the Middle Devonian orthoquartzite/ carbonate package with the second or upper horizon mapped about 1,000 - 1,100' stratigraphic feet above this contact.

One sulfide deposit occurs in the lower horizon. It has a strike length of approximately 500 feet with massive sulfides exposed up to 12 foot true widths. Disseminated mineralization occurs in both the hanging and footwall up to at least 5 feet from the massive sulfides. This deposit is a strata-form deposit dominantly composed of pyrrhotite with subsidiary amounts of sphalerite and galena. To date, this deposit is the only one of the three known deposits drill tested. Table 1 summarizes analytical results on the relevant borehole:

TABLE 1

Analyses from DDH 74 MM-2

Footage	Pb	Zn	Cu	Combined
408 - 411.5	.10	1.34	.02	
411.5 - 415	.23	1.21	.01	
435 - 437	.12	.36	.02	
558 - 562	.12	.24	.02	
622 - 627	.20	.08	.02	
627 - 632	.19	.12	.02	
632 - 637	.06	.02	.02	
637 - 642	.06	.03	.02	
642 - 647	.07	.02	.02	
788 - 793	.16	.38	.04	
793 - 798	.09	.26	.02	
798 - 803	.03	.15	.02	
803 - 808	.17	.28	.02	
808 - 813	.11	.32	.02	
813 - 816	.18	.69	.03	
816 - 819	.90	1.78	.02	
819 - 824	.04	.06	.02	
824 - 829	.04	.04	.01	
829 - 836	.01	.03	.02	
836 - 838	1.36	3.68	.02	5.04
838 - 842	.60	3.07	.02	3.67
842 - 847	.24	1.04	.03	1.28
847 - 852	.28	.97	.03	1.25
852 - 857	.43	2.18	.06	2.61
857 - 861	1.62	5.33	.14	6.95
861 - 866	3.74	6.02	.06	9.76

WEIGHTED AVG. 836-866 (30 FT) = 4.24 PERCENT COMBINED

WEIGHTED AVG. 852-857 (14 FT) = 6.40 PERCENT COMBINED

WEIGHTED AVG. 857-866 (9 FT) = 8.51 PERCENT COMBINED

Note: Only trace Ag values reported.

The upper horizon contains two known massive sulfide deposits plus one disseminated to near massive barite deposit. None of these deposits has been drill tested and consequently are of prime exploration interest in the proposed 1976 program. The massive sulfide deposits are similar to that in the lower horizon and occur about 2,000 feet apart within a pyritic quartzite that can be traced over a 4,000 foot strike length. Variably baritic quartzites occur midway between the deposits at station 33 (Figure 7). The more southerly of the two deposits is about 300 feet in length showing true widths up to 10 feet with indeterminate amounts of disseminated mineralization in the host rocks. Chip channel samples taken across and along the deposit yield assay results summarized in Table 2.

TABLE 2

Chip Channel Sample Analyses

Sample	Width/ Length	Pb	Zn	Cu	Combined
A	50	1.20	1.02	0.08	2.22
B	40	0.83	2.22	0.10	3.05
C	40	1.60	5.28	0.22	6.88
D	300(length)	2.20	2.64	0.08	4.84

The more northerly of the two deposits in this horizon, exposed in the main MM cirque floor, is approximately 200 feet in length and about 10 feet wide traceable only in poor outcrop and float rendering accurate dimensions unattainable. Grab samples from this showing range from 2.26 to 10.56 weight percent combined Pb+Zn comparing favorably with the overall range in combined Pb+Zn grab samples over the property of 2.26 - 22.63 weight percent. It is unknown whether the two sulfide deposits coalesce at depth along strike within the pyritic quartzite horizon. Other pyritiferous quartzite units examined to date on the property do not appear to host massive mineralization. Disseminated mineralization (less than 1 - 2% total base metal sulfides) was found at station 25 along the south wall of the main cirque.

Rusty pink to beige weathering, medium to coarsely crystalline chloritic trondjemitic(?) orthogneisses (unit 16) apparently cross-cut Cambro-Ordovician through Mississippian rocks in the eastern part of the map area. Since these orthogeneisses are cut by the S_1 foliation and, in turn, show apparent discondant relations to presumed Mississippian strata, they are tentatively assigned a late Mississippian or younger age. On the basis of regional relationships (Monger, 1975, p. 31, 39), it is likely the D_1 event is Middle to Upper Triassic (Tahtlanian) in age, thereby placing a poorly defined upper limit on the age of the orthogneisses.

Biotite granodiorites (unit 17) of the North Big Salmon Complex intrude Kechika Group(?) rocks in the northwestern corner of the map area. These rocks are unmetamorphosed, show intrusive, cross cutting contacts and are of assumed Middle Cretaceous age. No migmatitic rocks are developed at or near the granodiorite contact.

The earliest recognizable fabric element in the MM pile is the S_1 penetrative regional metamorphic foliation. Phase assemblages defining this surface imply upper greenschist facies metamorphic conditions during the D_1 event viz: biotite-chlorite, muscovite-biotite, muscovite-chlorite in pelitic lithologies; biotite-actinolite, actinolite-chlorite in basic metavolcanic rocks and tremolite-quartz in carbonate rocks. Inspection of Figure 7 reveals an approximate pre-D_2, pre-D_3 northwest-southeast strike and subvertical dip to S_1. (Note: Detailed geometric analysis of MM structural data has not been undertaken). Unit contacts are seen to be sensibly parallel to S_1 which is axial planar to F_1 folds. In this way, S_1 is seen as a transposition foliation analogous to S_1 in Anvil Range. If the Mississippian age assigned to units 6 to 15 is correct, the D_1 metamorphic event is Mississippian or younger. On paleontologic evidence, D_1 is certainly Middle Devonian or younger since it affects units 3 to 5.

S_1 is cut and folded by a younger penetrative regional metamorphic foliation, S_2. This element, in general, has a northwest-southeast strike and shallow, uniform northeast dip. It is axial planar to second phase (F_2) folds forming as a crenulation foliation with varying degrees of S_1 (and therefore S_o) transposition into the S_2 plane. Again, the geometric relationships of the principal regional metamorphic fabric elements are reminiscent of Anvil Range and southwestern Selwyn Basin northeast of Tintina Trench. Where seen together, F_1 and F_2 folds are coaxial as evidenced particularly well by a spectacular F_1 structure in units 4 and 5 refolded about a megascopic synformal F_2 anticline immediately west of the main sulfide deposits (Figure 7). This synformal anticline closes easterly to southeasterly with a shallowly easterly to southeasterly dipping axial plane and can be traced through much of the map area. Numerous, large scale parasitic F_2 isoclines can be mapped on its upper limb along the north ridge of the MM cirque. Phase assemblages defining the S_2 foliation are indicative of upper greenschist facies regional metamorphism during the D_2 event. The coincident metamorphic grades and coaxial nature of the D_1 and D_2 events could be taken as evidence that these two "events" represent readjustments of the stress field during a single deformational pulse. In this regard, the MM terrain is again similar to that of Anvil Range.

S_1 and S_2 are folded about three northeast-southwest trending, southwest plunging phase 3 (F_3) folds defining an antiformal syncline as dominant megascopic structural feature on the property. This antiformal syncline is slightly overturned to the northeast and shows a pronounced absence of penetrative or even incipient axial planar foliation. These F_3 folds demonstrate that on the scale of the property, the stratigraphic section appears in large part "upside down" (assuming at all times a Cambro-Ordovician age for units 1 and 2 and a Mississippian age for units 6 to 15). This can be taken as strong evidence of megascopic F_2 (F_1?) nappe development in the core of Pelly

Mountains. This is not unreasonable considering the proximity of the MM to the mobile core zone or North Big Salmon Complex. It is interesting to speculate that the megascopic synformal F_2 anticline outlined in the northern half of the map area may be such a "nappe" structure. If this is the case, F_2 "keels" of Mississippian volcanic rocks would certainly be expected in the broad outcrop areas of unit 2 surrounding and northwest of MM (Figure 2). It is suggested that this "inverted sequence" is probably not entirely generated by a series of pre-or syn-D_1 imbricate thrusts because the entire, nearly complete Paleozoic section exposed on MM is inverted. Conformable thrust fault contacts separating each of the three dominant lithologic packages from the others across the entire area seems coincidental and therefore unlikely. Notwithstanding, it is still possible for the Mississippian package to represent a pre-or syn-D_1, eugeoclinal allochthon obducted onto a Devonian carbonate platform.

Structural relationships in the eastern portion of the map area are less clear than in the main cirque area. Specifically, the package of graphitic schists (unit 11), orthoquartzites (unit 10), dolomites (unit 9), ultramafic and related rocks (units 6 to 8) may be in pre-or syn-D_1 thrust contact with structurally lower rocks of units 13, 14 and 15, even though they occupy their expected stratigraphic position. Some attention should be paid to the contact relations between units 11 and 15 south of stations 24 to 29 to evaluate this possibility.

In summary, rock units in the MM volcano-sedimentary pile most probably represent a nearly continuous Paleozoic section from the Cambro-Ordovician through Mississippian. It is problematical whether the Mississippian volcanic pile is allochthonous within this sequence. Three geometrically distinct periods of folding (two associated with regional dynamothermal metamorphic events) produce a complicated internal geometry to the deformed sequence. It is suggested that the second period of folding has produced a megascopic easterly to southeasterly closing synformal anticline of which the core lower limb and hinge zone are preserved. This isoclinal structure overturns the stratigraphic sequence in the map area. The D_1 event from regional considerations and relative age relationships is probably Upper Triassic (Tahltanian) in age. Middle and Upper Triassic strata north of the map area affected by the D_2 event suggest it to be of Jurassic or younger age.

EXPLORATION HISTORY

1973 Exploration Program

Work on the MM/JJ claim block in 1973 included reconnaissance prospecting and geology, geochemical, ground magnetic and gravity surveys, followed by completion of two diamond drill holes. Results of each of these programs are reviewed below.

Approximately one week was spent mapping and prospecting the MM property in 1973. As no better topographic maps existed in the area at that time, all mapping results were plotted on 1 inch = 2,640 feet claim maps for 105-F-7. The general distribution of the presently recognized lithologic units was mapped and the megascopic synformal F_2 anticline recognized. Results of this reconnaissance exercize are incorporated in Figure 7. Reconnaissance prospecting in the main MM cirque located one of the three presently known massive sulfide showings. Chip cannel sampling results over this showing are reported above (Table 2). This showing (southerly deposit in upper mineralized horizon) was originally covered by eight (8) Zink claims of Spartan Explorations in 1970.

A crude chain and compass grid was established on the slope immediately west of the headwall of the main MM cirque for geochemical, ground magnetic and gravimetric surveys. Because of the crude nature of this flagged grid, it cannot be successfully tied to the picketted, transit surveyed and chained grid established over the central and eastern portions of the property in 1974. The 1973 grid baseline is sub-parallel (slight westward divergence) to line 0+00 of the 1974 grid. Four points from the 1973 grid were located and surveyed to the 1974 grid (Figure 12). These points (plotted on all 1974 survey base maps) are:

1. 1973 BL, 0+00
2. 1973 BL, 36+00S
3. DDH 73 MM-1
4. DDH 73 MM-2.

Because of the poor fit of the 1973 grid with respect to the 1974 grid, no attempt has been made to incorporate results of similar surveys for the two years. Therefore 1973 and 1974 survey results are treated and presented separately.

Results of the 1973 soil geochemical survey are given in Figure 8. Two subparallel trends of nearly coincident Cu, Pb and Zn highs are defined southwest of the main cirque. Comparison of these trends to the geologic map (Figure 7) shows the "highs" are tracing map units 13, 14 and 15 along the north and south limbs of the southern-most antiformal F_3 syncline, while the broad zone of geochemical lows in the northern part of the survey area monitors the Middle Devonian platform carbonate (units 3 to 5) outcrop pattern. In summary, the 1973 soil geochemical program proved to be of limited exploration significance as it apparently did little more than "map" bedrock geology in a local area and was not extensive enough to outline or evaluate areas of anomalous response within units 13, 14 and 15.

A ground magnetic survey (Figure 9) was completed over the 1973 grid prior to a gravimetric survey. Scattered highs were revealed over the entire surveyed area. Inspection of Figure 10, a compilation of reportedly anomalous geochemical, magnetic and gravimetric responses, suggests a weakly defined pattern of ground magnetic highs associated with the previously noted geochemical highs. This coincidence most probably reflects high pyrrhotite and base metal concentrations in units 13, 14 and 15 as revealed in 1973 drill core from these units.

The 1973 gravimetric survey is summarized in a report prepared by Peter E. Walcott and Associates included as Appendix 1 of this report. Three gravity highs, originally thought to be associated with massive sulfide mineralization, were defined on a contoured plot of the Bouguer values with terrain corrections applied. Inspection of Figure W-169-4 in Appendix 1 with Figure 7 above suggests the gravity highs may be related to bedrock topography beneath heavy talus cover in the survey area. Good correspondence of a large linear gravity low with a known stream through the southwestern part of the surveyed area lends support to this interpretation. In addition, it seems unlikely that the essentially "background" levels of iron sulfides for units 13, 14 and 15 in DDH's 73 MM 1 and 2 (drilled on gravity highs A and C, Figure W-169-4, Appendix 1) would generate a significant mass excess response. Additionally, as no reliable topographic maps of the property existed in 1973, the reported terrain corrections may be of questionable validity, and the effect of the MM cirque east of the survey area may have been difficult to evaluate.

Two diamond drill holes (73 MM 1 and 2) were completed in 1973 (Figures 7, 8, 9, 10). They were located to test coincident or nearly coincident gravimetric, magnetic and geochemical responses in strata known to contain massive sulfide mineralization in the main cirque immediately east of the 1973 grid. Mineralization of economic significance was not encountered in either drill hole. According to Jansons (1973) "several short zones of 20 - 40% estimated total sulfides (mainly pyrrhotite with lesser pyrite) were present". Assayed core never contained more than 1% combined lead-zinc but "170 feet of 0.20 - 0.25 combined lead-zinc was obtained". A summary of the available assay data on these holes is given in Table 3 below (Jansons, 1973):

TABLE 3

1973 Diamond Drilling Assay Results

Drill Hole	Element	Range	Best Combined Pb + Zn	Depth (Ft.)
73 MM 1	Cu	Tr. to 0.01%		
	Pb	Tr. to 0.89%		
	Zn	Tr. to 0.11%		
			0.89%	380-390
73 MM 2	Cu	0.01 - 0.40%		
	Pb	Tr. to 0.14%		
	Zn	Tr. to 0.27%		
			0.27%	(290-300)
				(350-360)
			0.30%	370-380

Logs for these holes cannot be located in company files at present. Since these logs were filed for assessment work, copies should be available from the Watson Lake Mining Recorder. Core from these holes is stored at the mine core reacks, should re-logging be warranted.

1974 Exploration Program:

Detailed geologic mapping, soil geochemical and ground magnetic surveys were completed in 1974. Results of these surveys were tied to and plotted on new 1 inch = 400 foot orthophotographic mapping produced by North West Survey Corporation (Yukon) Ltd. Four map sheets covering the MM/JJ claim block were produced from 1973 1 inch = approximately 1,000 foot black and white aerial photography of the area. Relevant horizontal control (Figure 11) was established by White, Hosford and Impey Ltd. in 1974 using a tellurometer and theodolite. The 1974 geochemical and geophysical survey grid was established by White, Hosford and Impey Ltd. by surveying and picketing the baseline and turning right angled picket lines. Contact line-cutting was performed by D. Waugh and Assoc. A partial claim survey (Figure 12) was also conducted by J. F. Welter of White, Hosford and Impey Ltd. During this survey, drill hole collars and 1973 grid points were tied to the 1974 grid and thereby, the 1974 orthophoto. A gap was noted in the MM claim block (Figure 12).

Results of the geologic mapping and attendant conclusions have been reviewed above and in Figure 7. It is pointed out that only two and one half weeks were spent in property mapping. Results should therefore be treated as a reconnaissance. Mapping of the eastern portion of the map area should be completed concomitant with drilling in the main cirque area.

Grid soil sampling on the 1974 grid (Figures 13, 14, 15) confirmed 1973 Lapie project stream silt results in the MM cirque in that a prominant train of semi-coincident and coincident lead-zinc-copper anomalies was found. It is felt that this "train" is a reflection of mechanically dispersed massive sulfide fragments from the cirque headwall transported downslope toward

Seagull Creek by mountain glaciation. Contributions to this anomaly train from the south wall of the cirque appear probable. For example, the broad lead with flanking zinc anomaly immediately north of station 25 is caused by minor sulfide mineralization at station 25. A similar situation occurs immediately north of station 23, a minor galena occurrence in pyritic quartzites. It should be noted that some of the anomaly train could reflect additional sulfide occurrences in the cirque floor since this is the general area into which the mineralized strata would project through the core of the northern, antiformal, F_3, syncline (Figure 7).

Ground magnetic survey results are given in Figure 16. Inspection of this figure and Figure 7 shows very weak monitoring of stratigraphy similar to that shown in the 1973 ground magnetic survey. The 1800 gamma contour of the 1974 data conforms closely with the form and location of the 1961 federal aeromagnetic survey (Figure 17). It is possible that the federal and coincident ground magnetic responses are indicative of disseminated pyrrhotite within units 13, 14 and 15 that may harbor massive sulfide mineralization. Alternatively, the broad eastern portion of the federal anomaly may only be related to disseminated iron sulfides similar to the western lobe of the same anomaly (Figure 17) as evidenced by the 1973 drilling results. Three coincident Cu/Pb/Zn geochemical and ground magnetic anomalies are noted in the 1974 surveys:

1. At L40+00N, 28+00E there is a magnetic anomaly of about 400γ relief associated with anomalous Pb (1,400 ppm) and Zn (2,150 ppm). A broad zone of weak, anomalous Cu values occurs west of this location.

2. At L24+00N, 0+00 to 7+00E a sharp magnetic anomaly of about 1600γ is associated with anomalous Cu ($>$100 ppm), Pb (200 - 400 ppm) and Zn (1,000 - 6,000 ppm).

... 21

3. On L24+00S, 0+00 to 6+00E, the core of the federal aeromagnetic response is associated with weakly anomalous Cu (>50 ppm), Pb (120 - 160 ppm) and Zn (200 ppm). These three specific areas should be prospected in detail and evaluated.

Two diamond drill holes totalling 2,010 feet were completed in 1974. DDH 74 MM-1 tested a coincident ground magnetic and gravity (anomaly C, W-169-4, Appendix 1) feature on the 1973 survey grid (Figures 7, 12). The hole was collared in orthoquartzites of unit 4 terminating in calc-silicate schists of unit 2 demonstrating the existence of the above discussed synformal, F_2 anticline. No economic mineralization was encountered as the Mississippian sequence was not intersected. It is thought that the gravity response is due to a bedrock high or ridge as evidenced by the 6 foot overburden depth and existence of modern ephemeral stream channels northwest and southeast of the drill site. The log for this hole forms part of Appendix 2. Core is stored on the property near the drill site.

DDH 74 MM-2 was collared at -50° on a 33° bearing from the 6,100' level between stations 89 and 90 (Figures 7, 12). This inclinal hole was intended to intersect the massive sulfide deposit in the lower mineralized quartzite and the southerly deposit in the upper quartzite horizon. The lower of the two deposits was intersected with results as given in Table 1 above. The hole was continued to a depth of 1,413 feet in an attempt to reach the upper mineralized zone, anticipated between 1,400 and 1,600 feet. Inclement weather forced termination of the drilling program in early October prior to intersecting the second zone. The drill log is included in Appendix 2. No downhole or dip test data are available for this hole, rendering precise location of this hole difficult. The core is stored at the drill site.

... 22

The hole is cased and capped, suitable for re-entry. Camp gear, drill shack, drilling platform and approximately 1,000 feet of BQ rod remain on the property.

PROPOSED 1976 EXPLORATION PROGRAM

Drill testing of the sulfide deposits in the upper mineralized horizon constitutes the primary objective for 1976 exploration on the MM group. Completion of geologic mapping in the eastern part of the property, plus follow-up evaluation of geological problems and coincident ground magnetic/ geochemical anomalies, form a secondary objective. An A.F.E. covering this proposed, general program is included as Appendix 3.

Approximately 1,100 feet of drilling is proposed to test the two sulfide showings. On the southern showing, two holes are suggested:

1. A 300' horizontal hole, and
2. A 500' inclined (-45^{o}SW) hole from the same setup.

This minimal "fan" coverage should evaluate the width of massive and disseminated mineralization, plus provide some information on down-dip continuity and dimensions of the deposit. A 300' inclined borehole is planned to evaluate the northern showing. Contingent drill funding up to 1,500 feet is provided in the A.F.E. This footage could be expended in any of the following ways:

1. Additional hole(s) on the known showings to test dip potential.

2. Additional hole(s) between the known showings to test strike and/or dip continuity and potential.

3. Testing of the federal aeromagnetic response.

4. Testing of coincident geochemical/ground magnetic anomalies.

5. Testing of undeveloped targets in extensions of mineralized units along main cirque valley floor.

A total budget of $92,200 is proposed for this program (Appendix 3).

D. S. JENNINGS

April, 1976

REFERENCES

Archer, Cathro and Assoc. Ltd. (1972) Northern Cordillera Mineral Inventory, Yukon and Northwest Territories; Book 2.

Campbell, R. B. (1967) Reconnaissance Geology of Glenlyon Map Area, Yukon Territory; Geol. Surv. Can., Mem. 352.

Geological Survey of Canada (1961) Geophysics Paper 7005G; Aeromagnetic Series, Sheet 105 F.

Jansons, U. (1973) Exploration Report 1973 for Anvil Mining Corporation Ltd.; Company File.

Jennings, D. S. (1973) Reconnaissance Geology of Tummel Basin; Anvil Mining Corporation Ltd., Company File.

Lewis, P. F. (1974) Reconnaissance Geology and Geochemistry, Anvil Range Program, Y.T.; Report for Ridgemont Mining Corp., Company File.

Monger, J. W. H. (1975) Upper Paleozoic Rocks of the Atlin Terrane, Northwestern B.C. and South-Central Yukon; Geol. Surv. Can., Paper 74-47.

Tempelman-Kluit, D. J. (1972) Geology and Origin of the Faro, Vangorda and Swim Concordant Zinc-Lead Deposits, Central Yukon Territory; Geol. Surv. Can., Bull. 208.

__________________ (1976) Stratigraphic and Structural Studies in the Pelly Mountains, Yukon Territory; Geol. Surv. Can., Paper 76-1A, pp. 97 - 106.

Wheeler, J. O., Green, L. H., and Roddick, J. A. (1960a) Quiet Lake, Yukon Territory; Geol. Surv. Can., Map 7-1960.

__________________ (1960a) Finlayson Lake, Yukon Territory, Geol. Surv. Can., Map 8 - 1960.

APPENDIX 1

A REPORT

ON

A GRAVITY SURVEY

Rose Lake Area, Watson Lake M.D.

Yukon Territory

FOR

ANVIL MINING CORPORATION LIMITED

Faro, Yukon Territory

BY

PETER E. WALCOTT & ASSOCIATES LIMITED

Vancouver, British Columbia

MARCH 1974

TABLE OF CONTENTS

ACCOMPANYING MAPS - Scale 1" = 200'

INTRODUCTION

Between August 29th and September 16th, 1973, Peter E. Walcott & Associates Limited carried out a gravity survey over part of a property, located near Rose Lake, Yukon Territory, held by Anvil Mining Corporation Limited.

The survey was carried out over a "compass and chain" grid on lines 400 feet apart.

Measurements of relative gravity were made every 200 feet along the lines using a CG-2 gravity meter. In addition elevations at each of the gravity stations were obtained using a Wild T-1A theodolite and rod.

The data was then processed and presented in profile and contour form on Maps W-169-1 to 4 that accompany this report.

PROPERTY, LOCATION & ACCESS

The property, consisting of the MM claims is located in the Watson Lake Mining District of the Yukon Territory.

The claims are situated around the 5000 foot level on the west side of Seagull Creek some 18 miles south of the settlement of Ross River.

Access is obtained by helicopter from the Canol Road.

PURPOSE

The purpose of the survey was to try and locate the presence of any mineralized deposits by the gravimetric method, possible occurrences of which having been suggested by mineralized outcroppings on the property.

GEOLOGY

The reader is referred to a report by the staff of Anvil Mining Corporation Limited.

PREVIOUS WORK

Previous work on the property consisted of geological mapping and prospecting, geochemical surveying and magnetic surveying carried out by the staff of Anvil Mining Corporation Limited during the 1973 field season.

SURVEY SPECIFICATIONS

The gravity survey was carried out using a Scintrex CG-2 gravity meter, which measures variations in the earth's gravitational field to an accuracy of ± 0.01 milligals.

7 Base stations were established at suitable locations within the area to be surveyed. The closure on these was 0.015 milligals.

Values of observed gravity were then obtained every 200 feet along the lines. Corrections for meter drift were made by tying-in to these previously established base stations at intervals not exceeding 2 to 3 hours. Drifts of over 0.10 milligals per hour were not allowable.

Elevations of the gravity stations were determined by rod and transit (Wild T-1A theodolite) using the stadia method. Errors in the tying-in of loops were kept to a minimal, this being dependent on the severity of the topography but was less than 0.5 feet per loop.

The density to be used in applying corrections for differences in elevation was determined by calculating the Bouguer gravity for a line using various densities and determining the gravity profile and subsequently the density least reflecting the topography. A density of 2.55 gm/cc was then used in the computation.

Corrections were then applied to the observed gravity values for differences in elevation and latitude. Terrain corrections were calculated from the contoured elevation maps and supplementary field observations using a standard three circle template.

The final Bouguer gravity values were then plotted and contoured.

DISCUSSION OF RESULTS

The contoured Bouguer gravity (Map W-169-4) exhibited numerous highs and lows as was expected due to the severity of the topography and underlying rocks of different specific gravity, as evidenced by the large low occurring around the edge of the cliff.

Three reasonably strong Bouguer highs - Anomalies A, B & C respectively on Map W-169-4 - appeared to be roughly coincident with magnetic and geochemical anomalies and were considered worthy of further investigation, as it was thought that they could be indicative of sulphide occurrences.

Since then two of them - Anomalies A and C - have been investigated by borehole technique with positive results i.e. sulphides were encountered in the holes.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Between August 29th and September 16th, 1973, Peter E. Walcott & Associates Limited carried out a gravity survey over part of a property held by Anvil Mining Corporation Limited.

The property is located near Rose Lake, Yukon Territory.

The survey indicated the presence of three gravity anomalies roughly coincident with previously obtained magnetic and geochemical anomalies.

As a result the writer considered them worthy of further investigation.

He therefore recommended verbally at the time that the results be carefully studied in conjunction with those of previous work in particular with the geology and should they appear encouraging then they should be investigated by borehole techniques. (Since then two of them have been drilled with positive results).

Respectfully submitted,

PETER E. WALCOTT & ASSOCIATES LIMITED

Peter E. Walcott, P.Eng.
Geophysicist

Vancouver, B.C.
March 1974

APPENDIX

ANVIL MINING CORP. LTD.

ROSE LAKE PROPERTY, ROSS RIVER AREA, Y.T.

GRAVITY SURVEY

PROFILES OF BOUGUER GRAVITY & SURFACE ELEVATIONS

SCALE: 1 INCH = 200 FEET

MAP NO. W-169-1
TO ACCOMPANY A REPORT BY-
PETER E. WALCOTT P.Eng., DATED MARCH-74

PETER E. WALCOTT & ASSOC. LTD.

ALTAIR drafting

ANVIL MINING CORP. LTD.

ROSE LAKE PROPERTY, ROSS RIVER AREA, Y.T.

GRAVITY SURVEY

PROFILES OF BOUGUER GRAVITY
(INNER CIRCLE CORRECTED)

SCALE: 1 INCH = 200 FEET

200 100 0 200 400 600

MAP NO. W-169-2
TO ACCOMPANY A REPORT BY
PETER E. WALCOTT P. Eng., DATED MARCH-74

PETER E. WALCOTT & ASSOC. LTD.

ALTAIR drafting

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.

ANVIL MINING CORP. LTD.

ROSE LAKE PROPERTY, ROSS RIVER AREA, Y.T.

GRAVITY SURVEY

CONTOURS OF SURFACE ELEVATIONS
(FEET)

SCALE: 1 INCH = 200 FEET

200 100 0 200 400 600

MAP NO. W-169-3
TO ACCOMPANY A REPORT BY
PETER E. WALCOTT P. Eng., DATED MARCH-74

PETER E. WALCOTT & ASSOC. LTD.

ALTAIR drafting

N.B. 400.00 MILLIGALS TO BE ADDED TO ALL READINGS.

inches
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.

ANVIL MINING CORP. LTD.

ROSE LAKE PROPERTY, ROSS RIVER AREA, Y.T.

GRAVITY SURVEY

CONTOURS OF BOUGUER GRAVITY
(MILLI-GALS)

SCALE: 1 INCH = 200 FEET

200 100 0 200 400 600

MAP NO. W-169-4
TO ACCOMPANY A REPORT BY
PETER E. WALCOTT P. Eng., DATED MARCH-74

PETER E. WALCOTT & ASSOC. LTD.

ALTAIR drafting

APPENDIX 2

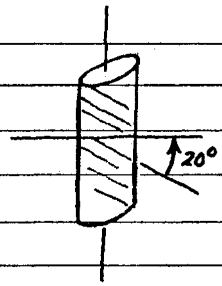
Diamond Drill Record

COLLAR:		HOLE SURVEY		
		FOOTAGE	AZIMUTH	DIP
NORTH				-90°
EAST				
ELEVATION	5700'	Hole not surveyed		
LOGGED BY	D. S. Jennings			
DATE LOGGED	Sept. 6, 1974			
MAP REFERENCE NO.		METHOD:		

COMPANY NAME Cyprus Anvil Mining Corporation
PROPERTY NAME MM
DRILLING CONTRACTOR Arctic Diamond Drilling
ASSAYER No core submitted for assay
PURPOSE OF HOLE Test 1973 gravity anomaly

HOLE NO. DDH MM 74-1
CLAIM NAME MM 7
COMMENCED Sept. 2, 1974
FINISHED Sept. 6, 1974
PROJECT NO. 460

FROM	TO	RECOVY	DESCRIPTION	SAMPLE FROM	SAMPLE TO	SAMPLE WIDTH	SAMPLE NO.	ASSAYS			
0	6		Overburden								
6	309		Slightly calcarcous carbonaceous quartzite								
			S_1 foln. 25° @ 17'								
			30° @ 72'								
			Fold Hinges 15° @ 117'								
			234' 25° @ 147'								
			257' 25° @ 187'								
			65° @ 217'								
			30° @ 256'								
			25° @ 279'								
309	309.5		Pyritic black graphitic marble band. S_1 foliation 25° @ 309.5								
309.5	324		Slightly clacareous graphitic quartzite w/occasional marble bands								
			1/2" to 6" thick								
324	334		Well foliated (S_2) calc-silicate schist w/marble bands up to 1". S_2								
			@ 329' = 30°. Diss. po stringer @ 328.5'								
334	339		Graph. calc-silicate schist minor diss. po $<$ 1%; S_2 @ 20° @ 335'								
339	343		Calc-silicate schist; diss. po throughout up to $\approx$ 2-5% po. 4"								
			sample taken @ 342'								
343	349		Silicated marble with minor po & po + py stringers and blebs w/up								
			to 5% total sulfides over one 6" interval (344.5-345)								



Diamond Drill Record

COLLAR:
NORTH
EAST
ELEVATION
LOGGED BY
DATE LOGGED
MAP REFERENCE NO.

HOLE SURVEY: FOOTAGE | AZIMUTH | DIP
METHOD:

COMPANY NAME
PROPERTY NAME
DRILLING CONTRACTOR
ASSAYER
PURPOSE OF HOLE

HOLE NO. DDH MM 74-1
CLAIM NAME
COMMENCED
FINISHED
PROJECT NO.

FROM	TO	RECOVY	DESCRIPTION
349	407		Calc-silicate schist w/minor marble bands up to 1": 1-3% diss. po
			throughout. $S_1 \approx S_2$ 20° @ 387'
407	408.5		Graphitic calc-silicate schist w/no diss. po
408.5	410		Calc-silicate schist w/1-3% diss. po throughout
410	417.5		Calc-silicate schist w/no diss. po. $S_1 \approx S_2$ = 20° @ 417
417.5	419		Marble bands in CS schist w/1 4" thick band of 25-30% po @ 418' & 1
			3" thick band 20-30% diss. po @ 418.5. No ZnS/PbS noted
419	423		Calc-silicate schist w/ $\angle$ 1% diss. po; no PbS/ZnS
423	453		Non calcareous, chlor-graph schist w/siliceous bands and no diss. po
			or other sulfides. One 3" band of normal CS schist w/1-3% diss. po
			@ 447'. $S_1 \approx S_2$ = 15° @ 447'
453	459		Calc-silicate schist w/ $\angle$ 1% diss./blebby po
459	470		Non-calc., chlor-graph schist w/no diss. po or other sulfides
470	484		Calc-silicate schist w/ < 1% diss. po. $S_2 \approx S_1$ = 25° @ 475'
484	494		Non-calc., chlor-graph schist w/no diss. po
494	569.5		Calc-silicate schist w/1%-3% diss. po. $S_2 \approx S_1$ = 0° @ 517'
			$\approx$ 40% po 566-567'
			$S_2 \approx S_1$ = 30° @ 569'
569.5	597		Felsic, finely xlline chlor schist w/1-5% total sulfides (py + po) as
			diss. blebs. Few 1 foot sections up to 10% total sulfides.
			EOH - 597

Diamond Drill Record

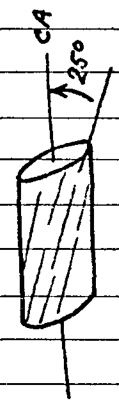
COLLAR:
NORTH
EAST
ELEVATION 6200'
LOGGED BY D. S. Jennings
DATE LOGGED Oct. 10, 1974
MAP REFERENCE NO.

HOLE SURVEY		
FOOTAGE	AZIMUTH	DIP
	33°	-50°
Hole to be Surveyed in 1975		
METHOD:		

COMPANY NAME Cyprus Anvil Mining Corporation
PROPERTY NAME MM
DRILLING CONTRACTOR Arctic Diamond Drilling
ASSAYER Cyprus Anvil Assay Lab
PURPOSE OF HOLE Test showings #1 & #2 in main MM cirque

HOLE NO. DDH MM 74-2
CLAIM NAME MM 10
COMMENCED Sept. 10, 1974
FINISHED Oct. 10, 1974
PROJECT NO. 460

FROM	TO	RECOVY	DESCRIPTION	SAMPLE FROM	SAMPLE TO	SAMPLE WIDTH	SAMPLE NO.	ASSAYS
0	2		Dol. marble; rubbly ≈ 20% recovery					
2	4		Med. gray dol. marble as above ≈ 80% recovery					
4	22		As above, no structural features					
22	57		Mottled med. & lt. gray dolomite					
57	80		Lt. gray, massive, unmottled featureless dolomite					
80	130		As 22-57 $S_1 \approx S_2 = 25^\circ$ @ 87'					
130	156		As 57-80; ankerite xls. 147-150					
156	156.7		Dk. gray med. xlline dolomite					
156.7	159		Lt. gray mottled dol. $S_1 \approx S_2 = 40^\circ$ @ 159'					
159	162		As 57-80					
162	167		Lt. gray mottled dol. at 156.7-159'					
167	170		Lt. gray featureless, unmottled dol.					
170	175		Off-white med. xlline calcitic marble. $S_1 = 70^\circ$ @ 175'					
175	221		Med. gray, med. xlline calcitic marble w/unident xls. Sample					
			taken @ 181.5'. 1" chartreuse talc filled shear @ 202'					
221	262		Med. gray finely xlline dol. w/occasional ankerite xls.					
			$S_2 = 25^\circ$ @ 232'					
262	292		Lt. gray mottled, fg. dol. No good foln.					
292	296		Med. & lt. gray dol. fossil "chowder." Prob. brachiopod fragmentals					
296	299		Med. gray mottled dol.					



Diamond Drill Record

COLLAR:	HOLE SURVEY		
	FOOTAGE	AZIMUTH	DIP
NORTH			
EAST			
ELEVATION			
LOGGED BY			
DATE LOGGED			
MAP REFERENCE NO.	METHOD:		

COMPANY NAME
PROPERTY NAME
DRILLING CONTRACTOR
ASSAYER
PURPOSE OF HOLE

HOLE NO. DDH MM 74-2
CLAIM NAME
COMMENCED
FINISHED
PROJECT NO.

FROM	TO	RECOVY	DESCRIPTION	SAMPLE FROM	SAMPLE TO	SAMPLE WIDTH	SAMPLE NO.	ASSAYS						
299	304.5		Med. & lt. gray dol. "chowder"											
304.5	321.5		Alternating lt. calcite & dk. mottled dolomitic bands w/minor											
			"chowder" and intraformational bxia.											
321.5	353		Mottled med. & lt. gray dol.											
353	360.5		Dk. gray fine & med. xlline calcitic marble. Prominant 6" bxia @											
			355'											
360.5	372.5		Finely xlline. lt-med gray, slightly calc., graphitic qtzite. S_1 =											
			40^o @ 362'											
372.5	375		Siliceous bio-chlor. schist											
375	377.5		Finely xlline, non graph. qtzite											
377.5	385		Finely xlline well foliated feldspathic bio-chlor. schist											
385	394.5		Graphitic feldspathic schist. S_1 50^o @ 386'											
394.5	406		Very lt. gray silicated dolomitic finely xlline marble											
406	408		Graphitic schist											
408	415	100%	Off-white, finely xlline silicated dolomitic marble w/diss. py +											
			siderite ≈ 10% total sulfs. from 412-413. Py only. No PbS/ZnS.											
415	435		Siliceous graphitic schist (≈ 60% graphite). S_1 and S_2 sub ll in											
			places											
435	437	100%	Silicated finely xlline dol. marble. ¼" ZnS(?) band @ 436.5'. All											
			dol. marble should be assayed.											

Diamond Drill Record

COLLAR:	HOLE SURVEY		
	FOOTAGE	AZIMUTH	DIP
NORTH			
EAST			
ELEVATION			
LOGGED BY			
DATE LOGGED			
MAP REFERENCE NO.	METHOD:		

COMPANY NAME
PROPERTY NAME
DRILLING CONTRACTOR
ASSAYER
PURPOSE OF HOLE

HOLE NO. DDH MM 74-2
CLAIM NAME
COMMENCED
FINISHED
PROJECT NO.

FROM	TO	RECOVY	DESCRIPTION	SAMPLE FROM	SAMPLE TO	SAMPLE WIDTH	SAMPLE NO.	ASSAYS							
437	441		Siliceous graph. schist. $S_1 \approx S_2 = 45^{\circ}$ @ 437'												
441	443		White chlor. mottled qtze-feldspathic schist. Possible metam. dike												
443	446		Slightly graphitic QFBC schist Q = quartz C = chlorite F = feldspar M = muscovite												
446	457		Siliceous graph. schist B = biotite												
457	462		Well foliated, csely xlline QFBCM schist. $S_1 = 0$ @ 458' in F_2(?)												
			fold nose. $S_1 \approx 50^{\circ}$ @ 462'												
462	484		Siliceous graph. schist												
484	492		QFBC schist												
492	495		Graphitic QFBC schist												
495	506		QFBC schist w/bull qtz. veinlets & pods. $S_1 = S_2 = 50^{\circ}$ @ 500'												
506	538		Garnetiferous QFBC schist. $S_1 = S_2 = 45^{\circ}$ @ 527'												
538	558		QFBC schist becoming more bio-rich and more finely xlline down hole												
			changing to BC granulite (textural sense)												
558	562	100%	Graphitic schist w/5-10% po + minor py as blebs and stringers $\approx //$												
			S_1 & S_2. Visible ZnS @ 561'. Entire interval should be assayed.												
562	654	99.4%	Finely xlline QFBG Gar granulite. $S_1 \approx S_2 = 60^{\circ}$ @ 576'. Unit has												
			some x cutting po + py stringers.												
			622-647 Strongly pyritic section w/¼" py bands // S_1; assay section												
654	682		Strongly banded gar QFBC schist. $S_1 = S_2 = 70^{\circ}$ @ 677'												

Diamond Drill Record

COLLAR:	
NORTH	
EAST	
ELEVATION	
LOGGED BY	
DATE LOGGED	
MAP REFERENCE NO.	

HOLE SURVEY		
FOOTAGE	AZIMUTH	DIP
METHOD:		

COMPANY NAME

PROPERTY NAME

DRILLING CONTRACTOR

ASSAYER

PURPOSE OF HOLE

HOLE NO. DDH MM 74-2

CLAIM NAME

COMMENCED

FINISHED

PROJECT NO.

FROM	TO	RECOVY	DESCRIPTION	SAMPLE FROM	SAMPLE TO	SAMPLE WIDTH	SAMPLE NO.	ASSAYS						
682	788		Finely banded, finely xline BC gran. (not QF) $S_1 = S_2 = 20^\circ$ @ 707'											
788	816	98.5%	Closely banded, coarsely xlline QFBC schist w/po-py-ZnS bands											
			Strong ZnS 814.5 - 814.9											
816	819	100%	Finely banded, finely xlline QFBC gran (very siliceous) w/$\approx$ 50%											
			total sulfides. py $\gg$ po $\gg$ ZnS > PbS All 3 visible. May run											
			5% combined Pb + Zn											
819	836	100%	V. finely xlline qtz-musc. chlor. schist w/1/16" bands and blebs of											
			po + py w/ > 1% total sulfides											
836	855	100%	As above w/ $\approx$ 10% total sulfides. 836.5-837.5 $\approx$ 60% total sulfides											
			w/po $\gg$ py > ZnS 840.5-841 = mass. sulfs. w/po $\gg$ py > ZnS											
855	866	100%	As above w/ $\approx$ 30% total sulfides. $S_1 = S_2 = 55^\circ$ @ 855'. $BaSO_4$											
			comes in @ 861'. 861-866 = 60%-70% total sulfs.											
866	947		Coarsely xlline qtz. musc. chlor. schist $\ll$ 1% py. $S_1 \approx S_2 = 30^\circ$ @											
			880'. Occasional ¼" py bands 889-891; 901-902											
947	948.5		Graphitic qtz-musc schist $S_1 = 0^\circ$ in nose of F_2 fold											
948.5	951		Q-M-C schist < 1% py											
951	961		QMC schist 1-5% py 952.5-954 $\approx$ 5% py. No other sulfides											
961	1024		Banded bio-chlor-Q-F schists $S_1 = S_2 = 25^\circ$ @ 971'											
			1011-1011.5 = 6" graphitic BCQF schist w/5% po. No ZnS/PbS											

Diamond Drill Record

COLLAR:	
NORTH	
EAST	
ELEVATION	
LOGGED BY	
DATE LOGGED	
MAP REFERENCE NO.	

HOLE SURVEY

FOOTAGE	AZIMUTH	DIP

METHOD:

COMPANY NAME
PROPERTY NAME
DRILLING CONTRACTOR
ASSAYER
PURPOSE OF HOLE

HOLE NO. DDH MM 74-2
CLAIM NAME
COMMENCED
FINISHED
PROJECT NO.

FROM	TO	RECOVY	DESCRIPTION	SAMPLE FROM	SAMPLE TO	SAMPLE WIDTH	SAMPLE NO.	ASSAYS						
1024	1026		Mod. chloritic QFCB schist. $S_1 \approx S_2 = 30^\circ$ @ 1025'											
1026	1026.5		Chloritic fault gouge											
			<u>Fault</u>											
1026.5	1046		V. finely xlline lt. gray chloritic qtzite w/1-5% total sulfides											
			py$\gg$po											
			1031-1036: 5-10% total sulfides w/2-1" bands to 70% total sulfides											
			py$\gg$po. Band @ 1034 has sm. amt. $<$ 1% ZnS											
1046	1065		Qtzite grades into fine xlline finely banded QFCB schist. $S_1 \approx S_2$ =											
			60° @ 1061'											
1065	1070		Graphitic schist											
1070	1100		Strongly banded finely xlline BCQF schist. $S_1 = S_2 = 50^\circ$ @ 1086'											
1100	1107		V. finely xlline siliceous bio-chlor granulite											
1107	1139		Banded finely xlline BCQF gran w/prominent chlor clots											
1139	1193		Finely xlline siliceous BC granulite. $S_1 \approx S_2 = 45^\circ$ @ 1139'											
			3" band 20% total sulfides po$>$py @ 1163.5											
1193	1325		Banded finely xlline BC schist w/no visible sulfides. $S_1 \approx S_2$ =											
			45° @ 1211'. 1-2% po from 1220-1221'. 6" fault gouge 1239-1239.5'											
			$S_1 \approx S_2$ = 50% @ 1246. $S_1 \approx S_2 = 70^\circ$ @ 1295. 1305-1306 $\approx$2%-5% py											
			in F_2 hinges. Numerous act+qtz+CO_3 bands (dk. green) Often show											
			minor py blebs.											

Diamond Drill Record

COLLAR:	
NORTH	
EAST	
ELEVATION	
LOGGED BY	
DATE LOGGED	
MAP REFERENCE NO.	

HOLE SURVEY		
FOOTAGE	AZIMUTH	DIP
METHOD:		

COMPANY NAME
PROPERTY NAME
DRILLING CONTRACTOR
ASSAYER
PURPOSE OF HOLE

HOLE NO. DDH MM 74-2
CLAIM NAME
COMMENCED
FINISHED
PROJECT NO.

FROM	TO	RECOVY	DESCRIPTION	SAMPLE FROM	SAMPLE TO	SAMPLE WIDTH	SAMPLE NO.	ASSAYS							
1325	1328.5		Banded BC schist w/20-30% py in ep. rich band of schist unit. No												
			PbS/ZnS												
1328.5	1337.5		Finely xlline, banded BC schist w/1-2% diss. po as blebs and												
			stringers												
1337.5	1340.5		Finely xlline only slightly banded gray qtzite 1-5% total sulfides												
			py>> po												
1340.5	1342		As 1328.5-1337.5												
1342	1344		As 1337.5 - 1340.5												
1344	1377.5		Finely xlline siliceous bio. gran. to BC schist w/1-2% po blebs and												
			stringers												
			1348-1348.7 30-40% total sulfs. po>>> py												
			Core broken and blocky from 1346-1370 $S_1 \approx S_2 = 60^\circ$ @ 1367												
1377.5	1383.5		Finely xlline, lt. gray, slightly calc. qtzite w/< 1% total												
			sulfides largely py. 1" po>> py band mass sulf. @ 1380.5												
1383.5	1413		Moderately to strongly comp. banded, finely xlline BC schist												
			6" prominant Q-C-Py-Po bxia vein (< 2% total sulfs.) centered @												
			1394.75, 1396.75, 1402. 2" such vein @ 1410.5. $S_1 \approx S_2 = 55^\circ$												
			@ 1408'												

APPENDIX 3

CYPRUS ANVIL MINING CORPORATION

A.F.E. 76-2500
(Exploration)

TITLE: MM Project and Related Reconnaissance

ESTIMATED COST:

Account Number		MM Claims Group	Related Reconn.	Proposed A.F.E.
01	Salaries and Wages	$ 9,500	$ 23,400	$ 32,900
02	Staking Costs	-	10,000	10,000
08	Drilling	39,600	-	39,600
11	Analyses/Geochem.	500	12,250	12,750
12	Field Equipment	-	2,000	2,000
13	Camp Costs	-	8,000	8,000
14	Fuel	1,000	-	1,000
15	Rotary Wing	26,600	46,250	72,850
17	Miscellaneous Transportation	2,100	4,400	6,500
33	Property Maintenance	3,500	-	3,500
41	District Expense	1,000	1,000	2,000
44	Overhead	8,400	4,300	12,700
	TOTAL	$ 92,200	$111,600	$203,800

PROJECT DESCRIPTION:

The MM and contiguous JJ claim groups are located in the core of Pelly Mountains on N.T.S. mapsheet 105-F-7 at approximate co-ordinates of 61°27' lat., 132°40' long. (Figure 1). The property, comprising 76 MM and 81 JJ mineral claims in good standing until 10 October, 1980, lies 36 miles south of Ross River and 14 miles east of the South Canol Road and has been the subject of geological, geochemical, geophysical and drilling programs during 1973 and 1974. Expenditures to date on the MM/JJ claim block total $181,037.00.

Massive, strataform, stratabound, pyrrhotitic base metal (Cu, Pb, Zn, Ag) deposits occur with disseminated to massive barite deposits in pyritic quartzites intercalated within polymetamorphic, polydeformed intermediate to acidic volcanic and volcaniclastic rocks of presumed Mississippian age. Three showings of massive sulfides have been mapped and surface sampled on the property. One band has been drill tested yielding the following results:

DDH MM 74-2	836-866' (30')	4.24% Pb+Zn
	852-866' (14')	6.40% Pb+Zn
	857-866' (9')	8.41% Pb+Zn

Copper and silver values were insignificant. The remaining two showings lie within the same baritic quartzite unit about 2,000' apart and constitute the principal drilling targets for the proposed 1976 program. This quartzite unit can be traced in discontinuous outcrop for 4,000'. A ground defined, federal, aeromagnetic anomaly toward the eastern end of the property in the same stratigraphic position as the known sulfides also remains to be evaluated.

Recent work by officers of the Geological Survey of Canada confirms earlier suggestions by Cyprus Anvil personnel that the mineralized

CYPRUS ANVIL MINING CORPORATION

A.F.E. 76-2500
(Exploration)

TITLE: MM Project and Related Reconnaissance

ESTIMATED COST:

Account Number		MM Claims Group	Related Reconn.	Proposed A.F.E.
01	Salaries and Wages	$ 9,500	$ 23,400	$ 32,900
02	Staking Costs		10,000	10,000
08	Drilling	39,600		39,600
11	Analyses/Geochem.	500	12,250	12,750
12	Field Equipment		2,000	2,000
13	Camp Costs		8,000	8,000
14	Fuel	1,000		1,000
15	Rotary Wing	26,600	46,250	72,850
17	Miscellaneous Transportation	2,100	4,400	6,500
33	Property Maintenance	3,500		3,500
41	District Expense	1,000	1,000	2,000
60	Recoveries	92,200	47,200	139,400
	TOTAL	$ (8,400)	$ 60,100	$ 51,700

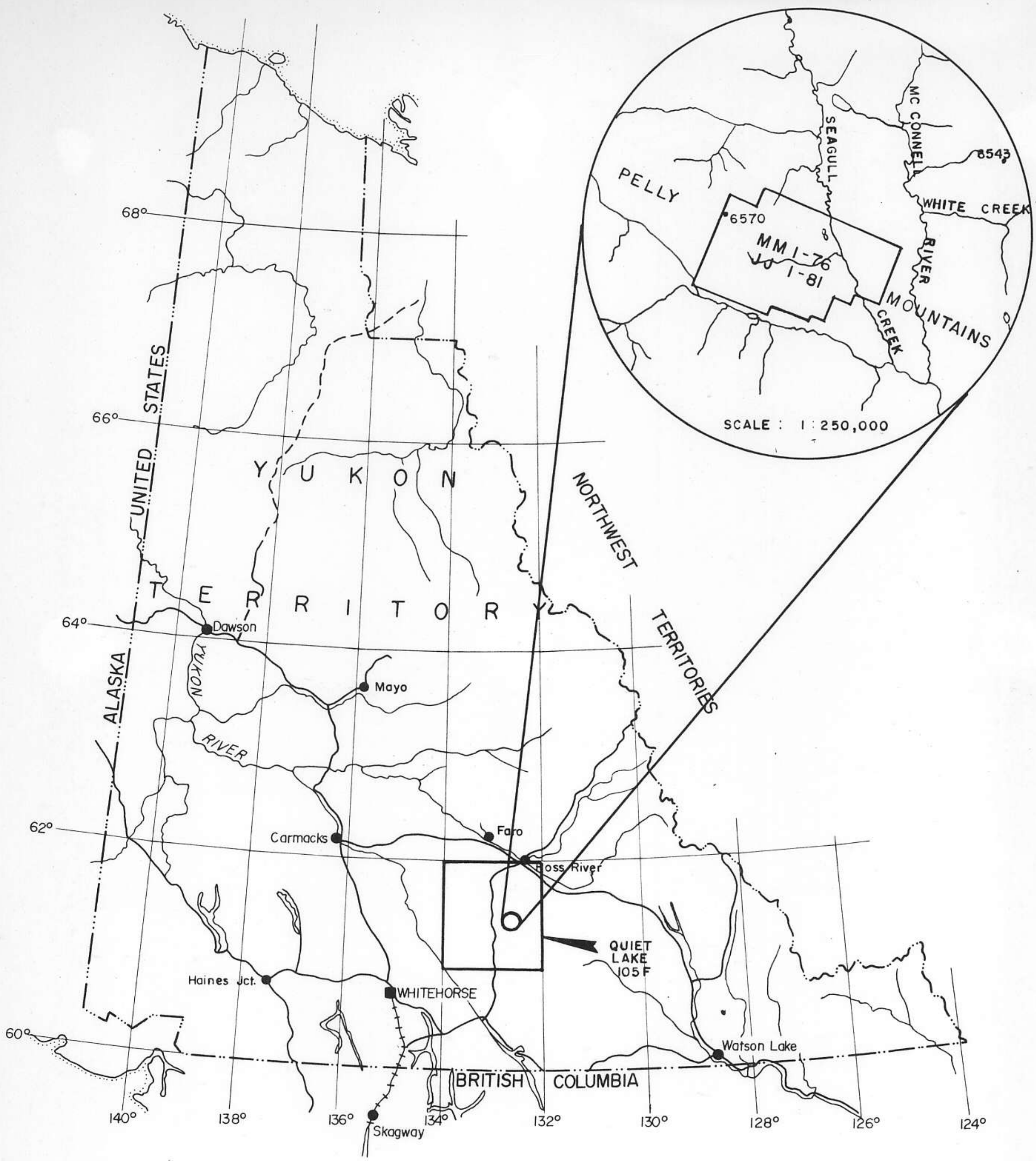
PROJECT DESCRIPTION: The MM and contiguous JJ claim groups are located in the core of Pelly Mountains on N.T.S. mapsheet 105-F-7 at approximate co-ordinates of 61°27' lat., 132°40' long. (Figure 1). The property, comprising 76 MM and 81 JJ mineral claims in good standing until 10 October, 1980, lies 36 miles south of Ross River and 14 miles east of the South Canol Road and has been the subject of geological, geochemical, geophysical and drilling programs during 1973 and 1974. Expenditures to date on the MM/JJ claim block total $181,037.00.

Massive, strataform, stratabound, pyrrhotitic base metal (Cu, Pb, Zn, Ag) deposits occur with disseminated to massive barite deposits in pyritic quartzites intercalated within polymetamorphic, polydeformed intermediate to acidic volcanic and volcaniclastic rocks of presumed Mississippian age. Three showings of massive sulfides have been mapped and surface sampled on the property. One band has been drill tested yielding the following results:

DDH MM 74-2	836-866'	(30')	4.24% Pb+Zn
	852-866'	(14')	6.40% Pb+Zn
	857-866'	(9')	8.41% Pb+Zn

Copper and silver values were insignificant. The remaining two showings lie within the same baritic quartzite unit about 2,000' apart and constitute the principal drilling targets for the proposed 1976 program. This quartzite unit can be traced in discontinuous outcrop for 4,000'. A ground defined, federal, aeromagnetic anomaly toward the eastern end of the property in the same stratigraphic position as the known sulfides also remains to be evaluated.

Recent work by officers of the Geological Survey of Canada confirms earlier suggestions by Cyprus Anvil personnel that the mineralized



CYPRUS ANVIL MINING CORPORATION

MM PROJECT

PROPERTY LOCATION MAP

YUKON

SCALE : 1" = 100 MILES

Figure: 1

horizon on the MM is of probable Mississippian age and correlative to a Mississippian volcanic terrain (660 mi.^{2}) northeast of the property (Figure 2). A regional geochemical and geological reconnaissance project is proposed to evaluate the massive sulfide deposit potential of this terrain.

PROPOSED WORK: A modest diamond drilling program (1,100' definite, 1,500' contingency) is proposed to test the remaining two massive sulfide showings and the above-mentioned magnetic anomaly on the MM/JJ claims during July and August, 1976. Evaluation of the showings would be accomplished with at least three horizontal or inclined holes totalling 1,100'. The remaining 1,500' of drilling is apportioned to contingency testing of the 4,000' long baritic quartzite, host to the main showings, and to the magnetic response. Detailed geologic mapping of the eastern end of the claim group will also be completed. All mobilization and transportation to the property is by helicopter from the South Canol Road or from the terminus of a tote road at the head of Upper Sheep Creek (Figure 2). A budget of $92,200 is proposed for this part of the program.

Regional geochemical reconnaissance of the 660 mi.^{2} Mississippian volcanic terrain will be effected by a 4-man, helicopter supported, silt and contour soil sampling program based in Ross River during July and August. Rapid analytical turnaround from facilities in Ross River will allow almost instantaneous identification of anomalous areas which will be geologically evaluated and staked, if warranted.

Regional structural/stratigraphic mapping of the Mississippian pile in the 660 mi.^{2} terrain will be completed by a helicopter supported fly camp approach concomitant with the regional geochemical survey. This mapping program would concentrate on staked properties with an overview to future on-going programs, if any, as well as establishing a regional framework for evaluation of the geochemical data and all previously known and newly defined sulfide deposits. A total of $111,600 has been allotted to the regional programs with approximately $81,600 for the geochemical survey and the remaining $30,000 for geological mapping.

JUSTIFICATION: The proposed program on the MM claim group is a completion of the 1974 program designed to evaluate known massive sulfide occurrences on the property. Since the present level of testing is insufficient to critically evaluate the economic potential of the deposits, it seems justifiable to complete the proposed, minimal drilling program in light of the fact that massive sulfide deposits belong to perhaps the most economically viable class of mineral deposits.

Completion of the proposed regional project appears justifiable in terms of probable competition in the area, massive sulfide targets and our relatively advanced technical position in the search for massive sulfides

... 3

in this terrain afforded by our understanding of the MM occurrence.

PREPARED AND SUBMITTED BY:

Date

APPROVED BY:

Date

Date

GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF MINES AND TECHNICAL SURVEYS

PRELIMINARY SERIES

SHEET 105F PRELIMINARY SERIES

GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF MINES AND TECHNICAL SURVEYS

SHEET 105G

LEGEND

Map-units 6d, 3a, appear on Map 8-1960 "Finlayson Lake" only

CENOZOIC

QUATERNARY

- **12** Unconsolidated glacial and alluvial deposits

TERTIARY

- **11** Dark brown and black basalt flows

PALEOCENE

- **10** Shale, sandstone, and conglomerate

MESOZOIC

JURASSIC AND/OR CRETACEOUS

- **9** Medium- to coarse-grained, biotite granodiorite and quartz monzonite, in part porphyritic, minor diorite, granite, and gneiss

PALAEOZOIC

MISSISSIPPIAN (?)

- **8** Current-bedded, ripple-marked, dark grey limestone, minor dark grey and brown argillite, and dolomite

MISSISSIPPIAN (?) OR EARLIER

- **7** Heterogeneous, shattered hornblende syenite, associated with unit 6
- **6** 6a, partly altered green volcanic rocks, greenstone; meta-diorite; minor serpentine and amphibolite, 6b, green and maroon breccias, tuffs, and flows; minor meta-diorite, slate, chert, and greywacke, 6c, buff, rusty, and pale green felsic breccias and tuffs; minor chert and brown crinoidal limestone, 6d, massive grey and cream limestone
- **5** Brown and black-weathering, siliceous slate and shale, thin-bedded varicoloured cherts with shaly partings, speckled grey and brownish grey greywacke; minor chert pebble conglomerate

SILURIAN AND DEVONIAN

- **4** Grey and buff-weathering, thick-bedded dolomite with local lenses of chert; buff to reddish weathering, well-bedded, dark grey dolomite, and sandy and silty dolomites; buff, grey and white, lichen-covered quartzite

ORDOVICIAN AND SILURIAN

- **3** Black slate, platy black limestone, grey and pink siltstone; 3a, minor volcanic breccia

CAMBRIAN

MIDDLE AND UPPER CAMBRIAN (?)

- **2** Lustrous phyllite; grey and orange-weathering phyllite in part limy and dolomitic, and locally changed to hornfels; minor greenstone, limestone, chert, greywacke, and phyllitic quartzite (perhaps younger), 2a, greenstone breccia and tuff

LOWER CAMBRIAN

- **1** 1a, massive grey and buff quartzite; 1b, grey and brownish grey phyllite; 1c, grey, buff, and orange-weathering, grey limestone, locally oolitic, 1d, limestone, quartzite, and phyllite, undivided

---

- **A** Quartz-biotite and quartz-chlorite schist, micaceous quartzite, hornfels; minor phyllite and limestone
- **B** Limestone and minor dolomite associated with A and C
- **C** Micaceous, quartzose gneiss, granitoid gneiss, minor quartz-biotite schist
- **D** Dunite; minor peridotite, pyroxenite, and serpentinized equivalents; gabbro and diorite

Geological boundary (defined, approximate or assumed)
Limit of geological mapping, unmapped area . . . U
Bedding (horizontal, inclined, vertical, overturned)
Bedding (dip known, tops unknown)
Bedding (estimated attitudes, includes foliation in metamorphic rocks; dip g, gentle, m, medium, s, steep)
Foliation (horizontal, inclined, vertical)
Fault (defined, approximate or assumed)
Thrust fault (defined, approximate or assumed)
Anticline (defined, approximate)
Syncline (defined, approximate)
Fossil locality
Mineral occurrence or prospect . . . × Mo
Rock altered to hornfels

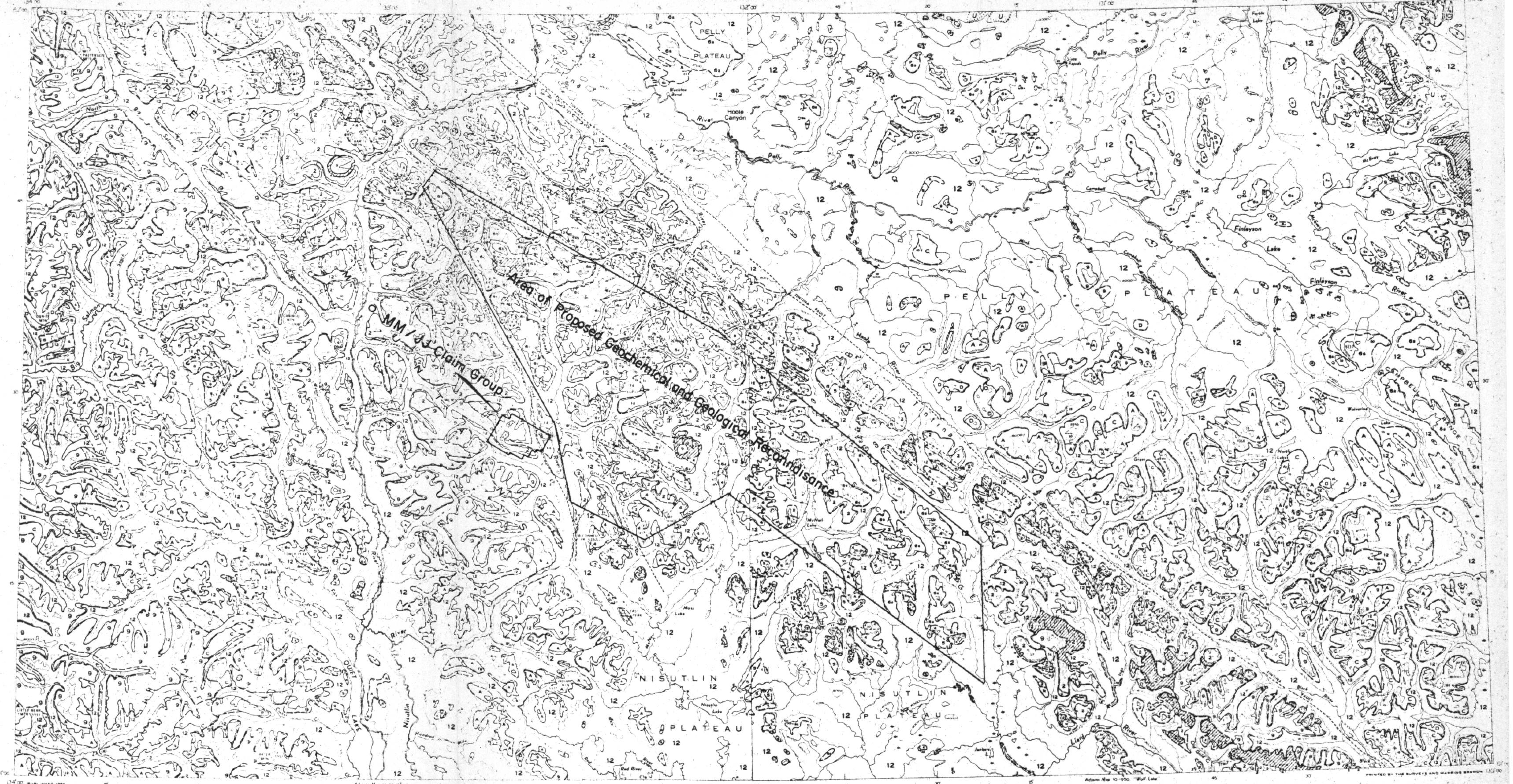
MINERAL SYMBOLS

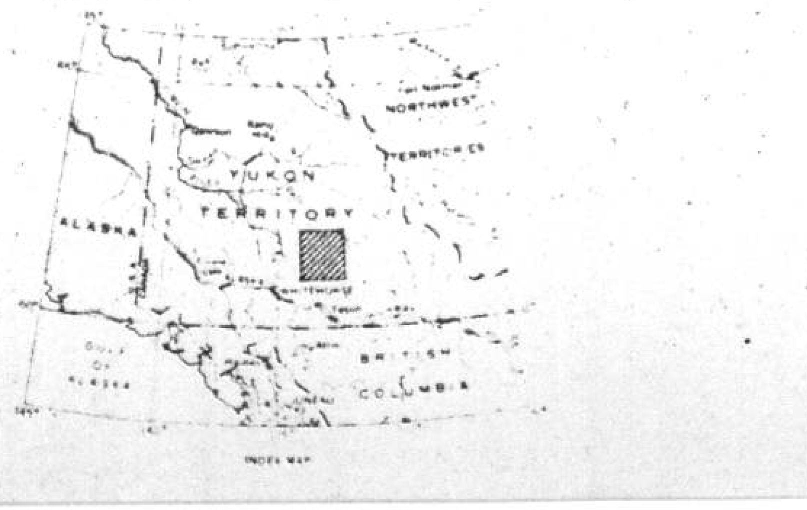
Asbestos	asb	Lead	Pb
Barite	ba	Molybdenum	Mo
Copper	Cu	Silver	Ag
Gold	Au	Tungsten	W

Geology by J.O. Wheeler, 1956, 1958, 1959; L.H. Green, 1959, and J.A. Roddick, 1959

Air photographs covering this area may be obtained through the National Air Photographic Library, Topographical Survey, Ottawa

In response to public demand for earlier publication, Preliminary Series maps are issued in this simplified form and will be clearer to read if all or some of the map-units are hand-coloured





MAP 7-1960
GEOLOGY
QUIET LAKE
YUKON TERRITORY

Scale: One Inch to Four Miles = $\frac{1}{253,440}$
Miles
4 2 0 4 8 12

COPIES OF THIS MAP MAY BE OBTAINED FROM THE DIRECTOR GEOLOGICAL SURVEY OF CANADA OTTAWA

LEGEND

Road
Trail
Intermittent stream
Contours (interval 1000 feet)
Height in feet above mean sea-level . . . 7886

Cartography by the Geological Survey of Canada, 1960

Approximate magnetic declination, 33° 20' East

Geographical names subject to revision

inches
0 1
0 1 2
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.

MAP 8-1960
GEOLOGY
FINLAYSON LAKE
YUKON TERRITORY

Scale: One Inch to Four Miles = $\frac{1}{253,440}$
Miles
4 2 0 4 8 12

COPIES OF THIS MAP MAY BE OBTAINED FROM THE DIRECTOR GEOLOGICAL SURVEY OF CANADA OTTAWA

LEGEND

Intermittent stream
Marsh
Contours (interval 1000 feet)
Height in feet above mean sea-level . . . 7184

Cartography by the Geological Survey of Canada, 1960

Approximate magnetic declination, 33° 54' East

Geographical names subject to revision

Figure: 2