GEOLOGICAL, GEOCHEMICAL AND BARITE SAMPLING REPORT
ON THE
GK 1-32 MINERAL CLAIMS

N.T.S. 105F-14, 105F-16
WHITEHORSE MINING DISTRICT

YUKON TERRITORY

Latitude 61°55'N  Longitude 133°00'W

WORK PERFORMED DURING THE PERIOD AUGUST 5 - DECEMBER 31, 1978

Vancouver, B.C.
October, 1978

H.F. Foster
This report has been examined by the Geological Evaluation Unit and is recommended to the Commissioner to be considered as representation work in the amount of $8,800.00.

[Signature]
acting
Resident Geologist or
Resident Mining Engineer

Considered as representation work under Section 53 (4) Yukon Quartz Mining Act.

[Signature]
B. E. Baxter
Supervising Mining Recorder

Commissioner of Yukon Territory
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRONTISPICE</td>
<td>1</td>
</tr>
<tr>
<td>KEY MAP - PROJECT AREA AND PROPERTY LOCATIONS</td>
<td>2</td>
</tr>
<tr>
<td>SUMMARY AND CONCLUSIONS</td>
<td></td>
</tr>
<tr>
<td>RECOMMENDATIONS</td>
<td>3</td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td>3</td>
</tr>
<tr>
<td>MINERAL CLAIMS</td>
<td>4</td>
</tr>
<tr>
<td>LOCATION AND ACCESS</td>
<td>4</td>
</tr>
<tr>
<td>PREVIOUS WORK</td>
<td>4</td>
</tr>
<tr>
<td>GEOLOGY</td>
<td>5</td>
</tr>
<tr>
<td>Stratigraphy</td>
<td>5</td>
</tr>
<tr>
<td>Mineralization</td>
<td>6</td>
</tr>
<tr>
<td>PROSPECTING</td>
<td>19</td>
</tr>
<tr>
<td>GEOCHEMISTRY</td>
<td>19</td>
</tr>
<tr>
<td>SAMPLING PROCEDURE AND ASSAYS</td>
<td>21</td>
</tr>
<tr>
<td>BIBLIOGRAPHY</td>
<td>25</td>
</tr>
<tr>
<td>PERSONNEL EMPLOYED</td>
<td>26</td>
</tr>
<tr>
<td>STATEMENT OF COSTS</td>
<td>27</td>
</tr>
<tr>
<td>AFFIDAVIT SUPPORTING STATEMENT OF COSTS</td>
<td>28</td>
</tr>
<tr>
<td>CERTIFICATE</td>
<td>29</td>
</tr>
</tbody>
</table>

APPENDIX - LEGEND OF LITHOLOGIC SYMBOLS
FIGURES

1. Compilation Map 2
2. Stratigraphic Column 6
3. Cross-Sections AA3, BB4, CC1 7
4b. Looking South to the GK EAST Showing 12
5. Looking Southwest to the FARWEST Showing, GK Mineral Claims 13
6. Grey, massive thinly bedded barite, WEST Showing, GK Mineral Claims 15
7. Well bedded, grey and black barite, EAST Showing, GK Mineral Claims 16
8. Nodular barite, WEST Showing, GK Mineral Claims 17
9. Typical bedded and nodular barite, WEST Showing, GK Mineral Claims 18
10. Prospecting Traverses 20
11. Barite Sampling Sections A, B, and C 22
12. Barite Sampling Section D 23
13. Barite Sampling Sections E, F, G, and H 24

PLATES

7-1 GK 1-32 Claims In Pocket
7-2 Geology and Geochemistry In Pocket
Looking Southwest to the GK Claims
SUMMARY AND CONCLUSIONS

The GK 1-32 claims are situated in the Pelly Mountains, 13 kilometers south of the Robert Campbell Highway, an all-weather road linking the towns of Watson Lake, Ross River, Faro and Carmacks. The GK is located about 37 kilometers by road from Ross River.

Preliminary geological mapping and sampling of barite occurrences was carried out in 1977 on the GK claims, which property covers a 7-kilometer strike length of bedded barite in Mississippian shales. Further mapping, barite sampling, geochemical surveys, and prospecting were carried out to assess the claims for both barite and lead-zinc potential during the 1978 field season.

Mapping and sampling of the barite horizon indicated almost direct milling grade barite (90.47% BaSO₄, specific gravity 4.12) over thicknesses of at least 18 meters and beneficiate grade barite (73.28%, specific gravity 3.76) over 66 meters of thickness at the WEST showing (Fig. 1). This near vertical dipping section of barite situated on a gentle ridge crest constitutes an excellent start up quarry operation with little or no stripping initially required of reserves within a strike-length of at least 1 kilometer. Without regard for barite not yet examined in detail in the northwest a tonnage potential of 21 million tons exists over a strike of 2 kilometers assuming a pit depth of 50 meters, an average thickness of 50 meters, and an average grade of 75% BaSO₄.

A combination of prospecting and assay results from reconnaissance geochemical soil sampling lines indicates no potential for economic concentrations of lead and zinc.

On the basis of evaluation of results obtained from work carried out to date further exploration of the barite potential is warranted. Diamond drill testing, and additional geological mapping and surface sampling are recommended within a budget of $80,000 for 1979. Consideration should be
given to involving a barite mud company as a joint venture partner and ultimate end user of product.

RECOMMENDATIONS

As work carried out to date has indicated that the GK claims have good potential for substantial reserves of economic grade barite with easy access to public roads kept open on a year-round basis, the following work is recommended:

a) Surface chip sampling on northwest extensions of the WEST Showing and southeast extensions of the EAST Showing (Fig. 1) in order to provide further information for preliminary tonnage calculations and selections of targets for diamond drill testing.

b) Surface mapping and chip sampling of the FAR WEST Showing (Fig. 1) in order to establish dimensions and grades which can be ultimately assessed by diamond drill testing.

c) A total of 840 meters of diamond drill testing of the WEST and EAST Showings should be conducted on 4 fences spaced 250 meters apart with two holes, inclined at 45°, being drilled on each fence to test the barite to a depth of 50 meters.

A detailed budget analysis of the above-proposed program for a total expenditure of $80,000 is presented in Chapter 3.

INTRODUCTION

The GK 1-32 claims were staked July 30, 1977 to cover a thick-bedded barite occurrence within Devono-Mississippian stratigraphy, which equivalent section hosts the TOM zinc-lead massive sulphide deposit at Macmillan Pass and the Driftpile Creek occurrences at Gataga Lakes in northern British Columbia. Claim acquisition was largely based upon
the presence of major accessible tonnages of potentially economic barite apparent in the deposit.

The claim block received only cursory exploratory attention consisting of preliminary mapping and sampling of the barite during the 1977 season.

During 1978 further work carried out on the GK claims consisted of reconnaissance geochemical surveys, prospecting, geological mapping and surface sampling of barite showings. Results of that work are presented in this report.

MINERAL CLAIMS

The GK Group is comprised of the following mineral claims:

<table>
<thead>
<tr>
<th>N.T.S.</th>
<th>CLAIM</th>
<th>GRANT NUMBER</th>
<th>RECORDING DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>105F-15</td>
<td>GK 1-8</td>
<td>YA19362-YA19369</td>
<td>August 4, 1977</td>
</tr>
<tr>
<td>105F-14</td>
<td>GK 9-14</td>
<td>YA19370-YA19393</td>
<td>August 4, 1977</td>
</tr>
</tbody>
</table>

LOCATION AND ACCESS

The GK Group comprises 32 contiguous claims in a block 16 claims long by 2 claims wide which extends northwest-southeast along strike in the St. Cyr Range of the Southern Yukon Territory (Fig. 1). The property is reached by helicopter from Ross River 20 miles to the east, or Faro 20 miles to the north-northwest.

PREVIOUS WORK

The area now covered by the GK claims has not, to the knowledge of the author, been the subject of any concerted exploration activity in the past. Known work has however been carried out in nearby related areas as described below.
A property on the northeast side of Mt. Cook three miles to the east of the GK claims has had exploration in connection with lead-zinc bearing veins within Cambrian metasediments. Grab samples from these veins averaged 12.8 oz./ton silver, 22.8% lead and 12.5% zinc. The area was held as the FOX claims by Atlas Exploration Ltd. in 1966 and more recently as the WIMP claims by Utah Mines Ltd.

The mineralization is pertinent to a discussion of the GK claims as vein systems on the WIMP claims could equate to "stringer-zone" mineralization known to underlie stratiform lead-zinc barite deposits on the TOM property.

The GREW claims contiguous to the east of the GK are held by Amax Exploration Ltd. These claims were staked on the basis of lead-zinc geochemical anomalies discovered in the course of regional exploration by that company. The exploration objective of their program is believed to be lead-zinc mineralization in a tuffaceous horizon within Mississippian volcanics similar to "MM" deposit currently under investigation by Cyprus Anvil Mining Corp. in the nearby Seagull Lake area.

GEOLOGY

Geological mapping of the GK claims was carried out at a scale of 1:25,000 utilizing government aerial photographs and 1:50,000 topographic maps for control. Results have been plotted on an 1:12,500 enlargement of the 1:50,000 government topographic maps (Plate 7-2).

Rocks underlying the GK claims consist of Devonian to Carboniferous calcareous sediments, shales, and volcanic rocks which are interpreted as forming the southern limb of a gently folded anitcline, the fold axis of which lies along the northern boundary of the claim group (Fig. 3, Cross-section 884). A brief summary of the stratigraphy described in the section following is presented in Fig. 2.

Stratigraphy

a) Devonian (Dvc - Unit 5)
   Sub Unit 5a - limestone
   This unit is characterized by buff weathering black
Brown and grey weathering, fissile and massive quartz-biotite siltstone and sandstone, sometimes rusty, argillaceous shale; buff sandy limestone

Buff and orange weathering grey and brown siltstone; grey, black, green and cream colored chert, minor chloritic shale.

Black siliceous slate and shale, sometimes with yellow alteration; minor grey argillite and calcareous, thin laminated siltstone.

Barite

Orange weathering, sometimes pyritic, cream colored tuff; green agglomerate, tuff, and volcanic flow rocks; Minor buff limestone.

Orange weathering grey and black phyllite and sooty grey shale; orange weathering grey limestone; buff weathering, grey and black, crinoidal and sandy limestone; minor black cherty shale.

NOTE: SEE APPENDIX FOR LITHOGRAPHIC SYMBOLS.
ALL SECTIONS LOOKING EAST

NOTE: FOR LOCATION AND LEGEND SEE PLATE 7-2 AND FIG. 2
crystalline and crinoidal limestone which tends to be exposed as resistant massive outcrops on ridge tops. Crinoids vary from 1 millimeter to 1 centimeter in size and are sometimes recrystallized. Their buff coloured sandy equivalents contain fragments of crinoids.

These limestones occasionally weather to a bright orange colour and can be mistaken for the orange weathering volcanics, sub unit 5b.

Less resistant grey phyllite may form a significant portion of sub unit 5a as the phyllites appear to occur only in areas of thick moss cover and limited outcrop. This phyllite has orange weathered fractures and varies in colour from grey to black.

Sub Unit 5b - volcanics

This volcanic sub unit is composed of orange and buff weathering, pyritiferous white tuffs and massive fine grained green flows and agglomerates of intermediate to acid composition. The thickness and character of sub unit 5b is variable along strike. Flows, where present in 5b, range up to 30 meters in thickness and intertongue with carbonates and phyllites of sub unit 5a. Narrow tuff horizons are present where flows are absent from the section.

Thin section analysis of these volcanics showed these rocks to be welded or crystalline tuffs, some showing shards of devitrified glass.

b) Upper Devonian-Mississippian (uDMs - Unit 6)

Sub Unit 6a - shale
Black and grey shales of variably graphitic and phyllitic character dominate this unit. The shales can be siliceous and even cherty near contacts with sub units 6b. A yellowish alteration is often seen on fracture surfaces in the shale.

Northwest of the claim group exposures of 6a are composed of both phyllitic shale and grey tuffaceous siltstones which exhibit chloritic groundmasses in thin section.

Tentatively mapped as unit 6a, are black epsomite shale and brown weathering chloritic tuffaceous siltstone occurring north of the GK claims and designated 6a7 on Plate 7-2. The shale is characterized by scree slopes coated with white epsomite salts which impart a silver-blue tint to the black shales when viewed from a distance. The brown weathering tuffaceous siltstone is characterized by a "flaky" appearance in hand specimen and thin section analysis reveals abundant clay minerals in the groundmass.

A trachytic sill or dyke is associated with both the shale and barite (6b) northwest of the claim group but is not seen to the southeast on the claim group. This rock unit may be the lateral equivalent of the barite which is pinching out to the northwest but will be included in 6a for this report because of its limited extent as presently mapped.

Sub Unit 6b - barite

Barite occurs as a distinct horizon enveloped within shales of sub unit 6a over a strike length of 7 kilometers within the claim block. Its continuity is masked by overburden cover
in the central part of the claim block for a distance of 1.5 kilometers (Plate 2-2). The barite, which was mapped and sampled in detail on the southeastern portion of the property, is further described in the following sections 7.5.2 and 7.7 of this report.

c) Mississippian (Mt - Unit 7) - chert

Unit 7 forms ridge crests and resistant bluffs trending along the length of the claim group and less resistant shales of unit 6a (Fig. 3). Intertongued and interbedded brittle cream and green coloured chert, black and grey chert, grey and brown tuffaceous siltstone, and buff coloured tuff are "kinked" into chevron folds which only locally disrupt an otherwise uniformly southerly dipping sequence of rocks. At the southeast end of the claim group minor fine grained amygdaloidal green tuffaceous flows are interbedded in the chert.

d) Carboniferous (Cs1 - Unit 8)

Sub Unit 8a - limestone
Buff weathering, calcite veined, sometimes recrystallized silty and sandy limestone comprises sub unit 8a. These rocks appear to pinch out to the northwest.

Sub Unit 8b - sandstone
Massive grey thin and thick bedded fine grained and medium grained sandstone are the prevalent rocks of sub unit 8b. Individual beds may grade to darker colours due to an increase in terrigenous and carbonaceous material and shale partings
up to several centimeters in thickness are not uncommon.

Some sandstones are dolomitic, containing particles of chert, shale, feldspars, and clay minerals in a rusty coloured dolomitic groundmass.

The unit has only been observed in the central portion of the claim group (Plate 7-2), however mapping to the northwest suggests that this member is probably a dominant rock type in unit 8 (undifferentiated 8a and 8b).

Mineralization

Three main barite showings have been examined to date on the property, the EAST Showing, the WEST Showing, and the FAR WEST Showing (Fig. 1 and Plate 702).

The WEST and EAST Showings (Fig. 4), form an almost continuous barite exposure of approximately 2 kilometers in strike length, and dipping from 45° to 80° to the south. Exposures sampled indicate a total thickness ranging from 30 meters to greater than 60 meters which at one location (Section D, Fig. 4b) contains a 27-meter section of shale and baritic limestone.

Near vertically dipping beds at the WEST Showing trend across a rounded ridge crest, thus presenting an excellent potential open pit quarrying area with little or no stripping being initially required.

The FAR WEST Showing (Fig. 5), which is not as well exposed as the WEST and EAST Showings, was not sampled because of its limited exposure. At this location the barite appears to dip less steeply to the south (Fig. 3, Section BB4) and overlying
Fig. 4a Looking SW to the GK West Showing

Fig. 4b Looking South to the GK East Showing
Fig. 5 Looking SW to the FAR WEST Showing, G.K. Mineral Claims.
strata form prominent cliffs above the hillside on which the barite occurs. The barite varies in texture and composition as is reflected by assays (Section 7.7).

Grey, massive, thinly (1-2 millimeters) bedded barite occurs mainly at the top of the barite section. This high grade barite shows thin discontinuous beds of white and grey barite with minor inclusions of black chert (Fig. 6). Sample Section C described in Section 7.7 shows assays from this type of barite as illustrated in Fig. 11.

Beneath the grey, massive, thinly bedded barite, rusty and grey weathering, well bedded black and white barite (Fig. 7) occurs as interbeds with narrower sections of this latter grey, massive barite. This well bedded black and white barite is lower grade (50% to 80% BaSO₄) and is composed of 2 - 5 millimeter beds of pale grey barite and black chert. Beds are continuous and show microscopic flow and differential compaction structures considered to be due to primary soft sediment deformation (Fig. 7) that have undergone further weak, post lithification, deformation. Barite of this nature was mapped in sample section A in the 0-3 meter and 6-9 meter intervals (Fig. 11).

The lowest grade barite occurs near the base of the barite section and is best described as nodular barite (Fig. 8). Pale grey boudin-shaped nodules of barite occur in black chert. These nodules occasionally concentrate to form distinct, 1 to 5 centimeter thick nodular barite beds and, as shown in Fig. 9, can grade into uniform grey barite beds such as seen
Fig. 6  Grey, massive, thinly bedded barite, West Showing, GK Mineral Claims
Fig. 7  Well bedded, grey and black barite, East Showing, GK Mineral Claims.
Fig. 8  Nodular barite, West Showing, GK Mineral Claims
Fig. 9   Typical Bedded and Nodular Barite at the WEST Showing, G.K. Mineral Claims
in previously described grey and black barite sections. This type of barite, mapped in sample section A (9-12 meters), is considered uneconomic and part of the footwall to the barite mineralization.

PROSPECTING

It was established during 1977\(^1\) that the GK claims are underlain by rock types equivalent to those hosting the TOM and JASON deposits in Macmillan Pass some 208 kilometers to the northeast on the opposite, eastern boundary of the Selwyn Basin. Conventional prospecting was conducted along the barite horizon in an effort to discover lead-zinc mineralization possibly associated with the barite, as is the case at the TOM and JASON deposits. Fig. 10 details the areas prospected in 1978. Prospecting did not reveal any lead-zinc occurrences.

GEOCHEMISTRY

Geochemical surveys consisting of reconnaissance soil sampling lines were carried out in conjunction with prospecting to locate base metals mineralization. Sample lines were established in the following manner:

a) contour sample lines were installed immediately downslope from the barite horizon to detect base metal mineralization possibly associated with the barite;

b) sample lines were installed across the regional strike of the stratigraphy at two locations (Plate 7-2) to detect base metal mineralization possibly occurring at locations laterally adjacent to the barite.

Several silt and rock chip samples were also collected in the course of field mapping. Threshold values of 400 ppm for zinc, 50 ppm for lead, and 2.5 ppm for silver were arbitrarily chosen for the limited data collected to date. Results from geochemical surveys did not indicate any significant anomalies. Only two samples yielded high zinc values; one (440 ppm zinc) over barite at the WEST Showing (Plate 7-2) and one rock chip (800 ppm zinc) over unit 8 stratigraphy northwest of the claim group. No anomalous values were obtained for lead or silver.

**SAMPLING PROCEDURE AND ASSAYS**

Systemmatic chip sampling was carried out over exposed barite sections at several locations on the GK claims (Plate 7-2). Chip samples were collected, utilizing a hammer and moil, over 3-meter sections (except where otherwise indicated). Samples were shipped to Bondar-Clegg Laboratories in North Vancouver, B.C. and analysed for SiO₂, Fe, Ca and BaSO₄ content; specific gravity determinations were carried out as well.

Assay results are shown in Fig. 11 to 13 along with geology of the sampled sections. The locations of these chip sample sections are shown in Fig. 4a and 4b and Plate 7-2.

Sample sections A, B, C, F and G over the WEST Showing (Fig. 11 and 13) represent about 63 meters of thickness. The best section is within section C where baritic material assayed an average of:

- 8.58% SiO₂
- 0.20% Fe
- 0.20% Ca
- 90.47% BaSO₄
- 4.12 specific gravity

over a thickness of 18 meters.
**NOTES**

*×××××××× Scree*

All measurements in meters
Sampled in 3m intervals

FOR SAMPLING LOCATIONS SEE PLATE 7-2
LOOKING WEST

NOTES
All measurements in meters
Sampled in 3m intervals
FOR SAMPLING LOCATIONS SEE PLATE 7-2
SECTION E
Scale 1:200
Sampled in 2 m interval

SECTION F
1:500

SECTION G
1:500

SECTION H
1:500

NOTE
All measurements in meters
Sampled in 3m intervals, unless otherwise indicated.

FOR SAMPLING LOCATIONS SEE PLATE 7-2
BIBLIOGRAPHY

Archer, Cathro & Associates
1977: Northern Cordillera Mineral Inventory

Tempelman-Kluit, D.J.
APPENDIX

LEGEND OF LITHOLOGIC SYMBOLS
## Lithological Symbols Used in Cross-Sections and Stratigraphic Columns

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Conglomerate" /></td>
<td>Conglomerate</td>
</tr>
<tr>
<td><img src="image2" alt="Granite" /></td>
<td>Granite</td>
</tr>
<tr>
<td><img src="image3" alt="Sandstone" /></td>
<td>Sandstone</td>
</tr>
<tr>
<td><img src="image4" alt="Carbonate Breccia" /></td>
<td>Carbonate Breccia</td>
</tr>
<tr>
<td><img src="image5" alt="Siltstone" /></td>
<td>Siltstone</td>
</tr>
<tr>
<td><img src="image6" alt="Reefal Limestone" /></td>
<td>Reefal Limestone</td>
</tr>
<tr>
<td><img src="image7" alt="Silty Shale" /></td>
<td>Silty Shale</td>
</tr>
<tr>
<td><img src="image8" alt="Calcereous Siltstone" /></td>
<td>Calcereous Siltstone</td>
</tr>
<tr>
<td><img src="image9" alt="Sandy Shale" /></td>
<td>Sandy Shale</td>
</tr>
<tr>
<td><img src="image10" alt="Siderite" /></td>
<td>Siderite</td>
</tr>
<tr>
<td><img src="image11" alt="Shale" /></td>
<td>Shale</td>
</tr>
<tr>
<td><img src="image12" alt="Calcereous Phyllite" /></td>
<td>Calcereous Phyllite</td>
</tr>
<tr>
<td><img src="image13" alt="Calcereous Shale" /></td>
<td>Calcereous Shale</td>
</tr>
<tr>
<td><img src="image14" alt="Phyllite" /></td>
<td>Phyllite</td>
</tr>
<tr>
<td><img src="image15" alt="Shaley Limestone" /></td>
<td>Shaley Limestone</td>
</tr>
<tr>
<td><img src="image16" alt="Argillite" /></td>
<td>Argillite</td>
</tr>
<tr>
<td><img src="image17" alt="Limestone" /></td>
<td>Limestone</td>
</tr>
<tr>
<td><img src="image18" alt="Gneiss" /></td>
<td>Gneiss</td>
</tr>
<tr>
<td><img src="image19" alt="Dolomite" /></td>
<td>Dolomite</td>
</tr>
<tr>
<td><img src="image20" alt="Schist" /></td>
<td>Schist</td>
</tr>
<tr>
<td><img src="image21" alt="Volcanics" /></td>
<td>Volcanics</td>
</tr>
<tr>
<td><img src="image22" alt="Breccia" /></td>
<td>Breccia</td>
</tr>
<tr>
<td><img src="image23" alt="Tuff" /></td>
<td>Tuff</td>
</tr>
<tr>
<td><img src="image24" alt="Bedded Chert" /></td>
<td>Bedded Chert</td>
</tr>
<tr>
<td><img src="image25" alt="Calcereous Sandstone" /></td>
<td>Calcereous Sandstone</td>
</tr>
<tr>
<td><img src="image26" alt="Nodular Chert" /></td>
<td>Nodular Chert</td>
</tr>
<tr>
<td><img src="image27" alt="Sandy Carbonate" /></td>
<td>Sandy Carbonate</td>
</tr>
<tr>
<td><img src="image28" alt="Ironstone Nodules" /></td>
<td>Ironstone Nodules</td>
</tr>
<tr>
<td><img src="image29" alt="Silty Carbonate" /></td>
<td>Silty Carbonate</td>
</tr>
<tr>
<td><img src="image30" alt="Septaria Nodules" /></td>
<td>Septaria Nodules</td>
</tr>
<tr>
<td><img src="image31" alt="Quartzite" /></td>
<td>Quartzite</td>
</tr>
<tr>
<td><img src="image32" alt="Siliceous" /></td>
<td>Siliceous</td>
</tr>
</tbody>
</table>