ARCHER, CATHRO
AND ASSOCIATES LTD.
CONSULTING GEOLOGICAL ENGINEERS

BENTALL CENTRE, VANCOUVER, B.C. 688-3022 OR 522-1562

POST OFFICE BOX 1708
WHITEHORSE, Y.T.

GEOLOGICAL MAPPING
and
GEOCHEMICAL SAMPLING
August 1-20, 1970 69

DR 1-64 and Patsy 1-8 claims
Mt. Cockfield Area
Claim Sheet 115-J-9
Whitehorse Mining District

62°35'N
138°25'W

R.J. Cathro, P.Eng.
Dawson Range Joint Venture
July 15, 1970

INTRODUCTION

The copper-molybdenum mineralization on Mt. Cockfield was discovered independently and almost simultaneously by geochemical sampling crews working for Newmont Mining and the Dawson Range Joint Venture (DRJV), comprised of Straus Expl., Trojan Consolidated Mines, Great Plains Development Co., and Molybdenum Corp. of America. Newmont staked the northwest side a few days before DRJV staked the southeast side on July 8, 1969. A camp was installed on the claims between August 1 and 20. The claims are registered in the name of Archer, Cathro & Associates Ltd., as follows:

Claim Name	Grant No.	Recording Date
DR 1-48	Y35652-Y35699	July 16, 1969
Patsy 1-8	Y36098-Y36105	July 28, 1969
DR 49-64	Y36106-Y36121	July 28, 1969

HISTORY, LOCATION AND ACCESS

There is no record of previous work nor evidence of prior staking or physical sampling on Mt. Cockfield. This mountain lies some ten miles southeast of the Casino property and is one of the highest summits in the area (6250 ft). It forms a height of land between the headwaters of Dip Creek (Rude, Victor and Colorado Creeks) and the headwaters of Selwyn River (Buttle and Culbert Creeks). Present access if by helicopter.

1969 EXPLORATION

Silt geochemistry was used to outline the anomalous area prior to staking. Subsequent soil sampling on a picketed grid and geological mapping at a scale of 1 inch = 1/2 mile completed the 1969 program. Figure 1 shows the geology, which was mostly mapped by R.E. Culbert, P.Eng and by Newmont geologists. Figures 2 and 3 show the copper and molybdenum response from the soils.

GEOLOGY

Mt. Cockfield shows for more outcrop, fresh talus and felsenmere than is normal in the Dawson Range. A prominent colour gossan (yellow and red) is present near the summit. Because of the good exposure, good detail was possible in the mapping. Most of the area is a volcanic erosion remnant on a pendant of Yukon Group which is enclosed in the Klotassin Batholith. Evidence of ancient alpine glaciers is present in the form of modified cirques and relatively steep talus slides. As well, the drainage pattern has disarranged somewhat. Low terraces and erosion benches are present. The following detailed description of the geology is abstracted from the 1969 Summary Report for the DRJV, pp 68-77:

of a different drainage pattern.

Foliation in the Yukon Group generally trends NNW and dips steeply. "Bedding" is apparently not always conformable. The magnetic trend of the Mt. Nansen volcanics has its usual northwesterly orientation and there are some magnetic highs in the adjacent intrusion which do not have an obvious cause. One fault zone was recognized which shows relative movement upward on the southwest side. This either preceded or accompanied the felsites. Another topographical and magnetic lineament (which appears to be accompanied by dislocation) is present to the south of the intrusive contact.

The rocks are mainly members of the Mt. Nansen volcanic series, which overlies or is faulted against the older Yukon Group and is intruded by a "dent cheval" quartz monzonite. Rather than employ the general rock units used for regional mapping, however, a set of purely descriptive lithological units has been used, as these are likely to be of more economic significance.

(i) Metamorphic Suite (Yukon Group)

A considerable percentage of this complex

consists of greenstone and derived amphibolite, suggesting that this may have been a site of volcanic activity as far back as the early Paleozoic. On the ridge east of Battle Creek, the Yukon-Mt. Nansen contact is of surprisingly gradational appearance, representing little more than a slow change from regional to contact metamorphic, within a basaltic terrain. The usual assortment of schist, gneiss, and feldspathic metaquartzite accompanies the amphibolite in lower sections. Between the forks of Battle Creek, leucogneiss dominates, complete with "dent cheval" quartz-feldspar rock and migmatites. It is possible that the intrusive was derived from these rocks. The leucogneiss produces its usual blonde gossan, but no mineralization was observed. To the east, there are local areas of pyritization, usually developed where felsite dykes have intruded the Yukon Rocks.

On the south end of the property, metamorphic rocks have been faulted against the volcanics on a fracture trending about 120° and dipping north-

east. Amphibolite, quartzite and gneiss dominate the metamorphic suite in the vicinity of the property.

(ii) Volcanic Rocks

a. Basalts and related dark volcanics

Basalts comprise the bulk of material on the property, which is not surprising as they are the most common flows of the Mt. Nansen. Typically they are plain, black, dense and drab weathering. Varieties include plagioclase or mafic porphyries, vesicular flows, green or deep grey colourations, epidote alteration, dioritization, indistinct breccias and pyritization. Pyritization is quite widespread and locally intense, causing a dark gossan. Usually this mineralization and other forms of alteration accompany dyke intrusion. What little chalcopyrite has been seen on the property was located in basalts near the intrusive contact or "dent cheval" dykes. It was found in one place as a disseminated mineral, but more often accompanies pyrite and quartz in fracture fillings. A

few highly pyritized feldspar porphyry dykes cut the felsites near the western edge of the property. These closely resemble dyke rocks cutting felsites at the Casino deposit.

b. Light weathering volcanic rocks

Certain volcanics weather lighter grey than on fresh surface. These have much the same range of variations as the normal dark basalts, and perhaps even less tendency toward mineralization. The rocks pass gradationally into all of the other volcanic units and their mapping has not proved greatly significant except perhaps in separating the other classifications. Rocks mapped in this group on the northwest corner of the volcanic assemblage may be a fine grained derivative of the intrusion.

c. Volcanic flows, breccias, tuffs and dykes of light colour

There is a considerable quantity of acid volcanic rock in the Mt. Cockfield area. Some may be related to the Carmacks volcanic episode and all observed flows or tuffs are quite high in the volcanic sequence. Rocks

of this category in the southwestern part of the property are breccias, exhibiting fragments of all other rock types in the region. The matrix is often white and is occasionally a quartz porphyry. It is undoubtedly related to the adjacent altered felsites but is less vuggy, altered and of less economic interest.

An intrusion of this material in the extreme southeastern part of the property also contains pyritiferous rhyolite and altered felsites and is likely the origin of geochemical anomalies in that region. Highly pyritiferous basalts accompany it.

Rocks of this group in the northeastern part of the property are mainly tuffs, dykes (perhaps fluidal) and banded flows. They are mineralized only where accompanied by pyritiferous rhyolite dykes.

d. Pyritiferous rhyolites

These highly fractured and rusty rocks supply most of the bright gossans. Typically they are light coloured, cherty and appear siliceous. Prior to pyritization they may

have been darker, as occasional remains of mafic phenocrysts can be seen in various stages of being replaced by pyrite. Except for fracturing, the rock is quite resistant to alteration, so that the sulphides are not leached. Pyrite is disseminated and no significant chalcopyrite has been observed in this rock, although geochemical results suggest it may be present.

e. Altered felsites

This is the material which gives a light blonde gossan and in some ways resembles the intrusion at Casino. For the most part it consists of vuggy, white rhyolite flows with a shaley, horizontal cleavage. Locally it is quartz or feldspar porphyry or contains corroded and broken "dent cheval". A few highly altered lithic fragments are often present, especially where these felsites grade into the forementioned breccias. Alteration is widespread, although seldom of a highly quartz-sericite or quartz-kaolin nature associated with Casino.

The dominant representation of this rock type is from flows capping the two highest summits of Mt. Cockfield. It is doubtful that these have any great depth, and they exhibit very little visible sulphide mineralization. Tourmaline? and specularite appear locally. It is possible that these felsites are related to the quartz monzonite intrusion.

(iii) Granitic Intrusion

The dominant intrusion is typical "dent cheval" quartz monzonite, usually attributed to the Mesozoic. Upon approaching a volcanic contact, however, several changes may take place. Mafics (dominantly hornblende) first chloritize and then disappear or are replaced by pyrite or secondary biotite. Boundary phases and dykes generally display "dent cheval" and locally hornblende, quartz or pyrite in a grey groundmass. Pink syenite is present near the western part of the contact and it may not be a coincidence that this is the region where quartz veins cut (and

mineralize) both the intrusion and the volcanics.

Copper was found in quantity only near the intrusive contact or "dent cheval" dykes. Usually it is on widely and erratically spaced fractures in basalts and is accompanied by pyrite and quartz. Only a very few flecks were seen in pyritized regions elsewhere. Molybdenite was also found in quartz veins and occasionally disseminated near the intrusive contact, but in the intrusion rather than basalts. One quartz vein containing ferrimolybdenite runs for some distance through the volcanics but all surface mineralization has been weathered out. Both copper and molybdenum showings are restricted to the western part of the older intrusive contact, and the strongest surface mineralization is on the Newmont claims although, even here, it nowhere approaches economic grade. No galena was seen on the property despite fairly strong lead stream sediment anomalies.

Figures 10 and 11 show the results of grid soil sampling for copper and molybdenum. Samples were taken at 400 foot centres except for areas where lack of fine

material made sampling impossible. There is little soil development on the property and all samples were taken from a "C" horizon. In many instances the sample is actually fine talus. Because samples were taken from a much more responsive horizon a higher threshhold value has been used in contouring values. It is interesting to note that, like the Hayes property, silt values are often higher than the soil values from the area being drained. The only area significantly anomalous in molybdenum is the quartz monzonite at the north end of the property. This anomaly is about 2000 feet long and 1000 feet wide but lack of supporting copper values reduces its priority. An area anomalous in copper is found from line 44N to 68N from the west property boundary to baseline B (an anomaly about 4000 feet by 2400 feet). The centre portion of the anomaly could not be sampled due to coarse talus. Mapping shows pyritiferous rhyolites and altered felsites in dark volcanic rocks, very similar to other parts of the property where little geochemical response was obtained.

The relatively high background response of the volcanic areas of the Mt. Cockfield property may be

due to an underlying, mineralized intrusion. If so, it is possible that this intrusion is within the range of surface drilling within the copper anomaly. However, since no interesting intrusive float has been found and the volcanics are not strongly fractured or altered, this property is assigned a lower priority for immediate work. Sufficient expenditure has been made to keep the claims in good standing for two and possible three years.

CONCLUSIONS AND RECOMMENDATIONS

Mt. Cockfield intrusions do not show strong hydrothermal alteration or composition complexity typical of the younger stage of orogeny in the Dawson Range (i.e. Casino). Work to date suggests that the best mineralization in the Cockfield stock actually occurs in fracture zones in the older Klotassin Batholith, possibly above a buried younger stock. Further work on the DRJV claims should await drill results from the better exposures on the Newmont property.

Respectfully submitted,

ARCHER, CATHRO & ASSOCIATES LTD.

R.J. Cathro, B.A.Sc., P.Eng.

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AFFIDAVIT

I. Robert J. Cathro, with business address at Box 1708, Whitehorse, Y.T., hereby declare that, to the best of my knowledge and belief, the attached statement of expenditures is a fair and accurate representation of the cost of 1969 exploration on the DR and Patsy claim groups, claim sheet 115-J-9.

R.J. Cathro, P.Eng.

Sworn before me at
Whitehorse this 29 day
of July, 1970.

A.R. Archer,
Notary Public

061373

NEWMONT MINING
CO GROUP, 52 CLAIMS

DRJV
DR GROUP
72 CLAIMS

138° 30' W

62° 40' N

Rude Cr.

Victor Cr.

West Battle Cr.

Battle Cr.

LIMIT OF MAPPING

MT. COOKFIELD
6250'

Culbert Cr.

Colorado Cr

LEGEND

SYMBOLS

TT	PYRITIZATION
Cu	CHALCOPYRITE
Mo	MOLYBDENITE
	DYKES
	FAULTS

GEOLOGY

RECENT

9 GLACIAL & FLUVIAL DETRITUS, TALUS

CRETACEOUS OR YOUNGER (?)

8 COCKFIELD STOCK (?) QUARTZ MONZONITE, IN PART PORPHYRITIC & FINE GRAINED, WEAKLY ALTERED AND MINERALIZED.

7 KLOTASSIN BATHOLITH - QUARTZ MONZONITE, GRANODIORITE

MESOZOIC - MT. NANSEN VOLCANIC COMPLEX
COULD BE IN PART TERTIARY CARMACKS VOLCANICS.

6 BASALTS & RELATED DARK VOLCANICS

5 PALE WEATHERING VOLCANICS

4 FLOWS, BRECCIAS, TUFFS, PALE DIKES

3 PYRITIFEROUS RHYOLITE

2 ALTERED FELSITE

CAMBRIAN OR OLDER

1 YUKON GROUP METASEDIMENTS

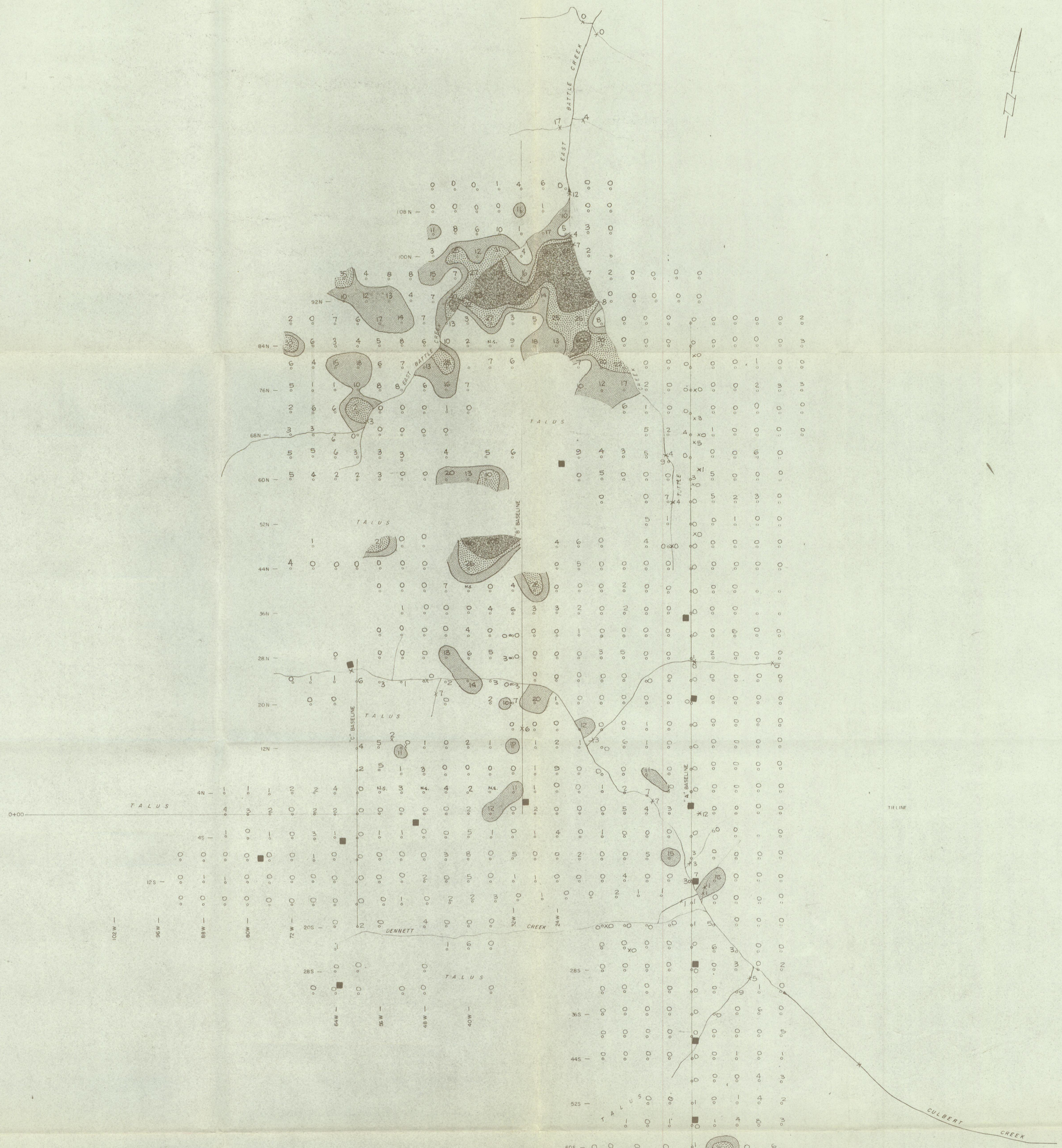
GEOLOGY
MT. COCKFIELD PROPERTY
DAWSON RANGE JOINT VENTURE
ARCHER CATHRO ASSOCIATES LTD.
CONSULTING ENGINEERS

SCALE
Mile 1 1/2 0 1/2 1 Mile

SEPT. - 1969

FIGURE 9


BATTLE CREEK
EAST BATTLE CREEK
TALUS
"B" BASELINE
"C" BASELINE
"A" BASELINE
TITLINE
DENNETT CREEK
CULBERT CREEK
LEGEND
100-200 p.p.m.
200-400 p.p.m.
> 400 p.p.m.
SCALE
800 Ft. 0 800 1600 Ft.
COPPER
Geochemical Survey
MT. COCKFIELD AREA
DAWSON RANGE SYNDICATE, Y.T.
ARCHER & CATHRO
Consulting Geological Engineers
DATE August, 1969
DRAWN
SCALE 1"= 800'
DWG. No. 10
— CLAIM POSTS



MOLYBDENUM

Geochemical Survey

MT. COCKFIELD AREA

DAWSON RANGE SYNDICATE, Y.T.

ARCHER & CATHRO

Consulting Geological Engineers

DATE	August, 1969
DRAWN	
SCALE	1" = 800'

DWG. No. 11