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RIDGEMONT MINING CORPORATION

ANVIL RANGE PROGRAM, YUKON TERRITORY

RECONNAISSANCE GEOLOGY AND GEOCHEMISTRY

by

P.F. Lewis, B.Sc.

March 1974

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A REPORT

on the

RECONNAISSANCE GEOLOGY AND GEOCHEMISTRY
ANVIL RANGE PROGRAM, YUKON TERRITORY

for

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INTRODUCTION

This report describes the reconnaissance geology of 400 square miles of terrain in the Anvil Range, Yukon Territory, and the results of a silt sampling program undertaken over the area. The area is located just north of Faro on the northern flank of the Anvil Batholith (Fig.1).

Interest in this area stemmed from the work of Kangaroo Exploration Corporation on its Mount Mye prospect. This work located a sub-economic zinc-copper deposit - the KD deposit (G. A. Jilson, 1974) - in volcanic rocks previously thought to be of Permo-Pensylvanian age (D. J. Tempelmen-Kluit, 1972a). Detailed mapping showed that these volcanic rocks are part of the Lower Palaeozoic metamorphic assemblage that hosts the Faro, Vangorda and Swim deposits. In addition, this mapping revealed a very sharp fall in metamorphic grade and intensity of deformation with distance from the Anvil Batholith. This contrast had resulted in the deduction (op. cit., 1972a) that sedimentary rocks some distance to the north-east of the batholith, within the present area of interest, are younger than, and unconformably overlie, the higher metamorphic grade rocks near the batholith which host the above deposits. However, the detailed mapping showed this contrast to be gradational and not due to unconformable relationships, and hence the sedimentary rocks to the north-east are considered possible hosts to mineralization such as that found in the metamorphic sequence.

The Anvil Range Program was formulated to explore the above volcanic and sedimentary rocks, and two approaches were used:

1.) Staking and soil sampling of areas that were known to be anomalous from a previous silt and reconnaissance soil sampling program conducted by Anvil Mining Corporation Ltd. The Dana, Jon, He, She, Try, Jan and Lisa claim groups were staked and all but the Lisa group sampled, and the work done is the subject of reports for Ridgemont Mining Corporation and Kangaroo Exploration Corporation (G. A. Jilson and J. G. Simpson, 1974a, 1974b, 1974c, G. A. Jilson, 1974, and P. F. Lewis and J. G. Simpson, 1973b).

2.) Complete coverage of the 400 square mile area by detailed silt sampling, coupled with reconnaissance geological mapping, which is described in this report.

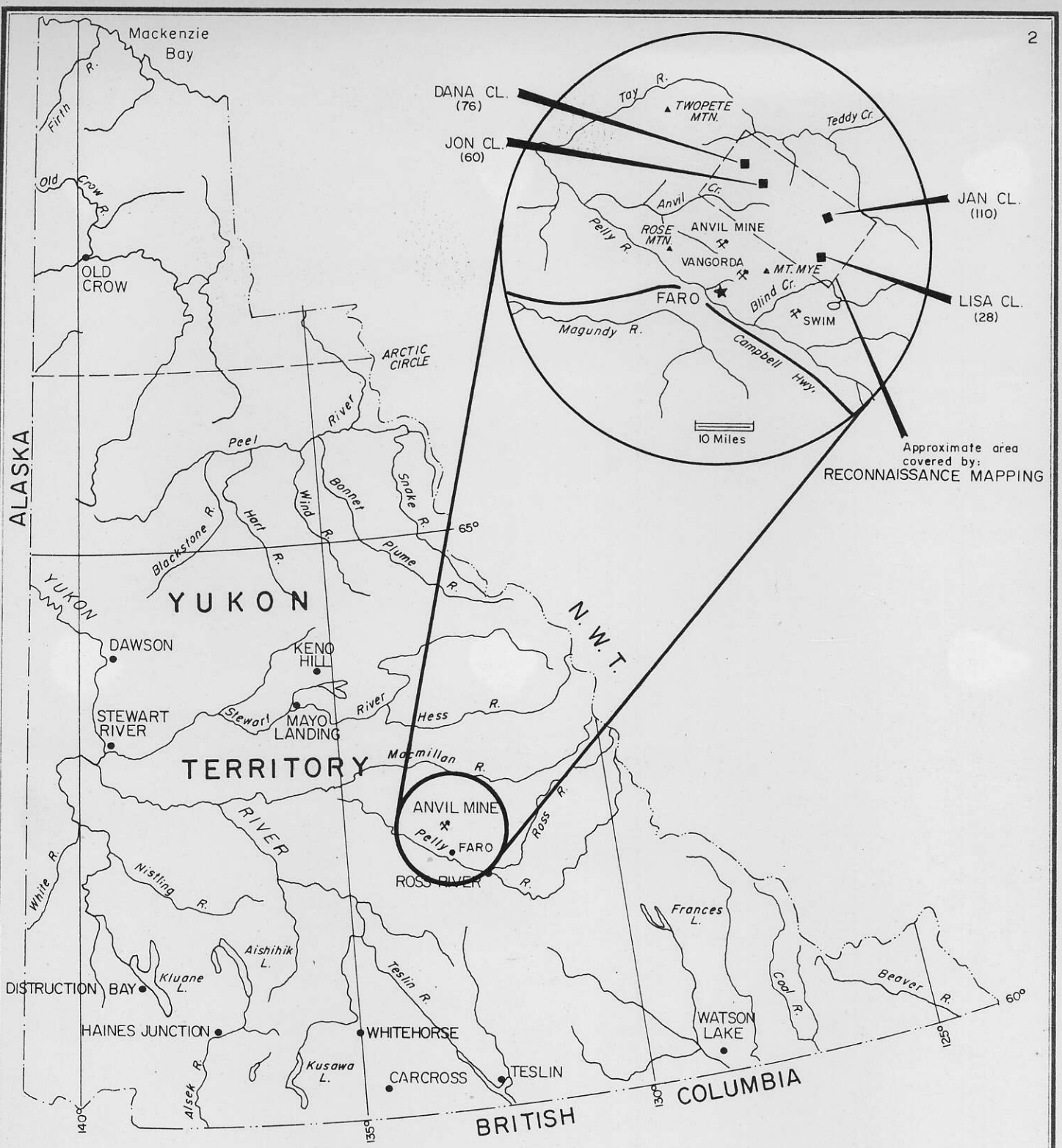

FIGURE I

PROPERTY LOCATION MAP

SCALE 0 20 40 60 80 100 MILES

RIDGEMONT MINING CORPORATION

ANVIL RANGE PROGRAM

YUKON TERRITORY

GEOLOGY

Introduction

The enclosed geological map at a scale of one inch to half a mile is a compilation of work by the Geological Survey of Canada, Spartan Explorations Ltd., Atlas Explorations Ltd., Kangaroo Exploration Corporation and Ridgemont Mining Corporation, as indexed on the map.

For ease of discussion the map has been subdivided into areas as indexed on Fig. 2 overleaf. Three of these areas: Mount Mye, Lisa and Dana, have been mapped in detail, the former two being the subject of earlier reports for Kangaroo (P. F. Lewis and J. G. Simpson, 1973a, and P. F. Lewis, 1973) and Ridgemont (P. F. Lewis and J. G. Simpson, 1973b) respectively. Hence these two areas are dealt with in summary fashion only whereas the Dana area is discussed fully in this report. The Dana and Mount Mye areas can be considered control areas on which mapping of the remaining areas was based. Most of the mapping was done using daily helicopter support from the Mount Mye base camp. The Jan and Lisa areas were mapped from suitably located fly-camps.

Regional Setting

As shown on Fig. 2, the southwesterly mapped areas (P, G, X, Y, T, S, Mt. Mye and Lisa) lie on the northern limb of the Anvil Arch (D. J. Tempelman-Kluit, 1972a), a regional feature which is assymetric to the north and cored by the partly syntectonic (Lewis, 1973) Mesozoic Anvil Batholith of granitic composition. Cloaking the batholith is a mantle of dominantly metasedimentary rocks of Palaeozoic age which are host to the Faro, Vangorda and Swim deposits on the south flank of the Arch. On the north flank, the metasediments give way northward to metavolcanic rocks, largely by facies change although some thrust contacts are inferred (Lewis, 1973). In accord with Roddick and Green (1961), but contrary to Tempelman-Kluit (1972a), these volcanics are believed to be the same age as the metasedimentary rocks, and are host to a sub-economic zinc-copper deposit (G. A. Jilson, 1974).

The northeasterly mapped areas (Dana, J, Z, K, Jan and O) lie between the Anvil Arch and the Tay River, and are underlain by a dominantly chert-argillite assemblage (op. cit., 1961). Campbell(1967) named this assemblage the Earn Group in the Glenlyon map-area and proposed four formations as shown on Table I.

In the northeast half of the mapped area these formations apparently form another arch, here called the "Tay Arch" (see "Area Z" and "Area K" sections). The Tay and Anvil Arches are bounded by probable major faults: the Tintina fault zone to the southwest and a probable parallel fault zone that localizes much of the Tay River valley to the northeast, here called the "Tay Fault Zone". Both these fault zones are the locus of Triassic molasse-type sediments implying uplift of the "Anvil Range Horst" by normal movement on the faults, in the Triassic. This normal movement may have been preceded by reverse

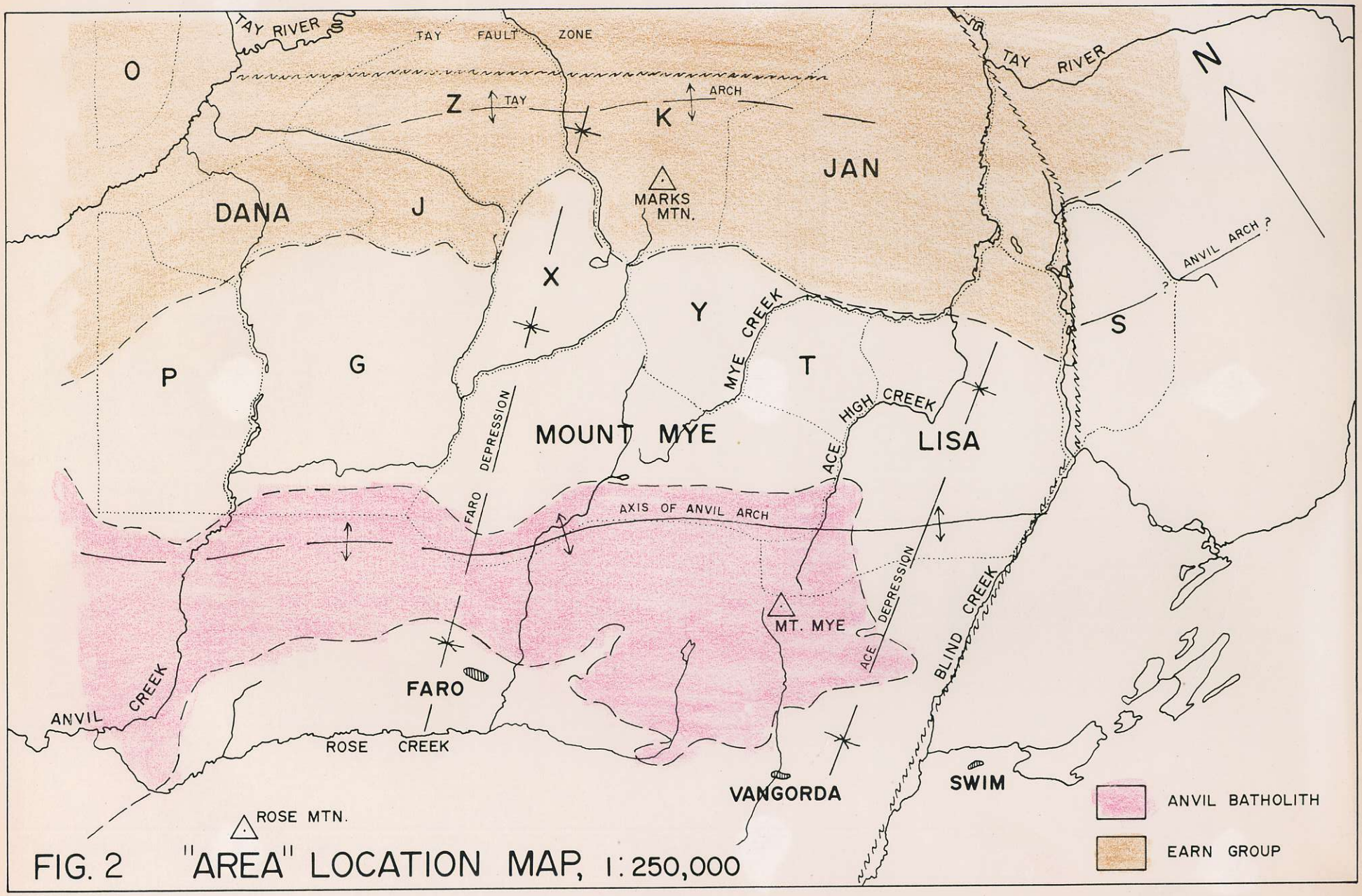

FIG. 2 "AREA" LOCATION MAP, 1:250,000

TABLE I

Stratigraphic Column, Earn Group (after Campbell, 1967)

Period	Map unit or Formation	Lithology	Thickness (feet)
Lower Mississippian	13	Thin bedded chert, argillite, quartzite and minor limestone	~10,000 +?
	Conformably overlying		
Lower Mississippian	KALZAS FORMATION (12)	Limestone; minor argillite and chert	750 - 1250
	Conformably overlying		
Lower Mississippian	CRYSTAL PEAK FORMATION (11)	Chert - pebble and chert-cobble conglomerate and breccia; minor quartzite	~4,500?
	Possibly unconformably or disconformably overlying		
Lower Mississippian and/or earlier	10	Chert, argillite, quartzite, limestone and chert conglomerate	4,000+?

Possibly unconformably overlying Proterozoic "Grit Unit"

movement of the subduction type, culminating with emplacement of alpine-type ultramafic slices, in the Tintina Zone, during the Permo-Triassic (Monger et al, 1972, and op. cit., 1972a)

The Crystal Peak Formation and possibly all clastic members of the Earn Group appear to have been derived from an Ordovician to Silurian chert-argillite assemblage, now exposed to the northeast of the Anvil Range Horst (op. cit., 1961). These and other clastics of similar age in the northern Cordillera have apparently been derived from a northwesterly or westerly source-area implying uplift due to westerly directed subduction, or obduction of the oceanic, Ordovician to Silurian assemblage in the Upper Devonian (Monger et al, 1972). According to the above authors this westerly directed subduction at the site of the present Tintina Trench was quickly superceded by easterly directed subduction at the site of the Denali-Shakwak Trench. The early westerly subduction may have been oblique, accounting for the 40 miles of Palaeozoic right-lateral transcurrent movement on the Tintina fault zone as deduced by Roddick (1967). Monger et al (1973) consider that the easterly directed subduction at the Denali Trench was continuous until the Permo-Triassic collision of the northern segment of the Coast Range Island Arc, which may have finally closed the Tintina suture, emplaced ultramafic slices as described above and resulted in regional metamorphism and deformation of the Anvil Range rocks. Post-orogenic uplift and molasse sedimentation followed.

Approximately 250 miles of right-lateral displacement on the Tintina fault-zone is postulated in the Cretaceous (Tempelman-Kluit, 1970, 1972b, Roddick, 1967). High heat flow and local directed stress, possibly associated with such displacement, resulted in the intrusion and deformation (Lewis 1973) of an early phase of the Anvil Batholith in the Lower Cretaceous, and similtaneous further deformation and metamorphism of its host metasediments. The Anvil Arch was probably produced by isostatic updoming of the Batholith after emplacement, and is associated with yet further, minor, deformation of the metasediments (Lewis, 1973). Northerly and east-northeasterly trending faults, warps and minor structures may be associated with movements on the Tintina fault zone in Upper Cretaceous or early Tertiary time (op. cit., 1973). On a regional scale the east-northeasterly structures are associated with features named the "Faro Depression" and the "Ace Depression" (see sections: Area K and Lisa Area).

A major problem in the Anvil Range is the age of the metasedimentary and metavolcanic host rocks to the Faro, Vangorda, Swim and KD (Jilson, 1974) deposits. Roddick and Green (1961) considered them to be Mississippian (?) and or later (?), Tempelman-Kluit (1972a) regarded them as Hadrynian (?) to Ordovician (?) and Pennsylvanian-Permian, while the present author (1973) settled Ordovician? to Permian? probably mostly Devono-Mississippian, on the basis of fossil discoveries made by previous workers and structural data.

Areal Description

This areal description deals firstly with areas underlain by probable Earn Group equivalents (Dana, J, Z, K, Jan and O) and then with the remaining areas to the south.

DANA

The Dana claim group and surrounding area is underlain by rocks of the Upper Devonian (or earlier) to Permian (?) Earn Group (Campbell 1967). These rocks have been folded about an axial plane dipping approximately 45° south, with fold axes plunging 20° towards N 115°E (Fig. 3). Figure 4 shows true structural profile sections through the area projected onto a vertical plane of the same strike (025°). The style of folding is seen to be cuspate or chevron, with anticlines having steep to overturned northern limbs and sub-horizontal southern limbs. Minor, coaxial, modification of the southerly dipping axial plane slaty cleavage is apparent at the south end of section E-F near a porphyry dyke. The stratigraphic column deduced from these sections and the mapping is shown on Table II. The map units are described briefly below.

Unit 13a

Scattered outcrops of sedimentary breccia occur in the east centre of the map area (Map 13 in pocket). The rock is very poorly sorted, consisting of rounded to angular, cobble to sand sized clasts of chert, quartzite, slate and minor granitic material in a finer matrix rich in limonite. The unit is crudely horizontally bedded and is seen to lie on a fissured erosion surface of grey and black banded chert and slate. Erosion of this unit has stained the stream bed draining the area for 2000 feet downstream. These exposures were probably the reason for early interest in the area.

Unit 11b

Porphyritic biotite quartz monzonite typical of the late post-tectonic phase of the Cretaceous Anvil Batholith outcrops in the southwest corner of the map-area. The rock has flow-aligned phenocrysts of orthoclase up to 3 inches by 1/2 inch, in a coarse grained ground-mass of quartz, feldspar, biotite and accessories

Unit 10a

A dyke-like body of granitic intrusive outcrops at the south end of section E-F. The north margin of this body is of foliated quartz porphyry whereas the remainder is of equigranular, fine to medium grained, quartz-rich microgranite. A possible flow structure was noted approximately normal to the south contact, which may be a fault. Xenoliths of silicified and hornfelsed argillite or chert were noted at the north contact, where the intrusive is in contact with units 5a and 6d. The similarity of the quartzes in units 6d and 10a, and the structural features of the intrusive, suggest that unit 10a is contemporaneous with units 5 and 6, and hence is probably of Ordovician to Silurian age (see also pages 12, 16 and 24)

Unit 8

The northeastern portion of the map-area is underlain by cherty sediments. In its southeastern part, this unit (8a) apparently consists of two cycles of black, graphitic chert-slate alternations overlying massive grey and black cherts, separated by a grey and black siliceous slate unit (8c). The chert-slate sub-units are

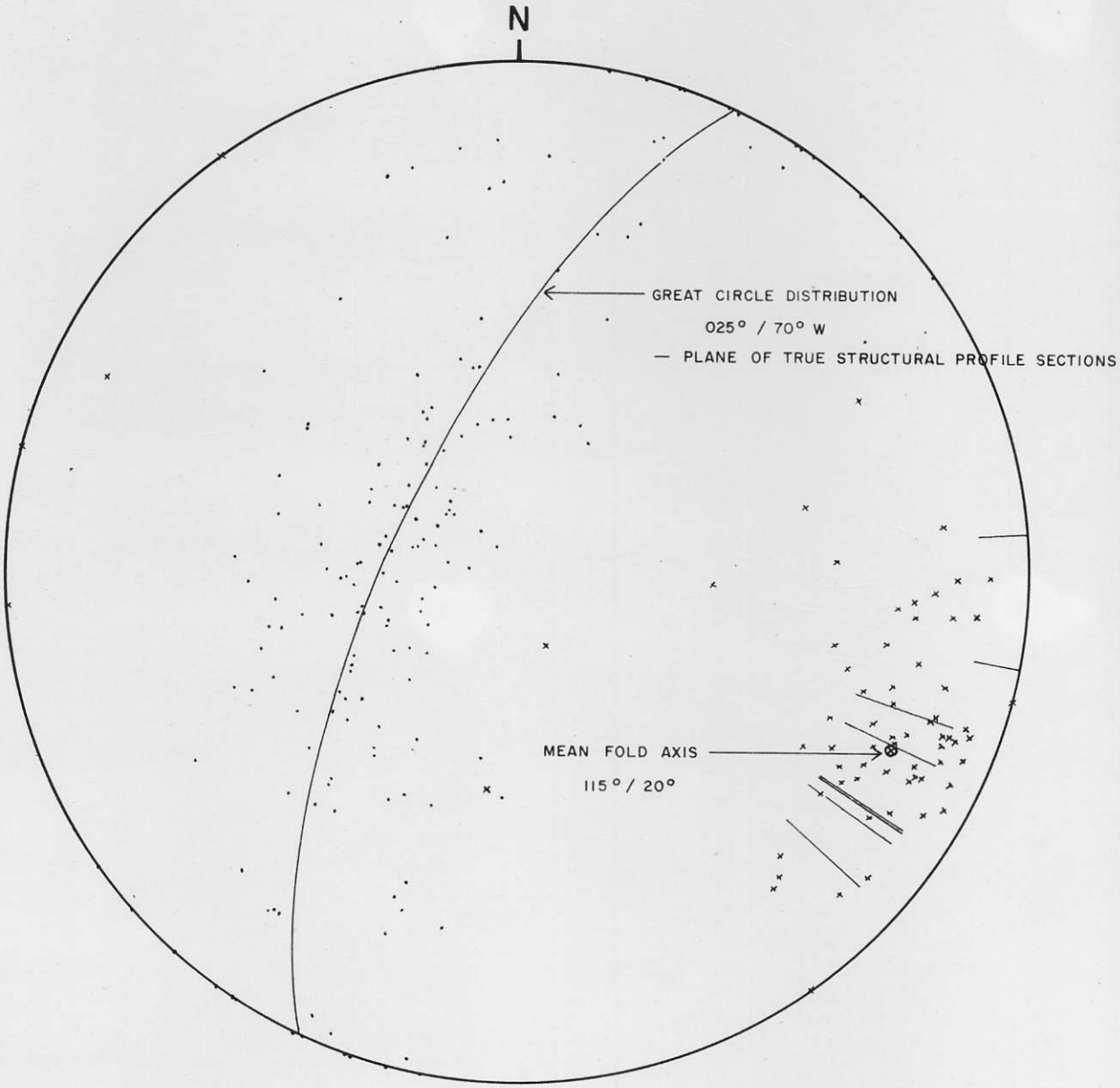

FIGURE 3

STEREOGRAPHIC PLOT OF BEDDING ATTITUDES AND FOLD AXES, DANA PROSPECT

KEY:

- • POLE TO BEDDING (155 Points)
- x FOLD AXIAL DIRECTION (74 Points)
- / FOLD AXIAL TREND, WITH PLUNGE RANGE

P. F. L., 1974

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DANA PROSPECT

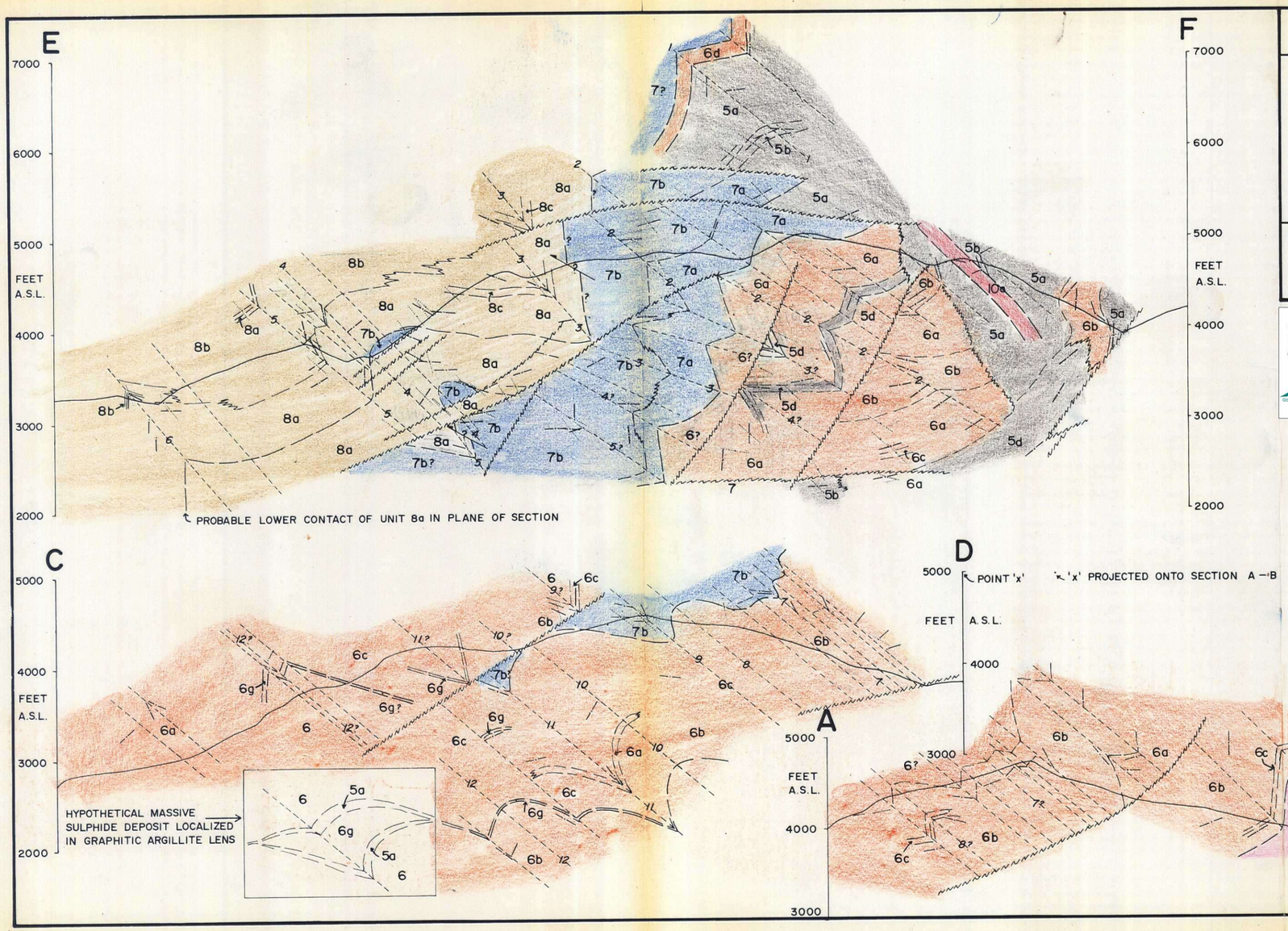
ANVIL RANGE PROGRAM

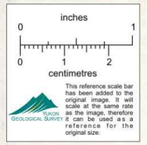
SECTIONS A-B, C-D, AND E-F

DESIGNED: P. F. LEWIS, 1974

FIGURE 4

FEET 1000 0 1000 2000 3000 FEET





THESE SECTIONS ARE TRUE STRUCTURAL PROFILE SECTIONS PROJECTED ONTO A VERTICAL PLANE TRENDING 025°.

TO OBTAIN A TRUE PROFILE SECTION, PROJECT ONTO 025°/70° W., RESULTING IN DECREASE IN VERTICAL SCALE BY A FACTOR = SINE 70° = 0.9397

KEY: (ALL DATA PROJECTED FROM SURFACE, ALONG 115°/20°, THROUGH TRUE PROFILE SECTION, ONTO VERTICAL SECTION)

- BEDDING ATTITUDE AND STATION
- AXIAL PLANE SLATY CLEAVAGE ATTITUDE AND STATION
- AXIAL PLANE OF FOLDS
- FAULT TRACE ON SURFACE (FAULTS ARE HIGH ANGLE, NORMAL OR REVERSED)
- POSSIBLE THRUST PLANE
- LITHOLOGICAL CONTACT
- FACIES CONTACT

a) LITHOLOGICAL UNIT NUMBERS ARE THOSE USED AND EXPLAINED ON MAP 13

b) MAJOR AXIAL PLANES ARE NUMBERED AS ON MAP 14

TABLE II

Stratigraphic Column, Dana Area (compare Table I)

Period	Map unit	Lithology	Thickness (feet)
Quaternary	13	Overburden	
	Unconformity		
Quaternary	13a	Sedimentary breccia with oxide rich matrix	50 +
	Unconformity		
Cretaceous	11b	Porphyritic quartz monzonite ANVIL BATHOLITH	
	Intrusive contact with unit 6		
Ordovician? - Permian ?	10a	Foliated quartz porphyry and massive micrograntie	
	Intrusive contact with units 5 and 6		
Mississippian-Permian?	8a	Black chert with thin limestone and slate bands	100+
	8a	Massive grey and black chert	100
	8c	Grey and black siliceous slate	100
UNITS 5 - 8 incl. -EARN GROUP	8a	Black chert with thin slate partings	100
	8a	Massive grey and black chert	200
	8a	Black ribbon chert	100
	Facies equivalent of		
	8b	Bleached ? pyritic chert	1000-2000
	Conformably ? overlying		
Upper Devonian-Mississippian	7b	Interbedded limestone, quartzite and slate	1000-2000
	Conformably overlying and facies equivalent of		
	7a	Calcareous slate	0? -1000
	~~7a~~ and 7b	- KALZAS FORMATION	2000
	Conformably? overlying units 6d?, 6c, 6b, 6a and 5a		
Ordovician ? - Upper Devonian?	6g	Sulphide-bearing siliceous exhalite	0-2
	Facies equivalent of		
	6d	Quartz-eye bearing, fissile, volcano-clastic wacke	0-100?
	Facies equivalent of		
	6c	Aplitic welded siliceous tuff and/or rhyolite	0-2000?
	Facies equivalent of		
	6b	Banded siliceous tuff	0-2000?
	Facies equivalent of		
	6a	Eutaxitic tuffaceous? chert	0? -3000+
	Unit 6 conformably overlying and facies equivalent of		
Ordovician - Upper Devonian?	5a	Black argillaceous chert and siliceous slate	0? -4000+
	Facies equivalent of		
	5b	Interbedded siltstones and slates	0-100
	Facies equivalent of		
	5d	Banded black and grey chert	0-500

Base not exposed, may conformably (?) overlie oceanic or calc-alkaline volcanics or unconformably (?) overlie Proterozoic "Grit Unit" (Campbell, 1967)

characterized by 6" chert beds with 1" slate partings, each underlain by a ribbon chert sub-unit and overlain by cherts with thin (2") limestone horizons. This assemblage is partly overlain by and partly a facies equivalent of bleached ? pyritic chert, (unit 8b), outcropping to the north and northwest. A thin band of this unit at the north end of section E-F has discordant contacts with the surroundings black cherts indicating that it is an alteration product of the black cherts. The rock is pale grey to white, white rusty weathering and locally gives a soil geochemical response in lead and zinc.

The unit is correlated with Map Unit 13 of Campbell 1967 (Table I) in the Glenlyon map-area (105L). Campbell (page 56) assigns a Mississippian? to Permian ? probably Pennsylvanian, age to these rocks.

Unit 7

A calcareous formation (unit 7) runs diagonally across the map area from top centre to the southeast corner. This formation has been arbitrarily divided into a lower calcareous argillite unit (7a) and an upper unit (7b) of interlayered dirty limestone, quartzite and slate which apparently becomes increasingly limy upward in the sequence. Some limestone beds of five feet thickness were noted, but the range 6" to 18" is typical. A synformal outlier of unit 7 shown on section C-D has apparently suffered post-tectonic thermal metamorphism as it bears randomly oriented tremolite-actinolite needles. The source of this thermal metamorphism is unknown. These exposures also bear probable spirifer valves probably of Lower Mississippian age (op. cit., 1967, 1961), and are seamed with black calcite veins that may bear sphalerite. The outcrop area of this outlier is overlain by soils weakly anomalous in lead and zinc, unlike other exposures of unit 7 to the southeast. This is probably due to the closer proximity of the outlier to the volcanic centre which was the source of unit 6.

This formation is correlated with the Lower Mississippian Kalzas Formation in the Glenlyon map-area (op. cit., 1967). The Kalzas Formation has, however, a much greater proportion of limestone than unit 7.

Unit 6

Unit 6 is characterized by very siliceous volcanic effusive rocks, volcanoclastic sediments and exhalative chemical sediments as listed in Table II. Unit 6g is analogous to Archean massive sulphide deposits in that it probably formed by precipitation of a heavy metal-bearing effusive fluid in a sub-aqueous environment. Unit 6g is, however, a thin disseminated sulphide bearing unit in contrast to Archean analogues, possibly due to factors such as:

a) higher temperature of the effusive fluid
b) steeper palaeoslope
c) less strong reducing environment (as evidenced by syngenetic pyrrhotite rather than pyrite)

It is considered that the presence of local reducing basins characterized by graphitic argillite, within or near the volcanic centre, would favour the formation of massive Cu-Zn-Pb sulphide deposits of the Anvil type, only relatively enriched in copper. Hence any conductors outlined within unit 6 are high priority exploration targets. This concept is illustrated in Figure 4.

Two facies of unit 6g are observed:

(i) A chalcopyrite-pyrrhotite-pyrite-quartz (sphalerite?) facies, relatively quartz rich with perhaps 0.5 to 1.0% Cu (hand sample estimate). This facies is exposed in trenches in the north west part of the map area (where it has weak to absent soil geochemical expression) and in the north central area (where it has strong soil geochemical expression and apparently changes facies rapidly).

(ii) A galena-sphalerite-quartz (chalcopyrite? -pyrrhotite? -pyrite?) facies, relatively quartz poor and more strongly oxidized. A grab sample from the canyon cutting the map area from north to south gave an atomic absorption analysis of 1.72 % Pb and 4.6% Zn. A hand sample with higher lead content was obtained along strike from the chalcopyrite facies in the north central part of the map area. The large circular trenched area at the crest of the slope in this area shows a gossan zone which has a high zinc soil response and is probably of this facies.

There are apparently two sulphide - bearing horizons in the north-central part of the map-area. The upper horizon is not exposed but is inferred from a discontinuous strong soil geochemical response south of and parallel to the very strong and coincident geochemical response of the exposed horizon.

In the southeast corner of the map area, and at the northern contact of the quartz porphyry dyke (10a), are horizons of a fissile, gritty, dark grey, quartz-eye bearing rock (6d) thought to be a slightly reworked volcanic ash. The quartzes are fresh and clear to smoky, and are similar to those in the ~~prophyry~~ porphyry, hence Unit 6d is thought to be a volcanoclastic equivalent of the intrusive.

The dominant facies of unit 6 are units 6a, 6b and 6c. Unit 6a is black, very finely crystalline to cherty, and highly siliceous, with a eutaxitic (flammé or flaser) structure on the weathered surface suggesting a tuffaceous origin. Spatially, this facies is the most easterly facies of unit 6 and apparently grades laterally into impure black cherts and siliceous slates of unit 5 to the east.

Unit 6b is characterized by relief weathering, regular, 1/10 " - 1/2 " banding. It is again finely crystalline to cherty and grades laterally into banded cherts (unit 5d) in the south part of the map area. Some exposures exhibit an odd weathering effect in which planar (?) "vesicle" trains are developed at a high angle to the banding (bedding). This feature is believed to be due to recrystallization during the major deformation affecting these rocks, whereby easily weatherable material was concentrated in blebs in planes parallel to the axial plane of folds. This explanation is by no means satisfactory however, and the possibility exists that the "vesicles" express a true volcanic vesicular structure. This unit is associated with float occurrences of black, manganiferous, nodular silica.

Unit 6c is characterized by pale grey, white, cream or pinkish, aplitic textured, highly silicic volcanic rock, probably rhyolite. The unit is equigranular, massive to weakly banded and of uncertain geometry. Facies boundaries drawn between units 6a, 6b and 6c are very tentative and possibly in part gradational over tens (?) of feet. If a comparison with Archaean environments

is valid, it may be that sulphide horizons (unit 6g) are localized at the upper contact of lenses of rhyolite (6c).

Unit 5

The dominant member of unit 5 is recessive weathering, graphitic, siliceous slate and argillaceous chert unit (5a). Purer, banded, cherts (5d) are associated with the facies change to unit 6. These cherts are often indistinguishable from unit 8a . Another facies of unit 5, not subdivided, that is associated with unit 6, is slate with oxide spots after pyrite (?). This facies occurs immediately below unit 6d in the south-east corner of the map-area. Minor lenses (?) of interbedded siltstone and slate (unit 5b) of turbidite type occur within unit 5a. In the Glenlyon map area, apparently correlatable strata have Lower Mississippian fossils in limy horizons near their top, while to the southeast similar graphitic slates and argillaceous cherts bear Ordovician-Silurian graptolites. Hence the age of units 5 and 6 may be anywhere from Ordovician or earlier to Lower Mississippian, and/ or there may be a hiatus between Ordovician-Silurian and Devono-Mississippian sedimentation. A further alternative is that the limy horizons of the Glenlyon area properly belong to the Kalzas Formation (no limy members occur within units 5 and 6). If this is the case, unit 5 (and 6) and unit 8 may be correlatable to the Ordovician-Silurian and Devono-Mississippian chert-argillite assemblages of Roddick and Green (1961), in which the latter is in part derived from the former. This is interesting in that in the Dana area both units have derived soils anomalous in lead and zinc, and the Devono-Mississippian unit has a weaker response than the Ordovician - Silurian unit. It may be that soil anomalies reflect Devono - Mississippian secondary dispersion of Ordovician-Silurian primary metal dispersion. If this is so, anomalies underlain by unit 8 can probably be discounted. The base of unit 5 is not seen in the Dana area.

A major fault zone appears to cut the map-area in two from north to south. This zone may be contemporaneous with the major, early, folding and be due to the greater competence of the volcanic-rich western block. Such faults are north to north-northeast trending. Other northeast and north- northeast trending faults and fractures, dipping steeply west, may be tensional fractures due to extension parallel to the early fold axis during the early folding. When later events gave rise to depressions and culminations in the early fold axis, these fractures were the site of minor movement; e.g. in the Dana area easterly tilting was in part compensated by downdropping the western block on these faults. Such a fault, parallel to and 1000 feet east of section E-F has an apparent displacement of about 500 feet, west block down. Also important are north to north-west trending faults which are very apparent on ERTS imagery of the region. In the western half of the area, two such faults apparently have movement directions approximately in the axial plane of the folds, with displacement of the northeast block about 3000 feet up-dip. In terms of horizontal and vertical components these faults are left-lateral oblique with horizontal displacement of approximately 2500 feet and vertical displacement of 1500 feet. Major faults, possibly correlatable major folds and structural domains are shown on Map 14. While this map is probably a considerable oversimplification, it may be useful should:

a) further sections be required through the map-area, in portions with limited outcrop.
b) the trace of a rock-unit on the surface be required.

Of importance in later discussion are the possible thrusts shown on Fig. 4 and Maps 13 and 14. These are inferred at localities where unit 8 appears to dip southward underneath unit 7. As shown in Fig. 4 their effect is to shear out a vertical limb which would have satisfied the overall, regionally northward, dip and also the more widely evidenced conclusion that unit 8 overlies unit 7.

AREA "J"

Area J adjoins the Dana area to the east, as shown on Fig. 2, and is separated from it by a major fault trending approximately 350°. Movement on this fault is probably normal, east block up. Two similar faults occur within the area splitting it into a western horst block, and central and eastern successively downthrown blocks. The area is bounded to the northeast by a northwest trending fault which is probably a splay fault off the proposed Tay Fault Zone (Fig. 2), and to the south by a problematical contact with volcanic rocks of unit 4. This contact may be in part normal fault, in part thrust and in part basal unconformity (G. A. Jilson, pers. comm.). This latter possibility is enlarged upon in discussion of area "G".

The sequence from north to south is essentially the same as that described for the Dana Area (Table II). A greater variety of rock types are represented in units 5 and 6, and units 13a, 11b, 10a, 8c, 8b and 6g are not represented. Facies not previously described are:

Unit 6f

Thin horizons (~10 feet) of rusty, schistose, cream-coloured, felsic metavolcanic rock are found interbedded with units 6d, 5a (in part oxide-spotted slates (see "Dana Area")), and 6e. This unit is very similar to unit 4d, which borders the area to the south, and is also associated with rusty orange carbonate, like unit 4d. It is uncertain whether the rock chemistry is primary or due to metasomatism during shearing as suspected in some cases with unit 4d.

Unit 6e

Massive grey to brown weathering orthoquartzite composed of sand-sized clasts of clear or smoky, lustrous quartz, as in unit 6d, is thought to be a reworked, sorted, version of unit 6d. However, the rock is very poorly bedded if at all. Despite its purity it may not be particularly mature, as the quartz clasts are probably mostly, only moderately rounded, quartz "phenocrysts" from a not-too-distant volcanic ash deposit.

Unit 6d

This unit contains angular cobble-sized exotic blocks of darker grey, finer-grained material, adding to its pyroclastic character.

Unit 6a

Included in unit 6a are banded brown and grey tuffaceous (?) slates which are seemingly gradational with the oxide spotted slates (5a) and a brown-grey knobbly weathering fragmental siliceous rock that is probably syn-sedimentary slump breccia, since some fragments are of banded tuffaceous material, (6a, 6b).

Unit 5d

Included in unit 5d are bedded conglomerates or breccias that may be basal to unit 6. They may also be "the thin end of the wedge", or eastern extension of the Crystal Peak Formation in the Glenlyon and northwest Tay River map areas (op. cit., 1967, 1961), although the correlated unit (10) in the Glenlyon map-area is said to contain "gritty conglomerate" horizons. In area J the conglomerate is associated with black cherts with thin black shale partings (5d), and is underlain by a recessive slate unit (5a) very apparent on the aerial photography of the area. The conglomerate contains a complete spectrum from angular to rounded fragments, some with imbricate alignment, of quartzite (6e) and chert (5a, 5d). Beds have variable clast size, coarser cobble-bearing beds being up to five feet thick while finer pebble conglomerate beds are about one foot thick.

A pod of massive barite (G. A. Jilson, pers. comm.) associated with horizons of unit 6, outcrops in the southeast corner of the map-area, and the surrounding area is the source of zinc silt anomalies and zinc-lead-copper soil anomalies. The frequent occurrence of barite in the upper stratigraphic levels of stratiform volcano-sedimentary zinc-lead-copper deposits justifies detailed geological mapping and further geochemical and geophysical work in this area.

The structure of area "J" is apparently complex. In the north, the stratigraphic order deduced from the Dana area is, at first sight, reversed. The apparent dip of unit 8 under unit 7 is believed to be due to a thrust similar to those described in the Dana area. The apparent dip of unit 7 under unit 6 may also be due to such a thrust, or to a biased group of readings obtained from unit 7 in the poorly exposed area to the north of the contact. Structures observed at the contact suggest that it may be involved in a southerly verging, moderately inclined syncline in which unit 6 <u>underlies</u> unit 7 in the western block, and in a northerly verging anticline in the eastern block.

In units 5 and 6, facies changes and the possibility of super-imposed co-axial folding (as at the south end of section E-F in the Dana area, and evidenced here by northerly dipping early cleavage) complicate structural interpretations. In the western block there is a synform which may be an early or late fold, while the eastern block apparently consists of, from north to south, a northerly inclined anticline, an upright syncline and an upright anticline, all first generation folds. At the southern end of the eastern block this latter anticline seems to be involved in the crestal zone of a large amptitude (~ 1+miles) later antiform, resulting in a repetition of unit 5d without changing the bedding to early cleavage relationships. If this is so, the southernmost, north dipping, strata are overturned.

AREA "Z"

Area Z shares its western boundary with area J (Fig.2), and is bounded to the east by a major valley, probably the locus of faults. The northern boundary is arbitrarily set at the limit of useful exposure south of the swamps of the Tay River Valley, and the southern boundary is a major thrust plane on which unit 4 volcanic rocks override the Earn Group rocks.

Stratigraphically the sequence is essentially as described for the Dana area (Table II), with the following additions:

Unit 10b

Two dykes of altered biotite-quartz-feldspar porphyry intrude units 8 and 9 in the east-central part of the area. The eastern dyke may be conformable to bedding in unit 8, but both dip southwest at 60° and, since unit 9 dips northeast at 30°, both probably record the post-unit 9, pre-later tilting, vertical plane. The eastern dyke is strongly jointed parallel to its contacts and, sub-horizontally, normal to them. Joint planes are the site of highly altered and sheared intrusive. The bulk of the material does not appear to have been involved in a major deformation, however, in contrast to unit 10a, hence unit 10b may be Triassic or later, whereas 10a may be Ordovician.

Unit 9

Unit 9 is a package of homoclinal, northerly dipping, shales, siltstones and sandstones, underlying much of the north of area Z. In the eastern exposures, these rocks are of flysch facies (9a), with multiple, laterally extensive graded bedding units of about one foot thickness. An apparent disconformity in these exposures may be a mega-syn-sedimentary slump truncation, or a minor intraformational unconformity. Each bedding unit consists of a lower, graded (sometimes cross-bedded) silt-or sandstone, sometimes overlain by laminated siltstone, overlain by laminated shale (i.e. a Bouma A-B-E sequence). In the western and central exposures, thick massive grey to buff siltstone beds (9b) are intercalated with sequence, and some ripple structures were noted - these latter were probably produced by deep-sea turbidite flow.

Unit 9 is unmetamorphosed and unfolded, in contrast to unit 8. Hence unit 9 is believed to unconformably overly unit 8, and Mississippian brachiopods found in it (op. cit., 1961) are believed to have been reworked from the Earn Group (units 5-8 inc.). An apparently analogous facies (unit 9c) is Roddick and Green's unit 10 (op. cit., 1961) which bears Triassic pelecypods. This age is considered likely for unit 9 as a whole, on the basis of tectonic considerations discussed in the "Regional Setting" section.

Unit 8. A red hematitic, argillaceous chert + blue-grey chert + slate assemblage (8b) is found near the northern boundaries of unit 8 at what may be a high stratigraphic level in the formation. Pyritic cherts and associated gossans (compare Dana area) are also found at this level along the northern contact of the unit. Near the gossans in the centre of area Z a eutaxitic texture, with cream weathering fiammé on a brown-grey weathering matrix (compare unit 6a), was observed, suggesting a tuffaceous addition to the cherts. The streamlet draining this immediate area is anomalous in zinc, lead and copper. The eastern gossans give rise to a very local zinc-lead-copper anomaly that is unimpressive in zinc but the area is not well drained. The western gossans give strong silt anomalies in all three metals and warrant further, more detailed investigation. An acid intrusive body (Unit 10) is believed to outcrop on the ridge to the south of these gossans (G. A. J., pers. comm.), and a mile or so east along this ridge are very local occurrences of pink, aplitic material (compare unit 6c), white sheared tuff?, hydrothermal breccia (see also unit 6, below) and

quartz veining, all grouped under unit 8d.

The southern contact of unit 8 is, in the west at least, a steep thrust plane dipping south on which the older unit 7 rocks appear to conformably overlie the younger unit 8 rocks. This thrust or reverse fault is marked by intense shearing parallel to bedding in unit 7, and by pyrite mineralization in unit 8, giving a rusty zone at the contact. Similar faults have been described earlier.

Unit 7. Unit 7 contains horizons of volcanic material correlated with units 6a and 6c. Whether these units are basal to unit 7 or intercalated with the formation is unknown.

Unit 6. Facies 6b and 6g are not represented in the area. Facies 6d is dominant, in a synclinal wedge at the south end of the area. At its southern contact it contains "xenoclasts" as in area J, and overlies breccio-conglomerates of unit 5d. Crude bedding was noted in some of these exposures, confirming that the fissility of these rocks is a tectonic feature rather than a bedding-plane compaction phenomenon. Outcrops of fissile, cream-coloured felsic metavolcanic rock (6f) occur within this wedge of unit 6d. A prominent pointed hill to the north of these exposures is capped by breccio-conglomerates of unit 5d apparently overlying quartzites of unit 6e - the initial impression of this hill was that it was cored by a resistant, silicic breccia pipe and that the breccio-conglomerate was of hydrothermal origin - in this case rounding of cobbles would be by a fluidization flow process as often advocated for kimberlite and lamprophyre intrusions. Streams draining this area are strongly anomalous in zinc and copper justifying further work in the area. Further outcrops of unit 6e, with exceptionally fresh quartz clasts, flank another wedge of unit 6 rocks on the summit to the east. The structure here is very uncertain, but synclinal form is suggested. The north flank of this hill is strongly anomalous in zinc and weakly so in copper, warranting further investigation.

Unit 5. Unit 5b is not represented in area Z. Unit 5a is dominantly the thin-bedded, graphitic, argillaceous chert and siliceous slate described previously. Outcrops in the east of the area are very similar to unit 8a i.e. 2-6" black chert beds with 1/4" slate partings. Originally, this similarity and structural data from area "Z" suggested that the two units, 5a and 8a, were equivalent and that unit 7 formed synclinal outliers between them. However this theory was discarded in favour of the Dana stratigraphy modified by thrusts as described above.

Structurally, the most important feature of this area is the "Tay Arch", which is a complex feature incorporating a major, gently inclined, early deformation anticline in unit 8, an apparent later deformation arch similar to the Anvil Arch (evidenced by variations in early cleavage attitude, dip of unit 9, etc.) and the thrusts already described, which impart a dominantly southerly dip to the south flank of the arch in spite of the paradoxical aging of the sequence southward away from the axis of the arch. At the southern margin of unit 7 the early cleavage becomes affected by later events and the structure is incoherent. Further south the synclinal wedge of unit 6 has already been described. In the northeast portion of area Z , hematitic cherts of unit 8b directly overly volcanoclastic wacke of unit 6d, which in turn overlies slates and bedded breccio-conglomerates of unit 5. The absence of unit 7 in this sequence is unexplained. The sequence is thought to be a horst block upthrown on a fault parallel to and part of the "Tay

Fault Zone" (Fig. 2), exposing the unit 5 rocks in the core of the Tay Arch.

AREA "K"

Area K is bounded on the northeast by the limit of exposure south of the Tay River swamps, on the northwest by area Z, on the south and southwest by apparently geologically arbitrary major valleys, and on the southeast by drainage features which are possibly the locus of large faults with little displacement.

The sequence is as in area Z. A linear belt in the north and northeast represents the upthrown north flank of the Tay Arch, as described above for area Z, in which the sequence: unit 5, minor unit 6 (with "xenoclasts"), units 8 and 9 are represented. Southwest of the fault, outliers of unit 9 may be present on the north flank of the arch, and the arch is again cored by a major early anticline in unit 8. Again, units 5, 6, and 7 dip south on the south flank of the arch, supposedly due to thrusts as described for areas J and Z. This is especially true in the western portion of area K, where very few northerly dips are noted in these units. Here a southerly younging, apparently conformable sequence of units 5, 6 and a thin band of unit 7 lies with thrust contact on unit 8, and is in turn overlain by another thrust plate containing units 5,6, and plugs or dykes of unit 10a.

The flat top of Marks Mountain, representing the highest stratigraphic level of this plate, is formed from a sheet of volcanoclastic wacke (6d) which is massive and appears almost intrusive in character in its northernmost exposures. This sheet is successively underlain by tuffaceous cherts (6a) (including minor unit 5e described below), a thin band of orthoquartzite (6e), chert - argillite (5a), tuffaceous cherts (6a) (again, with 5e), and finally by chert-argillite (5a) again, exposed in an anticline in the centre of area K. Part of this sequence is repeated in a syncline to the north of this anticline, which lies on unit 7 with a probable tectonic contact. The lower, northern, thrust plate here consists of a thin sheet of unit 7 with minor intercalations of unit 6. To the west, the lower plate consists of a sequence, from top to bottom: sheared chloritic material (gouge?), chert pebble and cobble breccio-conglomerate (unit 5d or "wildflysch" tectonic breccia material), a thin limestone-slate assemblage (7b), siliceous slate (5a), tuffaceous chert (6a) with bands of rhyolite or welded tuff (6c) and siliceous slate (5a), overlying siliceous slate whose base, a possible thrust sole, is not seen. An outcrop of unit 6e in the topmost unit 5a is interesting in that it appears to cross-cut local lithological trends.

Unit 5e

Thin horizons of fissile grey limestone interbedded with slate, and limy tuffaceous slate are seen on the north face of Marks Mountain.

The quartz-porphyry dyke or plug (10a) mapped on the north ridge of Marks Mountain contains many 1/2" xenoliths of country rock near its contacts and is horizontally columnar jointed. A similar plug may outcrop on the north face of the hill directly west of Marks Mountain. This general area is the source of zinc, lead and copper silt anomalies and is worthy of more detailed investigation.

The southern margin of unit 8 is the locus of two transported gossans, the Yeti in the west and the Zeus in the east. The Yeti gossan is derived from rusty pyritic cherts and hematitic argillaceous cherts to the northeast. These rocks are the source of a local lead silt anomaly. However, a zinc-copper silt anomaly is associated with the northern contact of unit 8, with unit 9 in this area. There is a general relationship of relatively high zinc and copper in streams draining the core of the Tay Arch (unit 5) and the north contact of unit 8, and relatively high lead in streams draining the south contact.

The Zeus gossan may in part be derived from unit 8b as well, but an in-situ gossan on the south wall of the valley in unit 6 is the more likely source of it, its associated weak zinc and lead silt anomalies and a stronger, more localized zinc-lead-minor copper anomaly in the stream that drains the in-situ gossan to the west. High lead values downstream from the Zeus gossan may be due to an occurrence of galena in unit 8b to the north. Both these possibilities should be investigated further.

Of interest in area K is a zone of disturbance trending 050°. This zone has been named the Faro Depression and has the following characteristics:

i) It marks the axis of a major depression in the Anvil Batholith and the Anvil Arch.

ii) It is apparently responsible for the preservation in a depression of a great thickness of Unit 4 volcanic rocks in area "X".

iii) The Anvil orebody, the KD deposit, the porphyries described above, and the Yeti anomalies lie between one and two miles to the east of its axis, and its axis is parallel to major soil geochemical anomalies and galena-bearing veins in the Mount Mye Area.

iv) It is associated with D_5 structures (Lewis, 1973) in the Mount Mye area and in area Z, especially immediately north of Marks Mountain, and in the northern upthrown block in the Tay Fault Zone.

v) It appears to have a well defined width of approximately four miles.

vi) It is parallel to known fractures in the Pre-Cambrian basement to the east and northeast, which may have been responsible for mineralization of overlying strata (e.g. at Pine Point).

JAN

The Jan area is bounded on the north and northwest by area K, on the east by a major north trending fault zone, on the southwest by a major fault and on the south by the valley of Mye Creek.

Units 5, 6, 7 and 8 are represented, with units 6a and 6b underlying most of the area. Exposure is limited, but the available lithological and structural data can be explained by basin and dome interference patterns developed by the interaction of north to northwest trending early folds and east-northeast trending late folds as shown on Map 2. Unit 7 may be thrust over unit 8 in the northeast corner of the area.

Gossans associated with unit 8b in the northeast do not seem to have any geochemical expression in the stream silts.

In the northwest strong silt anomalies in zinc, lead and copper drain rocks very similar to those found in the western part of the Dana area (unit 6b) with "vesicle" trains oblique to banding, and a siliceous gossan. This favourable horizon is probably continuous along strike to the eastern margin of the Jan area. It is probably the source of the very strong zinc and lesser copper and lead silt anomalies in the northeast of the area, as well as similar zinc-copper-minor lead silt anomalies in the east, and the probably hydromorphic soil anomalies on the Jan claims to the southwest. These latter anomalies may also be due in part to high background levels in the siliceous slates of unit 5a exposed in a domal structure underlying the centre of the Jan area. As recommended by G.A. Jilson et al (1974c) the favourable horizon should be covered by a soil geochemical survey, by extending the Jan grid to the north and northeast.

Streamlets draining the area to the southwest show local copper and minor lead and zinc silt anomalies worthy of follow-up prospecting.

AREA "O"

Area O mapping is based on a report by Atlas Explorations Ltd. on their Owl claim group. The rocks constitute a homoclinal, south-dipping, faulted sequence of Earn Group units 5, 6, 7 and 8. North-easterly trending sphalerite-galena-chalcopyrite bearing veins are present in unit 5 or 8a cherts, and disseminated chalcopyrite and arsenopyrite are found in fine grained siliceous rocks (8b?). There seems to be a higher proportion of discrete limestone beds in this sequence than in rocks to the southeast.

MOUNT MYE

The Mount Mye area geology is the subject of a report by Kangaroo Exploration Corporation (Lewis, 1973), to which the reader is referred for detailed discussion of lithologies, stratigraphic problems, internal structure, etc. The metasedimentary rocks have been intensely deformed twice (D_1 and D_2 deformations) and no stratigraphic order can be deduced. The unit divisions used here and on Map 1 combine lithological and metamorphic characteristics, and the units are thought to be largely time-stratigraphic equivalents. They are numbered in order of present tectonic superposition.

The rocks are thought to represent an island arc assemblage of Palaeozoic age, probably Ordovician to Devonian. Four main volcano-sedimentary facies are present:

i) a proximal, dominantly calcalkaline volcanic facies (unit4) which contains fine to coarse, immature sediments (2f, 2g), minor limestones (1b), and may overly an Ordovician-Silurian graphitic slate (2d, 5a) basement.

ii) an intermediate, dominantly limy pelitic facies (2c, 2e) which contains volcanic horizons (3), and may be bordered distally by limestones (1b).

iii) an intermediate, dominantly limy pelitic facies (2c, 1) that has very minor, tuffaceous horizons and limestones (1b), and

iv) a distal, dominantly pelitic facies (2a, 2b, 2f, 2h) that may rest on and/or interfinger with unit 5.

The D_1 "event" in the Mount Mye rocks is apparently the same event that has folded the Earn Group to the north, while the coaxial disturbance of the early cleavage in the Earn rocks is thought to be related to the D_2 event. Local D_3 minor structures are associated with the very strong north-northwesterly lineaments in the region, while D_4 structures, including the Anvil Arch, are coaxial with, and geneticly related to, D_2 structures. D_5 structures trend east-northeasterly, and are late and brittle, although, as suggested above, they may have a fundamental, early basement control.

Structural style divisions and metamorphic grade divisions are largely coincident with the facies divisions, i) to iv), given above:
They are:

i) D_1 gentle to isoclinal buckle folds, with much associated shearing; D_2 to D_5 gentle folds and flexures. Sub-to low greenschist facies metamorphism.

ii) D_1 tight to isoclinal folds with transposition of bedding parallel to early foliation; D_2 open to tight flexural slip folds; local D_3 gentle to tight, chevron, flexural slip folds; D_4 and D_5 gentle flexures. Chlorite-grade greenschist facies metamorphism.

iii) D_1 as above; D_2 tight to isoclinal modified flexural slip folds; D_3-D_5 as above. Biotite-grade greenschist facies metamorphism.

iv) D_1, D_2, D_3, D_5 as above; D_4 gentle to close buckle, flexural slip and chevron cascade folds on the north flank of the D_4 Anvil Arch. Garnet-grade greenschist to staurolite-grade amphibolite facies metamorphism.

Lithologies present in the area are listed in Table III. The volcanic rocks of unit 4 are important in that they host the KD zinc-copper deposit (Jilson, 1974), which may have been a feeder zone to stratiform zinc-lead-copper deposits in the overlying sediments. This deposit is the source of a very local zinc-lead-copper silt anomaly, which demonstrates the necessity for extremely detailed silt sampling of this terrain.

LISA

The Lisa area covers the south-eastward strike extension of the Mount Mye metasediments. It is bounded on the southwest by the approximate axis of the Anvil Arch (Fig. 2), on the southeast by a major D_3 fault - the Blind Creek Fault (op. cit., 1972a), on the east by a major D_3 fault zone and on the north and northwest by valleys that may be the loci of major faults.

The geology is described in detail in a previous report for Ridgemont Mining Corporation (Lewis and Simpson, 1973b). Brief descriptions of units are given in Table III. In essence the rocks represent a northward steepening pile of layered metasediments comprising a thick, basal, coarse mica schist (2a), overlain by mixed limy phyllite (2c) and fine schists (2b, 2h), overlain by pyrrhotitic phyllite (2b), overlain by graphitic phyllite (2d). This assemblage is overlain by banded greywackes (5b or 9), and in fault contact with tuffaceous cherts of unit 6.

Minor copper showings in the canyon of Ace High Creek have very minor expression, if any, in stream silts. These minor showings are in a horizon lithologically equivalent to the ore horizon of the Faro deposit. There are minor lead silt anomalies associated with this general area, and while these anomalies

may be due to contamination by previous exploration, further work is recommended by this author (op. cit., 1973b).

The upper reaches of Ace High Creek (also known here as Mur Creek) show two zones of silts anomalous in zinc and lead. The upper, more anomalous, zone is correlatable with the known "Mur" showings in a roof pendant of schist in the Anvil Batholith. These showings are both pre-and post-deformation stringers and veins. The lower zone of anomalies spans the schist belt from its southern contact with the batholith (known locus of vein mineralization elsewhere in the region), through the calcsilicate unit (whose contacts are the locus of the Faro deposit), to its northern contact with the zinc-rich graphitic phyllite unit. In addition, it occurs after the transition from an active, straight stream in a V-shaped valley, into a meandering, low-energy stream in a broader swampy valley, where metal fixing in organic material is more prevalent. The intermediate zone of low values corresponds with a section of active stream draining a very large swamp. Hence this anomalous zone may be geneticly very complex.

The Lisa area is affected by the "Ace Depression" which is analogous to the Faro Depression. It shares characteristics i), iv), v), and vi) with the Faro Depression, and is in addition bounded by strong D_5 linears, i.e. the Vangorda-Mur Creeks lineament and the Blind Creek Fault, both having apparent left-lateral displacement.

AREA "T"

Area "T" is bounded on the southwest by the Mount Mye area, on the southeast by the Lisa area, on the northeast by a major fault separating it from the Jan area, and on the northwest by a D_5 linear which has localized the Mye Creek valley.

In the southeast, dark grey, thin-bedded (1"-6"), graded silty slates and slates (5b) overlie a thin bedded (6") brown, impure, sometimes laminated dolomitic limestone (5 e), which in turn overlies a grey, platy to massive, bioclastic limestone (5e) bearing Middle Devonian two-hole crinoid ossicles. This assemblage overlies massive orthoquartzite (6e) which also outcrops a mile to the west. Here it is in fault contact with, and/or may overlie volcanic rocks of unit 4. Orthoquartzite also outcrops a mile to the north, where it may dip under volcanic rocks (4) and is interbedded with siliceous slates of unit 5a. Hence the stratigraphic relationship of these Earn Group rocks to unit 4 rocks is uncertain, except that unconformable relationships are not apparent.

In the north a crude stratigraphy within the volcanics can be seen, in which finely banded subaqueous silicic tuffs (4c) overlie intermediate to acid pillow breccia (4b), which overlies intermediate to basic pillows and flows (4a) in turn overlying greenstones, possibly originally tuffaceous (4f). This assemblage probably lies on a surface which is the site of at least minor displacement.

The most complete phyllite sequence is seen in the northwest, where, from top to bottom,we have:-

D_2 crenulated, dark grey silicic phyllite or slate similar to rocks of unit 5a overlying the volcanics described above.

Dark grey - green fissile slaty tuff (3c)
Thin banded, silicic, subaqueous tuffs (3c)
Coarse tuff with orange carbonate alteration (3f)
Siliceous slates (2b)
Coarse carbonatized tuff (3f)
(all of the above units being only a few feet thick)
Grey limy slate and phyllite (2c) and grey platy limestone (1b)
Fissile coarse tuffs (3f)
Grey limy banded slate and phyllite (2c)
Fissile coarse tuffs (3f)
Light brown limy quartzose slates (2c) showing D_2 affecting the S_0/S_1 lineation.
Interbanded grey limestones (1b) and phyllite (2c)
Interbanded grey limestones (1b) and tuffs (3c)
D_2 folded grey limy phyllite (2c)
Interbanded buff and grey marble (1b) - two horizons
Limy phyllite (2c)
Greenstone pods (3a) with limy, chloritic phyllite selvedges (3e) - two horizons, the upper horizon showing D_1/D_2 interference patterns in chloritic, phyllitic tuff interbedded with buff marble.

As with the Mount Mye area, no stratigraphic order is implied here, due to the strong deformation. A dioritic plug (3d) intrudes the phyllites in northeast area T.

No significant silt anomalies were located in area T.

The assemblage as a whole can be said to dip eastward. However, the southern margin of area T is marked by a sharp truncation of these easterly dips against the north-northeasterly dipping graphitic phyllite (2d) bordering the higher metamorphic grade rocks. The northern boundary of the phyllite was suspected to be a zone of dislocation in the Mount Mye area (S. E. Ridge), where a D_2 fold structure in greenstones (3) seemed to plunge into the graphitic unit (2d). Skarny rocks at the contact suggest high heat flow and a marked difference in structural style and metamorphic grade was noted on either side of the unit. Hence this contact is the site of a major post-D_2 dislocation, thought to be a gravity slide of the Anvil Arch.

AREA "Y"

Area Y is separated from area T to the southeast by a D_5 linear occupying Mye Creek, which marks the axis of the major D_5 antiform that is responsible for the uplift of unit 5 in the Jan area. On the northeast, a fault separates it from the Jan area and on the southwest there is an arbitrary boundary with the Mount Mye area. On the northwest, a D_5 linear marking the margin of the "Faro Depression" separates it from area "X".

The southern half of area Y shows a succession similar to that of area T with fragmental (4b), pillowed (4a), and tuffaceous (4f, 4c) volcanics overlying phyllites (2b, 2c), with included greenstone (3a) lenses, silicic tuffs (3c) and chloritic phyllite (3c). The top of this north dipping pile is marked by a transgressive zone of altered, sheared, carbonatized volcanics (4d), thought to be due to the overthrusting of a synformal klippe of units 4, 5, 6, and 10, showing

a stratigraphic succession as follows:-

Intermediate pillowed volcanics (4a)
Intermediate-acid fragmental pillow breccia rocks (4b)
Dark brown slate (5c) with Ordovician-Silurian graptolites
Orthoquartzite (6e)
Black, graphitic, argillaceous cherts and siliceous slates (5a)

At the base of the sequence, lying on the proposed thrust plane, and apparently conformable, is a lens of very fresh-looking, undeformed rhyolitic crystal tuff (10c), with a porphyry dyke near its south contact. This unit may be Tertiary (op. cit., 1972) or Ordovician, having escaped deformation due to its incompetent host rock.

High zinc in stream silts in this area is probably due to high background zinc in unit 5. A local zinc-lead-copper anomaly in the stream draining the north boundary of the area is worth follow-up prospecting.

AREA "X"

Area X is bounded on the north by a thrust contact with area J. This thrust contact may form its eastern boundary, with area K, as well, or the rocks of area K may overlie those of area X. The western and southern boundaries are the upper forks of Anvil Creek - the former following a D_5 linear marking the northwestern margin of the Faro Depression.

Area X is underlain by an east-dipping pile of unit 4 volcanic rocks, and minor sediments (1b, 2c, 2f, 5a). The unit 5a rocks may conformably overlie the pile, or there may be a fault contact between them. Within the pile, the stratigraphic section is as follows:

Basic-intermediate pillows and flows (4a)
Pillow breccia (4b)
Thin (5') impure limestone (1b)
Massive tuffs (?) (4f)
Pillow breccia (4b) - at least 1500 feet thick
Massive tuffs (?) (4f)
Pillow breccia (4b), minor flows (4a)
Banded subaqueous tuffs (4c)
Massive and coarse bedded tuffs (4f)
Pillowed flows (4a)
Acid pillow breccia (4b)
Tuffs (4f)
Schistose pillows (4a)
Carbonatized tuffs (4d)
Thrust plane - carbonatized tuffs and sediments
Thin bedded siltstones and slates (2f)
Pillow breccia (4a)
Tuffs (4f)
Limy phyllite (2c)
Tuffs (4f) with minor associated jasper

This assemblage is warped by gentle D_1 folds, assymetric to the north, and is internally faulted.

In its northeast corner, Area X is underlain in part by black slates (5a) which are apparently the source of strong zinc and copper silt anomalies. This area warrants further investigation in the form of detailed prospecting and soil sampling.

AREA "G"

Area G is bounded to the southeast by the Mount Mye area and area X, to the northeast by area J and the Dana area, to the northwest by an intrusion of the porphyritic phase of the Anvil Batholith and by area P, and to the southwest by the axis of the Anvil Arch.

The southwestern portion of area G is underlain by the porphyritic phase of the Anvil Batholith (op. cit, 1972a), which is the source of spotty lead silt anomalies probably due to late, coarse, quartz-galena veing.

The southern half of the area is underlain by an assemblage similar to that of the Mount Mye area, with a volcanic pile (4) overlying a phyllitic sequence (2, 3) with possible thrust contacts. A number of dioritic stocks (3d) are present in the phyllites, which show a less intense D_2 effect than those in the Mount Mye area. In addition. there seems to be a marked discordance between attitudes north of the graphitic phyllite (2d), which are northwesterly dipping and those south of the unit, which are northeasterly dipping. The situation is very similar to that described in area T, and hence this area is believed to represent the northwestern end of a thrust plate that has ridden on unit 2d.

The western part of area G is underlain by amphibolite gneiss (op. cit., 1972) believed to underlie the thrust contact.

The northern half of the area is underlain in part by calcsilicate gneiss (1a, 1b) and amphibolite gneiss (3b), and in part by volcanic rocks of unit 4. A thrust contact is believed to separate the high metamorphic grade rocks from the low grade volcanics. The former rocks include thin horizons of acid volcanic material (6b) and are intruded to the west by porphyritic quartz-monzonite of the Anvil Batholith.

The eastern part of area G is underlain by altered, carbonatized volcanics (4d), characteristic of zones of shearing and/or dislocation, and by pillow breccias (4b). Unit 6e, orthoquartzite, overlies these rocks in this area, either unconformably or with thrust contact. Evidence along strike to the east suggests that unit 4 rocks have been thrust over units 5 and 6, rather than vice versa, hence an unconformity (or possible conformable contact) is favoured.

Streams draining area G have silts occasionally anomalous in copper, but with low lead and zinc (excepting the areas underlain by batholith as discussed). These spotty copper anomalies are believed to be due to trace blebs of chalcopyrite in the calcsilicate rocks (1) and volcanic rocks (4).

AREA "P"

Area P lies at the western extremity of the region covered by the reconnaissance program, immediately west of area G. It is underlain by calcsilicate gneiss (1) amphibolite gneiss (3b), coarse schist (2b) and porphyritic quartz-monzonite (11b). The amphibolite gneisses show some relic volcanic textures including fragmental texture (4b) and tuffaceous banding (4c). The inference is that this assemblage is a high metamorphic grade equivalent of units 4 and 2c. Again, only very local copper silt anomalies are noted with very low lead and zinc values.

AREA "S"

Area S lies on the eastern side of a major fault zone that forms the eastern margin of the Jan and Lisa areas. There appears to have been left-lateral movement on this fault zone, juxtaposing rocks of the Earn Group (unit 6) with coarse schists, granites and other metasediments characteristic of the core of the Anvil Arch.

The southern third of area S is underlain by coarse mica schists, with garnet and staurolite, showing D_2 rootless isoclines in quartz rods and incipient D_4 fabrics, as described in the Lisa area (Lewis and Simpson, 1973b). The central third is underlain by non-foliated, equigranular, medium grained hornblende-biotite granodiorite (11), and the northern third by what are apparently phyllite-grade metamorphic equivalents of the Earn Group. Rock types recognized here are black metacherts, quartzites, calcsilicate rocks, greenstones, limy phyllites and one exposure of limestone-cobble conglomerate. A silt anomaly was located in 1970 immediately east of these exposures, by Cyprus Exploration Corporation. The area was not covered by the present silt-sampling program.

Summary

The stratigraphic column deduced for the Anvil Range as a whole is given in Table III enclosed.

There are four main stratigraphic subdivisions present:

1) The Anvil Batholith and related intrusives (units 10, 11 and 12) of Cretaceous age.

2) A formation of post-orogenic sediments (unit 9) of Permo-Triassic age.

3) The Earn Group (units 5-8 and 10) of Ordovician (or earlier) to Pennsylvanian-Permian age.

4) The "Faro Metamorphic Complex" (units 1-4) of Ordovician (or earlier) to Devonian age.

The batholith contains only scattered vein mineralization probably derived from the metamorphic complex, and, with the post-orogenic sediments, can be discounted as a source of economic mineralization.

Although stratigraphic proof is not available, it seems likely that the volcanics of the Earn Group (unit 6) and those of the metamorphic complex

(unit 4) are co-genetic, and hence that mineralization such as that associated with the metamorphic complex may be found in the Earn Group, thus justifying the rationale for the program as stated in the introduction to this report. However, the Earn Group rocks stand on their own merit as worthy of further exploration.

Geochemically, the four subdivisions have their own signature. The batholith is characterized by scattered local lead silt anomalies, and low copper and zinc values, due to coarse quartz-galena vein mineralization. The post-orogenic sediments are low in all three metals, but this is not strikingly apparent from the silt maps, due to contamination from the Earn Group rocks to the south. The Earn Group itself has high background zinc in silts, and is relatively rich in copper and lead over large areas. In the metamorphic complex, the volumetrically most abundant rocks are the volcanics, amphibolite gneisses and calcsilicate gneisses, all of which are characterized by scattered copper anomalies, and low zinc and lead - this is especially true of the high metamorphic grade rocks. The graphitic phyllite unit (2d) has a high zinc background, in keeping with its correlation with unit 5. The two units are also indistinguishable on the airborne electromagnetic survey of the region.

The volcanic rocks of unit 4 are considered to be allochthonous, and to form two klippes; an upper klippe, underlying most of area X, and the northern parts of area Y and the Mount Mye area; and a lower, larger klippe underlying the southeast halves of areas G and Y, area T, and that part of the Mount Mye area northeast of unit 2d. In addition, there must be a major tectonic break between areas P and G, and the Dana area and area J to the north, to account for the contrast in rock-types, structural style and metamorphic grade between these areas.

GEOCHEMISTRY

Method

All streams and tributaries were sampled at approx. 1,000 foot intervals with particular attention being given to tributaries and tributary junctions. Wherever possible, silt fraction material was taken and assigned to prenumbered, Kraft wet-strength paper bags. Samples were partially air-dried and shipped to Whitehorse where they were further dried in an air oven at 70°, seived to 80 mesh on nylon screens and a two gram sample taken for further treatment. Three sample splits were then treated with 0.5N hydrochloric acid and the resultant solutions analysed for copper, lead and zinc using atomic adsorption techniques.

The results are shown on Maps 3 - 8 enclosed, and the silt sample numbers are given on Maps 9 and 10.

Results

The varied lithologies encountered during the mapping have characteristic and varied geochemical signatures. These variables, along with variable dilution due to stream size, etc., precludes the useful application of statistical treatment to the results. Anomalies worthy of further investigation have been chosen after consideration of all these variables and are shown on the interpretative Maps 11 and 12. These maps are perhaps best used as sepia overlays to the Geology Maps 1 and 2. The anomalies shown are discussed in the Geology section under the revelant area heading.

CONCLUSIONS AND RECOMMENDATIONS

The Anvil Range program was successful in that:

i) it supported the premiss that volcanic and sedimentary rocks to the northeast of the metamorphic pile cloaking the Anvil Batholith are worthy of exploration for mineral deposits cogenetic with Faro-type mineralization.

ii) it outlined numerous geochemical anomalies in geologically favourable terrain worthy of more detailed exploration, firstly by detailed geological mapping, prospecting and soil sampling, and then by more intensive techniques such as geophysical surveys and diamond drilling as warranted.

Target areas for such follow-up work are shown on Maps 11 and 12 and are numbered on a priority basis. The areas are defined by boundaries of geochemically anomalous catchment areas and by geologically favourable environments. The first four priorities are the logical and recommended continuations of work on the Dana, Jon, Jan and Lisa (in part) areas. Investigation of Target Area 5 is especially high priority due to the interest shown in this area by a rival company during the 1973 season.

Respectfully submitted,

P.F. Lewis

P. F. Lewis, B.Sc.

APPENDIX I

References

APPENDIX I

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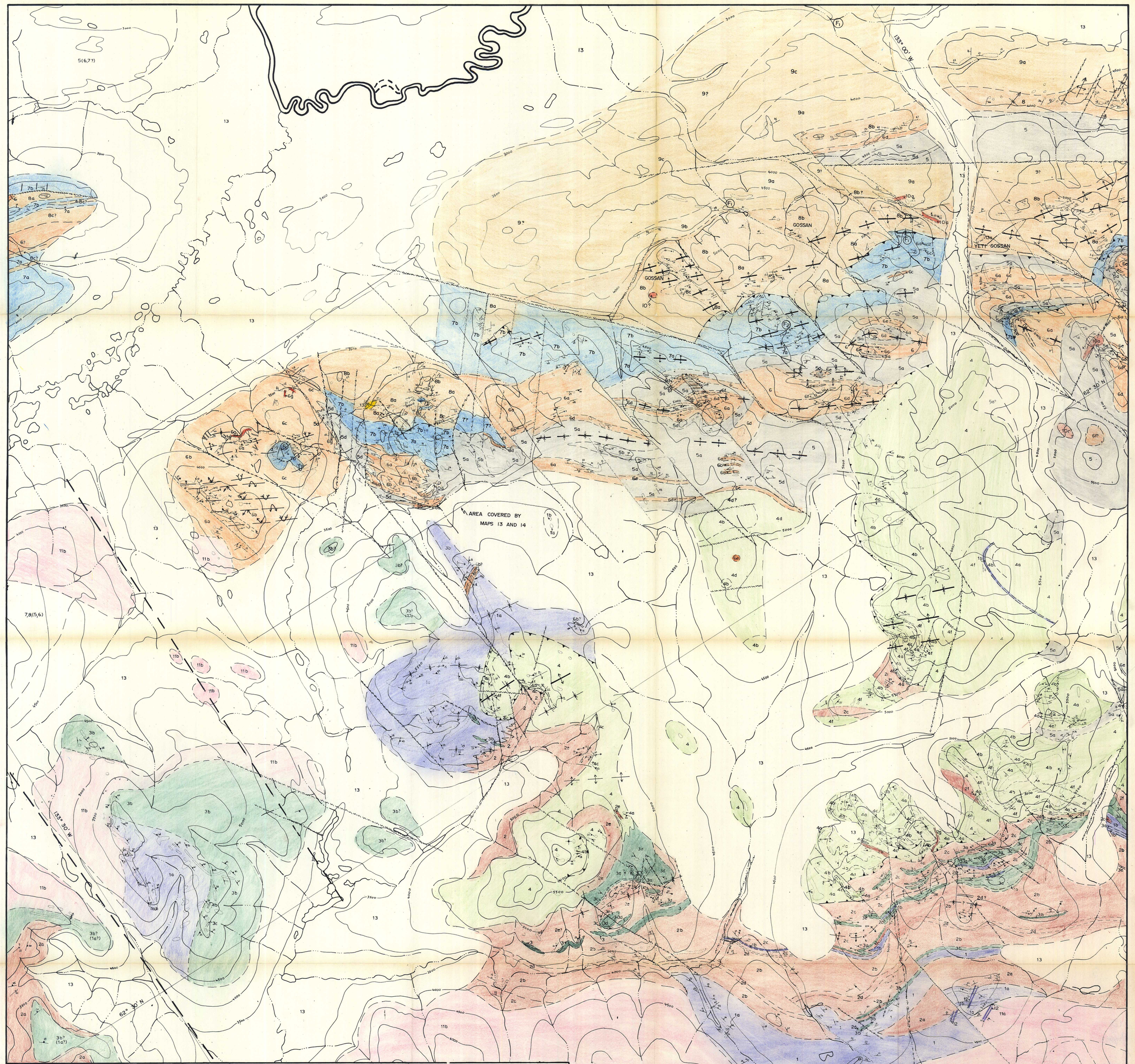
TABLE III

Stratigraphic Column, Anvil Range

Period	Map-unit		Lithology	Thickness (feet)
Quaternary	13		Overburden	
	Unconformity, in part			
Quaternary	13a		Breccio-conglomerate with oxide rich matrix, Unconsolidated limonitic mud	50+
	Unconformity			
Cretaceous-Tertiary	12		Hornblende porphyry	
	Intrusive contact with units 1, 2 and 11			
Cretaceous	11		ANVIL BATHOLITH and associated intrusions	
		11b	Prophyritic quartz-monzontie	
	Intrusive contact with units 1, 2, 3, 6 and 11a			
		11a	Muscovite-biotite granodionite, in part foliated	
	Intrusive contact with units 1 and 2			
Ordovician? and later	10		Rhyolitic intrusives and extrusives	
		10c	Welded crystal tuff	0-100+?
	Thrust contact (?) with unit 4			
		10b	Altered biotite-quartz-feldspar-porphyry	
	Intrusive contact with units 8 and 9			
		10a	Quartz-porphyry, in part foliated, and microgranite	
	Intrusive contact with units 5 and 6			
Mississippian? or Triassic	9		Facies present include:-	3000+?
		9c	Interbedded greywacke and shale, minor conglomerate, with Triassic pelecypods.	
		9b	Massive, thick bedded siltstones and sandstones	
		9a	Thin bedded, flysch-type, greywackes and shales	
	Unconformity			
Mississippian-Permian?	8		Facies present include:-	2000+
		8d	Aplite, tuff, hydrothermal breccia	minor
		8c	Black siliceous slate	minor
		8b	Bleached (?), pyritic chert	
		8a	Interbedded grey and black chert, and black slate, minor limestone.	
	Conformably (?) overlying			
Upper Devonian-Mississippian	7		KALZAS FORMATION, including	2000
		7b	Interbedded limestone, quartzite and slate	
		7a	Calcareous slate	
	Conformably (? - Crystal Peak Formation apparently absent) overlying			
Ordovician? - Devonian?	6		Facies present include	0-3000+?
		6g	Sulphide - bearing siliceous exhalite	minor
		6f	Schistose felsic metavolcanic rock	minor
		6e	Sparkling orthoquartzite	
UNITS 5 - 8 inc. EARN GROUP		6d	Fissile, quartz-eye bearing, volcanoclastic wacke	
		6c	Aplitic welded siliceous tuff and/or rhyolite	
		6b	Banded siliceous tuff	
		6a	Eutaxitic tuffaceous (?) chert and slate	
	Facies equivalent of			
Ordovician? - Devonian	5		Facies present include	5000+?
		5e	Interbedded grey impure limestone and slate, calcareous tuffaceous slate, silty dolomitic? limestone, and grey bioclastic limestone with Middle Devonian crinoids.	minor
		5d	Black and grey cherts with slate partings, bedded breccio-conglomerate	
		5c	Brown slate with Ordovician-Silurian graptolites	minor
		5b	Interbedded siltstones and shales	
		5a	Black argillaceous cherts and siliceous slates.	
	Conformably (?) overlying, facies equivalent (?) of, and in part underlying			
Ordovician? - Devonian?	4		Facies present include	5000+?
		4g	Coarse basic-intermediate intrusive plugs and dykes.	
		4f	Massive to schistose intermediate greenstones (metatuffs?)	
		4e	Metamorphosed hydrothermally altered volcanic rocks	
		4d	Sheared, carbonatized volcanic rocks	
		4c	Subaqueous, banded, silicic tuffs and tuffwackes.	
		4b	Intermediate-acid fragmental volcanic rocks (pillow-breccias)	
		4a	Basic-intermediate pillowed and massive flows.	
	Facies equivalent of (compare facies of unit 4)			
Ordovician? - Devonian?	3		Facies present include	0-5000+?
		3f	Massive to schistose intermediate greenstones (metatuffs?)	
		3e	Chloritic phyllite (metatuffs and tuffwackes?)	
		3d	Coarse basic-intermediate intrusive plugs and dykes	
		3c	Subaqueous, banded, silicic tuffs	
		3b	Amphibolite gneiss and chloritic schist, (minor relic breccia)	
		3a	Massive, basic-intermediate greenstones (meta-flows?)	
	Interbedded with and facies equivalent of			
Ordovician? - Devonian?	2		Facies present include	5000+
		2h	Andalusite porphyroblast phyllonite(?)	
		2g	Greywacke, pebble conglomerate	minor
UNITS 1-4 inc. FARO METAMORPHIC COMPLEX		2f	Interbedded siltstones and slates	
		2e	Limy, thin-bedded phyllite	
		2d	Graphitic phyllite	
		2c	Limy phyllite, transposed bedding	
		2b	Muscovite-chlorite phyllite	
		2a	Biotite-muscovite schist ± garnet, staurolite	
	Facies (?) equivalent of, and interbedded (?) with			
Ordovician? - Devonian?	1		Facies present include	5000+
		1b	Buff and grey marble and limestone, minor interbedded calcsilicate rocks and tuffs	
		1a	Calcsilicate gneiss and phyllite, minor schist (2a), phyllite (2b) and marble (1b)	
	Base of metamorphic complex not seen			



LEGEND

LITHOLOGY

13	OVERBURDEN; (13a) LIMONITIC BRECCIO – CONGLOMERATE, UNCONSOLIDATED TRANSPORTED GOSSAN	QUATERNARY
12	HORNBLENDE PORPHYRY DYKES	CRETACEOUS – TERTIARY
11	ANVIL BATHOLITH AND ASSOCIATED GRANITIC INTRUSIVES; (11a) GRANODIORITE, IN PART FOLIATED; (11b) PORPHYRITIC QUARTZ-MONZONITE	CRETACEOUS
10	(10c) RHYOLITIC CRYSTAL TUFF	ORDOVICIAN OR CRETACEOUS ?
	(10b) BIOTITE – QUARTZ – FELDSPAR PORPHYRY DYKES	TRIASSIC ? or LATER
	(10a) QUARTZ – PORPHYRY, IN PART FOLIATED, AND MICROGRANITE	ORDOVICIAN ? – DEVONIAN ?
9	(9c) GREYWACKE, SHALE, MINOR CONGLOMERATE	TRIASSIC
	(9b) THICKBEDDED SILTSTONE	MISSISSIPPIAN ? or TRIASSIC ?
	(9a) FLYSCH FACIES GREYWACKE AND SHALE	TRIASSIC ?
8	(8a) BLACK CHERT AND SLATE, MINOR LIMESTONE; (8b) BLEACHED PYRITIC CHERT; (8c) BLACK SILICEOUS SLATE; (8d) APLITE, TUFF, HYDROTHERMAL BRECCIA	MISSISSIPPIAN – PERMIAN ?
7	KALZAS FORMATION; (7a) CALCAREOUS SLATE; (7b) INTERBEDDED LIMESTONE, QUARTZITE AND SLATE	U. DEVONIAN – MISSISSIPPIAN
6	(6a) EUTAXITIC TUFFACEOUS CHERT; (6b) BANDED SILICEOUS TUFF; (6c) APLITIC WELDED TUFF OR RHYOLITE; (6d) QUARTZ – EYE VOLCANIC WACKE; (6e) ORTHOQUARTZITE; (6f) FELSIC METAVOLCANIC	EARN GROUP — ORDOVICIAN? — DEVONIAN ?
6g	SULPHIDE BEARING SILICEOUS TUFF OR EXHALITE	
5	(5e) INTERBEDDED LIMESTONE AND SLATE, CALCAREOUS TUFFACEOUS SLATE, SILTY DOLOMITIC (?) LIMESTONE, GREY BIOCLASTIC LIMESTONE;	DEVONIAN
	(5d) CHERT, BEDDED BRECCIO – CONGLOMERATE	ORDOVICIAN? – DEVONIAN ?
	(5c) BROWN GRAPTOLITIC SLATE	ORDOVICIAN or SILURIAN
	(5b) INTERBEDDED SILTSTONES AND SHALES	ORDOVICIAN ? – DEVONIAN ?
	(5a) BLACK ARGILLACEOUS CHERT AND SILICEOUS SLATE	
4	(4g) COARSE BASIC – INTERMEDIATE INTRUSIVE PLUGS AND DYKES	
	(4f) INTERMEDIATE GREENSTONES, POSSIBLY METATUFFS	
	(4e) METAMORPHOSED HYDROTHERMALLY ALTERED VOLCANIC ROCKS	
	(4d) SHEARED, CARBONATIZED VOLCANIC ROCKS	
	(4c) BANDED SILICIC TUFFS AND TUFFWACKES	
	(4b) INTERMEDIATE – ACID FRAGMENTAL ROCKS	
	(4a) BASIC – INTERMEDIATE PILLOWED AND MASSIVE FLOWS	
3	(3e) BASIC – INTERMEDIATE GREENSTONES; (3b) AMPHIBOLITE GNEISS, CHLORITIC SCHIST; (3c) BANDED SILICIC TUFFS AND TUFFWACKES; (3d) COARSE BASIC – INTERMEDIATE INTRUSIVE PLUGS AND DYKES; (3e) CHLORITIC PHYLLITE, (3f) INTERMEDIATE GREENSTONES, POSSIBLY META TUFFS	"FARO METAMORPHIC COMPLEX" — REPEATED SEQUENCE ALTERATION; NO STRATIGRAPHIC ANALYSIS POSSIBLE; HIGHLY DEFORMED, CONTEMP.
2	(2a) BIOTITE – MUSCOVITE SCHIST ± GARNET, STAUROLITE; (2b) MUSCOVITE – CHLORITE PHYLLITE; (2c) LIMY PHYLLITE; (2d) GRAPHITIC PHYLLITE; (2e) LIMY, BEDDED PHYLLITE; (2f) INTERBEDDED SILTSTONES AND SLATES; (2g) GREYWACKE, PEBBLE CONGLOMERATE (2h) ANDALUSITE PORPHYROBLAST PHYLLONITE ?	ORDOVICIAN? TO DEVONIAN? ; PERMO – TRIASSIC ? METAMORPHISM FOLLOWED BY CRETACEOUS METAMORPHISM OF UNITS 1 TO 3
1	(1a) CALSILICATE GNEISS AND PHYLLITE, MINOR SCHIST, PHYLLITE AND MARBLE; (1b) MARBLE AND LIMESTONE, MINOR CALCSILICATE AND TUFF.	

GENERAL

	OUTCROP		TRENCH
	LITHOLOGICAL BOUNDARY		FACIES CHANGE
X	FLOAT ROCK TYPE	(F)	FOSSIL LOCALITY WITH REFERENCE
Cu	CHALCOPYRITE		
Zn	SPHALERITE	Fe	PYRRHOTITE, PYRITE
		Pb	GALENA

STRUCTURE

	FAULT, OBSERVED, INFERRED		INFERRED THRUST
	ERTS IMAGE LINEAMENT		EARLY FOLD AXIAL TRACE, SYNCLINE, ANTICLINE
	BEDDING ATTITUDE, MEASURED, APPROXIMATE		EARLY PENETRATIVE CLEAVAGE, S_1
	LATER CRENULATION CLEVAGE, S_2		S_3
	S_4		S_5
	LATER FOLD (D_2) AXIAL TRACE		LATER FOLD (D_3) AXIAL TRACE
	EARLY FOLD AXIS, F_1		LATER FOLD AXIS, F_2
	F_2 BOUDIN OR QUARTZ ROD PLUNGE		F_3
	F_3 AXIS, WITH DOWN PLUNGE STYLE		F_4
			F_5
	F_4 CRENULATION LINEATION		

inches 0 1 2 — 0 1 2 3 4 5 centimetres

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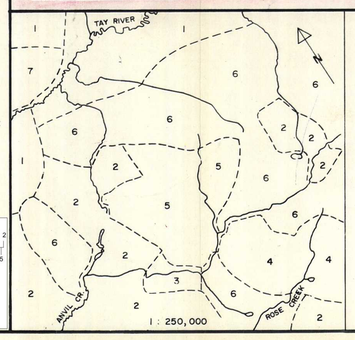
YUKON GEOLOGICAL SURVEY



INDEX OF SOURCES

1 : G.S.C. MAP 13 – 1961, J. A. RODDICK AND L.H. GREEN, 1961, 1" = 4 MILES.

2 : G.S.C. MAP 126IA, D. J. TEMPELMAN – KLUIT, 1972, 1" = 2 MILES.

3 : SPARTAN EXPLORATIONS LTD., TRY CLAIMS, 1971, 1" = 400 FEET.

4 : KANGAROO EXPLORATION CORPORATION, 1972, 1" = 500 FEET.

5 : RIDGEMONT MINING CORPORATION, (GAJ), 1973, 1" = 1/2 MILE.

6 : RIDGEMONT MINING CORPORATION, (PFL), 1973, 1" = 1/2 MILE.

7 : ATLAS EXPLORATIONS LTD., OWL CLAIMS, 1970, 1" = 1000 FEET.

RIDGEMONT MINING CORPORATION

ANVIL RANGE PROJECT

GEOLOGICAL COMPILATION SHEET 1

COMPILED: P. F. L.

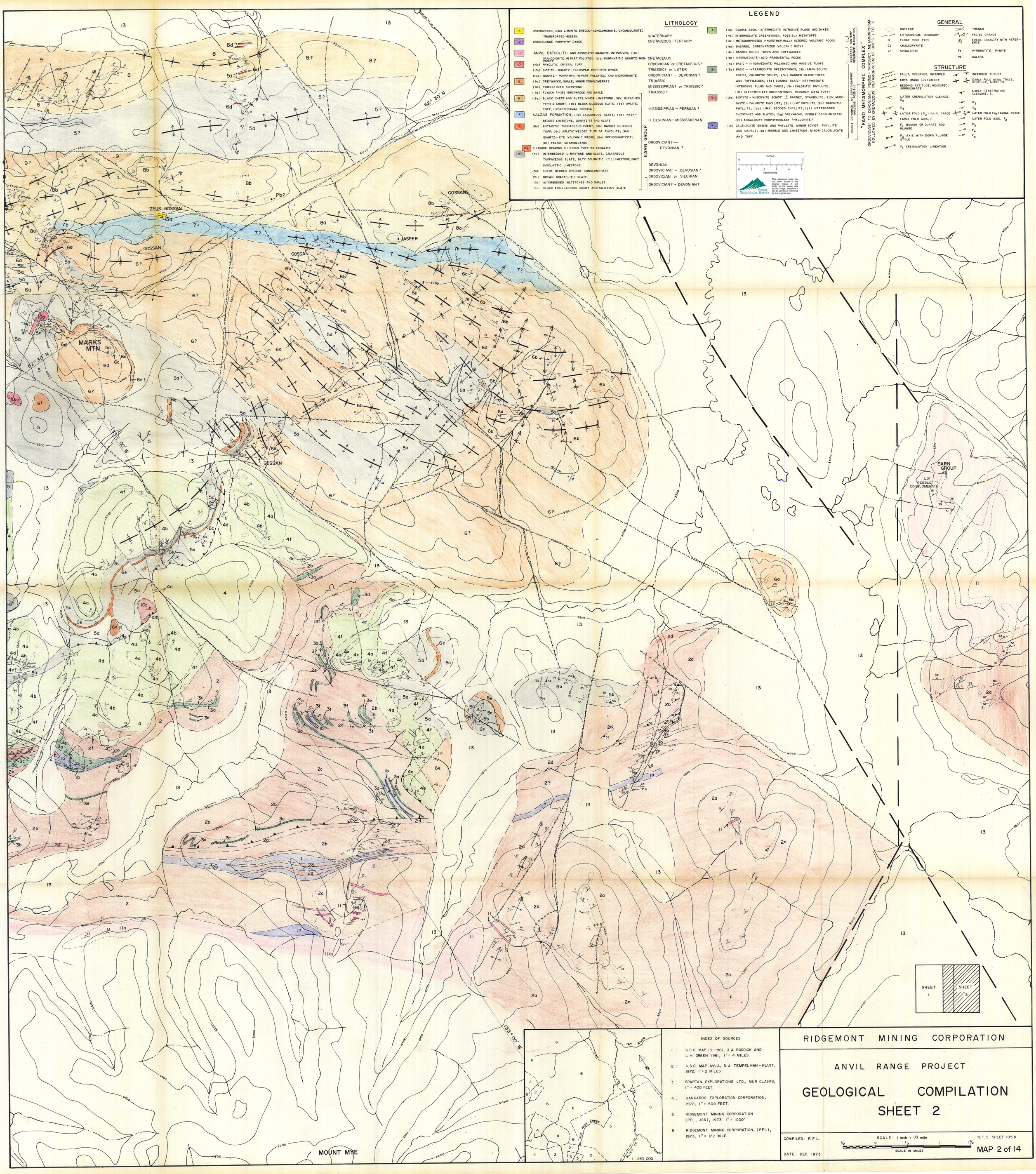
DATE: DEC. 1973

SCALE : 1 inch = 1/2 mile

1/2 0 1/2 1 1 1/2 — SCALE IN MILES

N.T.S. SHEET 105 K

MAP 1 of 14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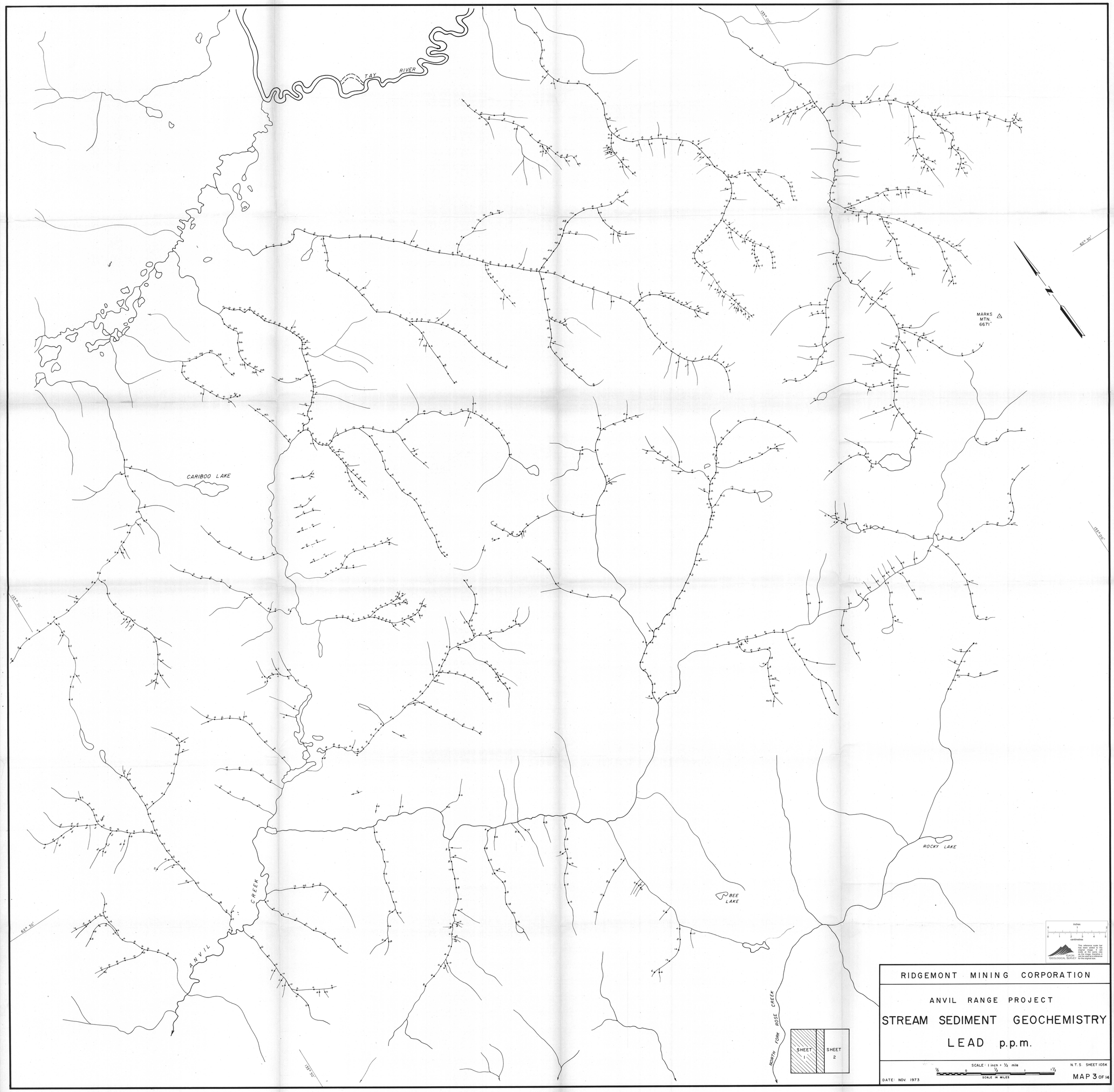
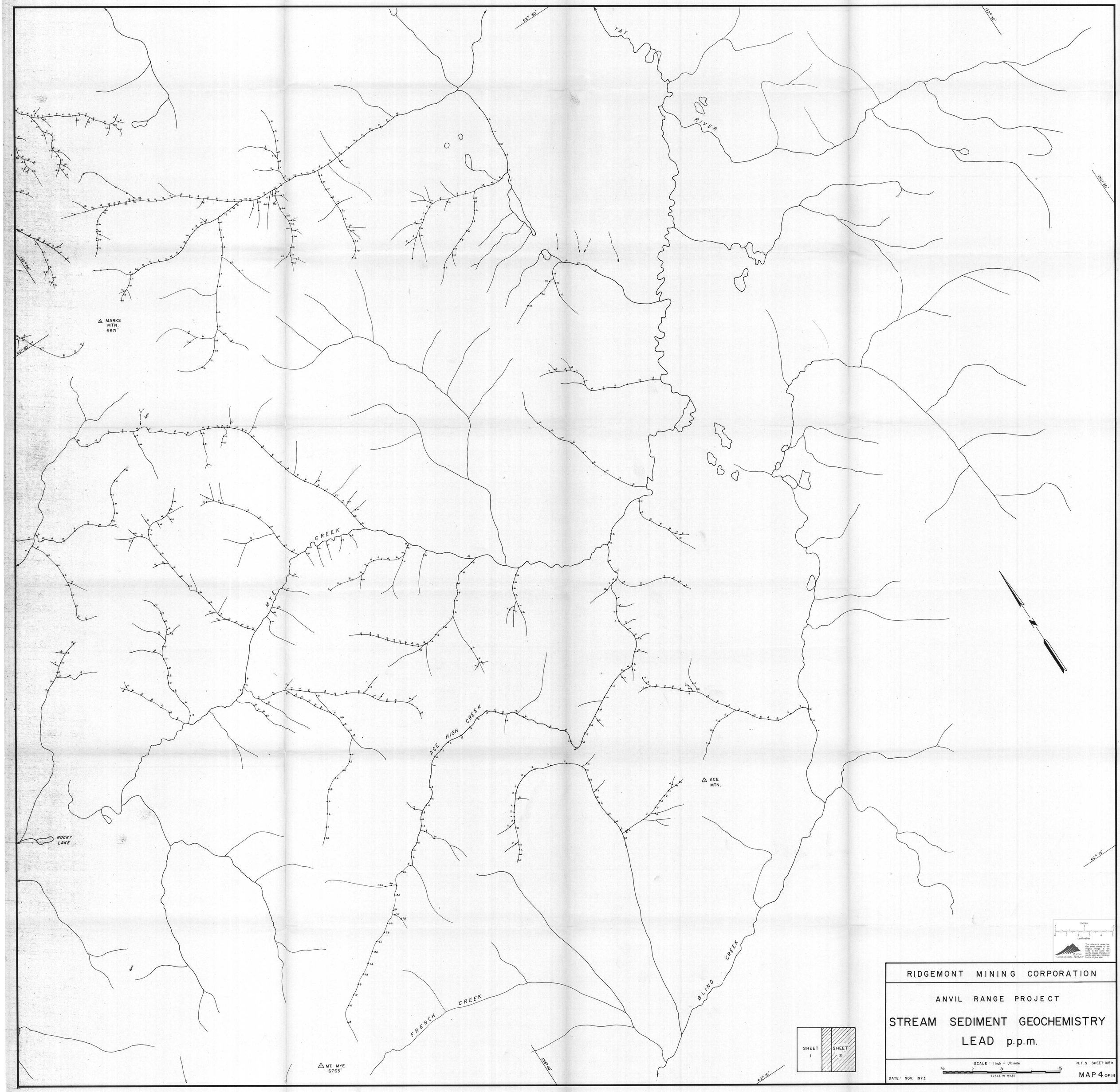
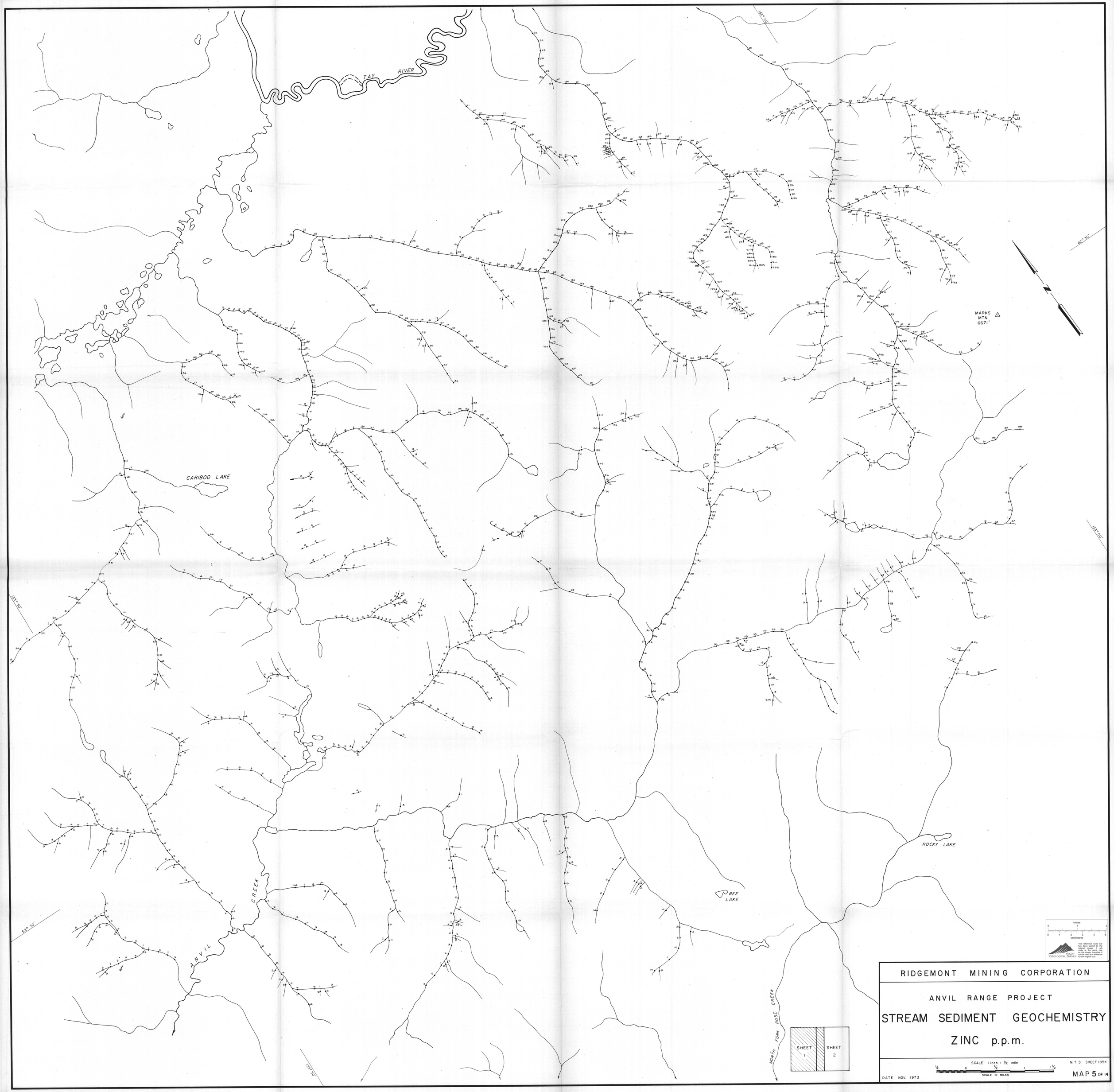
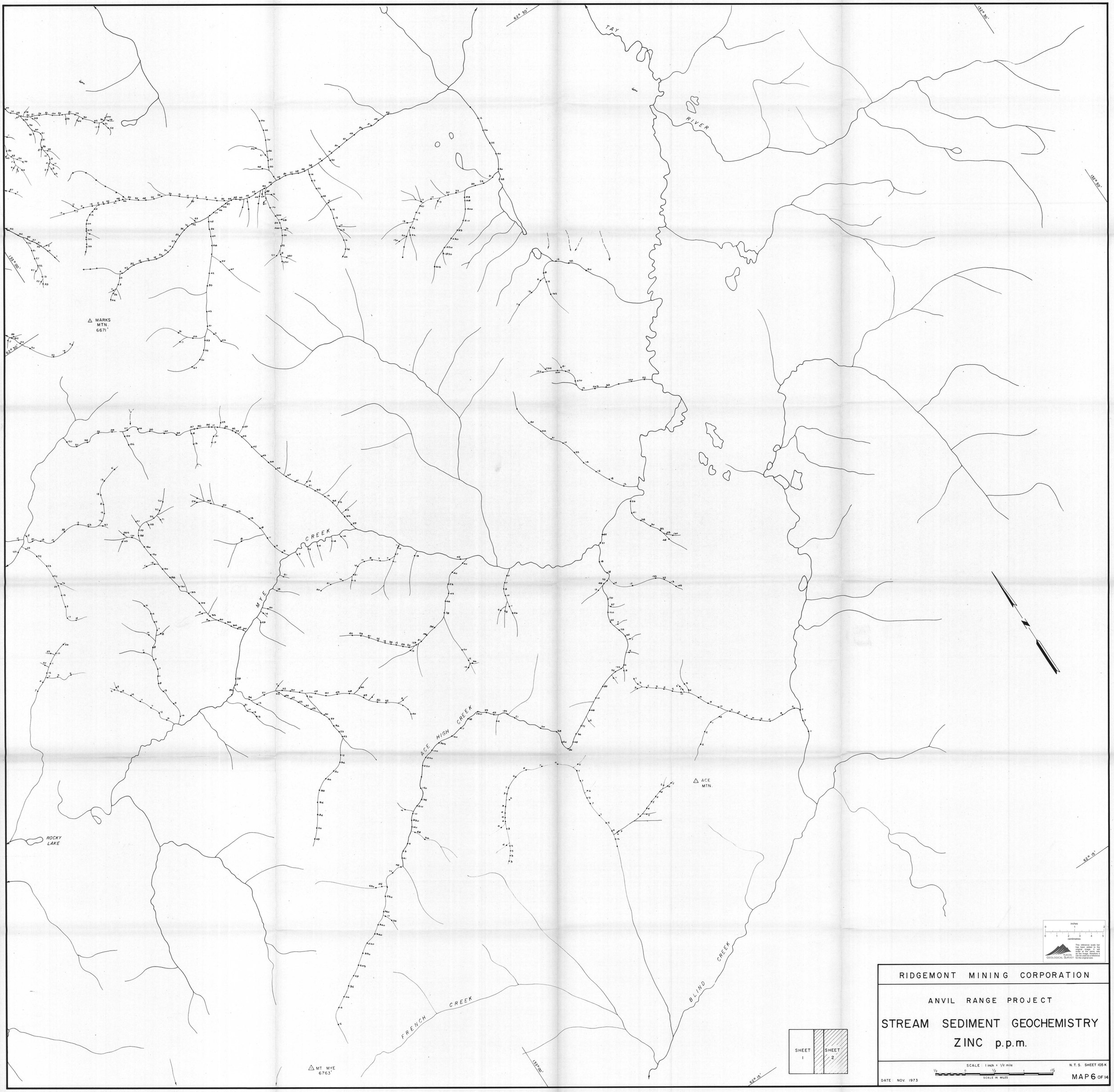
7 KALZAS FORMATION; (7a) CALCAREOUS SLATE; (7b) INTERBEDDED LIMESTONE, QUARTZITE AND SLATE — U. DEVONIAN- MISSISSIPPIAN
6 (6a) EUTAXITIC TUFFACEOUS CHERT; (6b) BANDED SILICEOUS TUFF, (6c) APLITIC WELDED TUFF OR RHYOLITE; (6d) QUARTZ-EYE VOLCANIC WACKE; (6e) ORTHOQUARTZITE; (6f) FELSIC METAVOLCANIC — EARN GROUP
6g SULPHIDE BEARING SILICEOUS TUFF OR EXHALITE — ORDOVICIAN? — DEVONIAN ?
5 (5e) INTERBEDDED LIMESTONE AND SLATE, CALCAREOUS TUFFACEOUS SLATE, SILTY DOLOMITIC (?) LIMESTONE, GREY BIOCLASTIC LIMESTONE — EARN GROUP
(5d) CHERT, BEDDED BRECCIO-CONGLOMERATE — DEVONIAN
(5c) BROWN GRAPTOLITIC SLATE — ORDOVICIAN or SILURIAN
(5b) INTERBEDDED SILTSTONES AND SHALES — ORDOVICIAN ? - DEVONIAN ?
(5a) BLACK ARGILLACEOUS CHERT AND SILICEOUS SLATE
4 (4g) COARSE BASIC-INTERMEDIATE INTRUSIVE PLUGS AND DYKES
(4f) INTERMEDIATE GREENSTONES, POSSIBLY METATUFFS
(4e) METAMORPHOSED HYDROTHERMALLY ALTERED VOLCANIC ROCKS
(4d) SHEARED, CARBONATIZED VOLCANIC ROCKS
(4c) BANDED SILICIC TUFFS AND TUFFWACKES
(4b) INTERMEDIATE-ACID FRAGMENTAL ROCKS
(4a) BASIC-INTERMEDIATE PILLOWED AND MASSIVE FLOWS
3 (3a) BASIC-INTERMEDIATE GREENSTONES; (3b) AMPHIBOLITE GNEISS, CHLORITIC SCHIST; (3c) BANDED SILICIC TUFFS AND TUFFWACKES, (3d) COARSE BASIC-INTERMEDIATE INTRUSIVE PLUGS AND DYKES, (3e) CHLORITIC PHYLLITE, (3f) INTERMEDIATE GREENSTONES, POSSIBLY META-TUFFS
2 (2a) BIOTITE-MUSCOVITE SCHIST ± GARNET, STAUROLITE; (2b) MUSCOVITE-CHLORITE PHYLLITE, (2c) LIMY PHYLLITE, (2d) GRAPHITIC PHYLLITE, (2e) LIMY, BEDDED PHYLLITE, (2f) INTERBEDDED SILTSTONES AND SLATES, (2g) GREYWACKE, PEBBLE CONGLOMERATE (2h) ANDALUSITE PORPHYROBLAST PHYLLONITE ?
1 (1a) CALSILICATE GNEISS AND PHYLLITE, MINOR SCHIST, PHYLLITE AND MARBLE, (1b) MARBLE AND LIMESTONE, MINOR CALCSILICATE AND TUFF.
REPEATED CONTEMPORANEOUS SEQUENCE ALTERATION
HIGHLY DEFORMED, NO STRATIGRAPHIC ANALYSIS POSSIBLE
"FARO METAMORPHIC COMPLEX"
ORDOVICIAN? TO DEVONIAN; PERMO-TRIASSIC? METAMORPHISM FOLLOWED BY CRETACEOUS METAMORPHISM OF UNITS 1 TO 3
inches
centimetres
This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.
YUKON GEOLOGICAL SURVEY
GENERAL
OUTCROP
LITHOLOGICAL BOUNDARY
X FLOAT ROCK TYPE
Cu CHALCOPYRITE
Zn SPHALERITE
TRENCH
FACIES CHANGE
FOSSIL LOCALITY WITH REFERENCE
Fe PYRRHOTITE, PYRITE
Pb GALENA
STRUCTURE
FAULT, OBSERVED, INFERRED
ERTS IMAGE LINEAMENT
BEDDING ATTITUDE, MEASURED, APPROXIMATE
LATER CRENULATION CLEVAGE, S_2
S_4
LATER FOLD (D_4) AXIAL TRACE
EARLY FOLD AXIS, F_1
F_2 BOUDIN OR QUARTZ ROD PLUNGE
F_3 AXIS, WITH DOWN PLUNGE STYLE
F_4 CRENULATION LINEATION
INFERRED THRUST
EARLY FOLD AXIAL TRACE, SYNCLINE, ANTICLINE
EARLY PENETRATIVE CLEAVAGE, S_1
S_3
S_5
LATER FOLD (D_5) AXIAL TRACE
LATER FOLD AXIS, F_2
F_3
F_4
F_5
ZEUS GOSSAN
GOSSANS
JASPER
GOSSAN
MARKS MTN
EARN GROUP
LST PEBBLE CONGLOMERATE
SHEET 1
SHEET 2
MOUNT MYE
133° 00' W
62° 30' N
TAY RIVER
HIGH CREEK
ACE
BLIND CR
1 250,000
INDEX OF SOURCES
1 : G.S.C. MAP 13-1961, J. A. RODDICK AND L. H. GREEN 1961, 1" = 4 MILES.
2 : G.S.C. MAP 1261A, D.J. TEMPELMAN-KLUIT, 1972, 1" = 2 MILES
3 : SPARTAN EXPLORATIONS LTD., MUR CLAIMS, 1" = 400 FEET.
4 : KANGAROO EXPLORATION CORPORATION, 1972, 1" = 500 FEET.
5 : RIDGEMONT MINING CORPORATION (PFL, JGS), 1973 1" = 1000'
6 : RIDGEMONT MINING CORPORATION, (PFL), 1973, 1" = 1/2 MILE.
RIDGEMONT MINING CORPORATION
ANVIL RANGE PROJECT
GEOLOGICAL COMPILATION
SHEET 2
COMPILED: P.F.L.
DATE: DEC. 1973
SCALE: 1 inch = 1/2 mile
SCALE IN MILES
N.T.S. SHEET 105 K
MAP 2 of 14


TAY RIVER
CARIBOO LAKE
MARKS MTN. 6671'
BEE LAKE
ROCKY LAKE
ANVIL CREEK
NORTH FORK ROSE CREEK
133° 00'
133° 30'
62° 30'
SHEET 1
SHEET 2
inches
centimetres
This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.
YUKON GEOLOGICAL SURVEY
RIDGEMONT MINING CORPORATION
ANVIL RANGE PROJECT
STREAM SEDIMENT GEOCHEMISTRY
LEAD p.p.m.
SCALE: 1 inch = 1/2 mile
SCALE IN MILES
N.T.S. SHEET 105K
DATE: NOV. 1973
MAP 3 OF 14


62° 30'
132° 30'
TAY
RIVER
132° 30'
133° 00'
62° 30'
MARKS
MTN.
6671'
CREEK
MYE
ACE HIGH CREEK
ACE
MTN.
ROCKY
LAKE
62° 15'
FRENCH
CREEK
BLIND
CREEK
MT. MYE
6763'
133° 00'
62° 15'
SHEET
1
SHEET
2
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.
RIDGEMONT MINING CORPORATION
ANVIL RANGE PROJECT
STREAM SEDIMENT GEOCHEMISTRY
LEAD p.p.m.
SCALE : 1 inch = 1/2 mile
1/2 0 1/2 1 1 1/2
SCALE IN MILES
N.T.S. SHEET 105 K
DATE : NOV. 1973
MAP 4 OF 14


TAY RIVER
CARIBOO LAKE
MARKS MTN. 6671'
ROCKY LAKE
BEE LAKE
ANVIL CREEK
NORTH FORK ROSE CREEK
133° 00'
133° 30'
62° 30'
SHEET 1
SHEET 2
inches
centimetres
NORTH 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.
RIDGEMONT MINING CORPORATION
ANVIL RANGE PROJECT
STREAM SEDIMENT GEOCHEMISTRY
ZINC p.p.m.
SCALE: 1 inch = 1/2 mile
SCALE IN MILES
N.T.S. SHEET 105K
DATE NOV. 1973
MAP 5 OF 14



RIDGEMONT MINING CORPORATION

ANVIL RANGE PROJECT

STREAM SEDIMENT GEOCHEMISTRY
ZINC p.p.m.

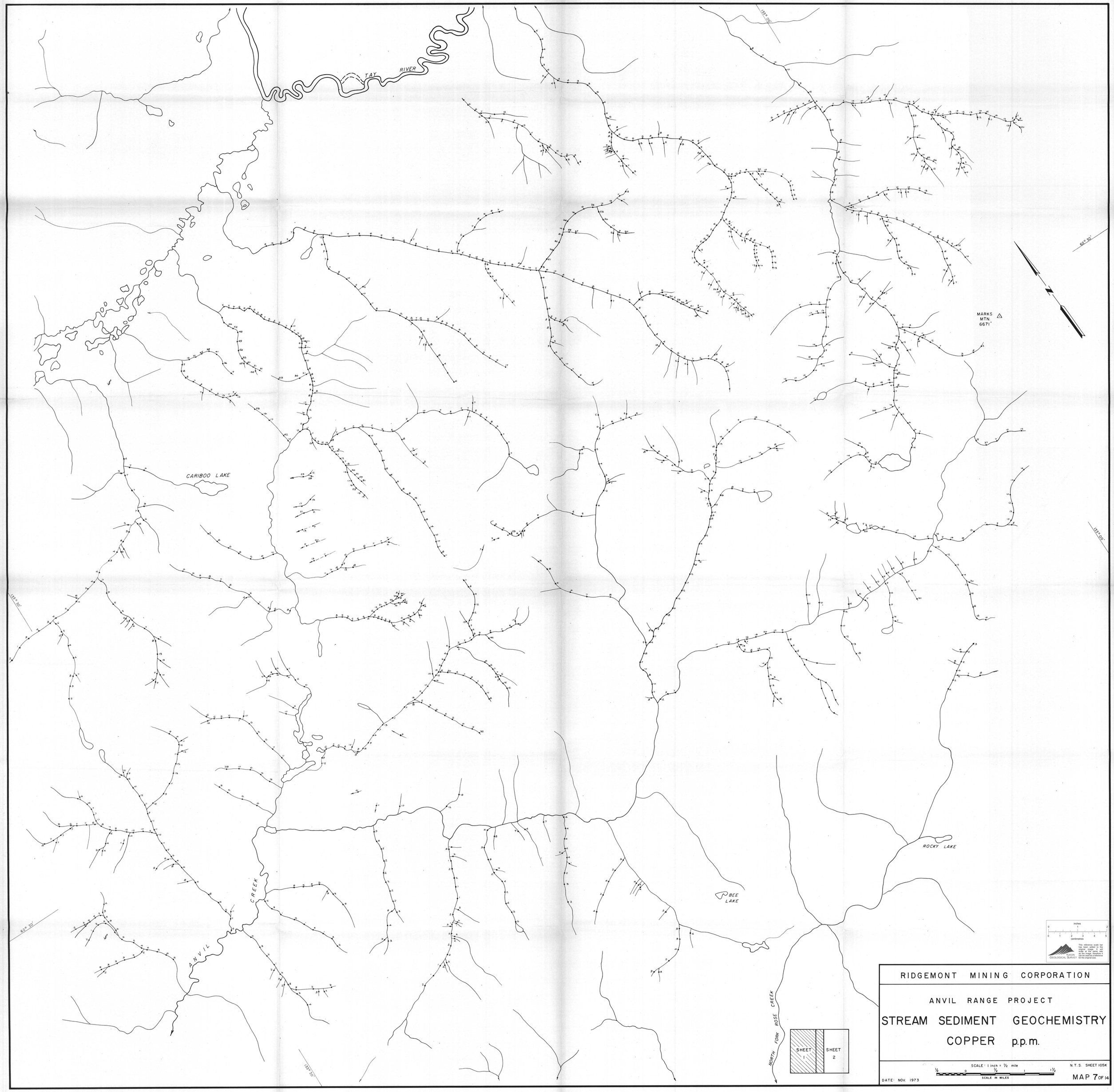
SCALE: 1 inch = 1/2 mile

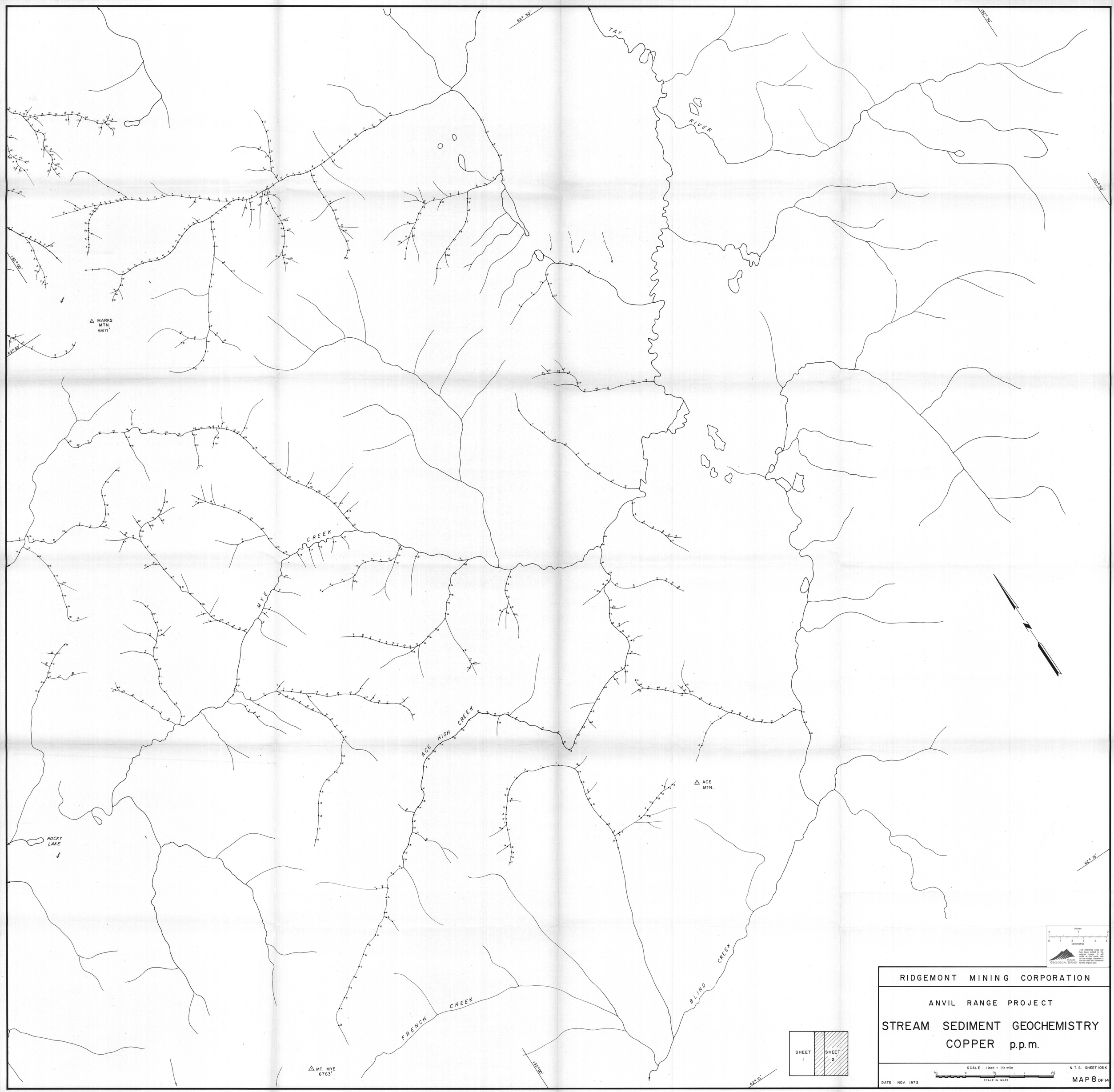
SCALE IN MILES

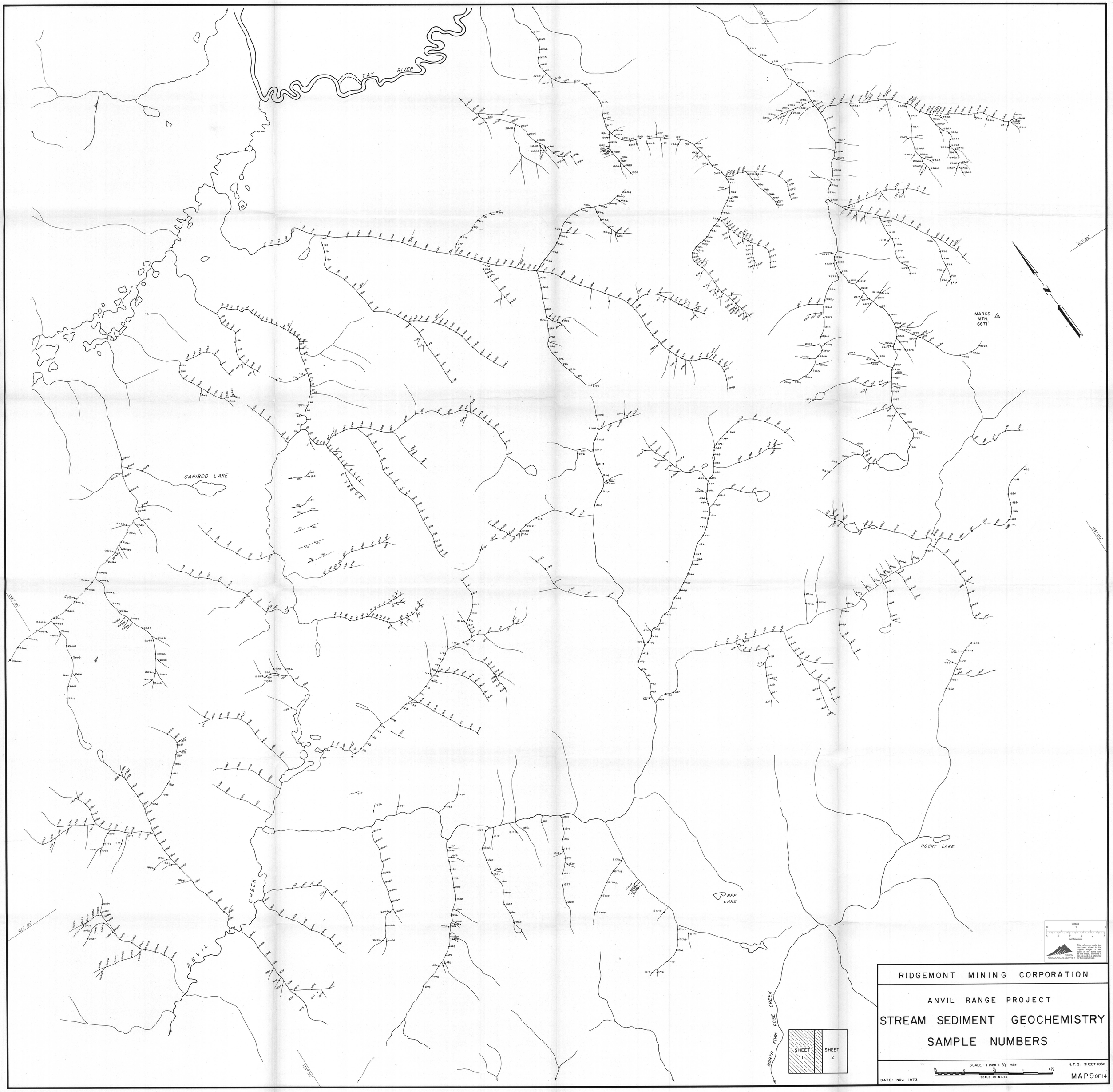
N.T.S. SHEET 105 K

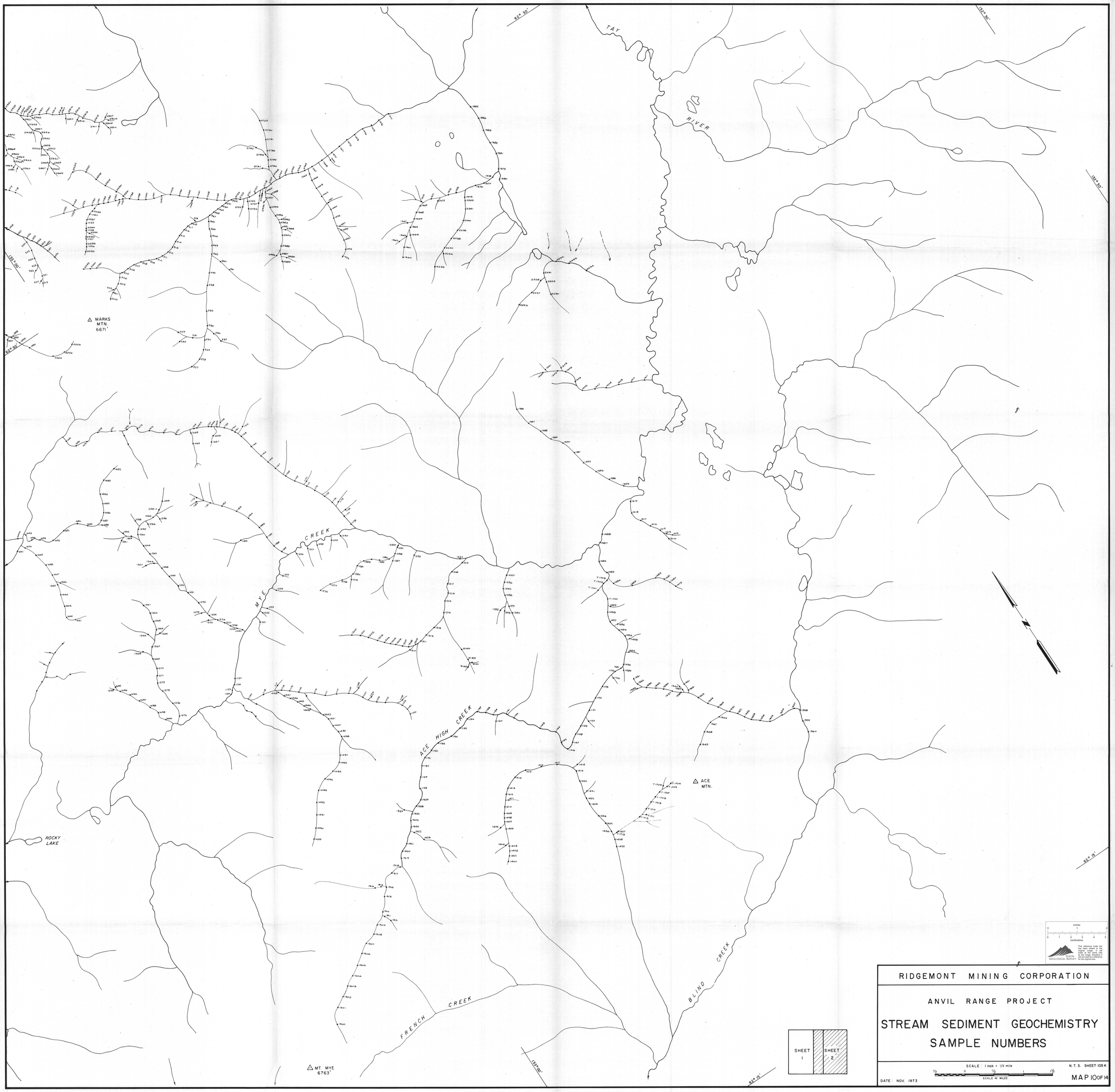
DATE: NOV. 1973

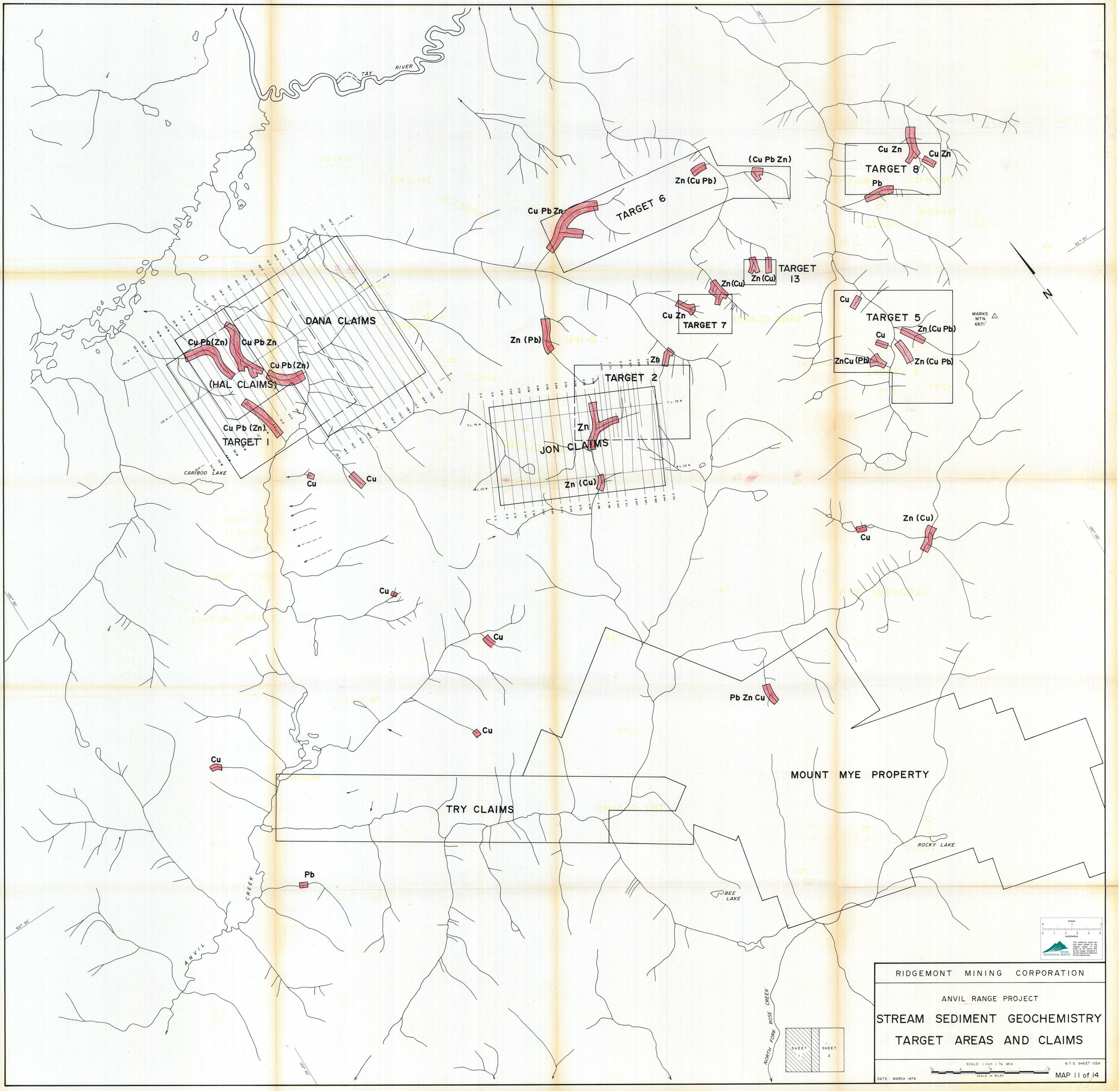
MAP 6 OF 14

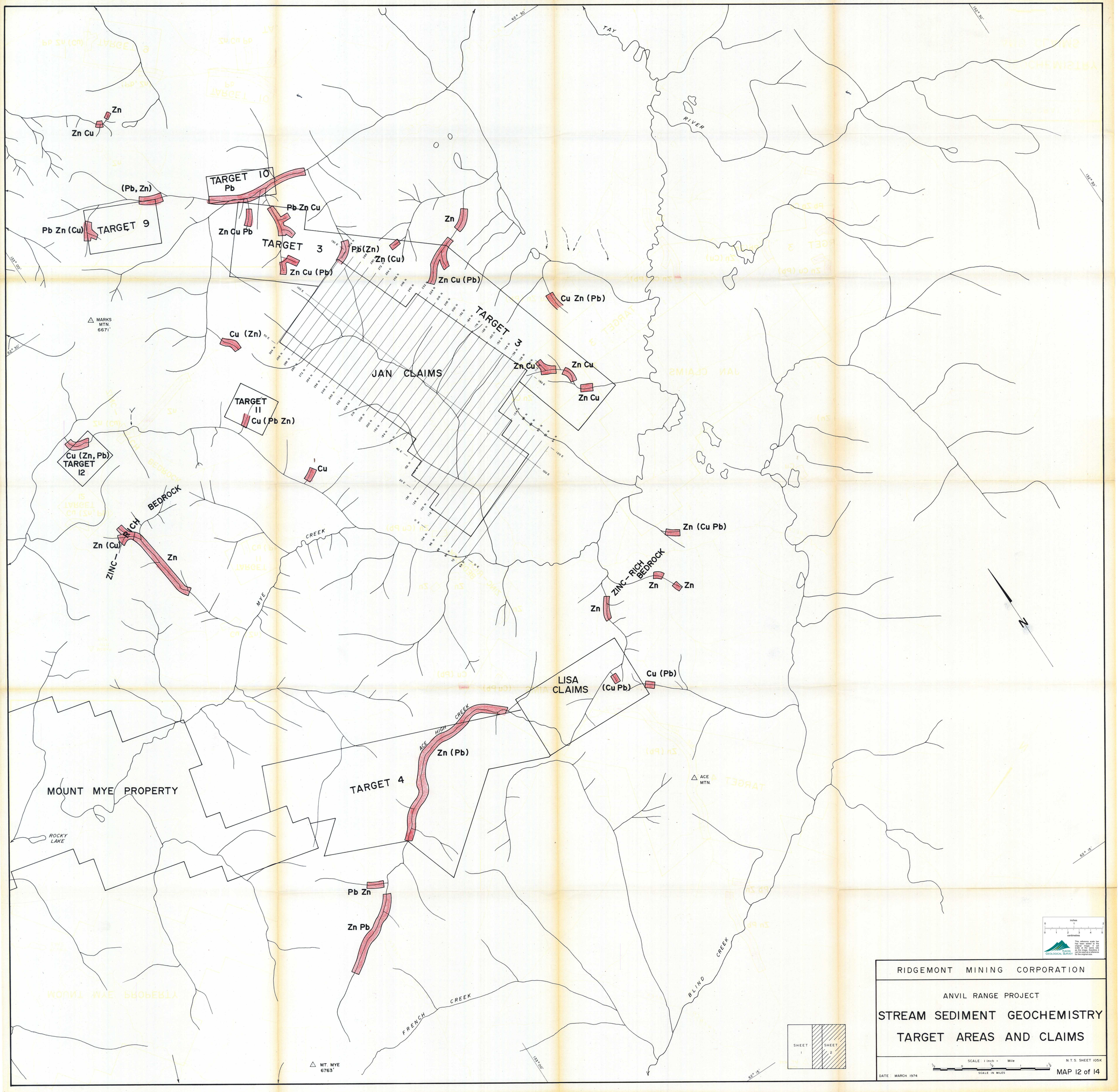

TAY RIVER
CARIBOO LAKE
MARKS MTN. 6671'
BEE LAKE
ROCKY LAKE
ANVIL CREEK
NORTH FORK ROSE CREEK
133° 30'
62° 30'
SHEET 1
SHEET 2
inches
centimetres
YUKON GEOLOGICAL SURVEY
This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.
RIDGEMONT MINING CORPORATION
ANVIL RANGE PROJECT
STREAM SEDIMENT GEOCHEMISTRY
COPPER p.p.m.
SCALE: 1 inch = ½ mile
SCALE IN MILES
N.T.S. SHEET 105K
DATE: NOV. 1973
MAP 7 OF 14


62° 30'
133° 30'
TAY
RIVER
133° 30'
133° 00'
62° 30'
MARKS
MTN.
6671'
CREEK
MYE
ACE HIGH CREEK
ACE
MTN.
ROCKY
LAKE
62° 15'
BLIND
CREEK
FRENCH
CREEK
MT. MYE
6763'
133° 00'
62° 15'
SHEET
1
SHEET
2
inches
centimetres
YUKON
GEOLOGICAL SURVEY
This reference scale bar
RIDGEMONT MINING CORPORATION
ANVIL RANGE PROJECT
STREAM SEDIMENT GEOCHEMISTRY
COPPER p.p.m.
SCALE : 1 inch = 1/2 mile
SCALE IN MILES
N. T. S. SHEET 105 K
DATE : NOV. 1973
MAP 8 OF 14


TAY RIVER
CARIBOO LAKE
MARKS MTN. 6671'
ROCKY LAKE
BEE LAKE
ANVIL CREEK
NORTH FORK ROSE CREEK
SHEET 1
SHEET 2
RIDGEMONT MINING CORPORATION
ANVIL RANGE PROJECT
STREAM SEDIMENT GEOCHEMISTRY
SAMPLE NUMBERS
SCALE: 1 inch = ½ mile
SCALE IN MILES
N.T.S. SHEET 105K
DATE: NOV. 1973
MAP 9 OF 14
YUKON GEOLOGICAL SURVEY


TAY
RIVER
MARKS MTN. 6671'
MYE
CREEK
ACE HIGH CREEK
ACE MTN.
ROCKY LAKE
FRENCH CREEK
BLIND CREEK
MT. MYE 6763'
62° 30'
133° 00'
132° 30'
62° 15'
SHEET 1
SHEET 2
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.
RIDGEMONT MINING CORPORATION
ANVIL RANGE PROJECT
STREAM SEDIMENT GEOCHEMISTRY
SAMPLE NUMBERS
SCALE : 1 inch = 1/2 mile
SCALE IN MILES
N.T.S. SHEET 105 K
DATE : NOV. 1973
MAP 10 OF 14


TAY RIVER
DANA CLAIMS
(HAL CLAIMS)
Cu Pb(Zn)
Cu Pb Zn
Cu Pb(Zn)
Cu Pb (Zn)
TARGET 1
CARIBOO LAKE
Cu
Cu
Cu
Cu
Cu
Cu
Cu
TARGET 6
Cu Pb Zn
Zn (Cu Pb)
(Cu Pb Zn)
Zn (Pb)
Zn
TARGET 2
Zn
JON CLAIMS
Zn (Cu)
TARGET 7
Cu Zn
Zn (Cu)
Zn (Cu)
TARGET 13
TARGET 8
Cu Zn
Cu Zn
Pb
TARGET 5
Cu
Cu
Zn (Cu Pb)
ZnCu (Pb)
Zn (Cu Pb)
MARKS MTN. 6671'
N
Zn (Cu)
Cu
Pb Zn Cu
MOUNT MYE PROPERTY
TRY CLAIMS
Pb
ANVIL CREEK
BEE LAKE
ROCKY LAKE
NORTH FORK ROSE CREEK
SHEET 1
SHEET 2
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 original image, and can be used as a reference for the original size.
RIDGEMONT MINING CORPORATION
ANVIL RANGE PROJECT
STREAM SEDIMENT GEOCHEMISTRY
TARGET AREAS AND CLAIMS
SCALE 1 inch = 1/2 Mile
SCALE IN MILES
N.T.S. SHEET 105K
DATE MARCH 1974
MAP 11 of 14


TAY
RIVER
Zn
Zn Cu
TARGET 10
Pb
(Pb, Zn)
Pb Zn Cu
Pb Zn (Cu)
TARGET 9
Zn Cu Pb
TARGET 3
Pb(Zn)
Zn (Cu)
Zn Cu (Pb)
Zn
Zn Cu (Pb)
Cu Zn (Pb)
MARKS MTN. 6671'
Cu (Zn)
TARGET 3
JAN CLAIMS
Zn Cu
Zn Cu
Zn Cu
TARGET 11
Cu (Pb Zn)
Cu (Zn, Pb)
TARGET 12
Cu
ZINC-RICH BEDROCK
Zn (Cu)
Zn
MYE CREEK
Zn (Cu Pb)
ZINC-RICH BEDROCK
Zn
Zn
Zn
N
LISA CLAIMS
(Cu Pb)
Cu (Pb)
ACE HIGH CREEK
Zn (Pb)
TARGET 4
MOUNT MYE PROPERTY
ACE MTN.
ROCKY LAKE
Pb Zn
Zn Pb
FRENCH CREEK
BLIND CREEK
MT. MYE 6763'
SHEET 1
SHEET 2
inches
centimetres
This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.
YUKON GEOLOGICAL SURVEY
RIDGEMONT MINING CORPORATION
ANVIL RANGE PROJECT
STREAM SEDIMENT GEOCHEMISTRY
TARGET AREAS AND CLAIMS
SCALE: 1 inch = Mile
SCALE IN MILES
N.T.S. SHEET 105K
DATE: MARCH 1974
MAP 12 of 14

RIDGEMONT MINING CORPORATION

DANA PROSPECT

ANVIL RANGE PROGRAM

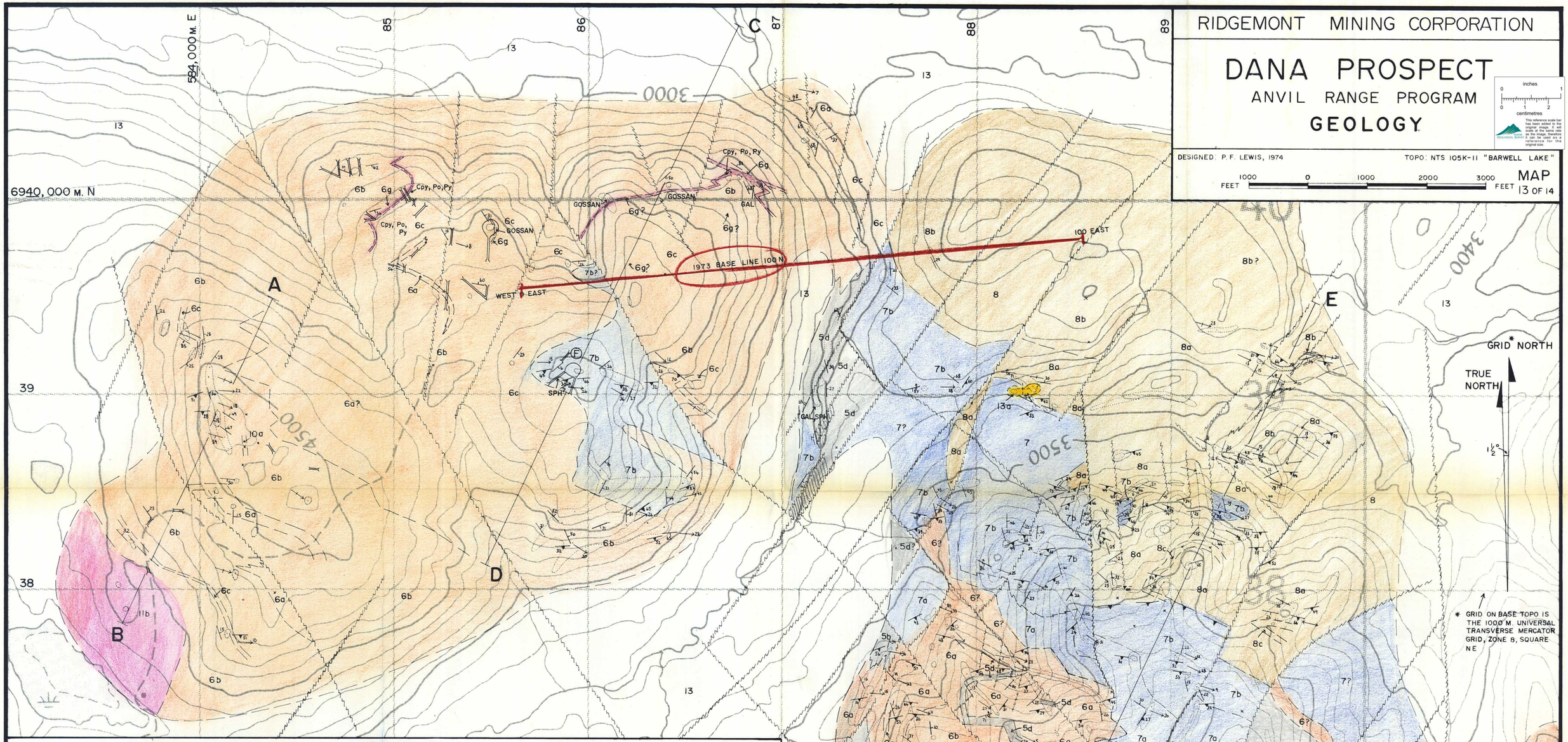
GEOLOGY

DESIGNED: P.F. LEWIS, 1974

TOPO: NTS 105K-11 "BARWELL LAKE"

1000 FEET 0 1000 2000 3000 FEET

MAP 13 OF 14



LEGEND

LITHOLOGY

- 13 — OVERBURDEN, 13a SEDIMENTARY BRECCIA WITH OXIDE MATRIX — QUATERNARY
- 11b — PORPHYRITIC QUARTZ MONZONITE — ANVIL BATHOLITH — CRETACEOUS
- 10a — FOLIATED QUARTZ PORPHYRY, MASSIVE MICROGRANITE — ORD. ? – PERMIAN?
- 8 — 8a: INTERBEDDED BLACK CHERT AND SLATE, 8b: BLEACHED? PYRITIC CHERT, 8c: BLACK SILICEOUS SLATE — MISS. ? – PERMIAN ?
- 7 — 7a: CALCAREOUS SLATE, 7b: INTERBEDDED LIMESTONE, QUARTZITE AND SLATE — KALZAS FORMATION ? — U. DEV. – MISS.
- 6 — 6a: EUTAXITIC TUFFACEOUS ? CHERT, 6b: BANDED SILICEOUS TUFF, 6c: APLITIC WELDED TUFF ? AND RHYOLITE ?, 6d: QUARTZ-EYE VOLCANOCLASTIC WACKE, 6g SULPHIDE RICH SILICEOUS TUFF ? — ORD. ? – U. DEV. ?
- 5 — 5a: BLACK ARGILLACEOUS CHERT AND SILICEOUS SLATE, 5b: INTERBEDDED SILTSTONE AND SLATE, 5d: BANDED BLACK AND GREY CHERT — ORD. – U. DEV. ?

STRUCTURE

- FAULT
- GOUGE ZONE
- POSSIBLE THRUST
- BEDDING, RIGHT WAY-UP
- OVERTURNED BEDDING
- SLATY CLEAVAGE
- CRENULATION CLEAVAGE
- EARLY FOLD AXIS
- LATE FOLD AXIS
- JOINT PLANE

GENERAL

- OUTCROP WITH STATION
- TRENCH
- X FLOAT
- LITHOLOGICAL BOUNDARY
- FACIES CHANGE
- CPY – CHALCOPYRITE, PO – PYRRHOTITE, PY – PYRITE, SPH – SPHALERITE, GAL – GALENA
- ⊙ DDH COLLAR, APPROX.
- Ⓕ FOSSIL LOCATION
- A ——— B LINE OF SECTION

RIDGEMONT MINING CORPORATION

DANA PROSPECT

ANVIL RANGE PROGRAM

STRUCTURAL DOMAINS

DESIGNED: P. F. LEWIS, 1974

TOPO: NTS 105K-11 "BARWELL LAKE"

1000 0 1000 2000 3000 FEET

MAP 14 OF 14

inches 0 1

0 1 2 centimetres

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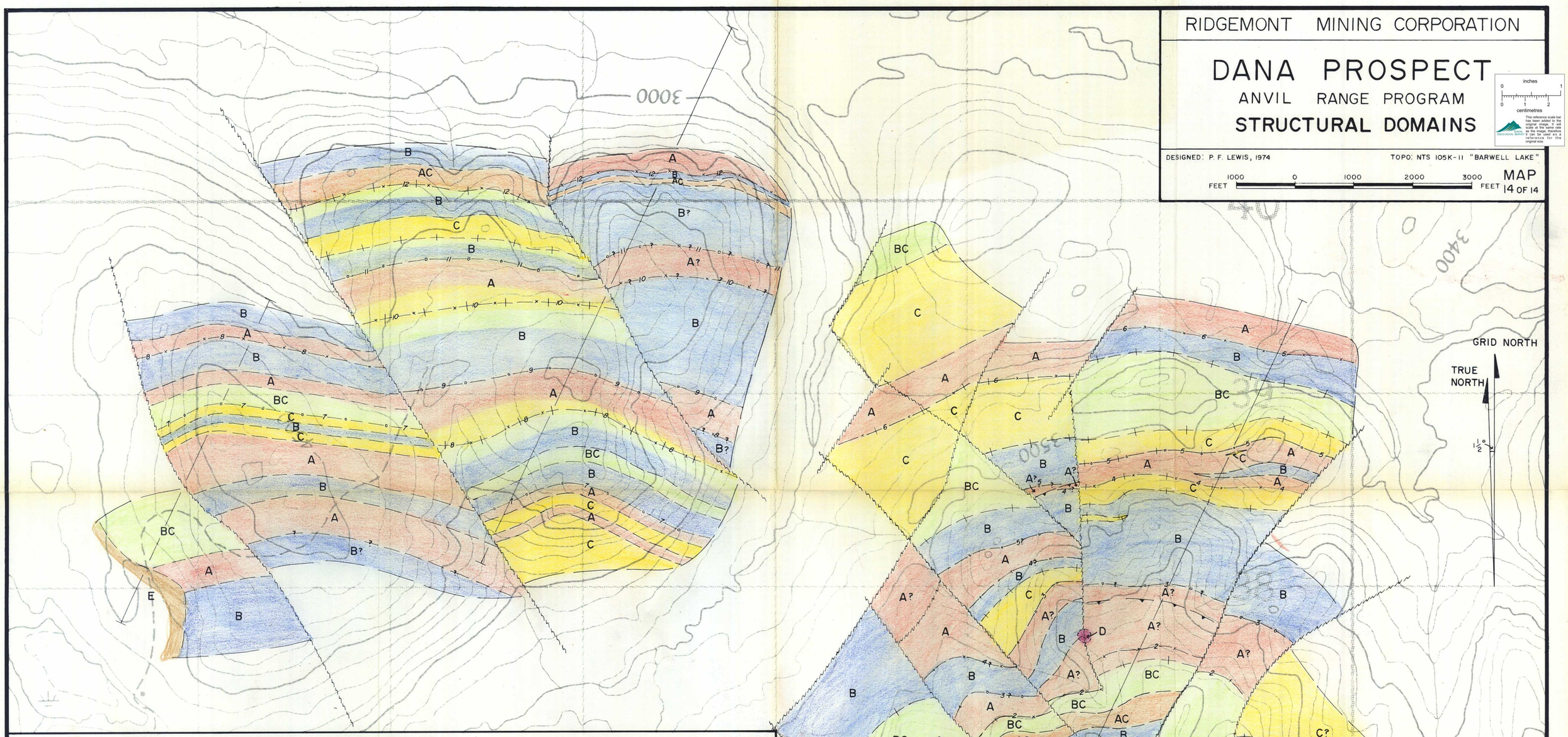
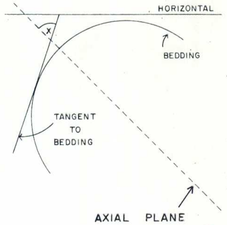


LEGEND

STRUCTURAL PROFILE OF FOLD



	X	BEDDING ATTITUDE
A	0° – 60°	SUBVERTICAL TO OVERTURNED, TRENDING 115°
AC	60° – 80°	STEEP NORTHEASTERLY DIPPING
C	80° – 100°	STEEP - MODERATE EAST - NORTH - EASTERLY DIPPING
BC	100° – 120°	MODERATE EASTERLY DIPPING
B	120° – 180°	GENTLE EASTERLY TO MODERATE SOUTHERLY DIPPING
D	DISTURBED BY LATER TECTONIC EVENTS	
E	POST - KINEMATIC INTRUSION	

AXIAL PLANE TRACE, CHEVRON HINGE

AXIAL PLANE TRACE, CYLINDRICAL HINGE

AXIAL PLANE TRACE, SYNCLINAL, (MAJOR STRUCTURE NUMBERED)

AXIAL PLANE TRACE, ANTICLINAL

LIMIT OF INFERENCE

FAULT

LINE OF SECTION