

GEOLOGICAL REPORT ON THE MM CLAIM GROUP

008763

Watson Lake Mining District

Yukon Territory

N.T.S. 105 F - 7

Latitude: 61° 27' N

Longitude: 132° 40' W

By

J. Mortensen

CYPRUS ANVIL MINING CORPORATION

January 2, 1979

Field Work Done During the Period: July 2 - July 20, 1978.

LIST OF CLAIMS

<u>Claims</u>	<u>Grant Nos.</u>	<u>Expiry Date</u>
MM 1 - 49	Y73864 - Y73912	October 10, 1985
MM 50 - 76	Y73975 - Y74001	October 10, 1985
JJ 1 - 37	Y74337 - Y74373	October 10, 1985
JJ 38	Y74374	October 12, 1981
JJ 39 - 53	Y74375 - Y74389	October 10, 1985
JJ 54 - 61	Y74390 - Y74397	October 10, 1981
JJ 62 - 69	Y74398 - Y74405	October 10, 1985
JJ 70 - 81	Y74406 - Y74417	October 10, 1981
DD 1 - 32	YA 625 - YA 656	August 24, 1983

GEOLOGICAL REPORT ON THE MM CLAIM GROUP

INTRODUCTION

The MM and adjoining JJ and DD claim groups, comprising 76 MM, 81 JJ and 32 DD mineral claims in good standing until 1985, are located approximately 58km (37 miles) due south of Ross River, at $61^{\circ} 27' N$ and $132^{\circ} 40' W$ (Map 1). Access is by helicopter from Ross River, or from the South Canal Road, roughly 22km (13 miles) west of the property.

The MM and JJ claims were originally staked in 1973 by Anvil Mining Corporation to cover several stratiform Zn-Pb-Ba showings. The DD claim group was tied on to the northeast in 1976 to cover an area of anomalous geochemical values, and to protect possible extensions of the mineralized horizon exposed on the MM. Field work carried out during the 1973, 1974, 1976, and 1977 field seasons included extensive geochemical surveys, ground geophysics, geological mapping, and a total of 4,178m (13,708 ft.) of diamond drilling. The results of this work have been discussed previously (Mortensen, 1978) and will only be mentioned as they apply to this report. During the 1978 field season, a total of 20 days were spent on the property, extending the area of detailed mapping to include the DD claim group. The specific purpose of this mapping was to gain a better understanding of facies relations in the rocks that host known showings, and to attempt to confirm the structural interpretation proposed for the 1977 map area. Geochemical fill-in sampling was also carried out on the DD and JJ claims.

GEOLOGY

The 1978 field work confirmed most aspects of the earlier interpretation. Several new showings were discovered which significantly enhance the potential of the property. Mineralization occurs discontinuously along a single stratigraphic horizon which can be identified over a strike length of at least 3,750m (12,000 ft.). Geochemical sampling indicates that the mineralized horizon has considerable width as well. Drill testing to date has only been carried out on the extreme southwesterly extension of this horizon.

The detailed geology of the MM, JJ, and DD claim groups is shown in Map 3. Nomenclature of the various rock types is in accordance with that used in the 1978 Pelly Regional Report (Dean and Mortensen, 1978), and with recent Geological Survey of Canada publications on the area, with the exception that in this report, the Devono-Mississippian volcanic-sedimentary sequence is subdivided to a greater degree. Brief descriptions of the various lithologies exposed on the property are given in Table I.

Within the Devono-Mississippian sequence, facies relations in a restored cross-section extending from the southwestern edge of the MM claim group to Seagull Creek on the eastern edge of the DD claim group are as shown below.

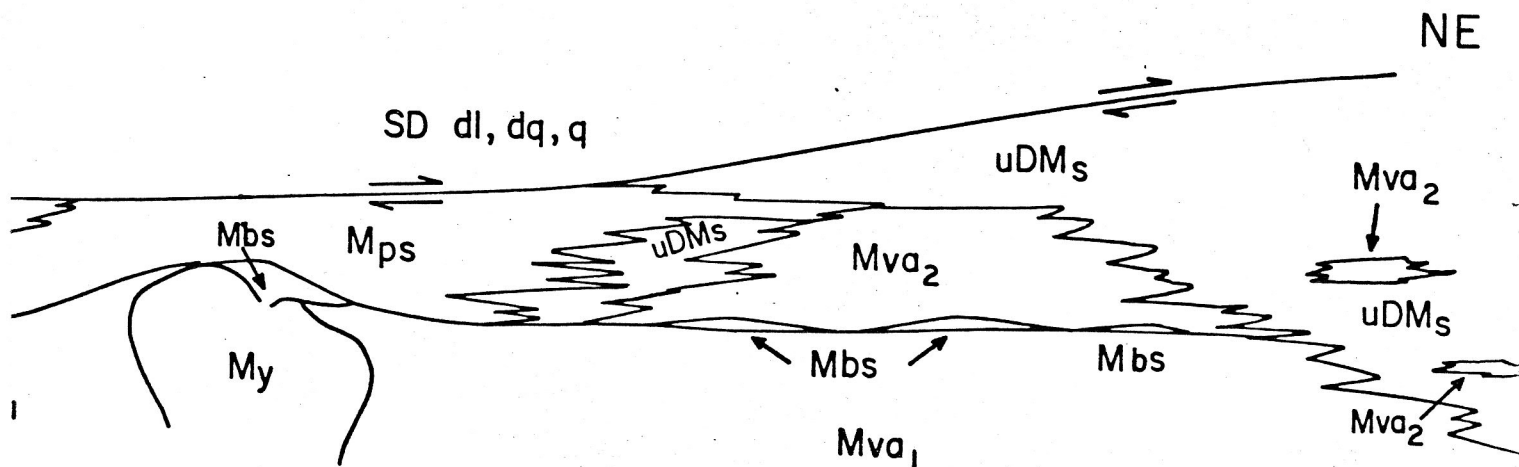


Figure 1: Restored cross-section (prior to deformation) showing facies relations within the Devono-Mississippian sequence on the MM/JJ/DD property.

TABLE I: STRATIGRAPHIC SEQUENCE FOR THE MM/JJ/DD AREA

<u>Map Symbol</u>	<u>Equivalent Unit Number 1978 report</u>	<u>Description</u>
KTqfp (?)	7	- highly chloritized calcareous feldspar porphyry dyke.
CPaub (?)	3	- highly sheared and brecciated serpentinite and serpentinitized durite; includes its metamorphosed equivalents (talc-chlorite-enstatite schist).
cRcs (?)	6b	- calc-silicate schist with rare recrystallized shell fragments.
cRs (?)	6a	- calcareous graphitic phyllite and carbonaceous marble.
uDMS	5b	- graphitic, locally slightly calcareous graphitic shale, minor graphitic arkose lenses.
Mva ₁	4b + 4c	- pyritic felsic tuff and lapilli tuff; includes its metamorphosed equivalents (quartz-feldspar-sericite-chlorite phyllite).
Mva ₂	5c	- intermediate composition tuff and lapilli tuff; minor amygdaloidal flows.
My	4a	- trachyte stock.
Mps	5a	- garnetiferous pelitic schist (chlorite-muscovite-biotite-garnet schist).
Mbs	4d + 5d	- massive pyritic sulphide; includes laterally equivalent pyritic sucrosic barite.
SDd1	2a	- massive to thin-bedded buff to pink weathering dolomite and limy dolomite; minor limestone; locally with abundant shell fragments.
SDdq	2b	- massive to thick-bedded buff weathering calcareous and dolomitic quartzite, locally with diffuse carbonaceous bands.
SDq	2b	- massive to thick-bedded quartzite
SDs	2c	- calcareous, locally pyritic shale and phyllite.
OSs1		- graphitic siliceous shale and slate.
u60s1	1	- medium grey-brown limy phyllite and minor calc-silicate schist.
161		- massive white to grey limestone with archeocyathid buildups.

The felsic tuff unit (Mva₁) probably derives mainly from the rhyolite/trachyte dome (My) that appears in the southwesterly end of the restored section. This dome was intersected by 1977 drilling (DDH 77-MM-03). Flanking the dome on both sides are coarse felsic agglomerates that grade laterally into fine-grained pyritic and locally graphitic felsic tuff and lapilli tuff, with occasional interbands of graphitic quartz-muscovite phyllite (uDMs). Phyllite interbands become increasingly abundant to the northeast, and on the DD property, the sequence is dominantly uDMs with only a minor amount of felsic tuff interbanding.

At or near the upper contact of the felsic tuff unit is a discontinuous horizon of barite ± sphalerite ± galena ± chalcopryrite mineralization (Mbs).

The most southwesterly known occurrence of this mineralization is immediately above the rhyolite/trachyte dome, where it forms a massive pyritic lens 9.4m (31.0 ft.) thick, averaging 10.39% combined metals. This lens apparently thins, and becomes increasingly diffuse to the northeast. Sporadic bands of sulphides (primarily sphalerite) occur throughout 77.5m (252 ft.) of a pelitic schist unit (Mps) that immediately overlies the massive sulphide lens. Sulphide mineralization ends abruptly southwest of the dome. Outcrop becomes poorer to the northeast, hence the upper contact of the felsic tuff unit is only locally exposed. Massive pyritic barite lenses with minor sphalerite and galena mineralization occur discontinuously along this contact for at least 3,230m (10,500 ft.) northeast of the dome. The lenses reach 3m (10 ft.) in thickness. Since the mineralized horizon is generally only exposed in anticlinal fold noses, it is impossible to determine whether the lenses have been structurally thickened at fold hinges.

Rocks overlying the felsic tuff unit show several lateral facies changes. Over 154m (500 ft.) of pelitic schist (Mps) overlies the dome area. This grades laterally both southwest and northeast into graphitic quartz-muscovite phyllite (uDMs). Further northeast, a unit consisting of volcanic-clastics and flow rocks of intermediate composition (Mva₂) overlies the felsic tuff. This relationship is seen along the entire length of the ridge south and east of MM Creek. North of MM Creek, the intermediate volcanic rocks are absent, and instead the felsic tuff unit (and its facies equivalent

black phyllite with felsic interbands) is overlain by a monotonous sequence of graphitic phyllite (uDMs). The time equivalent horizon corresponding to the upper contact of the felsic tuff therefore, is only recognizable by the disappearance of felsic interbands. No sulphide mineralization has been discovered on the northwest side of MM Creek, although highly anomalous geochemical values were noted below an area of graphitic phyllite /felsic tuff interbanding on the DD claims north-west of MM Creek.

The intermediate volcanics are overlain by more graphitic phyllite over all of the map area. These rocks are indistinguishable from the phyllites that are lateral equivalents to the volcanics.

Two rock units occur above the pelitic schist in the "dome area" that cannot as yet be correlated with any other rock type in the Devono-Mississippian sequence (Map 4). These strata were originally mapped as Units 6a (graphitic calcareous phyllite and graphitic marble) and 6b (bioclastic calc-silicate schist) and were thought to represent Carboniferous or Triassic rocks (Mortensen, 1978). During regional mapping in 1978, no equivalent rock types were noted in the Carboniferous or Triassic sequences. The units may therefore be as yet unrecognized Upper Mississippian (or younger) rocks, or may be part of yet another thrust slice which lies between the Devono-Mississippian sequence and the serpentized ultramafic slice.

Although the facies relations discussed above appear relatively straight forward, it must be stressed that the area has undergone three phases of deformation, two of which were tight to isoclinal, and which at least locally involved some transposition of bedding. The facies relations depicted in Map 6, therefore, must be regarded as no more than a best guess, subject to re-interpretation as more information becomes available.

A detailed structural interpretation is presented in an earlier report (Mortensen, 1978). Cross-sections A-B-C and D-E (Maps 4 and 5) show the nature of the deformation affecting the Devono-Mississippian strata. At first glance, structures shown in the sections appear to be rather unusual and even unbelievable. Regional mapping indicates that the Devono-Mississippian section

is actually a narrow thrust panel, bounded both above and below by thrust faults. It is postulated that this panel, being composed largely of incompetent shales and volcanoclastics, acted as a "lubricating horizon" during emplacement of overlying thrust sheets, and thus shows abundant evidence of internal crumpling and shortening that is not necessarily reflected in the underlying and overlying structural units. The excellent exposure of the Devonian-Mississippian rocks on the MM-JJ-DD property, and the fact that the structures as shown are similar to those seen regionally within this sequence suggest that the structures shown in the cross-sections are real.

GEOCHEMICAL SAMPLING RESULTS

Geochemical sampling was carried out over most of the DD and portions of the JJ claim groups, for the purpose of better defining anomalies which had been detected by earlier widely-spaced coverage. As a result, one large highly anomalous zone of lead and zinc values was located on the western slope of Seagull Creek valley, immediately south of MM Creek (Map 6). A second less anomalous zone occurs north of the confluence of MM and Seagull Creeks. Both of these anomalies occur topographically below the inferred stratigraphic position of the "mineralized horizon".

DISCUSSION AND RECOMMENDATIONS

Results of the 1978 field work indicate that the potential of the property is significantly greater than was previously thought. The most important discovery was that the mineralized horizon is areally very extensive, and that a considerable volume of baritic sulphides occur along the horizon. That this is the case implies that the processes of ore genesis must have been quite long-lived, and were probably of sufficient magnitude to produce a sulphide deposit of economic size and grade if a suitable trap for ore solutions was available. Two areas on the property are thought to be most likely to contain such deposits. These are:-

- 1) immediately northwest of drill hole 77-MM-03. Individual rock facies appear to be relatively continuous, and the sulphide body

intersected by 77-MM-03 is still open in this direction. It is therefore quite probable that this body is laterally extensive.

2) near MM Creek, at co-ordinates 22,370,000 N and 413,000 E. A bed of massive banded barite with abundant pyrite, galena, and sphalerite 8m (25 ft.) wide outcrops at this point, associated with a strong geochemical and ground magnetic signature. A continuous chip sample across the showing (perpendicular to bedding) yielded values of 2.1% combined metals over 4m (13 ft.). The showing is located very near the creek bed, therefore its extent cannot be determined from outcrop. The relatively large size of the showing, its high values of contained metals, and the ease with which it can be drill tested recommend it for further investigation.

A modest diamond drill program is proposed for the 1979 field season. A total of three to four drill holes, totalling approximately 900m (3,000 ft.) are required to adequately test the targets outlined above. One vertical hole should be collared as far northwest of DDH 77-MM-03 as is practical in order to test the northwesterly continuity of the sulphide body. This hole would be roughly 460m (1,500 ft.) in length. Two or possibly three short angled holes, each less than 150m (500 ft.) in length would be drilled to test the extent and grade of the barite-sulphide body on MM Creek.

REGIONAL CONSIDERATIONS

It has been postulated that the rock units presently exposed in the Pelly Mountains have been overthrust by a major tectonic slice of ultramafics, basalts and cherts (Tempelman-Kluit, 1976, 1977). Evidence for this appears to be inarguable. Structures in the map area have previously been related to nappe structures formed during the emplacement of this allochthon, and it has been suggested that, at least on the MM property, the base of the overthrust sheet was very close to the highest structural level presently exposed (Mortensen, 1978). This would put the rocks on the MM within an imbricated "parautochthon" zone. The presence of serpentinized ultramafic slices within the structural section supports this argument. What were

interpreted as imbricate thrust slices, however, have now been shown to be of regional extent with "individual" thrust packages being much more continuous than would be expected in an imbricate zone. Nevertheless, structures in the map area are consistent with the overthrusting of a major allochthonous slice. F_1 structures appear to be the result of crumpling of a relatively incompetent package (Devono-Mississippian shales and pyroclastics) during the thrusting event, and F_2 structures (which appear to post-date all of the thrusts in the map area) may be the result of vertical loading following emplacement of the allochthon.

Respectfully submitted,

Jim Mortensen.

January 2, 1979.

MM Drilling

1973 - 2 DDHs grav / geochem. - diss sulfs only

73MM-1 10' 0.89 (380-390)

73MM-2 zeros

1974 - 2 DDHs = 2,010'

74MM-1 GMAG + grav. - bedrock high

74MM-2 1413' geol. - hit / horizon
 30' - 4.24 % comb.
 14' - 6.40
 9' - 8.51

1975 - No work

1976 - 7 DDHs = 5,505'

76MM-1 no base metal sulfs no assays

-2 450' intersection || S₀ - sporadic values
 to 12%

-3 F/W no assays

-4 13' 7% comb. over 15'

-5 no signif. sulfs

-6 45' thick 11% over 8'
 9% " 10'

-7 not as good as 6

1977 - 4 DDHs = 5,388 (> 13,000' total)

77MM-1 1498 wide mineralized section
 best ≈ 14' ≈ 9%

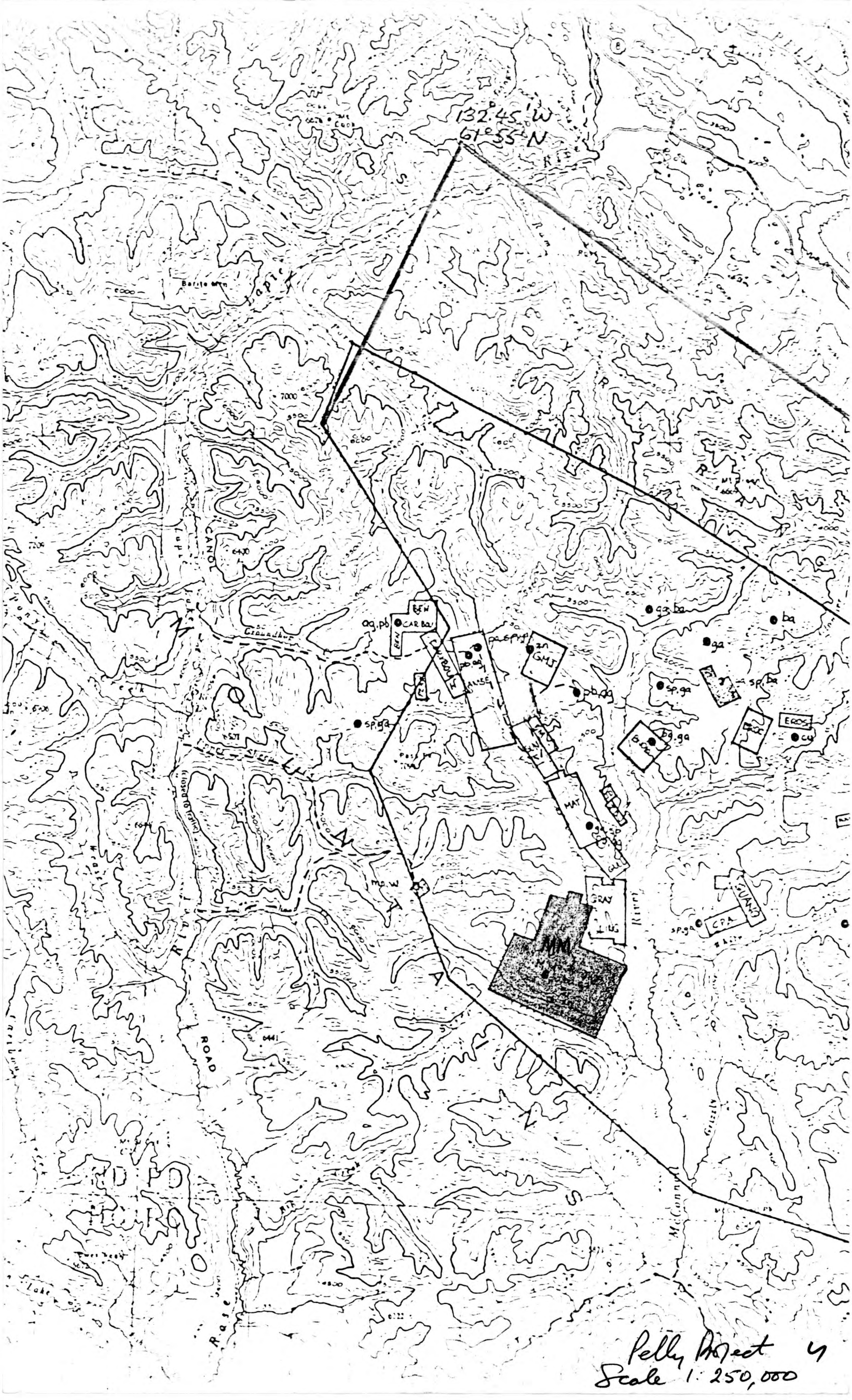
-2 1268 no assayable intervals

-3 1477' 9' ≈ 20% combined

11' ≈ 16% "

followed by 15' ≈ 3%

-4 1145 14' 3-4% comb.



132.45 W
61.55 N

Barile Mtn

CANTON

ROAD

McConnell

EFW
CAR BA

ANISE

MAT

GRAY

CPA

EROS

GA

SP GA

BA

GA

SP GA

CU

CPA

EROS

Pelly Project 4
Scale 1:250,000

IDEALIZED TIME-SPACE PLOT OF LITHOLOGIES AND FACIES RELATIONS FOUND IN MM STRATIGRAPHY

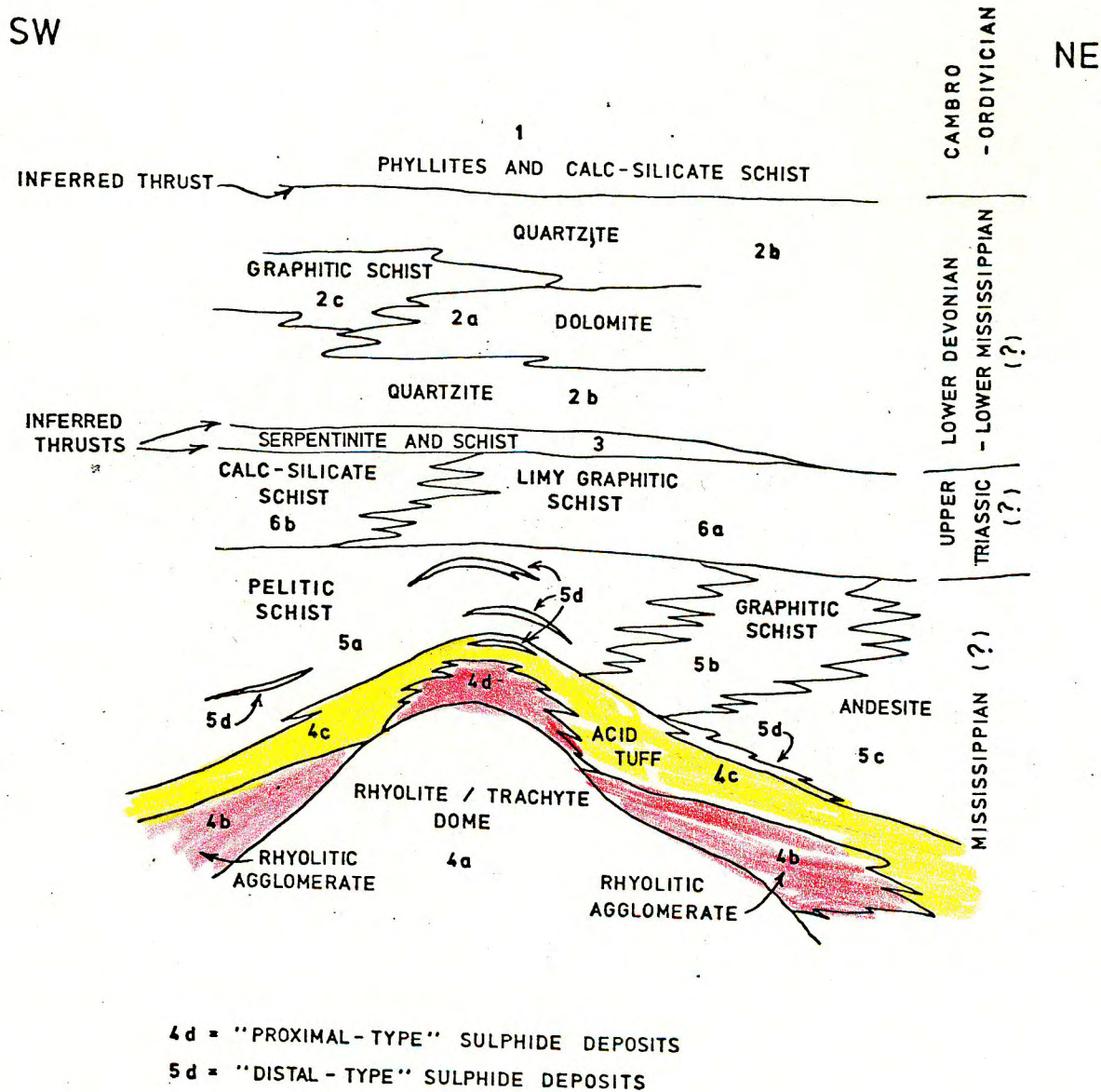
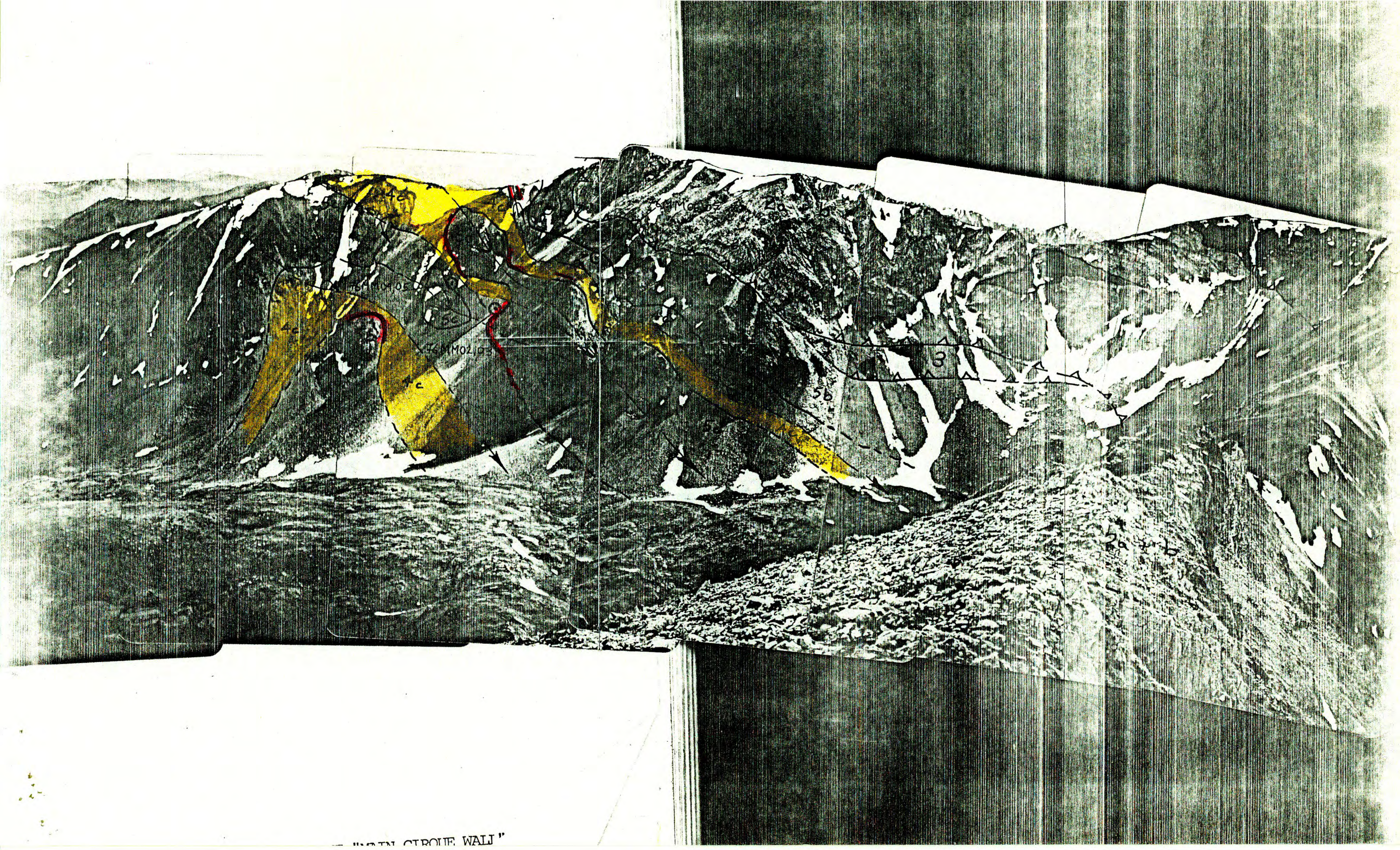


FIGURE 4



"MOUNTAIN CIRQUE WALL"

Drill Hole:- 77MM03 Angle:- -90 Ultimate Depth:- 1477'

Logged By:- J. Mortensen Plotting Scale:- 1" = 200'

