

In fulfillment for requirements for representation work, we the undersigned respectfully submit:



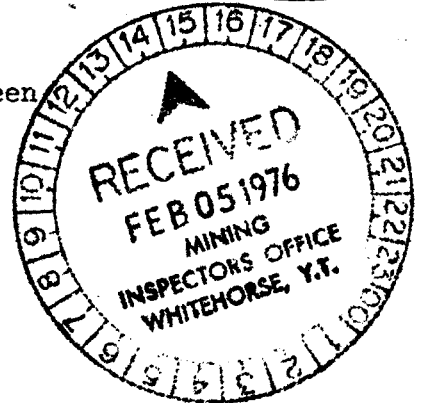
A GEOLOGIC AND GEOCHEMICAL EVALUATION OF THE CATHY 1-6, LORRAINE 1-6, CHAS, KAM 1-2, LES, WALT, FAT AND CITY CLAIMS, YUKON TERRITORY, CANADA



Claim Sheet Number: 105-0-7  
Latitude : 63° 16' N  
Longitude : ~~130° 34' W~~ - 130° 39' W  
130 - 34

being a result of work performed between

July 7, 1975 and January 22, 1976



BAROID OF CANADA, LTD.  
BAROID PETROLEUM SERVICES DIVISION  
NL INDUSTRIES, INC.  
Houston, Texas

*L. M. Tyralla*  
L. M. Tyralla  
Senior Geologist

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 \$8475.00.

*[Signature]*  
Resident Geologist or  
Resident Mining Engineer

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

*[Signature]*  
R. BAXTER  
Supervising Mining Recorder  
Commissioner of Yukon Territory

*[Signature]*  
W. E. Simon  
Geologist

*[Signature]*  
W. B. Sasser  
Field Engineer

07001

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A Geological and Geochemical Evaluation of the Cathy 1-6,  
Lorraine 1-6, Chas, Kam 1-2, Les, Walt, Fat and City Claims,

Yukon Territory, Canada

Introduction

Recent work in the Yukon Territory carried out by Baroid exploration geologists has indicated a barite district of considerable size. Baroid's efforts in this region have culminated in the acquisition of new barite deposits in Baroid's name and an evaluation of the region in terms of potential for additional barite discoveries.

Summary and Reserves

Nineteen claims were staked by Baroid personnel in the Hess River Area of the Yukon. These claims are distributed over an area of approximately 10 square miles in the general vicinity of Macmillan Pass. This area is accessible by the Canol Road from Ross River northeastward to Macmillan Pass. Reconstruction of the Northwest Territories portion of the Canol Road (234 miles) would be necessary to haul barite to the Mackenzie River. Alternatively, barite could be transported 811 miles through Ross River, Dawson City, and up the Dempster Highway to Inuvik on existing roads. In either case, access roads must be constructed from the Canol Road to the various claims and distances would range between 10 and 15 miles for each property. The topography of the region is rugged and mountainous. The prevailing climate consists of harsh winters with temperatures down to minus 60 degrees and mild summers. Mining operations could work for approximately five months during the summer which has temperatures ranging from 30 to 85 degrees F. All properties have readily accessible water supplies.

Barite mineralization in the Macmillan Pass region is localized within and restricted to the Upper Devonian Besa River Formation which, in this area, consists of shales, limestones, sandstones and siltstones. The barite is intimately associated with Carbonaceous shales and limestones and is undoubtedly syngenetic or early diagenetic in origin. The depositional environment for the Besa River Formation in the region was probably a quiet - water marine basin with restricted circulation and varying water depths. Barite deposition was probably controlled by availability of barium at the site of deposition rather than geochemical or lithologic affinities.

The following table summarizes the in situ reserves reported in the property description section of this report. All reserves are shown as probable, and based on areal extent and depth as indicated by topographic relief and reasonable stripping ratios. Given the apparent continuity of stratabound deposits, as all of these occurrences are, probably up to an equal amount of reserves can be considered in the possible category for each property. However, depth of mining by open pit methods would more than likely necessitate that reserves in the possible category be exploited by underground techniques.

Table I

Summary of Property Reserves

<u>Property Name</u>	<u>Average Specific Gravity</u>	<u>Probable Reserves (short tons)</u>
Chas Claim	4.22	57,400
Cathy 1 Claim	--	0
Cathy 2 Claim		
Shaly Barite	4.30	802,700
Baritic Limestone	4.30	675,600
Cathy 3 Claim	4.29	1,368,200
Cathy 4 Claim		
Shaly Barite	4.28	2,368,400
Gray Barite	4.29	158,000
Cathy 5 Claim	--	0
Cathy 6 Claim	--	0
Lorraine 1-2 Claims	3.49	196,000
Lorraine 3-4 & Kam 1-2 Claims	4.11	3,309,000
Lorraine 5-6 Claims	--	0
Fat and City Claims	4.19	160,000
Les and Walt Claims		
Baritic Shale	4.12	200,000
Baritic Limestone	4.08	106,500

Location, Climate and Physical Features

Baroid claims are situated in the central Mackenzie Mountains in the vicinity of the Yukon and Northwest Territories border (see Figure I). More specifically, the known barite occurrences are in the southern portion of the Hess Mountains with Mac Pass on the Canol Road being a well-known centrally located geographic point of the region. Within the Yukon Territory side of the divide, drainage is westerly into the Hess River; within the Northwest Territories side, drainage is to the northeast towards Keele River and its tributaries.

The region is generally mountainous and rugged with local relief as much as 5,200 feet. In general, maximum elevation averages between 7,000 and 8,000 feet with valley bottoms lying lightly below 4,000 feet, the approximate elevation of treeline. Above 4,000 feet, vegetation is confined to that of arctic tundra. Winters are long and harsh with plentiful snowfall and low temperatures, minus 40 to 60 degrees F. The summer months, July through September, are characterized by alternating periods of rainy and dry weather. Temperatures during the summer months range from 45 to 90 degrees F., with occasional freezing temperatures and light snow fall at higher elevations. Permafrost underlies the whole region.

Ownership, Claims, and History

Claims in the Yukon Territory can be staked by an individual or a company. The procedure for locating a claim in the Yukon is explicitly outlined in the Yukon Quartz Mining Act.



Recent exploration in the Mac Pass region has been primarily concerned with the search for metals. AMAX controls one of the world's largest tungsten reserves. The mineralization occurs as scheelite in a skarn zone situated at the contact of Ordovician limestone and Cretaceous granodiorite, and reserves are given at about 31 million tons of 0.9 percent WO<sub>3</sub>. Hudson Bay Mining and Smelting (HBMS) has partially explored an important base metals deposit located adjacent to the Canol Road. To date, reserves are estimated at 7 million tons of 15 percent combined lead and zinc. In the immediate area of Baroid's claims, Woodcock Consultants Ltd., have two claims known as the BAR claims number 1 and 2.

Below is listed all pertinent data concerning Baroid's claims in the Yukon Territory. All claims have been officially transferred from the locators to Baroid of Canada, Ltd., a subsidiary of Baroid Petroleum Services Division, NL Industries, Inc.

<u>Name of Claim</u>	<u>Grant No.</u>	<u>Staked By</u>	<u>Date Staked</u>	<u>Date Recorded</u>	<u>Date Transferred</u>
Cathy #1	Y97235	J.E. Lunn	2/08/75	2/10/75	2/10/75
Cathy #2	Y97236	J.E. Lunn	2/08/75	2/10/75	2/10/75
Cathy #3	Y97237	J.E. Lunn	2/08/75	2/10/75	2/10/75
Cathy #4	Y97238	J.E. Lunn	2/08/75	2/10/75	2/10/75
Cathy #5	Y97239	J.E. Lunn	2/08/75	2/10/75	2/10/75
Cathy #6	Y97240	J.E. Lunn	2/08/75	2/10/75	2/10/75
Lorraine #1	Y97229	S. Wise	2/08/75	2/10/75	2/10/75
Lorraine #2	Y97230	S. Wise	2/08/75	2/10/75	2/10/75
Lorraine #3	Y97231	S. Wise	2/08/75	2/10/75	2/10/75
Lorraine #4	Y97232	S. Wise	2/08/75	2/10/75	2/10/75
Lorraine #5	Y97233	S. Wise	2/08/75	2/10/75	2/10/75
Lorraine #6	Y97234	S. Wise	2/08/75	2/10/75	2/10/75
Chas	Y98235	L.M. Tyralla	7/17/75	8/07/75	12/01/75
Fat	Y98236	L.M. Tyralla	7/18/75	8/07/75	12/01/75
City	Y98237	L.M. Tyralla	7/18/75	8/07/75	12/01/75
Walt	Y98238	L.M. Tyralla	7/16/75	8/07/75	12/01/75
Les	Y98239	L.M. Tyralla	7/16/75	8/07/75	12/01/75
Kam #1 Fr.	Y98345	D.B. Simon	7/16/75	8/14/75	12/01/75
Kam #2 Fr.	Y98346	D.B. Simon	7/16/75	8/14/75	12/01/75

Facilities

Road access to the Mac Pass region is provided by the maintained portion of the Canol Road extending from Ross River, Yukon Territory to Mac Pass on the Northwest Territories/Yukon border (see Figure II). The road is an all-weather gravel road similar in condition to the Alcan Highway, but narrower. The maintained portion of the road ends at about Mile 218. The road has been used to Mile 172 (Godlin Lakes), but only during the winter.

Air access to the Mac Pass region can be carried out by fixed wing wheeled aircraft landing at a small airstrip located at about Mile 241, four miles west of Mac Pass. Float planes can land easily at Jeff, Fuller, and Sheldon Lakes (see Figure II). Jeff and Sheldon Lakes can also be reached by vehicle.

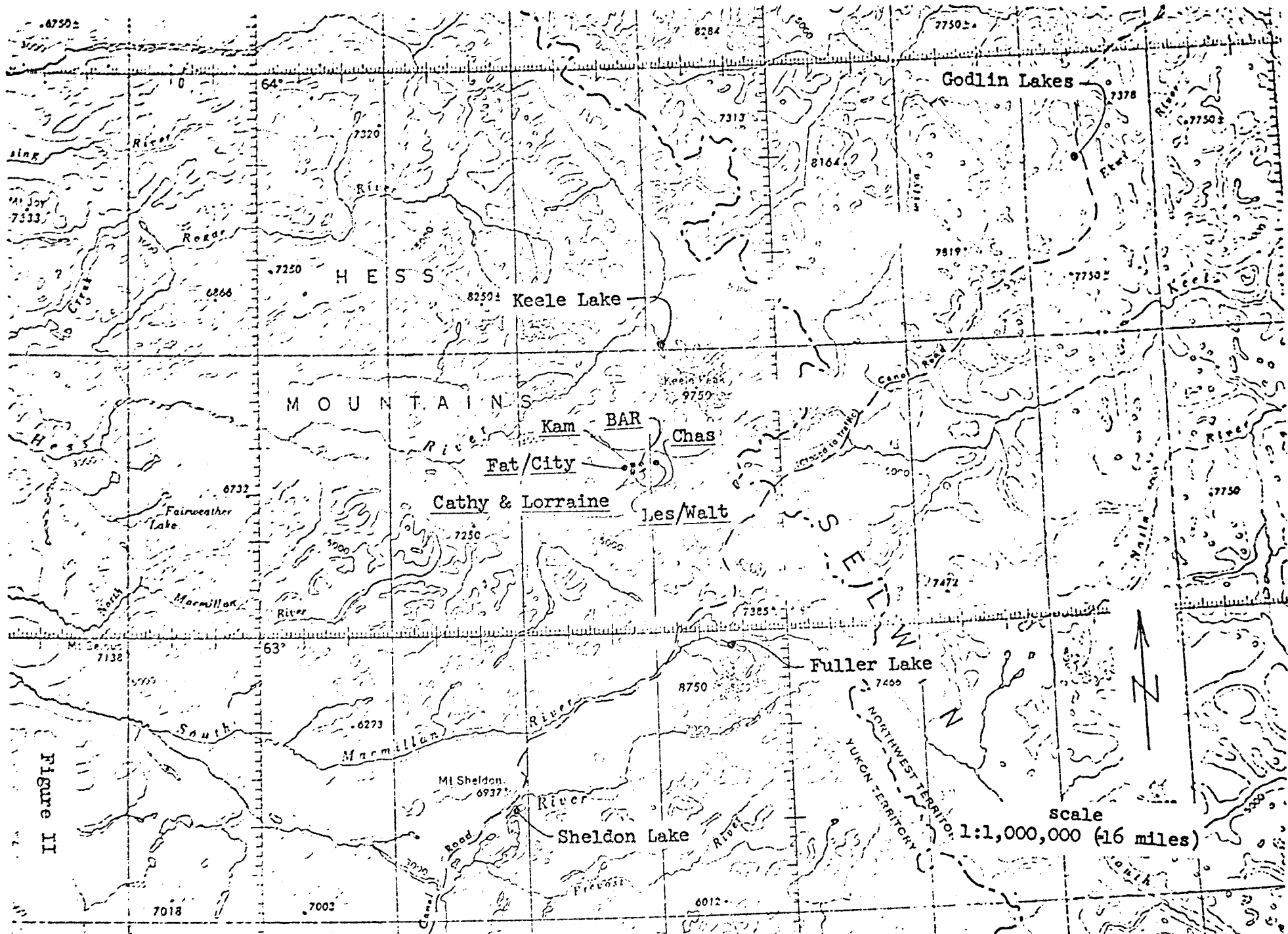


Figure II

Utilities (telephone, electricity) and fuel are provided to Ross River, the nearest town to Mac Pass. Distance from Ross River to Mac Pass is about 185 air miles or 205 road miles. Ross River has one motel and a restaurant. Air services at Ross River, fixed wing and helicopter, are offered by Trans North Turbo Air (TNIA) and Terr-Air (Territorial Airways). Also, Terr-Air is the local distributor for aircraft fuel. Several expeditors are located in Ross River and can handle procurement of supplies, establishing of base camps, etc.

As can be expected, water is plentiful through out the region, and perennial streams and rivers can provide for local water needs. Labor is non-existent in the region, and the closest labor source would be Whitehorse. Fuel oil is pumped from Skagway to Whitehorse, and is the closest large fuel source. Norman Wells is a fuel source too, but road conditions and removal of pipelines along the Canol Road make this an inaccessible fuel source. Wages are high, as is most everything in the territories; unskilled labor would average about \$4.50 per hour. Housing would have to be substantial with extra insulation and double glazed windows.

#### Transportation

The major unknown factor concerning transportation in this region, is the rebuilding and reopening of the eastern section of the Canol Road between Mac Pass and Norman Wells, a distance of about 234 miles. Discussion with governmental officials and various mining and exploration company personnel indicate that there are no immediate plans for reopening the eastern section of the Canol Road. The western portion is in the process of being cleaned-up which involves the removal and disposal of the equipment and buildings left by the U.S. Army after construction on the Canol Road was completed in 1943.

Assuming that there will be no permanent road established between Mac Pass and Norman Wells, barite production will have to move on the western section of the Canol Road, Mac Pass to Ross River. Locations of present and predicted consumption areas dictate that Inuvik would be the most likely embarkation point for any barite product originating in the Yukon or Northwest Territories. Based on this, any production of barite would probably be moved on the Canol Road to Ross River, on the Robert Campbell Highway to Carmacks, on the Whitehorse-Keno Road to Dawson City, and then along the Dempster Highway to Inuvik (see Figure III). This road distance is about 811 miles from Mac Pass to Inuvik. Transportation at this point would then be by water to eastern Alaska and the Arctic Islands.

#### Test Data

Samples collected on the Yukon claims were tested for specific gravity, metal content (Zn, Pb and Cu) and for best mode of beneficiation. Data pertaining to specific gravity and assay work are listed in the individual property description sections. Beneficiation data is listed below.

Cumulative specific gravity of samples from our Yukon claims averaged less than the minimum required by industry specifications. In order to utilize this material in drilling fluids, a 4.22 specific gravity product must be attained.

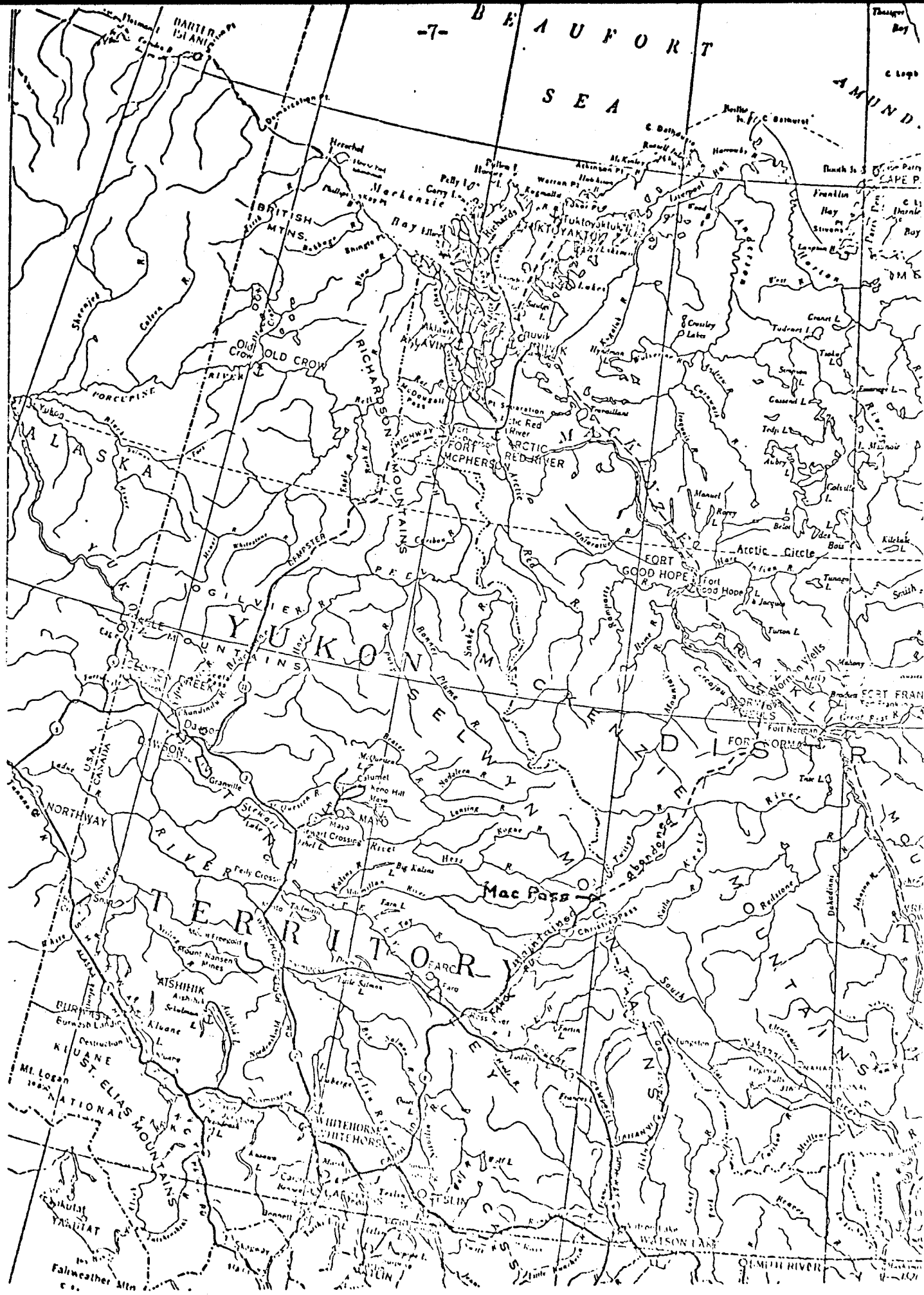


Figure III

Four beneficiation tests were conducted on a bulk sample to determine the best and most economical method to upgrade the barite ore to a 4.22 product. Information from these tests are summarized in the following tables.

Table II

Crude Ore  
Screen Analysis - Bulk Ore Sample

<u>Size</u> <u>Tyler Mesh</u>	<u>Wt. %</u>	<u>Sp. Gr.</u>
+ 8	64.07	4.06
+ 10	8.22	4.08
+ 20	10.43	4.09
+ 65	7.88	4.27
+100	0.95	3.57
+200	1.10	3.95
+325	0.78	4.13
-325	6.57	4.20
Head (calc.)	100.00	4.08
Head (assay)		4.06

Table III

Beneficiation Tests-Bulk Ore Sample

<u>Separation</u> <u>Method</u>	<u>Feed</u>		<u>Conc.</u>		<u>Midd</u>		<u>Tail</u>	
	<u>Sp.Gr.</u>	<u>Size</u>	<u>Wt.%</u>	<u>Sp.Gr.</u>	<u>Wt.%</u>	<u>Sp.Gr.</u>	<u>Wt.%</u>	<u>Sp.Gr.</u>
Jig	4.06	- $\frac{1}{4}$ "	76.23	4.19	--	--	23.77	3.69
Table	4.07	- 20-M	63.75	4.13	18.91	3.81	17.34	4.13
Table	4.02	- 28-M	39.23	4.18	29.73	3.76	31.04	4.09
Table	4.07	- 10-M	40.87	4.24	39.62	3.87	19.51	4.15
Flotation	4.08	-200-M	87.90	4.27	3.10	3.02	6.00	2.85
Table *	4.05	- 20-M	48.80	4.20				

\* Slime Deck

Wt. % = percentage weight recovery.

From the above data flotation appears to be the best method of beneficiation offering the highest weight recovery at an acceptable specific gravity. In terms of cost, however, flotation is also the most expensive. Jigging would be a less costly alternative if the ore could be selectively mined to increase the quality of the feed and produce a product of desirable specific gravity.

Procedures and Methods

Geological work was carried out from a base camp situated on Keele Lake (see Figure II), the nearest accessible location for float planes. To gain access to the individual claims which are about 15 miles from base camp, a Bell G3B2

helicopter (Model 47) was utilized. The helicopter was chartered from Trans North Turbo Air (1971) Ltd., in Whitehorse at an hourly rate of \$180.00 Canadian, exclusive of fuel. Camp supplies and groceries were purchased in Whitehorse and flown into Keele Lake by float plane; Trans North served as our expeditor. Fuel for the helicopter was trucked to Sheldon Lake and flown to Keele Lake.

Geologic field work was accomplished by three company geologists and one field assistant from July 8, 1975 to July 26, 1975 excluding July 14th, 15th and 17th when other work was being done. The personnel were flown out to the claims in groups of two and each claim was mapped and sampled. Mapping was accomplished on claim reference map sheet 105-0-7 and included accurately plotting the claim boundaries, measuring and detailing the geology of the individual stratigraphic units and measuring and sampling the baritic horizons. Each sample collected weighed approximately 2 pounds and consisted of a continuous chip sample from the base of the baritic zone to the top. Each sample was marked and the location was plotted on the geologic field map. At the end of field work, the samples were bagged and transported by air freight to Baroid's Metallurgical Laboratory in Malvern, Arkansas for analysis. The geologists returned to Houston, Texas to prepare the report and draft the maps; the field assistant was paid and dismissed in Whitehorse.

Fifteen working days from August 11, 1975 to August 29, 1975 were utilized to prepare the report which was a collective effort of the three geologists who did the field work. Maps accompanying the report were drafted by an assistant field engineer in the Houston office.

Geochemical evaluation of samples is a part of the geologist investigation of these claims. All geochemical services were performed by qualified metallurgists at Baroid's Metallurgist Laboratory, P.O. Box 10, Malvern, Arkansas. The specific analytical procedures utilized are outlined in the following paragraphs.

Testing of the Yukon prospect samples included sample preparation, specific gravity analyses, chemical analyses or assays and 4 individual beneficiation tests. Specific gravity and chemical analyses were conducted on individual prospect samples; the remaining tests were run with a bulk sample.

#### Sample Preparation

Samples, as received, generally ranged in size  $\frac{1}{2}$  to 1 inch in diameter, 1 to 2 inches wide and 1 to 3 inches in length. Each sample must be crushed to meet the needs of the specific test involved. Samples for specific gravity and chemical analyses are crushed to minus 100-mesh. Samples for jig and screen tests were crushed to minus  $\frac{1}{4}$ ". Table test feed samples were crushed to minus 10, 20, and 28-mesh. Flotation tests were conducted with ore crushed and ground to minus 200-mesh.

#### Specific Gravity Analysis

Standard Le Chatelier specific gravity tests were conducted. This involves placing a measured weight of the sample into a Le Chatelier flask with a measured amount of kerosene. The pulp is mixed to remove air bubbles and allowed to stand in a constant temperature bath for two hours. The change in volume is then used to calculate the specific gravity.

### Chemical Analyses

Standard wet-chemical analyses were conducted to determine the lead, copper and zinc content of each prospect sample. This involves several dissolution, precipitation, filtration and titration steps.

### Beneficiation Tests

Screen Tests - Samples for screen tests were crushed to minus 1/4 inch. The sample was then wet screened at 325-mesh to remove slimes. The oversize fraction is then dried and re-screened, on the desired screen sizes, using a Ro-Tap sieve shaker.

Flotation Tests - Batch flotation tests were run at minus 200-mesh, using a Denver Model D-12 flotation machine. A standard barite flotation test utilizing a rougher separation and two stages of cleaning was conducted.

Jig Tests - Batch jig tests were run with bulk ore samples crushed to minus 1/4 inch, using a single cell jig.

Table Tests - Batch table tests were run at 10, 20 and 28-mesh. Single stage, two stage and scavenger separations were investigated.

### Personnel and Qualifications Summary

The geologic work outlined in this report was performed by two geologists and an engineer employed by Baroid Division, P.O. Box 1675, Houston, Texas 77001. The qualifications and relevant training and experience of each individual is summarized below:

Lester M. Tyrala, Senior Geologist  
P.O. Box 1675, Houston, Texas

Mr. Tyrala graduated from the University of Arizona in 1968 with a B.S. degree in geology. He worked for the Freeport Sulphur Company as an exploration geologist from 1968 to 1970 and came to Baroid in May, 1970. Mr. Tyrala is presently working on overseas assignment in London, England.

Donald B. Simon, Geologist  
P.O. Box 1675, Houston, Texas

Mr. Simon graduated from Western Washington State College in 1970 with a B.A. degree in geology and biology. He worked as a field geologist with AMAX Exploration Inc., in Kamloops, B.C. for 1½ years and then returned to school where he received a M.S. degree in geology from New Mexico Institute of Mining and Technology. In December, 1973, Mr. Simon joined Baroid as an exploration geologist.

Walter B. Sasser III, Field Engineer  
8850 Chimney Rock Rd., Houston, Texas

Mr. Sasser graduated from Memphis State University in December, 1973 with B.S. and M.S. degree in geology. He came to work for Baroid in June, 1974 as a field engineer but is currently employed by Continental Oil Company as an exploration geologist.

During the geologic investigation of the Baroid claims in the Yukon Territory, the services of Trans North Turbo Air (1971), Ltd. and one temporary personnel were utilized. The names and addresses are listed below.

Trans North Turbo Air (1971), Ltd.  
Box 4338  
Whitehorse, Yukon Territory

Mr. Van Vandenbas, Pilot  
Mr. Barry Cornfield, Engineer

Mr. Charles Sasser  
251 St. Joseph  
Baton Rouge, La. 70802

Mr. Sasser served as cook and field assistant.

The geologic report was prepared by L. M. Tyrala, D. B. Simon and W. B. Sasser with aid in drafting maps given by:

Douglas M. Dukes, Assistant Field Engineer,  
14123 Cindywood, Houston, Texas 77024

Mr. Dukes is a student at Stephen F. Austin University and was employed for the summer to assist in general office duties.

The geochemical services, specific gravity analyses and metal assays, were conducted by two metallurgists employed by Baroid Division.

David B. Suliin, Chief Metallurgist  
P.O. Box 10, Malvern, Arkansas 72104

Mr. Suliin graduated from Michigan Technological University with a B.S. degree in metallurgical engineering in 1962 and from South Dakota School of Mines with a M.S. degree in metallurgical engineering in 1965. Prior to joining Baroid in 1970, Mr. Suliin worked as a project engineer for Colorado School of Mines Research Laboratory and for U.S. Steel Applied Research Laboratory.

James E. Kaiser, Metallurgist  
P.O. Box 10, Malvern, Arkansas 72104

Mr. Kaiser received a B.S. degree in metallurgical engineering from Michigan Technological University in 1972. He was employed by Valenite Metals in Madison, Michigan for 8 months before he came to Baroid in July, 1973.

### General Geology

The Mac Pass region is composed generally of rocks representing geologically early periods of sedimentation. The majority of lithologies range in age from Proterozoic to late Paleozoic, with some formations of Cretaceous and Quaternary age. Depositional environments probably ranged from marine deepwater basins to continental shelves. In general, structure is dominated by faults, accompanied by vertical open folds.

The rock unit in the Mac Pass region containing the barite and base metal mineralization is the Besa River Formation of Upper Devonian age. (see Figure IV). The Besa River Formation, or its unnamed equivalent, "black clastics" (comm., Dr. S. L. Blusson) lies conformably on the Middle Devonian Nahanni Formation, and is unconformably overlain by unnamed Carboniferous rocks. The Besa River Formation is described as a "shale, argillite, dark grey to black and brown siltstone with minor chert-pebble conglomerate, quartzite, and banded chert" (Sekwi Mountain Map - Area, Yukon Territory and District of Mackenzie, S.L. Blusson, G.S.C. Paper 71-22, 1971).

In the Mac Pass region, the Besa River Formation is predominantly a black noncalcareous shale sequence which attains a thickness of over 2,000 feet. This shale sequence weathers a distinctive silver-gray, and can be readily identified from the air. Interbedded with the shale and resistant units of siltstone, limestone and pebble conglomerate which have positive relief and form somewhat isolated buttes. The siltstone unit is persistent and can be traced for many miles. More importantly, the siltstone unit serves as a marker bed for the baritic horizon in this area.

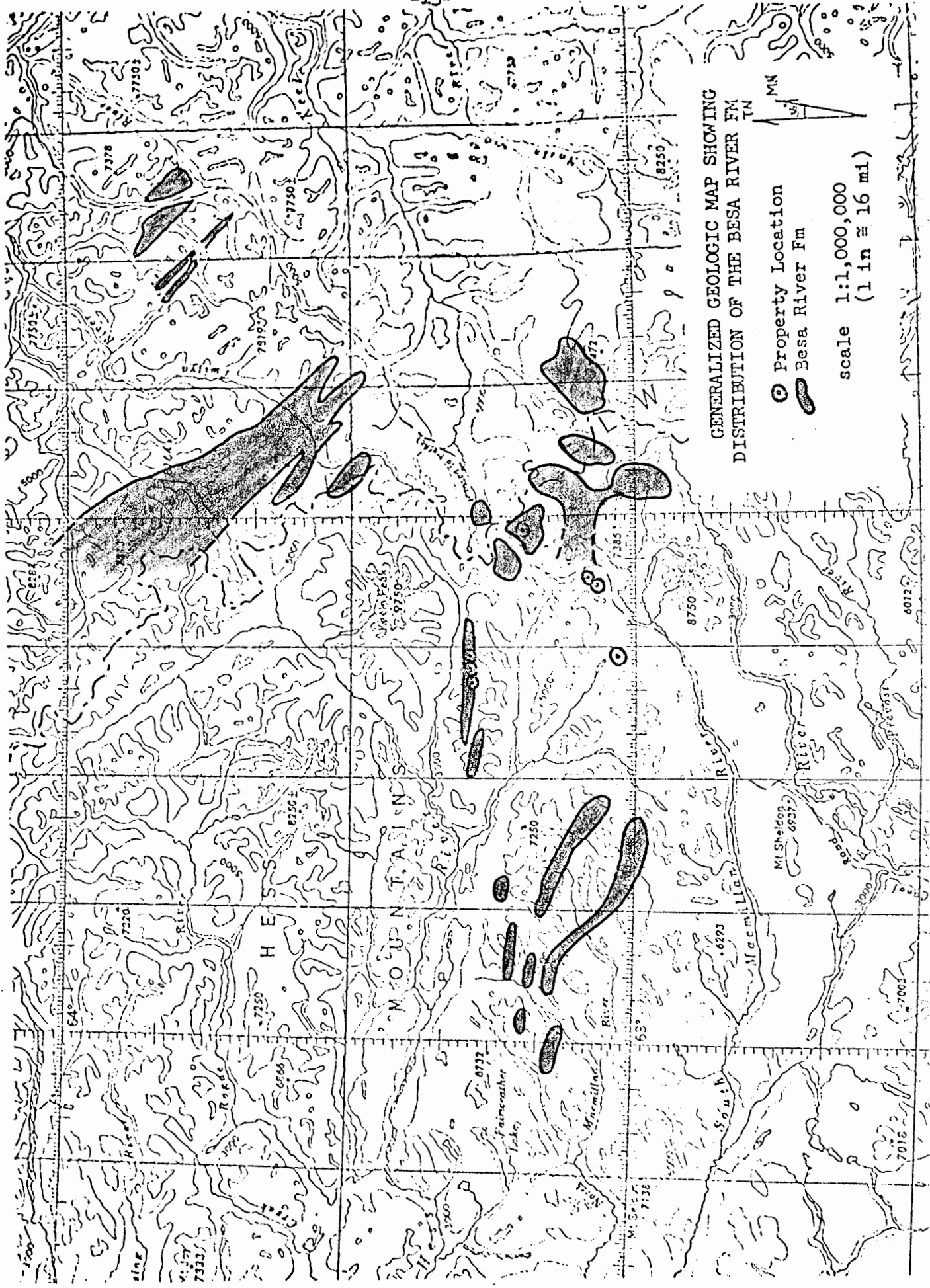
More detailed geology is discussed with the individual properties and shown on accompanying geologic maps.

#### Discussion of Geology and Mineralization

Barite occurrences in the Mac Pass region represent bedded stratabound deposits which formed contemporaneously with sedimentary rocks of Upper Devonian age. This indicates that barite deposition was directly related to late Devonian sedimentation, and a brief summary of the depositional environment present at that time is discussed in the following pages.

During late Devonian time, the Mac Pass region was part of an eugeosyncline situated between the Mackenzie Arch and the Selwyn Basin (see Figure V). Erosion of the uplift and subsequent sedimentation into the center of the basin resulted in an accumulation of a thick sequence of fine-grained clastics. The basin was evidently shallow and had restricted circulation as shales within this sequence have a high organic and pyritic content. Near shore, streams and wave action gave rise to a distinctive chert-pebble conglomerate and a well-sorted sandstone and siltstone facies. Following sedimentation, the basin apparently underwent structural changes which produced varying water depths and in turn, became conducive for limestone accumulation. This sequence of clastic material (shale, sandstone, siltstone, conglomerate) and limestone formed the present-day Besa River Formation.

Apparently during sedimentation, barium, probably in a complexed state, was introduced into the Selwyn Basin where it combined with seawater sulfate to form barite. In the area of the Cathy and Lorraine claims, deposition of barite was contemporaneous with deposition of limestone and carbonaceous shale. The different lithologies reflect different depositional environments. As indicated by the presence of coarse-grained clastics and limestone, the barite probably accumulated in shallow water.



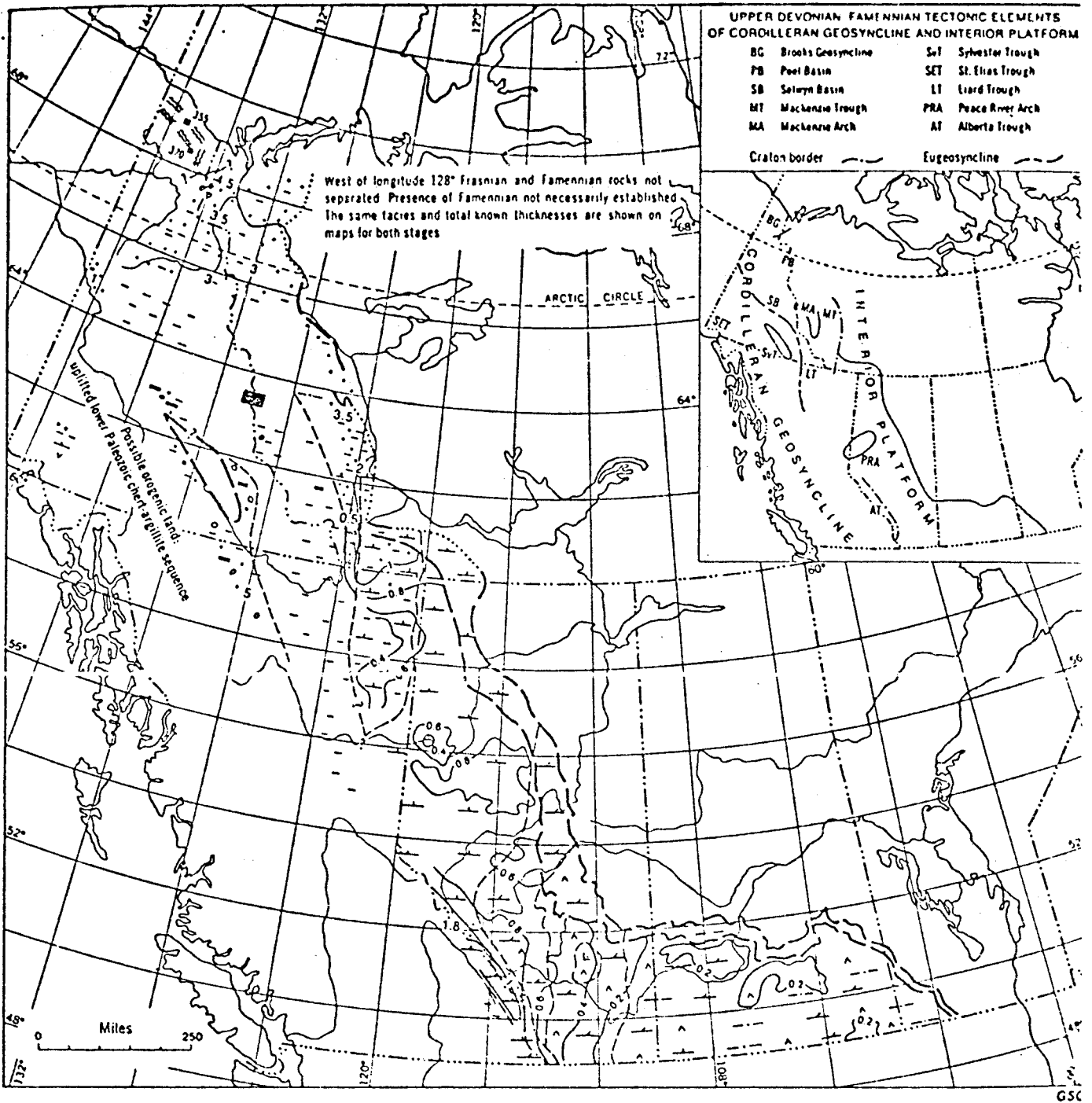
GENERALIZED GEOLOGIC MAP SHOWING  
DISTRIBUTION OF THE BESA RIVER FM  
TN



- Property Location
- Besa River Fm

scale 1:1,000,000  
(1 in ≈ 16 mi)

Figure IV



DEPOSITIONAL FEATURES

- Conglomerate . . . . . ○ ○
- Sandstone . . . . . : : :
- Siltstone . . . . . - - -
- Shale . . . . . . . . .
- Chert . . . . . - - -
- Volcanics . . . . . v
- Limestone . . . . . - - -
- Dolomite . . . . . - - -

- Anhydrite . . . . . ^
- Salt . . . . . L
- Truncated limit . . . . . ———
- Facies boundary . . . . . - - -
- Outcrop limit . . . . . ·····
- Isopach (thousands of feet) . . . . . ———
- Thickness (thousands of feet) . . . . . 3.5

ELLESMERIAN OROGEN

- Structural front (approximate) . . . . . ? - - - - ?
- Trend of metamorphic rocks . . . . . ~~~~~
- Granite pluton (age in millions of years) . . . . . 355m

PHYSIOGRAPHIC FEATURES

Blank areas are lowlands and plains developed on crystalline and sedimentary rocks of the craton, and where Famennian is now absent through erosion, or unknown. In the geosyncline the blank areas may be sea.

MAC PASS REGION

Figure V

Barium influx was not constant but occurred gradually and intermittently. On the Cathy and Lorraine claims, barren limestone and shale units are present over a barite-containing stratigraphic interval of about 750 feet. In addition, within this interval, several individual beds of both limestone and shale show a gradual increase in barite content from the basal contact to the top of the bed.

Other barite deposits within the Mac Pass region show similar modes of occurrence but the most notable is the Tom property (Hudson Bay). The significance of this occurrence is the association of barite and the base metals, galena and sphalerite. This association indicates that the Besa River Formation, in addition to barite, also contains substantial lead and zinc mineralization. All samples collected during our work in the region have been assayed for metal content. The results which are given in the Property Descriptions Section indicate that most samples showed moderate percentages of zinc but very low to negligible amounts of lead and copper. Metallurgical tests will be conducted in the near future to determine if the zinc is in a form amenable to concentration. If these results are favorable, more geochemical work will be recommended for the region.

### Conclusion

The Upper Devonian Besa River Formation in the Mac Pass region has been proven to be a significant geologic unit in terms of potential for barite mineralization for the following reasons:

- . All barite occurrences in this region examined by Baroid are located in the Besa River Formation.
- . All barite occurrences are stratabound and conformable with the enclosing sedimentary rocks of the Besa River Formation.
- . All barite occurrences appear to be syngenetic in origin.

In other words, the importance of exploring the Besa River Formation is based upon the obvious genetic correlation between barite mineralization and the geologic environment present at the time this formation was deposited. Whether this association is chemical, or related to a specific interval in geologic time is not known, but the nature of the barite occurrences suggests a time association. However, the controlling factor is the availability of barium during the Upper Devonian. Simply stated this means that irrespective of the geologic environment, without a source of barium, barite mineralization could not occur. This fact is partially substantiated by the lack of barite elsewhere in Upper Devonian formations time-equivalent with the Besa River Formation.

In conclusion then, the Mac Pass region during Upper Devonian time is characterized by widespread barite mineralization which was dependent on two necessary ingredients:

- (1) a source of barium available for transport to the site of deposition and,
- (2) a favorable environment (quiet-water marine basin with restricted circulation) in which barite could crystallize, precipitate and accumulate contemporaneously with marine sediments.

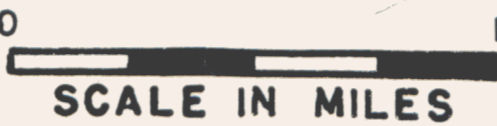
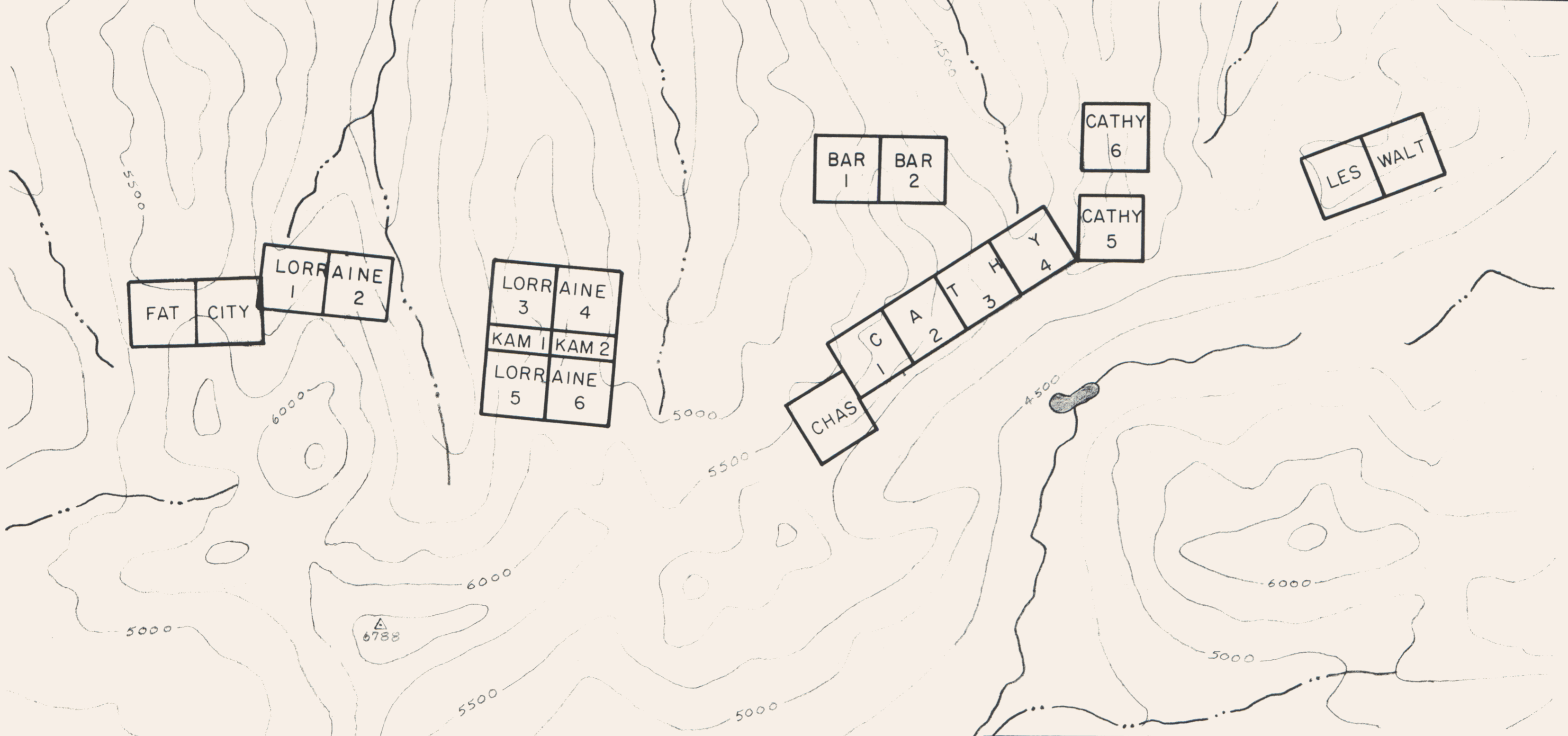
PROPERTY DESCRIPTIONS

CATHY AND LORRAINE AREA

The claims in this area of the Yukon Territory are located within 5 miles of each other and, for the purpose of road access, can be treated as a group. The Cathy and Lorraine area contains the Cathy claims numbers 1-6, the Lorraine claims numbers 1-6, the Kam claims numbers 1-2, and the Fat, City, Les, Walt, Chas and BAR claims (see Figure VI). All claims with the exception of the BAR claims (Woodcock Consultants Ltd.) are controlled by Baroid.

To provide access to the various claims would require construction of about 21 miles of road. Fourteen miles of this road would cross fairly flat terrain having a slope of less than 10 degrees. Much of this construction would be across muskeg and construction of at least one substantial bridge would be necessary. The remaining 7 miles of road construction would entail a major rock-moving operation due to topography. Slope stability would undoubtedly be a problem in the Besa River Formation.

The projected road represents the shortest and most suitable route from the claims to the maintained portion of the Canol Road. Distance from the junction of the projected road and the Canol Road to Ross River is approximately 116 miles.



**BAROID DIVISION**  
**NO**  
**INDUSTRIES**  
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**DRAWN DBS**      **DATE 8/13/75**  
**CHKD.**  
**APPR.**

PLANT

**LOCATION MAP OF BAROID AND WOODCOCK CLAIMS HESS MOUNTAINS, YUKON TERRITORY, CANADA**

**FIGURE VI**

SCALE \_\_\_\_\_

**A**

REVISIONS	REFERENCES

## CHAS CLAIM AND CATHY CLAIMS 1-6

### Summary

These claims are located in line blanketing a single ridge. The ridge trends N 68° E and is cut along its length by strata of the Besa River Formation striking N 75° E. The claims include eight different zones of barite along this ridge. These eight zones include barite associated with both limestone and shale and as independent units. The total probable tonnage is 5,430,300 short tons of 4.28 weighted average grade barite.

### Location and Physical Features

The Cathy claims are located in the Hess Mountains, Mayo Mining District, Yukon Territory at latitude 63° 16' N longitude 130° 38' W and are plotted on map sheet 105-0-7 (see Figure VI). They are east of the Lorraine claims, one mile east of Lorraine number 4 claim, at an elevation of approximately 5,700 feet. The Cathy 1 through 5 posts are along a location line trending N 70° E from Post number 1 of the Cathy number 1 claim. The claims lie NW of the posted location line. The razor-back ridge containing these claims is barren and rugged with relief of approximately 1,000 feet above the adjacent valley. Tundra obscures some shale outcrops but the barite and limestone are well exposed. The Chas claim is located SW and adjacent to the Cathy number 1 claim. All claims are approximately 1,500 feet in length and width.

### Claims, Ownership, and History

Barite on the Cathy claims was discovered by reconnaissance and was subsequently staked by Sandy Wise on February 8, 1975. As mentioned previously, posts were placed properly and metal claim tags attached during this program. The Chas claim was discovered by W. B. Sasser on July 17, 1975 and staked that day by L. M. Tyrala.

### Mineralization

The Cathy claims include stratigraphic units of the Besa River Formation with lower section units exposed on the Chas claim and upper section units to the east on the Cathy 5 claim.

The stratigraphy of this section of the Besa River Formation includes black shale, well-indurated quartz sandstone (sedimentary quartzite), barite, gray shale, and gray limestone units. The barite occurs in several different ways. It is generally gray-black microcrystalline to coarsely crystalline and associated with both the shale and the limestone units. The beds dip approximately 65° and strike N 75° E across the crest of the ridge. The north slope varies from 30° to 45° which produces some overburden on the barite beds dipping at a steeper angle.

Mineralization of the individual claims is as follows:

Chas Claim - One gray barite outcrop with a true thickness of 13 feet, and adjacent beds of black shale and indurated sandstone (sedimentary quartzite), are contained within the Chas claim (see Figure VII A). These units are part of the lower section of the Besa River Formation. The barite bed cuts through the ridge at an angle of 7° dipping 65°, striking N 75° E. The outcrop consists of a gray-black crystalline barite exposed along the top of the ridge for 150' (nearly along strike). The barite zone is contained between two thick sections of black shale showing a distinctly different relationship from the sequence of mineralization on the Lorraine group and other sections along the Cathy claims where it is associated with light gray limestone.

Cathy 1 Claim - This section of the Besa River includes units of black shale, two small barite beds (1 - 2' thick), and baritic limestone. This portion of the ridge is intersected by another ridge with higher elevation trending N-S. The result is that the barite beds plunge at 65° into the intersecting ridge approximately 200 feet down from the top (see Figure VII B). The barite contained within the baritic limestone zone would not be an economic deposit, due to overburden depth. Therefore, no tonnage is given for this claim area.

Cathy 2 Claim - The two stratigraphic units included within this claim are black shaly barite and baritic limestone. The shaly barite is sugary-textured with white calcite filling fractures. Several samples indicated positive zinc traces when tested with organic potassic iron cyanate. The baritic limestone unit consists of light gray barite and limestone. Within the unit the relationship between the calcite-barite changes from alternating to intertwining 1-3" layers. Both sections dip 65° and strike N 75° E, approximately 7° from that of the ridge (see Figure VII B). The result is that traversing the ridge is practically traversing the barite beds along strike.

The shaly zone makes up a saddle in the ridge while the more resistant baritic-limestone produces a peak area. The shaly barite unit is 90 feet thick (true thickness) and the baritic-limestone unit is 50 feet thick.

Cathy 3 Claim - The western half of this claim along the ridge contains a limestone and a shale unit. The eastern half consists primarily of a black shaly barite unit that is 100 feet thick and a small outcrop of resistant gray barite on the prominent peak of the area. The shaly unit here has no calcareous fracture fillings as does the unit on the Cathy 2 claim and no evidence of zinc was found. The bed dips 65°, following at depth the trend of the north slope but at a steeper angle. The slope is approximately 35° and extends 1,000 feet vertically to the adjacent valley floor. The barite bed strikes N 75° E and is similar to the beds on the Chas claim but having no apparent relationship with limestone (see Figure VII D).

Cathy 4 Claim - The strata within the Cathy 4 claim is divided into four distinct units; gray shaly barite, black shale, gray barite; and a gray shale which weathers brown. The gray shaly barite unit is 100 feet thick, strikes N 75° E and dips 65° NW (see Figure VII D). The barite is sugary-textured

and physically resembles a black fissile shale. The gray barite unit is 30 feet thick striking the same as the shale unit. The gray barite dips into an intersecting ridge which towers above the ridge containing the Cathy claims much the same as in the Cathy 1 claim. Dipping at 65° into the hill with approximately 200-250 feet of shale overburden eliminates this area as an economic deposit. The black shaly unit is situated on the open ridge and overburden would be minimal.

Cathy 5 Claim - One small barite outcrop was found on the Cathy 5 claim within a thick section of gray-black shale. The small occurrence tested positive for zinc but exhibited no evidence of holding a significant amount of tonnage. The occurrence is mentioned here in the event that further investigation might be warranted due to a positive zinc reaction. The unit is associated with thick shale units and is gray-black, coarsely crystalline with stringers of white calcite filling fractures. As described under the Cathy 4 section, this area is also at the junction of the two ridges and units dip into the hill and underlie a large shale section.

Cathy 6 Claim - No barite was found to occur within the limits of this claim. The geological units present are siltstones and mudstones with occasional limestone lenses.

Sample Data

The following samples were collected from the Chas Claim and the Cathy 1 through 4 claims. No samples were collected from Cathy 5 or 6.

<u>Sample Identification</u>	<u>Specific Gravity</u>	<u>Remarks</u>
<u>Chas</u>		
1	4.17	random chip sample
2	4.31	random chip sample
3	4.17	random chip sample
<u>Cathy 1</u>		
5	4.06	random chip sample
6	4.44	random chip sample
8	4.33	random chip sample
9	4.41	random chip sample
10	4.33	random chip sample
<u>Cathy 2</u>		
1	4.46	random chip sample
2	4.19	random chip sample
4	4.41	random chip sample
5	4.20	random chip sample
<u>Cathy 3</u>		
1	4.29	random chip sample
<u>Cathy 4</u>		
1	4.13	random chip sample
2	4.40	random chip sample
3	4.32	random chip sample

## Reserves

Chas Claim - One baritic unit is located on this claim. Tonnage is estimated at 273 short tons per dip foot. Mining to a depth of 200 feet would produce a probable tonnage of 57,400 short tons of 4.22 specific gravity barite with a stripping ratio of 1:3.3. The ridge is approximately 1,000 feet above the adjacent valley floor but mining to this depth would not be practical. At 1,000 feet depth, the stripping ratio would be 1:8. Also, projection of the barite body to this depth is questionable due to the possibility of a lenslike structure. However, the north ridge (that to be mined) slopes 45° and consists of shale that is very fissile. These factors should be considered in calculating overburden in relationship to a more resistant overlying bed (see Figure VII A).

Possible tonnage is estimated at 149,157 short tons with a stripping ratio of 1:4.7. This tonnage could be obtained at a depth of 500 feet.

Cathy 1 Claim - No tonnage estimates are given for this area due to an intersecting ridge that results in a tremendous amount of overlying shale which would necessitate underground mining.

Cathy 2 Claim - Two barite units are contained in this claim. The black shaly barite has a true thickness of 90 feet and can be traced by float material along the ridge for 220 feet. The estimated strike distance is 330 feet, or 50% more than the traversed distance. Volume is calculated for a 200-foot depth, 330-foot strike distance, and a 90-foot true thickness giving 5,940,000 cu. ft. (see Figure VII C). Probable tonnage in the unit is 802,700 short tons with an average specific gravity of 4.30. The baritic-limestone unit in this claim is 50 feet thick and can be traced by float material along the ridge for 330 feet. The volume of this unit is calculated using a 50-foot thickness, a 200-foot depth, and a 500-foot strike giving 5,000,000 cu. ft. The probable tonnage of this unit is 675,600 short tons with an average specific gravity of 4.30.

Cathy 3 Claim - One barite unit represents a significant tonnage in this claim. As described previously, the black shaly barite unit is 75 feet thick and can be traced by float material along strike for 450 feet. This unit could be mined to a depth of 200 feet with a stripping ratio of approximately 1:3 (see Figure VII E). Volume of this unit is calculated at 10,125,000 cu. ft. Probable tonnage in this orebody is 1,368,200 short tons with an average specific gravity of 4.29.

Cathy 4 Claim - One unit of gray shaly barite and one of gray barite are located on this claim. The shaly barite can be traced by float material for a distance of 600 feet giving a strike length of 900 feet (projecting 50%), a thickness of 100 feet and a practical mining depth of 200 feet, for a volume of 18,000,000 cu. ft. (see Figure VII E). The probable reserve tonnage would be 2,368,400 short tons with an average specific gravity of 4.28. The gray barite unit is smaller with 200-foot strike distance, a 30-foot true thickness, and a 200-foot depth giving a total volume of 1,200,000 cu. ft. The probable reserve tonnage is 158,000 short tons with an average specific gravity of 4.29.

Cathy 5 Claim - One small barite outcrop is contained by this claim, but it represents no significant tonnage.

Cathy 6 Claim - No barite was discovered on this claim.

Assay Results

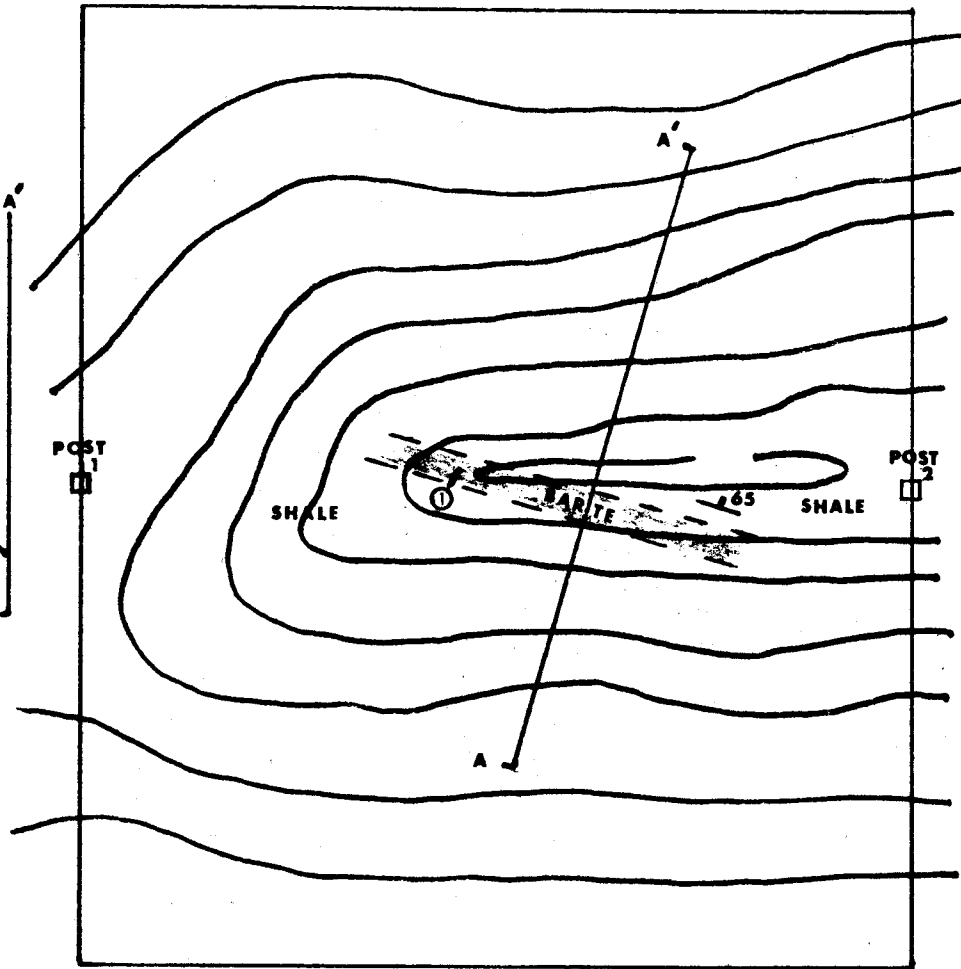
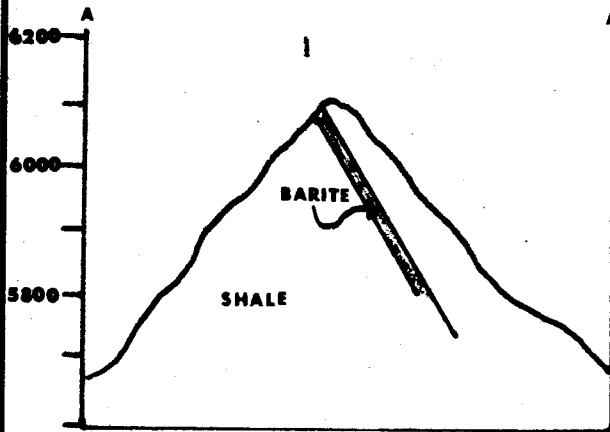
All samples tested for specific gravity were also analyzed for metal content. Values are in weight percent.

<u>Sample Identification</u>	<u>% Zn</u>	<u>% Pb</u>	<u>% Cu</u>
<u>Chas</u>			
1	1.73	T	0.00
2	1.49	T	0.00
3	1.03	T	0.00
<u>Cathy 1</u>			
5	2.73	0.02	T
6	1.62	0.08	T
8	2.31	0.03	T
9	0.62	T	0.00
10	2.83	0.09	T
<u>Cathy 2</u>			
1	1.88	0.04	T
2	0.49	0.22	T
4	0.67	0.18	T
5	0.55	0.16	T
<u>Cathy 3</u>			
1	0.49	0.16	T
<u>Cathy 4</u>			
1	0.44	0.13	0.00
2	0.33	0.16	0.00
3	0.97	0.04	0.00

T = trace

Conclusion

Barite on the Cathy claims represents the largest reserve tonnage of high grade (4.28 weighted average) barite evaluated during this project. Field evidence suggests that the stratigraphic units found within these claims are similar to those of the Lorraine and Kam claims. These claims should be given primary consideration in any possible future development of the area.



LEGEND	
BARITE OUTCROP	
SAMPLE LOCATION	

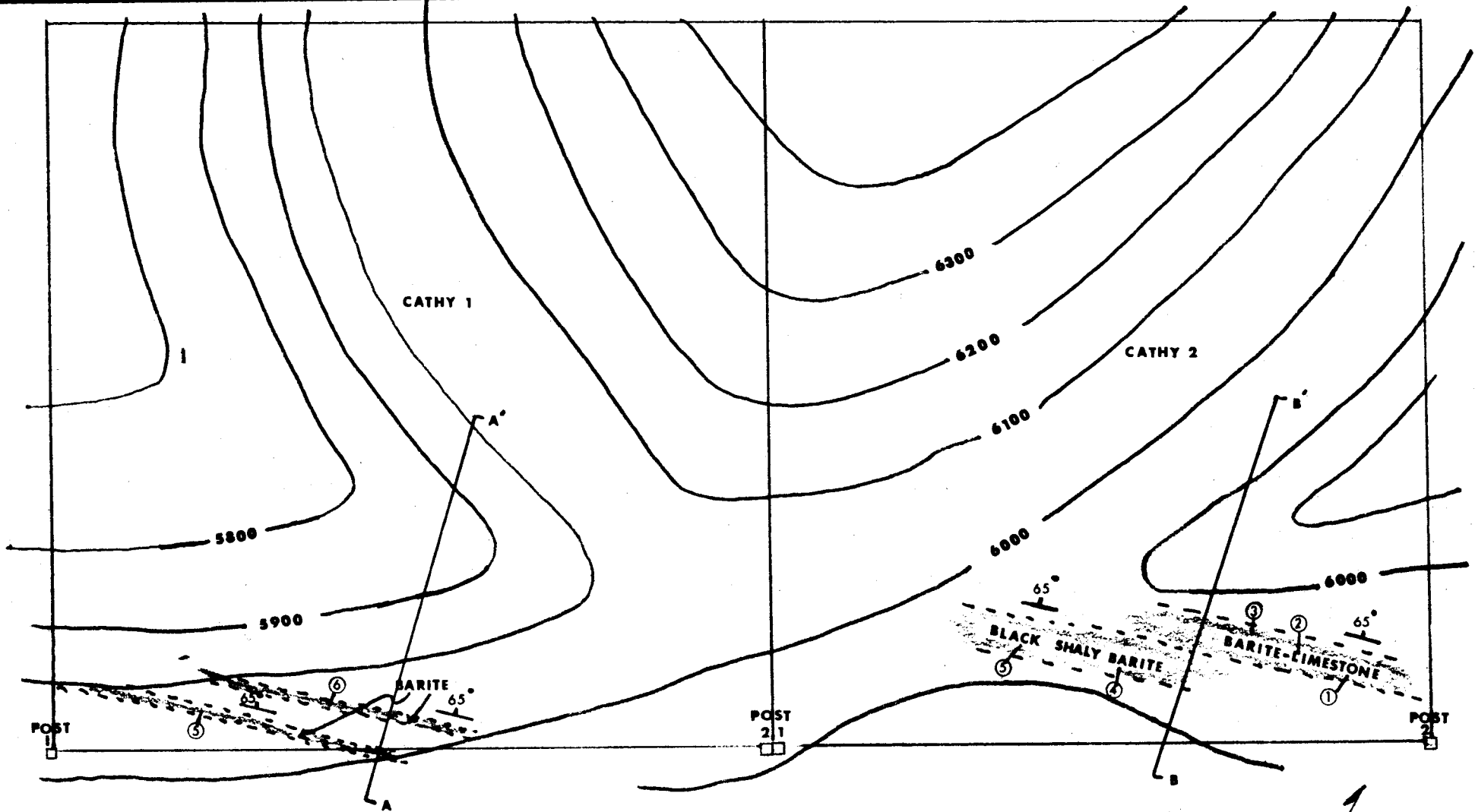
BAROID DIVISION	
INDUSTRIES	
P.O. BOX 1878 HOUSTON, TEXAS 77001	
DRAWN wbs	DATE 8-26-75
CHKD.	
APPR.	
PLANT	

PLAN MAP CHAS CLAIM	
YUKON TERRITORY, CANADA	
SCALE 1" = 300'	FIGURE VII A

REVISIONS

REFERENCES

A



LEGEND	
BARITE OUTCROP	
SAMPLE LOCATION	①

**BAROID DIVISION**  
  
**INDUSTRIES**  
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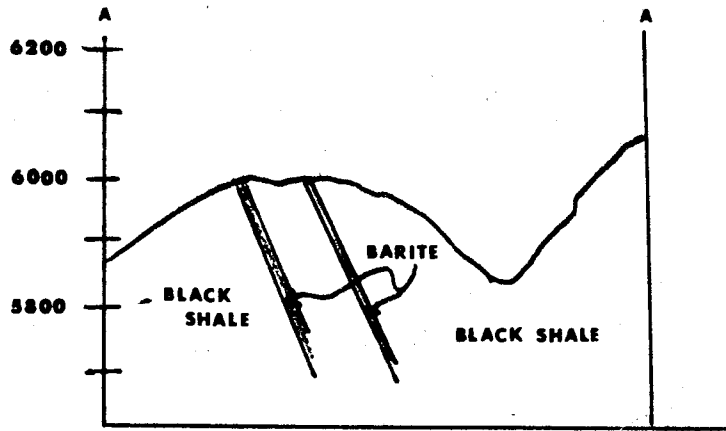
PLAN MAP CATHY 1 and 2 CLAIMS  
 YUKON TERRITORY, CANADA

REVISIONS

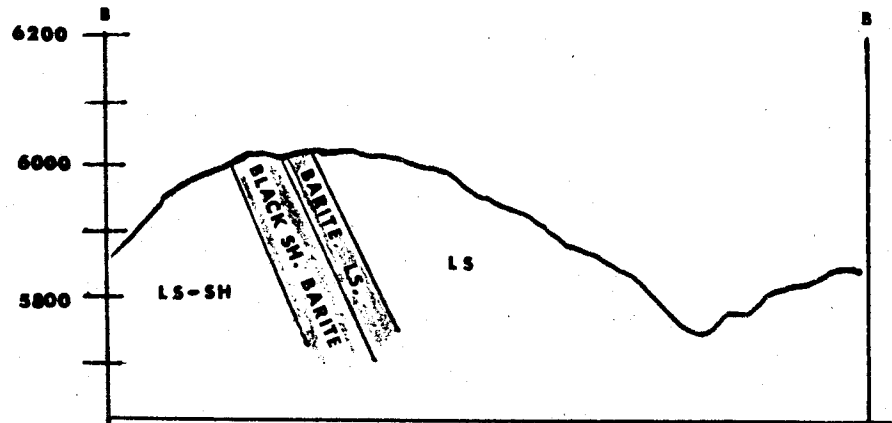
REFERENCES

DRAWN wbs	DATE 8-25-75
CHKD.	
APPR.	
	PLANT

SCALE 1" = 300'  
**FIGURE VII B**  
 A



CATHY 1



CATHY 2

BAROID DIVISION

**NO**  
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P.O. BOX 1078 HOUSTON, TEXAS 77001

CROSS SECTIONS

CATHY 1 and 2 CLAIMS

LOOKING WEST

REVISIONS

REFERENCES

DRAWN w b s

DATE 8-25-75

CHKD.

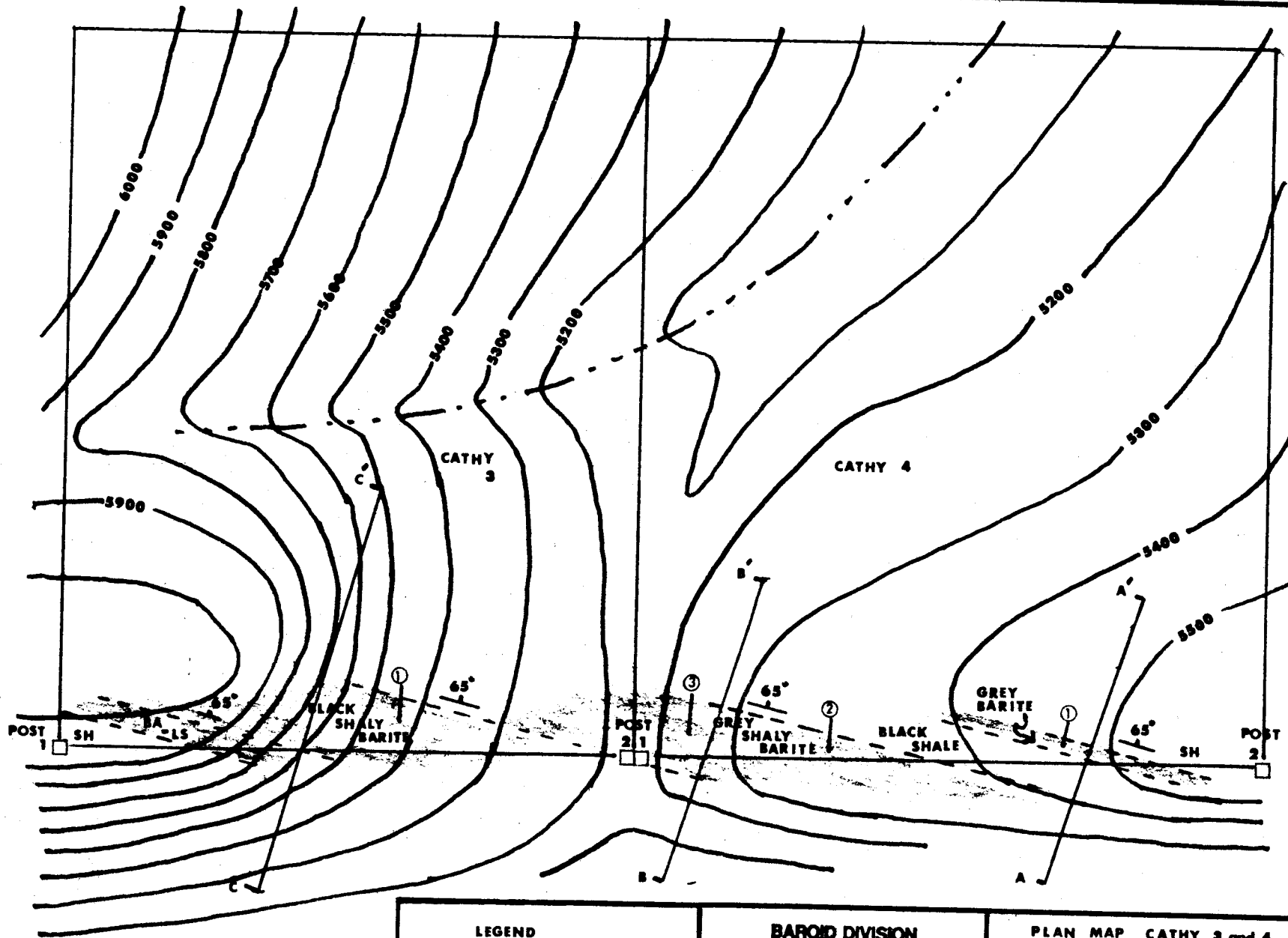
APPR.

PLANT

SCALE 1" = 300'

FIGURE VII C

A



LEGEND	
BARITE OUTCROP	
SAMPLE LOCATION	

**BAROID DIVISION**  
  
**INDUSTRIES**  
 P.O. BOX 1676 HOUSTON, TEXAS 77001

PLAN MAP CATHY 3 and 4 CLAIMS

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YUKON TERRITORY, CANADA

REVISIONS

REFERENCES
GSC 105-7-0

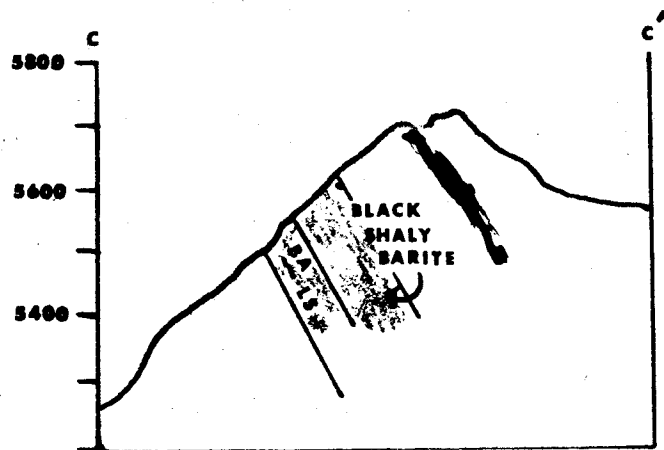
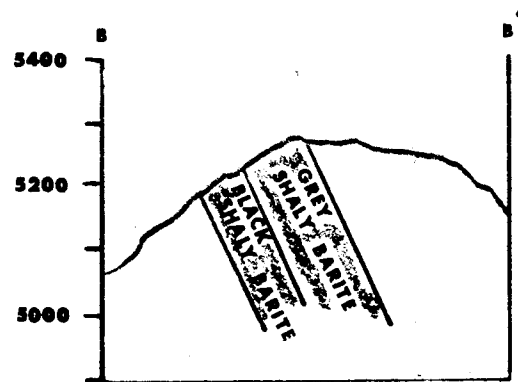
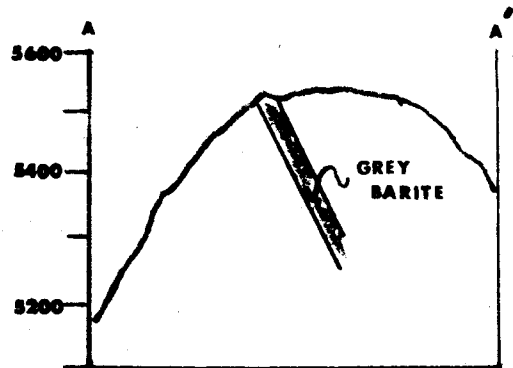
DRAWN wbs	DATE 8-26-75
CHKD.	
APPR.	

SCALE 1" = 300'

PLANT

FIGURE VII D

A



BAROID DIVISION



P.O. BOX 1875 HOUSTON, TEXAS 77001

CROSS SECTIONS

CATHY 3 and 4 CLAIMS

LOOKING WEST

REVISIONS

REFERENCES

DRAWN wbs

DATE 8-26-73

CHKD.

APPR.

PLANT

SCALE 1" = 300'

FIGURE VII E

A

## LORRAINE CLAIMS 1 AND 2

### Summary

The barite occurrence contained within the Lorraine claims numbers 1 and 2 is small and low-grade. The reserve is estimated at less than 200,000 short tons of 3.49 specific gravity barite.

### Location and Physical Features

The Lorraine claims numbers 1 and 2 are located about 5,000 feet west of Lorraine claims numbers 3 and 4, latitude 63° 16' N., longitude 130° 38' W., Hess Mountains, Mayo Mining District, Yukon Territory. The claims are plotted on map sheet 105-0-7. More specifically, the number 1 and 2 posts are located along the ridge line of a northerly-trending ridge. The two claims are contiguous, joining on their respective east-west boundaries (see Figure VIII A). The ridge on which they are situated is rugged, and with local relief about 1,000 feet above the adjacent valley. Vegetation is limited to tundra above the 4,900-foot elevation.

### Claims, Ownership and History

The Lorraine claims numbers 1 and 2 were staked by Sandy Wise on February 8, 1975. During the time of our work in the Mac Pass region, the posts were set up in the prescribed manner and Yukon claim tags attached. The claims were transferred to Baroid of Canada by Sandy Wise on February 10th, 1975.

Baroid's interest in this area started with a barite submittal from Mr. J. R. Woodcock, Woodcock Consultants Ltd., Vancouver, British Columbia in May, 1973. Conversations between Sandy Wise and Dr. Stu Blusson, Geological Survey of Canada in early 1975, led to the staking of a number of claims over barite occurrences in proximity to Woodcock's two BAR claims (see Figure XII A).

### Local Geology

The lithologies encompassed by the Lorraine claims numbers 1 and 2, are totally composed of the Upper Devonian Besa River Formation. The formation trends N 80° W., and dips vary from 48 degrees north to near vertical at the south end of the claim boundary, to N. 10° W., 48° W. at the north end of the claims. The Besa River Formation, for the most part, is a black fissile shale which weathers to a distinctive silvery-gray color. Some of the shale is reddish and weathers to a reddish-orange. Within the black shale section of the formation are several narrow, less than 100 feet thick, units of limestone. None of the outcrops examined appear to be dolomite.

### Mineralization

As exposed on the Lorraine claims numbers 1 and 2, the barite is associated with a limestone unit within the Besa River Formation. The baritic limestone unit is about 45 feet thick, and trends N. 76° W., 49 to 55° north.

The barite occurs as discreet lenses, ranging from 0.5 to 18.0 inches in thickness, up to 28 inches long, and are scattered throughout this limestone unit. The unit shows a general increase in barite content, from about 10 to 50 percent, from bottom to top. The increasing barite content is due to a greater number of lenses within the limestone rather than an enlargement of the lenses.

The contact between the barite and the enclosing limestone is sharp, and the texture of the two minerals is distinctly different. The barite is finely-crystalline and medium-gray; the limestone is micritic to sparry and light gray. In general appearance, the barite is comparable to chert zones in limestone. The baritic limestone unit is in contact with barren limestone units, both of which are about the same thickness.

### Sample Data

The following four samples were collected from the Lorraine claims nos. 1 and 2.

<u>Sample Identification</u>	<u>Specific Gravity</u>	
Lorraine 1/2 No. 1	3.29	random chip sample
Lorraine 1/2 No. 2	4.44	composite, high-grade zone
Lorraine 1/2 No. 3	3.69	random chip sample
Lorraine 1/2 No. 4	4.44	composite, representative high-grade

### Reserves

The baritic limestone is well exposed only on the ridge line, but can be traced by float along strike. The sampled unit is about 45 feet thick (true thickness). Based on float density, the zone appears to be lensoid, with a strike length of about 400 feet. The sampled section appears to be the thickest portion, as evidenced by the amount of fragments down slope, and is about the center of the baritic horizon.

Assuming a 400-foot long zone, with a maximum thickness of 45 feet and lensing out at either end, the unit yields 1,956 short tons of 3.49 specific gravity baritic rock, in place, per dip foot. Given the amount of topographic relief over the baritic zone and the density of barite float, it is reasonable to project a 100-foot downdip extension of the zone, for a reserve of 196,000 tons.

Assay Results

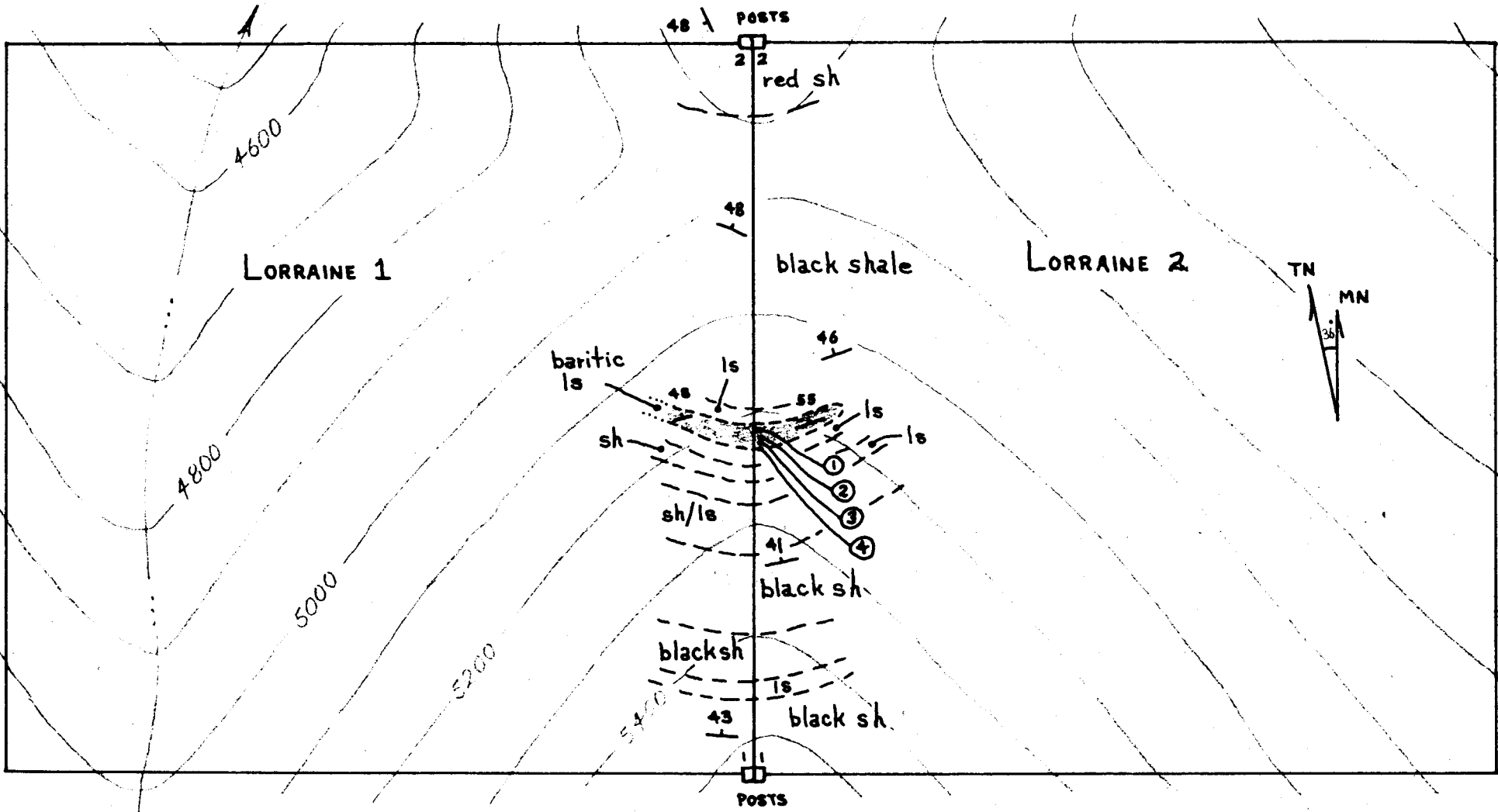
All samples tested for specific gravity were also analyzed for metal content. Results in weight percent are shown below.

<u>Sample Identification</u>	<u>% Zn</u>	<u>% Pb</u>	<u>% Cu</u>
Lorraine $\frac{1}{2}$ No. 1	0.75	0.04	0.00
Lorraine $\frac{1}{2}$ No. 2	1.94	0.04	0.00
Lorraine $\frac{1}{2}$ No. 3	T	T	T
Lorraine $\frac{1}{2}$ No. 4	T	T	T

T = trace

Conclusion

The surface indications of barite mineralization within the Lorraine claims numbers 1 and 2, suggest a zone that pinches out. The zone is neither exceptionally wide nor high-grade. This occurrence has to be viewed as a small deposit, and its future development would have to be contingent on a general exploitation of neighboring occurrences.



- - - - - barite outcrop  
 ① sample location

BAROID DIVISION  
**NO**  
 INDUSTRIES  
P.O. BOX 1675 HOUSTON, TEXAS 77001

DRAWN LMT      DATE 8-25-75  
 CHKD. \_\_\_\_\_  
 APPR. \_\_\_\_\_

PLANT

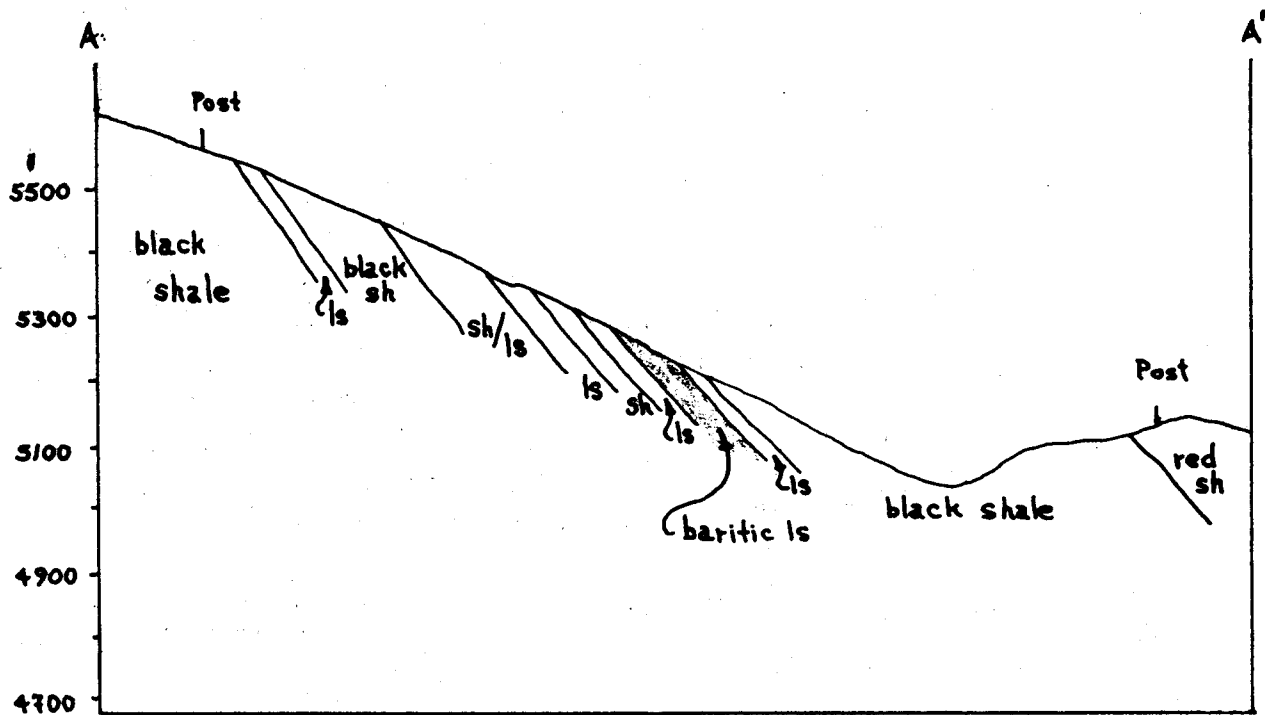
PLAN MAP OF LORRAINE  
 NOS. 1 AND 2, YUKON T.

SCALE 1"=300'

FIGURE VIII A  
 A

REVISIONS

REFERENCES
GSC MAP No. 105-0-7



(looking west)

<b>BAROID DIVISION</b>  <b>INDUSTRIES</b> <small>P.O. BOX 1675 HOUSTON, TEXAS 77001</small>		<b>CROSS-SECTION OF THE LORRAINE</b> <b>Nos. 1 AND 2, YUKON TERRITORY</b>	
<b>REVISIONS</b>	<b>REFERENCES</b> GSC MAP No. 105-0-7 GSC PAPER 71-22	DRAWN LMT CHKD. APPR.	DATE 8-25-75
		SCALE 1" = 300'	
		FIGURE VIII B A	

LORRAINE CLAIMS 3-6 AND KAM CLAIMS 1-2

Summary

Barite occurs on the Lorraine claims numbers 3 and 4 and on the Kam claims numbers 1 and 2, but not on the Lorraine claims numbers 5 and 6. The barite exposures are conformable to the enclosing strata which consist of shales and limestones belonging to the Besa River Formation. Thickness of the individual barite beds ranges from 35 feet to 300 feet. Reserves are estimated at 3,309,000 short tons of barite at an average specific gravity of 4.11. Mining would be by open pit methods with a stripping ratio of less than 1:3 to a depth of 100 feet.

Location and Physical Features

The Lorraine claims numbers 3 through 6 and the Kam claims numbers 1 and 2 are located approximately 1 mile east of the Lorraine claims numbers 1 and 2 at latitude 63° 16'N., and longitude 130° 37'W., Hess Mountains, Mayo Mining District, Yukon Territory. The location posts for these claims are situated along the crest of a northerly trending ridge with vertical relief to the valley bottom of 1,000 feet. Vegetation is limited to tundra above the 4,900-foot elevation.

Claims, Ownership and History

The Lorraine claims numbers 3 through 6 were staked by Sandy Wise on February 8, 1975. The claims are full-sized, 1,500 feet on a side. During our work on the claims, the location posts were set in the ground and metal tags issued by the Mining Recorder's office affixed to each post. The claims were transferred to Baroid of Canada by Sandy Wise on February 10, 1975.

The Kam claims numbers 1 and 2 were staked by D. B. Simon on July 16, 1975. These claims are fractional claims covering the gap between the Lorraine 3 and 4 claims and the Lorraine 5 and 6 claims. The length of the location line is approximately 500 feet and each claim extends 1,500 feet respectively to the east or west of the location line.

The Lorraine claims were staked on the basis of geologic work performed by the Geological Survey of Canada which indicated that this area contained a geologic environment favorable for barite mineralization. The Kam claims were staked as direct result of exploration work by D. B. Simon.

Local Geology

Rocks exposed on the Lorraine and Kam claims belong to the Upper Devonian Besa River Formation. In this area, the formation consists of an alternating sequence of black carbonaceous shale, limestone and barite, with some of the shale and limestone units containing varying amounts of barite (see Figure IX A). Near the northern end of the Lorraine 3 and 4 claims, a possible thrust

fault has placed reddish brown shale and dolomitic limestone adjacent to baritic shale and limestone. It is not known if these rocks belong to Besa River or another formation lower in the stratigraphic column. Strikes and dips on Besa River rocks range generally from N. 70° E., 49° NW to N. 90° E., 70° N. with a few local variations. Strikes and dips on the shale and dolomitic limestone north of the thrust fault are about N. 50° W., 25° NE.

### Mineralization

Barite occurs as conformable beds enclosed within shale and limestone on the Lorraine claims numbers 3 and 4 and the Kam claims numbers 1 and 2. No barite was discovered on the Lorraine 5 and 6 claims.

The thickest bed of barite which is actually an intimate mixture of barite, shale and limestone occurs near the center of the Lorraine 3 and 4 claims. A true thickness of about 300 feet was calculated from measurements taken during our exploration work. The other four barite zones lie south of the largest exposure and occur as individual beds separated by varying thicknesses of shale and limestone. Thicknesses of these beds are 50 feet, 105 feet, 40 feet and 35 feet respectively, south to north.

Generally, contacts between the barite, and the shale and limestone are sharp although occasionally the limestone is lightly baritic adjacent to the contact. In color, barite varies from light gray where limestone is associated to dark gray where carbonaceous shale is associated. The texture of the barite is uniformly microcrystalline.

### Sample Data

Twenty chip samples and one bulk sample were collected from the Lorraine and Kam claims. The location description and specific gravities are shown below (also see geologic map, Figure IX A).

<u>Sample Identification</u>	<u>Specific Gravity</u>	<u>Remarks</u>
Lor 3/4 1 0'-25'	4.36	composite sample, bed 1 south, Kam claims.
Lor 3/4 2 25'-50'	4.38	composite sample, bed 1 south, Kam claims.
Lor 3/4 3 0'-20'	4.23	composite sample bed 2, Kam claims.
Lor 3/4 4 20'-40'	4.28	random sample bed 2, Kam-Lorraine boundary.
Lor 3/4 5 40'-80'	4.29	random sample, bed 2 Kam - Lorraine boundary.

<u>Sample Identification</u>	<u>Specific Gravity</u>	<u>Remarks</u>
Lor 3/4 6 80'-105'	4.28	random sample, bed 2 Kam - Lorraine boundary.
Lor 3/4 7 0'-20'	4.01	composite sample bed 3, Lorraine claims.
Lor 3/4 8 20'-40'	4.07	composite sample bed 3, Lorraine claims.
Lor 3/4 9 0'-35'	3.80	composite sample bed 4, Lorraine claims.
Lor 3/4 10 0'-20'	4.20	composite sample bed 5, north, Lorraine claims.
Lor 3/4 11 20'-40'	4.20	composite sample bed 5, north, Lorraine claims.
Lor 3/4 12 40'-60'	3.87	composite sample bed 5, north, Lorraine claims.
Lor 3/4 13 60'-80'	4.24	composite sample bed 5, north, Lorraine claims.
Lor 3/4 14 80'-100'	4.08	composite sample bed 5, north, Lorraine claims.
Lor 3/4 15 100'-120'	4.29	composite sample bed 5, north, Lorraine claims.
Lor 3/4 16 120'-140'	4.31	composite sample bed 5, north, Lorraine claims.
Lor 3/4 17 140'-160'	4.29	composite sample bed 5, north, Lorraine claims.
Lor 3/4 18 160'-180'	2.62	composite sample bed 5, north, Lorraine claims.
Lor 3/4 19 180'-200'	4.39	composite sample bed 5, north, Lorraine claims.
Lor 3/4 20 200'-220'	4.36	composite sample bed 5, north, Lorraine claims.
Bulk Sample Lor 3/4	4.01	bed #5, north end Lorraine 3, 4 claims.

Reserves

As all barite exposures strike transverse to the crest of the ridge, projection of the barite along strike can only be estimated. From work performed on the Cathy claims however, a strike length of at least 500 feet would appear to be reasonable for the thinner barite beds and 900 feet for the thickest bed. Assuming a downdip extension of 100 feet, a strike length of 500-900 feet and thicknesses given in the Mineralization section, reserves for each of the barite beds are listed below.

<u>Location</u>	<u>Thickness</u>	<u>Strike Length</u>	<u>Average Specific Gravity</u>	<u>Reserves (Short Tons)</u>
Bed #1, South Kam claims	50'	500'	4.37	342,500
Bed #2 Kam - Lorraine claim boundary	105'	500'	4.27	700,000
Bed #3, Lorraine 3, 4 claims	40'	500'	4.04	253,000
Bed #4, Lorraine 3, 4 claims	35'	500'	3.80	208,000
Bed #5, North Lorraine 3, 4, Claims	300'	900'	4.08	3,460,000
Total (weighted average)			<u>4.11</u>	<u>4,963,500</u>

From the total tonnage figure given above, approximately one-third should be subtracted due to topographic expression of the barite orebodies. This yields a cumulative reserve for the Lorraine 3 and 4 claims and Kam 1 and 2 claims of 3,309,000 short tons of barite averaging 4.11 specific gravity (weighted basis).

Assay Results

All samples tested for specific gravity were also analyzed for metal content. Results in weight percent are given below:

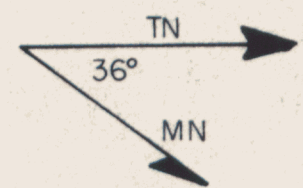
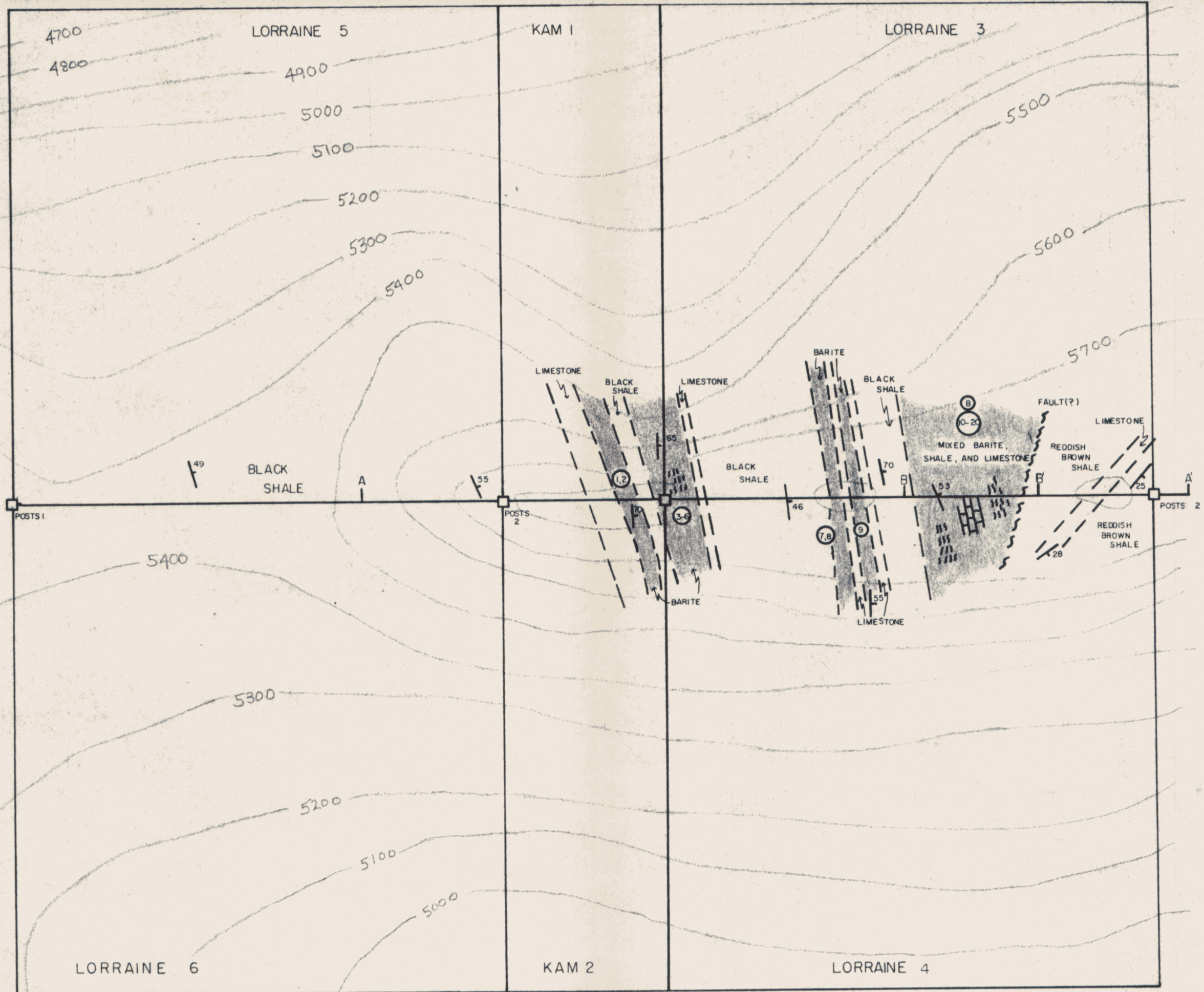
<u>Sample Identification</u>	<u>% Zn</u>	<u>% Pb</u>	<u>% Cu</u>
Lor 3/4 1 (Kam)	1.26	0.03	0.00
Lor 3/4 2 (Kam)	0.99	0.03	0.00
Lor 3/4 3 (Kam)	1.09	0.03	0.00
Lor 3/4 4 (Kam)	.99	0.03	0.00
Lor 3/4 5	1.69	0.03	0.00
Lor 3/4 6	0.43	T	T
Lor 3/4 7	T	T	T
Lor 3/4 8	T	T	T

<u>Sample Identification</u>	<u>% Zn</u>	<u>% Pb</u>	<u>% Cu</u>
Lor 3/4 9	T	T	T
Lor 3/4 10	T	T	T
Lor 3/4 11	T	T	T
Lor 3/4 12	T	T	T
Lor 3/4 13	1.19	T	T
Lor 3/4 14	0.90	T	T
Lor 3/4 15	1.38	T	T
Lor 3/4 16	1.36	T	T
Lor 3/4 17	2.15	T	T
Lor 3/4 18	0.18	T	T
Lor 3/4 19	1.59	T	T
Lor 3/4 20	2.56	T	T

T = trace

Conclusion

Surface exposures on the Lorraine 3 and 4 claims and the Kam 1 and 2 claims indicate that barite occurs as five separate beds with a cumulative thickness of over 500 feet. These claims represent an orebody of appreciable size and tonnage that could be mined by open pit methods. If Baroid was to consider developing a reserve in the Mac Pass region, the barite on these claims should be given substantial attention.

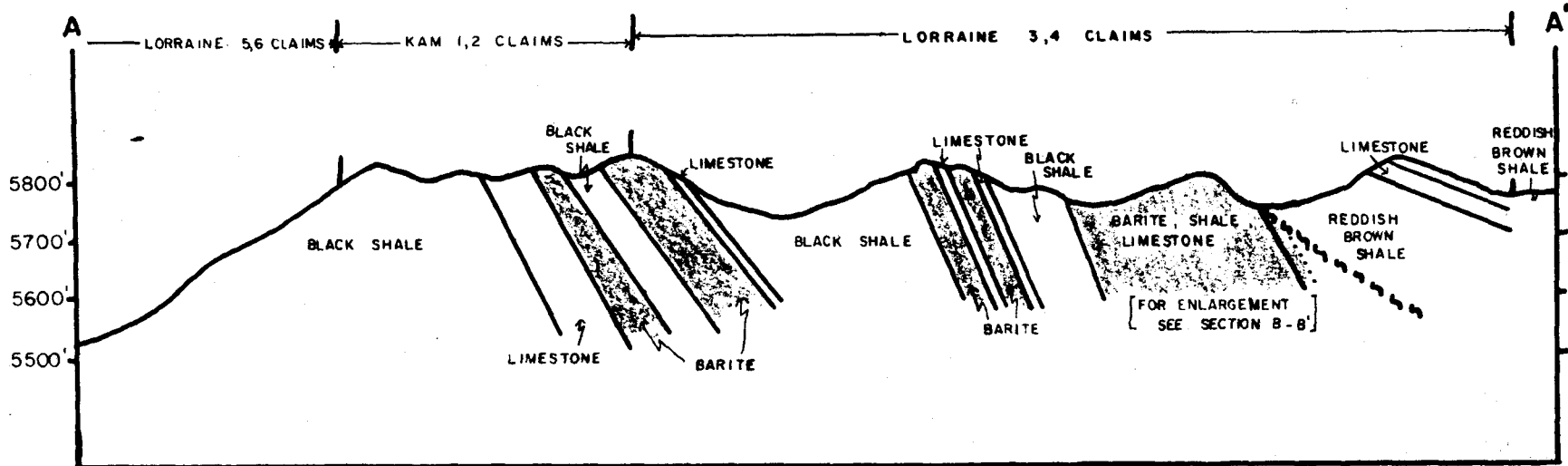


**LEGEND**

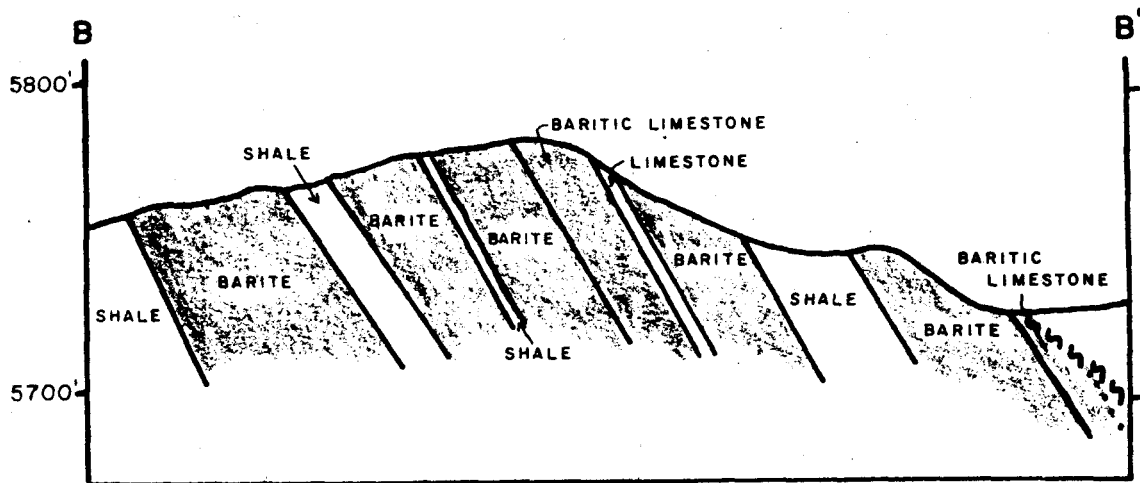
- GEOLOGIC CONTACT
- POSSIBLE THRUST FAULT
- LIMESTONE
- SHALE
- CLAIM POSTS LOCATION
- ORIENTATION OF GEOLOGIC CROSS SECTION
- SAMPLE LOCATION AND SAMPLE NUMBERS
- BULK SAMPLE LOCATION

**PLAN MAP OF  
LORRAINE 3-6 CLAIMS  
AND KAM 1-2 CLAIMS  
HESS MOUNTAINS  
YUKON TERRITORY, CANADA**

REFERENCE: GSC 105-0-7  
SCALE: 1" = 300'  
DBS - DMD 8-22-75



HORIZONTAL SCALE 1" = 300' VERTICAL SCALE 1" = 300'



CROSS-SECTION THROUGH BULK SAMPLE LOCALITY LABELLED (B)  
HORIZONTAL SCALE 1" = 75'



LEGEND	
	GEOLOGIC CONTACT
	POSSIBLE THRUST FAULT
	CLAIM POST LOCATION

BAROID DIVISION



P.O. BOX 1676 HOUSTON, TEXAS 77061

CROSS-SECTIONS  
LORRAINE 3-6 & KAM 1,2  
YUKON TERRITORY, CANADA

REVISIONS

REFERENCES  
GSC 105-0-7

DRAWN DBS DATE 8/27/75  
CHRD.  
APPR.

PLANT

SCALE see above

FIGURE IX B

A

## FAT AND CITY CLAIMS

### Summary

Barite on the Fat and City claims consists of two lens-shaped orebodies situated near the upper contact of a black shale, and is associated with thin limestone layers. Combined reserves are estimated at 160,000 short tons of 85 percent  $\text{BaSO}_4$  or 4.19 specific gravity (weighted average). Exploitation of these claims will depend on future development of larger barite occurrences in the area.

### Location and Physical Features

The Fat and City claims are located at latitude  $63^\circ 16' \text{N}$ . and longitude  $130^\circ 39' \text{W}$ . in the Hess Mountains, Mayo Mining District, Yukon Territory. The claims lie at 5,500 feet elevation and directly west of the Lorraine claims, numbers 1 and 2. The City claim and the Lorraine number 1 claim partially overlap (see Figure VI). The location line of the Fat and City claims is oriented north-south and the number 1 posts for each claim are located in a small saddle of a northerly trending ridge. Vertical relief on the claims is approximately 800 feet and for the most part the area is above treeline.

### Claims. Ownership and History

The Fat and City claims were staked by L. M. Tyrala on July 18, 1975 as a direct result of exploration by W. B. Sasser and L. M. Tyrala. At the time of staking, claim posts were set in the ground and marked in the manner prescribed by Yukon mining regulations. Metal tags have been issued from the Mining Recorder's office and will be attached to the posts at a later date.

As the Fat and City claims represent an original discovery of barite in this area, no history is available.

### Local Geology

Rocks exposed on or adjacent to the Fat and City claims belong to the Besa River Formation of Upper Devonian age. Lithologies include a basal chert-pebble conglomerate which crops out just south of the south end of the claim group, siltstone, shale, black shale and barite (see Figure X A). Strikes are consistently  $\text{N } 75\text{-}80^\circ \text{W}$  and dips range from  $51^\circ \text{NE}$  to  $75^\circ \text{NE}$ . The thickest unit of the Besa River Formation exposed on the claim group is a black shale which near the upper contact contains thin limestone sections. Barite mineralization is spatially related to the limestone.

### Mineralization

On the Fat and City claims, barite occurs as two separate and discreet, lens-shaped orebodies which are situated within 350 feet from the number 1 posts

(see Figure X B). The larger of the two lenses is approximately 650 feet in length with a true thickness of 20 to 25 feet. The other barite lens lies totally within the City claim and is 225 feet in length and 15 to 20 feet thick. Both lenses appear to pinch out laterally. Strikes and dips of the barite are conformable with those of the enclosing lithologies.

Mineralogically, the barite is closely associated and intimately intermixed with limestone. In general, the barite content in the limestone facies is fairly high although there are isolated patches of barren limestone scattered throughout the ore zone. The barite is finely crystalline, very light gray to medium gray in color and is nearly indistinguishable in this respect from the limestone.

Sample Data

Four chip samples were collected from the Fat and City claim group. Specific gravities are listed below.

<u>Sample Identification</u>	<u>Specific Gravity</u>	<u>Remarks</u>
FAT #1	4.26	random chip sample lens #1
CITY #1	4.32	random chip sample lens #1
CITY #2	3.71	composite chip sample lens #2
CITY #3	4.28	composite chip sample lens #1

Reserves

For the larger of the two barite lenses (lens number 1), reserves were calculated at 1,733 short tons per vertical foot of 4.29 specific gravity barite using dimensions of 650 feet long and 20 feet thick. For the other barite lens (lens number 2), reserves are estimated at 392 short tons per vertical foot of 3.71 specific gravity barite using dimensions of 225 feet long and 15 feet thick. Given the amount of topographic relief on the ore zones, a projection of 75 feet downdip would appear to be reasonable. This yields probable reserves for lens #1 of 130,000 short tons and for lens #2 of 30,000 short tons. Combined reserve tonnage on the Fat and City claims is then 160,000 short tons of 4.19 specific gravity barite (weighted average).

Assay Results

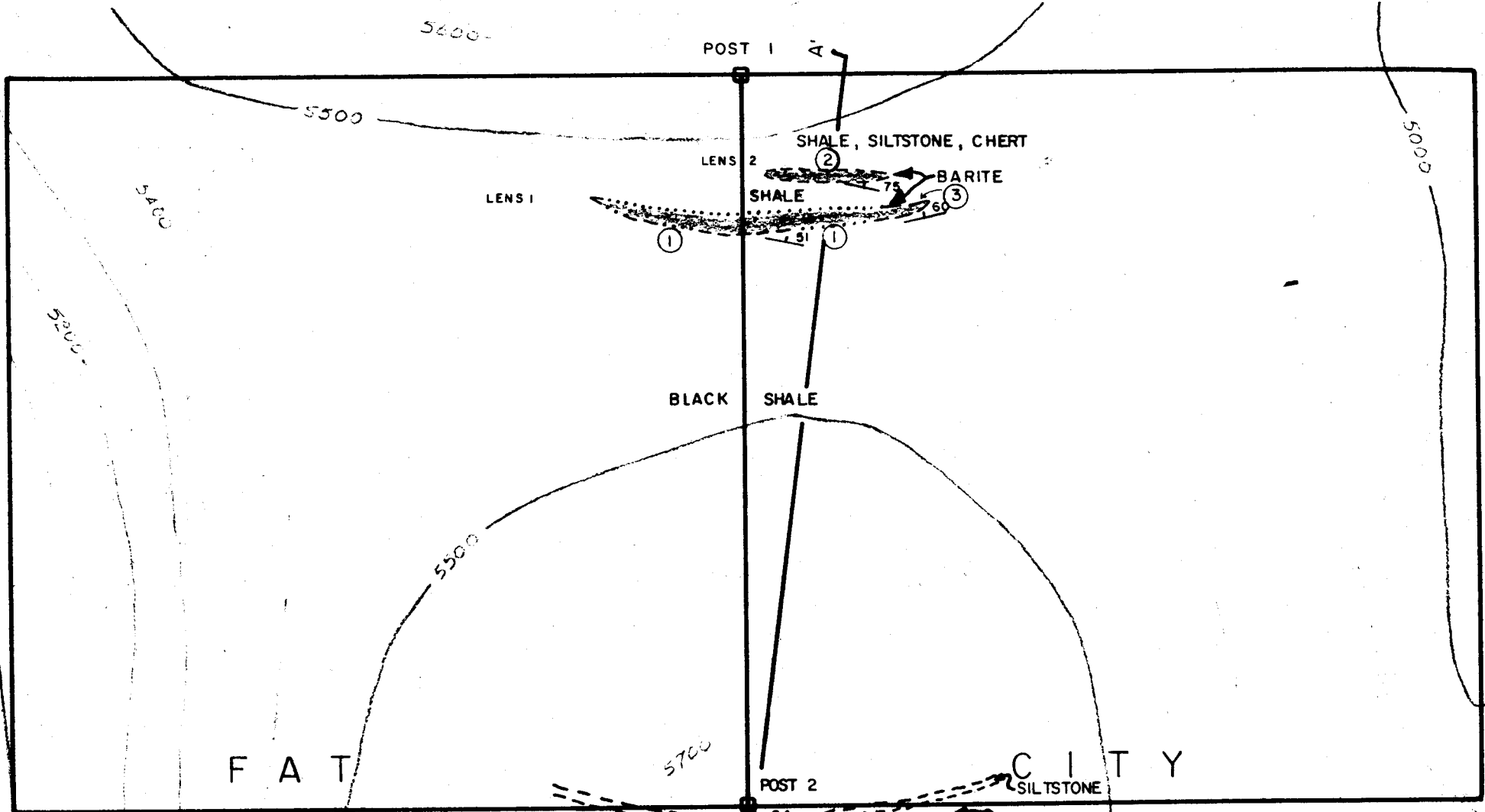
All samples tested for specific gravity were also analyzed for metal content. Results in weight percent are given below.

<u>Sample Identification</u>	<u>% Zn</u>	<u>% Pb</u>	<u>% Cu</u>
FAT #1	0.19	T	T
CITY #1	0.19	T	T
CITY #2	0.38	T	T
CITY #3	0.14	T	T




T = trace


Conclusion

From surface indications and metallurgical testing, barite on the Fat and City claims represents a small tonnage relative to other occurrences in the Cathy and Lorraine area and is of a specific gravity slightly below specifications on a combined weighted average basis. Mining of barite on these claims will be contingent upon possible future exploitation of neighboring deposits.



**LEGEND**

-  GEOLOGIC CONTACT
-  DOTTED, COVERED BY TALUS
-  SAMPLE LOCATION

<b>BAROID DIVISION</b>  <small>P.O. BOX 1075 HOUSTON, TEXAS 77001</small>	
DRAWN DBS	DATE 8/12/75
CHKD.	
APPR.	
PLANT	

<b>FAT/CITY CLAIMS</b> HESS MOUNTAINS, YUKON TERRITORY, CANADA	
SCALE 1" = 300'	
FIGURE X A	

REVISIONS	REFERENCES



## LES AND WALT CLAIMS

### Summary

Barite found on the Les and Walt claims occurs in both limestone and shale. The aggregate thickness of the horizon is about 45 feet and averages about 4.10 specific gravity. A preliminary estimate indicates about 3,000 tons of baritic rock per dip foot, and can be reasonably projected downdip 100 feet for a reserve of 300,000 short tons. The stratigraphic section on these claims correlates well with that found on the Cathy claims numbers 1-5, and is considered a strike continuation of those units.

### Location and Physical Features

The center of the Les and Walt claims are located approximately one mile east of the east boundary of the Cathy number 5 claim, latitude 63° 17'N., longitude 130° 34'W., Mayo Mining District, Yukon Territory, and are plotted on claim reference map sheet number 105-0-7. The claims are situated on a ridge trending east northeast. The number 2 post of the Les claim and the number 1 post of the Walt claim are located on a small knob. The relief is fairly rugged, and vegetation is limited to tundra, with arctic grasses growing on the southern slope.

### Claims, Ownership and History

This new barite occurrence was discovered by W. B. Sasser during the course of general reconnaissance at the eastern end of the Cathy claims and subsequently staked by L. M. Tyralla on July 16, 1975.

### Local Geology

The rock types within the Les and Walt claims are an apparent continuation of the units found on the Cathy claims numbers 1-5. The sequence is dominated by a thick interval of black shale of the Besa River Formation. The units trend N.70 to 75 degrees east and dip 20 to 25 degrees to the northwest. A thin unit of baritic limestone correlates with a similar unit in the Cathy claims. Also, a distinctive well-indurated sandstone (sedimentary quartzite) immediately underlies the mineralized horizon. This sandstone is particularly well-exposed near the eastern boundary of the Walt claim, and correlates with a sandstone found at the western border of the Cathy number 1 claim.

### Mineralization

Preliminary work indicates that the barite occurrence within the Les and Walt claims is a continuation of the baritic horizon found on the Cathy claims numbers 1 and 4. The baritic horizon is distinctly narrower on the Les and Walt claims, but the sequence of mineralization is duplicated. The barite

occurs in shale and limestone units. Within the shale unit the barite occurs as irregularly defined laminations. The contact between the barite and shale is distinct, and the barite content ranges from 10 to 80 percent. Conatined within the limestone horizon are irregular barite laminations and small lensoid masses of barite. The association of mineralization in both lithologies is very similar, with the only obvious difference being a relationship of barite to limestone or barite to shale.

The barite units constitute a section of approximately 45 feet true thick-ness. The baritic shale zone is the thicker of the two units, and is about 24 feet in thickness. The barite units are concordant with the overlying and underlying strata and all are oriented N. 70-74 E.; dipping 21-26 degrees NW.

Sample Data

The following two samples were collected from the Les and Walt claims.

<u>Sample Identification</u>	<u>Specific Gravity</u>	<u>Remarks</u>
W/L No. 1	4.12	Composite chip sample across the baritic shale unit.
W/L No. 2	4.08	Composite chip sample across the baritic lime-stone unit.

Reserves

The baritic units are well-exposed directly south of the Les number 2 post - Walt number 1 post. The baritic units can be traced by float about 400 feet westerly and 250 feet easterly. Using these distances, 24 feet thick at its maximum, and allowing for pinching out, yields 2,000 tons per dip foot for the baritic shale unit, and 1,065 tons per dip foot for the 21 foot wide baritic limestone unit. The units can be reasonably projected 100 feet downdip giving an inplace reserve of 200,000 short tons of baritic shale at 4.12 specific gravity, and 106,500 short tons of baritic limestone at 4.08 specific gravity. As an estimate, half of this tonnage could be recovered at a stripping ratio of about 1:3.8; the remainder of the reserve at a higher stripping ratio.

Assay Results

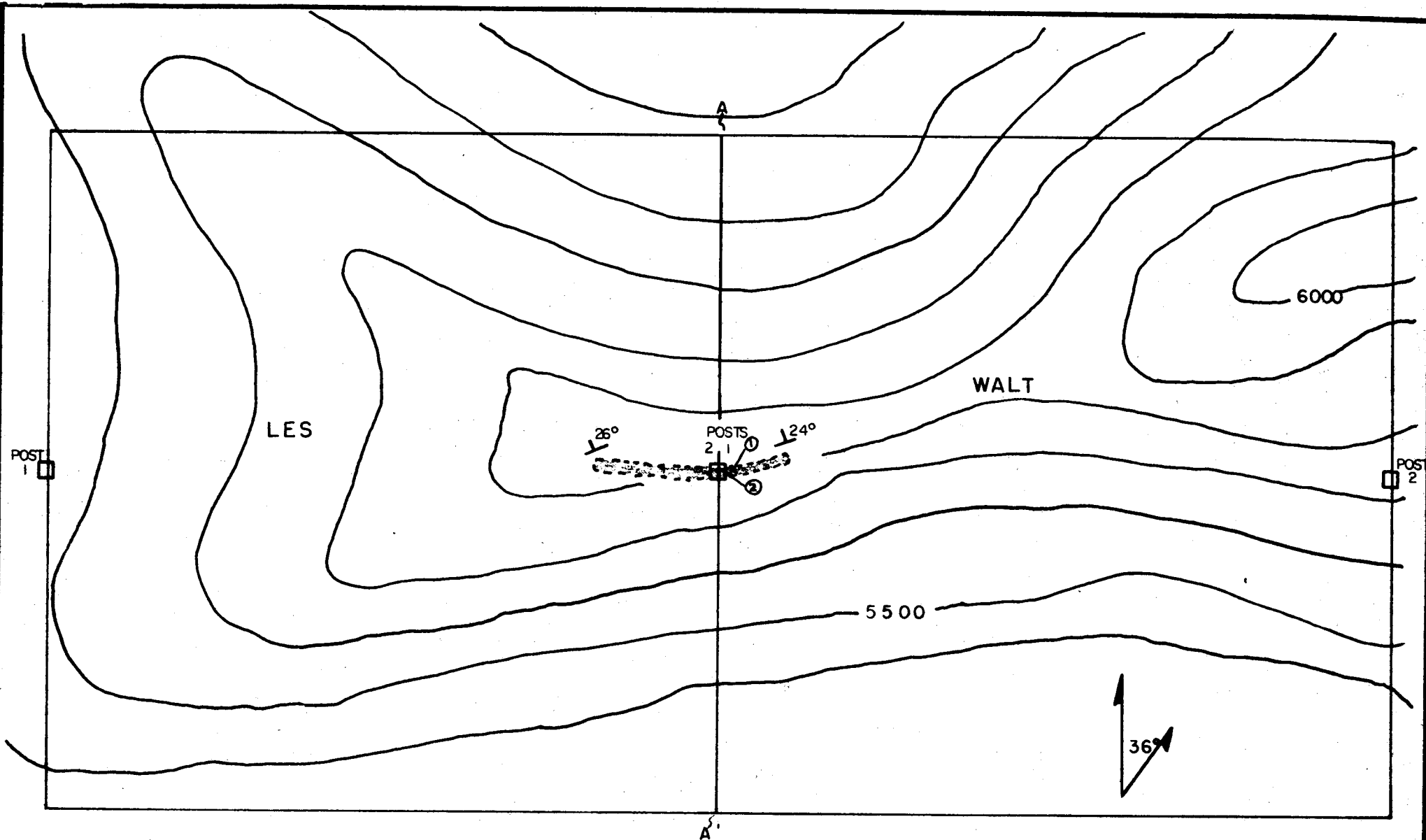
All samples tested for specific gravity were also analyzed for metal content. Results in weight percent are shown below.



<u>Sample Identification</u>	<u>% Zn</u>	<u>% Pb</u>	<u>% Cu</u>
W/L No. 1	0.09	T	T
W/L No. 2	T	T	T


T = trace

Conclusion

Surface exposures indicate that the baritic horizon within the Les and Walt claims pinches out. The horizon is neither exceptionally wide nor high-grade. The horizon is overlain at the west end of a thin unit of black shale, less than 40 feet thick. At the eastern end, the overlying units reach a thickness of more than 200 feet. The reserve is not large, and there is not strong evidence to suggest that additional work on these two claims would lead to discovery of additional economically important deposits.



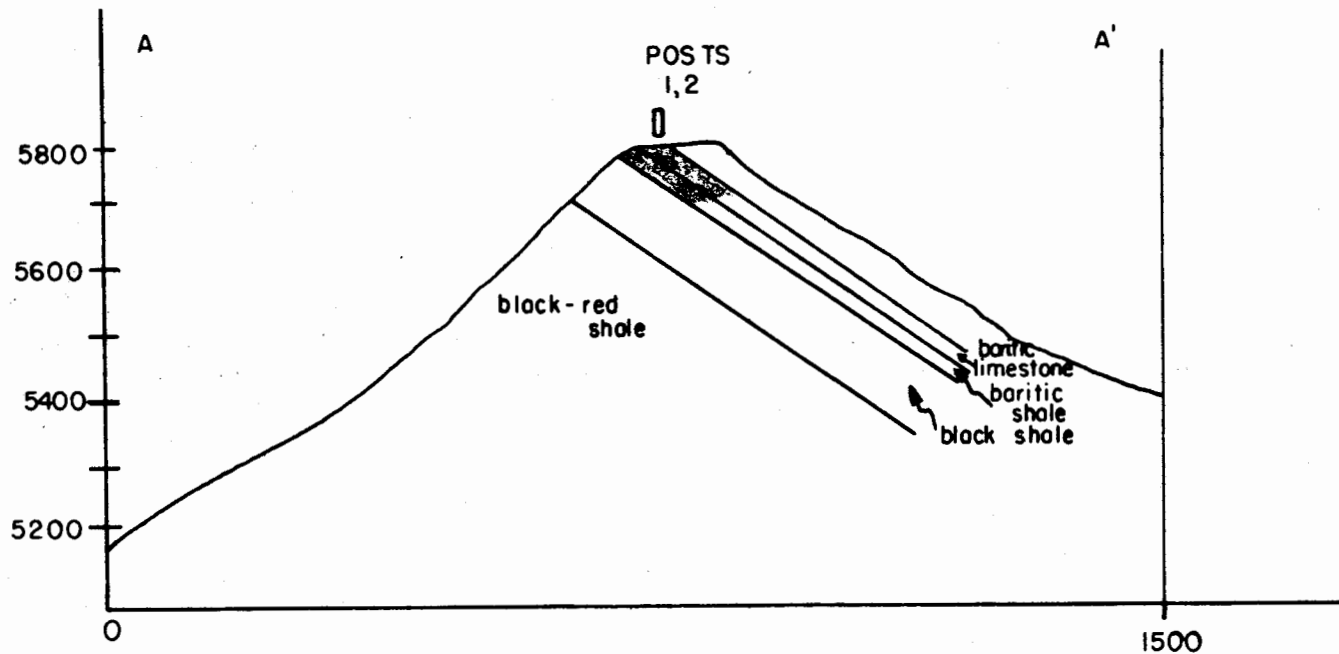
<b>LEGEND</b>	
BARITE OUTCROP	
SAMPLE LOCATION	
<b>REFERENCES</b>	
G.S.C. MAP 105-0-7	

<b>BAROID DIVISION</b>	
	
<small>P.O. BOX 1878 HOUSTON, TEXAS 77061</small>	
DRAWN <b>MT-DMD</b>	DATE <b>8-18-75</b>
CHKD.	
APPR.	
<small>PLANT</small>	

<b>PLAN MAP LES/WALT CLAIM</b>	
<b>YUKON TERRITORY CANADA</b>	
<b>SCALE 1" = 300'</b>	
<b>FIGURE XI A</b>	

<b>REVISIONS</b>

**A**



BAROID DIVISION



P.O. BOX 1675 HOUSTON, TEXAS 77001

CROSS SECTION - L E S / W A L T

REVISIONS

REFERENCES

G.S.C. MAP 105-0-7

DRAWN LMT-DM DATE 8-18-75

LOOKING WEST

CHKD.

APPR.

PLANT

SCALE 1" = 300'

FIGURE XI B

A

APPENDIX I  
SUMMARY OF COSTS

I. Salaries and Wages

A. Field Work

L. M. Tyrala, Senior Geologist	12 days @ \$58/day	\$ 696.00	
D. B. Simon, Geologist	12 days @ \$51/day	612.00	
W. B. Sasser, Field Engineer	12 days @ \$50/day	600.00	
Charles Sasser, Field Asst./Cook	12 days @ \$30/day	360.00	
		\$2,268.00	\$ 2,268.00

B. Office Work

L. M. Tyrala	15 days @ \$58/day	\$ 870.00	
D. B. Simon	15 days @ \$51/day	765.00	
W. B. Sasser	15 days @ \$50/day	750.00	
D. M. Dukes, Asst. Field Engineer	15 days @ \$22/day	330.00	
D. B. Suliin, Chief Metallurgist	2 days @ \$73.50/day	147.00	
S. M. Baynham, Typist	1 day @ \$30/day	30.00	
		\$2,892.00	\$ 2,892.00

II. Field Supplies and Support Services

A. Operating Supplies (receipts enclosed)

Groceries		\$ 472.76	
Camp Supplies		422.62	
SBBX Radio Rental		170.00	
		\$1,065.38	\$ 1,065.38

B. Helicopter and Plane Charter (receipts enclosed)

Helicopter Charter		\$ 6,750.00	
Aircraft Charter		4,015.70	
Fuel		873.81	
		\$11,639.51	\$11,639.51

III. Metallurgical Services

A. Specific Gravity Analyses @ \$7.81/Sample (includes sample preparation)

Lorraine and Kam Group, 25 samples	\$ 195.25	
Cathy and Chas Group, 18 samples	140.58	
Fat and City Claims, 4 samples	31.24	
Les and Walt Claims, 2 samples	15.62	
Lorraine 1, 2 Claims, 4 samples	31.24	
	<u>\$ 413.93</u>	\$ 413.93

B. Metal Assays @ \$7.91/Sample (includes sample preparation)

Lorraine and Kam Group, 72 analyses	\$ 569.52	
Cathy and Chas Group, 54 analyses	427.14	
Fat and City Claims, 12 analyses	94.92	
Les and Walt Claims, 6 analyses	47.46	
Lorraine 1, 2 Claims, 12 analyses	94.92	
	<u>\$1,233.96</u>	\$ 1,233.96

C. Beneficiation Tests (4 tests + sample preparation)

\$ 493.38	<u>\$ 493.38</u>
-----------	------------------

Grand Total of All Expenses:

\$20,006.16

APPENDIX II  
ITEMIZATION OF COSTS PER CLAIM GROUP

	<u>Lorraine and Kam Group</u>	<u>Cathy and Chas Group</u>	<u>Fat and City Claims</u>	<u>Les and Walt Claims</u>	<u>Lorraine 1,2 Claims</u>	<u>Cathy 6 Claim</u>	<u>Total</u>
<b>Salaries and Wages</b>							
Field Work	\$ 945.00	\$ 945.00	\$ -	\$ -	\$ 189.00	\$ 189.00	\$ 2,268.00
Office Work	486.90	486.90	486.90	486.90	486.90	457.50	2,892.00
<b>Field Supplies &amp; Support Services</b>							
Operating Supplies	266.35	266.35	-	-	266.34	266.34	1,065.38
Helicopter & Plane Charter	4,849.80	4,849.80	-	-	969.96	969.95	11,639.51
<b>Metallurgical Services</b>							
Specific Gravity Analyses	195.25	140.58	31.24	15.62	31.24	0	413.93
Metal Assays	569.52	427.14	94.92	47.46	94.92	0	1,233.96
Beneficiation Tests	<u>98.67</u>	<u>98.67</u>	<u>98.68</u>	<u>98.68</u>	<u>98.68</u>	<u>0</u>	<u>493.38</u>
<b>Total Amount of Representation Work Per Claim Group</b>	<b>\$7,411.49</b>	<b>\$7,214.44</b>	<b>\$711.74</b>	<b>\$648.66</b>	<b>\$2,137.04</b>	<b>\$1,882.79</b>	<b>\$20,006.16</b>

— = amount cannot be included because  
work was accomplished before  
recording date.

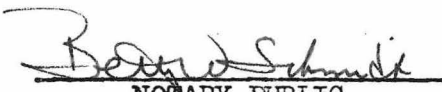
AFFIDAVIT

I, DONALD B. SIMON OF P. O. BOX 1675, HOUSTON, TEXAS USA. DO HEREBY CERTIFY THAT THE TIME AND EXPENDITURES AS SHOWN IN APPENDICES I AND II ARE TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE.

  
DONALD B. SIMON

SWORN BEFORE ME AT HOUSTON, TEXAS

THIS 26<sup>th</sup> DAY OF January, 1976

  
NOTARY PUBLIC  
BETTY W. SCHMIDT  
Notary Public in and for Harris County, Texas  
My Commission Expires June 1, 1977