

Name of Property - HAT BARITE

Introduction

A vein and cavity filling deposit of pure barite is located in a strong fault zone in Precambrian sedimentary which appear to be sheared argillites of the Horsethief Creek Group of the Windermere System.

Summary

A relatively pure barite vein with traces of copper (tetrahedrite) is located on a ridge between Bruce and Spring Creek about 18 miles west of Invermere in a strong strike slip fault. The northerly and southerly extensions of the fault may contain additional barite deposits. The origin of the barite may be an extinct hot spring along the fault. The hypothetical source of the barium in the spring could have been a barite cement in sandstone beds of the lower Horsethief Creek Group or the Toby Formation.

Property

Two claims - Hat and Hat No. 1 M.C.

Ownership

Allan Miller
1310 - 11th Ave.
Invermere, B.C.

Harold Bearham
Invermere, B.C.

Telephone 342-6759

Location

Lat. N $50^{\circ} 30'$ Long. W $116^{\circ} 17'$ Elev. 6300' to 7800'

Province - B.C.
Mining District - Golden Mining Division
Date Examined - June 17, 1977
Geological Map - G.S.C. Map 1326A 82 K. East
Geology of Lardeau East Half
Memoir 369 - J.E. Reesor
Plates 1 to 7 - G. Mason

The property is located on the back of a ridge between Bruce Creek and Spring Creek. The property can be reached by road from Invermere either on the north or south side of the ridge. On the north, a gravel road is followed along Bruce Creek for 18 miles from Invermere to elevation 6300' then by trail to the main showing of barite at elevation 7500'. Alternately on the south side of the ridge follow the road about 15 miles from Invermere up Toby Creek and Spring Creek to the Paradise Mine at elevation 7400', then by foot on a tractor road over the ridge to the barite showing.

History

The barite showing was discovered prior to 1950 by Mr. Larrabee Senior, the father-in-law to H. Bearham.

\$8,000 was spent about 1968 in an unsuccessful attempt to build a road from the south side up Spring Creek to the showing.

About 1970 on the Main showing, elevation 7500', a bulldozer stripped the highly sheared argillite from the hangingwall of the vein without blasting. About 2,500 tons of waste argillite was stripped. The Main showing of barite was stripped for a strike length of 75 feet and a dip length of about 20'. The thickness of the vein is 8 feet.

Production

Nil

Geology

The barite vein is located in the Horsethief Creek Group of the Windermere Group of late Precambrian age. The vein is located in an extension of a fault shown on Lardeau Sheet East Half by J.E. Reesor. The fault has not been previously named. I will refer to it as the Hat Fault.

The attitude of the Hat Fault is strike 147° dip SW 55° . Striations on the hangingwall of the vein plunge 15° northward. My interpretation of the movement on the fault is that it is a right hand strike slip fault with net horizontal displacement of 10,000 feet. The Hat Fault has caused extensive shearing for several hundred feet on both sides of the fault plane. Prominent cleavage St 147 Dip SW 55 has crushed adjoining argillite into unusual pencil or cigar shaped fragments with parallel orientation. One kink band fold occurs near the Main barite showing. Kink band folds occur when more than one direction of cleavage is developed.

The cleavage associated with the fault plane has resulted in many small quartz veins 6 inches to 12 inches in width and about 10 feet in length being "sweated out" of quartzite and quartz conglomerate bands in the Horsethief Creek Group near the Hat Fault. Similarly when black limestone beds west of Hat Fault were sheared, small scale pure white calcite veinlets were "sweated out". The recognition of the origin of the quartz and calcite veins may assist in tracing extensions of the Hat Fault north and south of the Main barite showing looking for extensions of the barite vein. These features possibly indicate that the barite vein has been sweated out of a much larger lower grade bedded barite bed in the lower Horsethief Creek Group. (See "Hypothetical ore" later in Report.)

There is faint banding within the barite parallel to the hangingwall which suggest the barite may have been deposited by repeated pulses of ore bearing solutions.

The stratigraphic column of the Horsethief Creek Group as described in Memoir 369 - J.E. Reesor 1973 was plotted. A unique black limestone bed (described by Reesor) was recognized west of the Hat Fault and south of the claim boundary. This marker bed is located about 800' in stratigraphic distance above the Toby Formation. The rocks to the east of the Hat Fault are about 80 to 90% argillite and 10 to 20% quartzite and conglomerate. These rocks appear to be about 1500 stratigraphic feet above the Toby Formation. This information agrees in part with the concept that the Hat Fault is a strike-slip fault.

Barite has been located at four locations along the trend of the Hat Fault for a strike length of 3,000 feet. Two of the barite locations occur in bedrock and two occur as float in talus slides.

Location A - Main showing on Hat M.C. occurs on north side of the ridge at elevation 7500'. The vein conforms to the attitude of the Hat Fault St 147° Dip SW 55° .

The hangingwall of sheared argillite has been stripped by tractor without blasting. The waste tonnage removed was about 2,500 tons. The strike length of barite exposed is 75 feet. The dip length is about 20 feet and the thickness of the vein is 8 feet.

There is approximately 3,000 tons of relatively pure high grade barite exposed. The only impurity is traces of copper estimated at less than 0.1% Cu as tetrahedrite. There could probably be another 3,000 tons found by stripping to a dip length of 80 feet.

Geology (Cont'd)

- Location B - About 1500' southwards and over the ridge at elevation 7700' the Hat Fault can be recognized by scattered quartz veins and shearing. This showing is just south of the Hat M.C. boundary. There is at least one vein of barite about 12 inches in width. Subsequently A. Miller examined this area with a geologist from Baroid Ltd. and reports they found a barite vein 4 feet in width. Stripping by tractor and backhoe between locations A and B possibly could find barite ore suitable for open pit mining.
- Location C - Northwesternly of the Main showing Location A and at elevation 7200', float of barite has been found in the talus slope. It has not been determined whether this barite came from Location A or the underlying bedrock.
- Location D - Further northwesterly below the road at elevation 6500' float of barite was found on the talus slope. H. Bearham, several years ago, attempted to drive an adit at this point to reach bedrock. Drifting through the deep talus was unsuccessful and location of the source of barite was not determined.

Theoretical Origin of Barite Deposits

There are over 15 known occurrences of significant barite deposits extending along the Rocky Mountain Trench from Golden, B.C. to northern Montana in the United States.

The sediments involve 60,000 stratigraphic feet of late Precambrian rock and 30,000 of Paleozoic to Tertiary rocks for a total thickness of 90,000 feet. Sedimentary barite deposits appear to be associated with deep sea sands and with volcanic flows in sediments.

There are at least six horizons in the stratigraphic column which contain volcanic flows: Fort Steele, Creston Formation, Purcell Lava, Irene Volcanics and Toby Conglomerate, Ordovician and Miocene. This suggests larger tonnages of sedimentary barite may be found in these horizons as a cement in sandstone.

Barite occurs as an important gangue mineral in the high grade Meggen deposit of massive pyrrhotite, galena sphalerite and chalcopryrite in Germany. This association suggests the widespread low-grade sub-marginal copper deposit extending from Coeur d' Alene, Spar Lake (Mont.), Waterton Flathead, Mount Nelson, Toby Formation should be examined for barite. There are many sweat out tetrahedrite veins with sub-marginals copper values that may be from sedimentary barite beds. i.e. Thunderhill, MacIntosh Mine, Lone Pine Butte.

If the Hat Barite is thought to have originated as a hot spring deposit then it would be associated with the Miocene volcanics along Pinchi and Manson Faults of northern B.C. Barite is soluble only as a chloride and as a bicarbonate. Barite precipitates on contact with sulphuric acid. The tetrahedrite at the MacIntosh Mine contains 1% Hg. The tetrahedrite from the Paradise Mine contained 6% Hg. Cinnabar deposits occur near Roosevelt along the west side of the Trench. This would suggest the Hat Barite could have been associated with Miocene volcanism in association with mercury deposition as in northern B.C. and with faulting associated with development of the Rocky Mountain Trench in southern B.C.

Ore - Grade and Tonnages of Barite

	<u>Vein Barite</u>			
	<u>Sample</u>	<u>% BaSO₄</u>	<u>Spec. Grav.</u>	<u>Reserves</u>
Location A	1*	92.4	4.37	3,000 Tons Positive
Elevation 7500'	2*	89.1	4.24	3,000 Tons Probable
	3*	91.1	4.34	? Tons Possible
	4*	93.6	4.42	

* Selected samples by A. Miller

Ore - Cont'd

	<u>Sample</u>	<u>Vein Barite</u>		<u>Reserves</u>
		<u>\$ BaSO₄</u>	<u>Spcc.Grav.</u>	
Location B)
Elevation 7800')
Location C)
Elevation 7200')
Location D)
Elevation)
<u>Bedded Barite Deposits</u>				2,000,000 Tons Hypothetical

The hypothetical source of the Hat Barite hydrothermal vein may be found in this area.

There is a good opportunity in this area to examine the stratigraphy of the lower Horsethief Creek Group and the Toby Formation to determine if the source of the barite veins is a barite cement in an original sandstone or conglomerate of the Horsethief Creek Group, the Toby Formation or the Mount Nelson Formation. Bedded deposits have been found in the Paleozoic rocks in the southern United States with thicknesses of 200 feet, length 1 mile and width ½ mile. The fact that there are numerous small veinlets of quartz along the Hat Fault which occur as "sweat outs" from quartzite and conglomerate and that similar veinlets of calcite from black limestone occur, suggests that the barite vein at Location A may have originated from an adjoining and nearby bedded barite deposit.

Bedded barite deposits may contain 90% BaSO₄. Rock containing 30% BaSO₄ or having a specific gravity of 3.2 is considered a minimum grade for beneficiation by flotation methods.

Mining Method

Highly sheared argillite along the Hat Fault both in the footwall and hangingwall of the vein would make an underground mining method extremely costly. Timbering would be required to support the backs unless the vein widened so development could be entirely in barite. I recommend that the ore be recovered by open pit methods. If other barite veins could be found where the walls were quartzite or conglomerate then underground methods might be considered.

The mining costs for open pit with stripping ratios of ore:waste: 1:10 could be only a tenth as expensive as underground mining in which ground support would be required.

An access road on the north side of the ridge would climb 1200' in elevation and at least 15,000' in length. A road in the sheared argillite could be built with minimum of rock blasting. This road could aid in exploration for additional barite mineralization. The B.C. Department of Mines may financially assist the building of such a road.

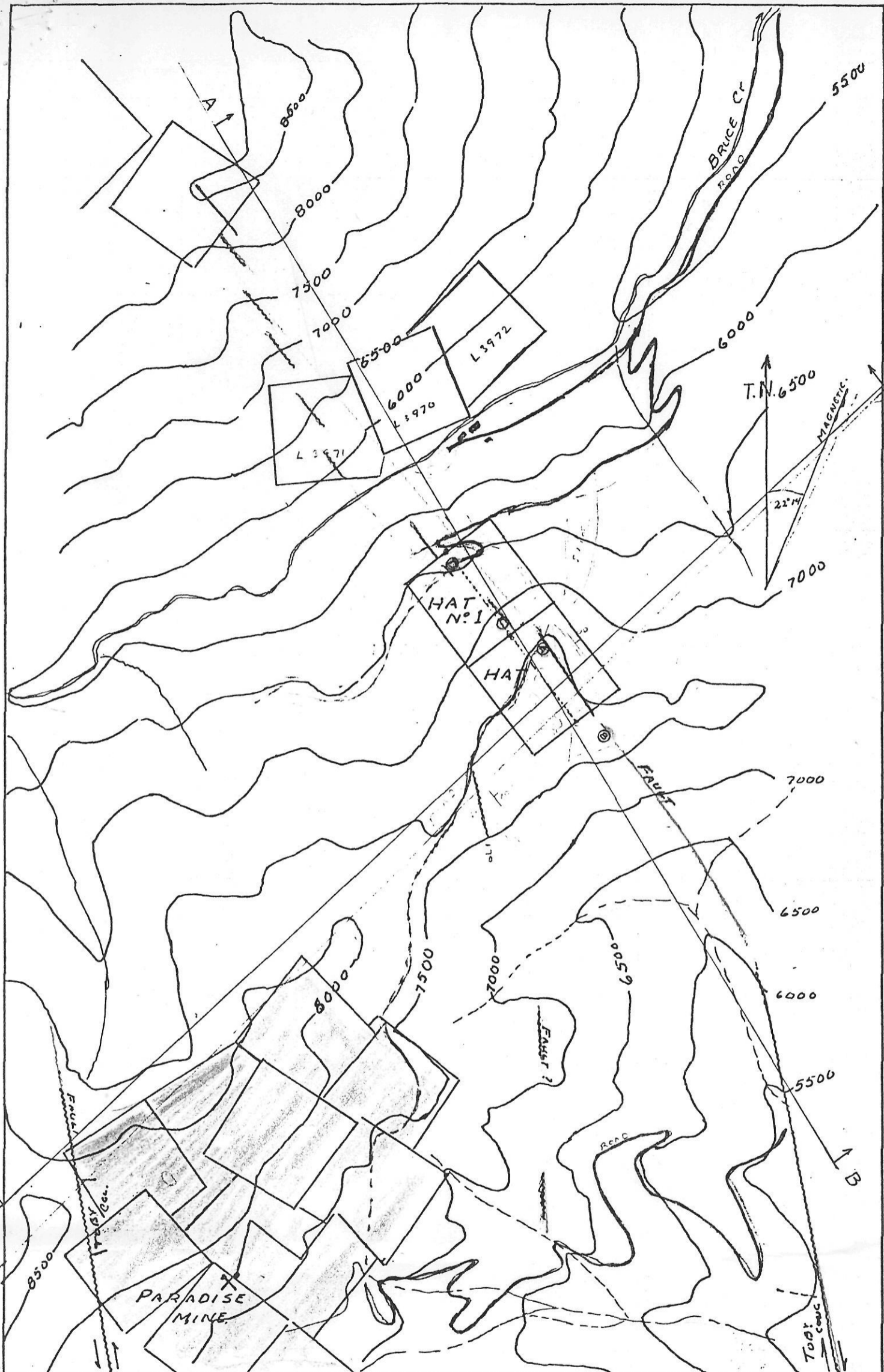
Financial

Barite Rock @ Windermere	
Nominal Value	\$10 to \$20/Ton
Processed Drilling Mud @ Lethbridge	
-325 Mesh 95% BaSO ₄ Sp. Gr. 4.2	
Wholesale to Drill Suppliers	\$50 to \$60/Ton
Retail Price by Drill Supply Co. (Alberta)	
Sold to oil and gas drilling co.	\$135/Ton @ Calgary
10 to 20% mark-up on wholesale	
Taxes (?)	

The apparent wholesale gross value of 6,000 tons at \$60/Ton is \$360,000.

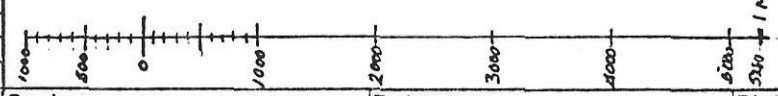
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Geology of Lardeau Map Area East Half B.C.
- D.A. Brobst (1965) - U.S. Geol. Survey
Mineral Investigations Map M.R. 43
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- Staff - Bureau of Mines
1970 Mineral Facts & Problems
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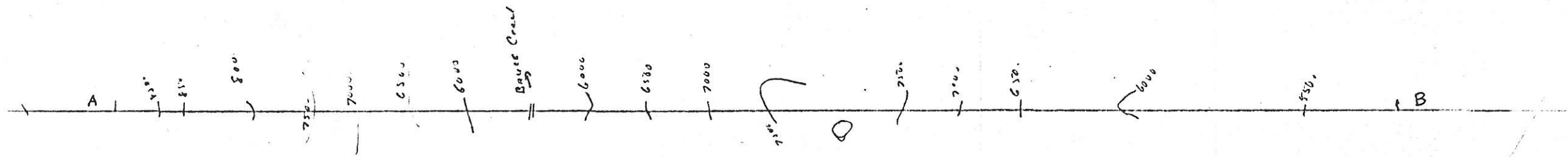
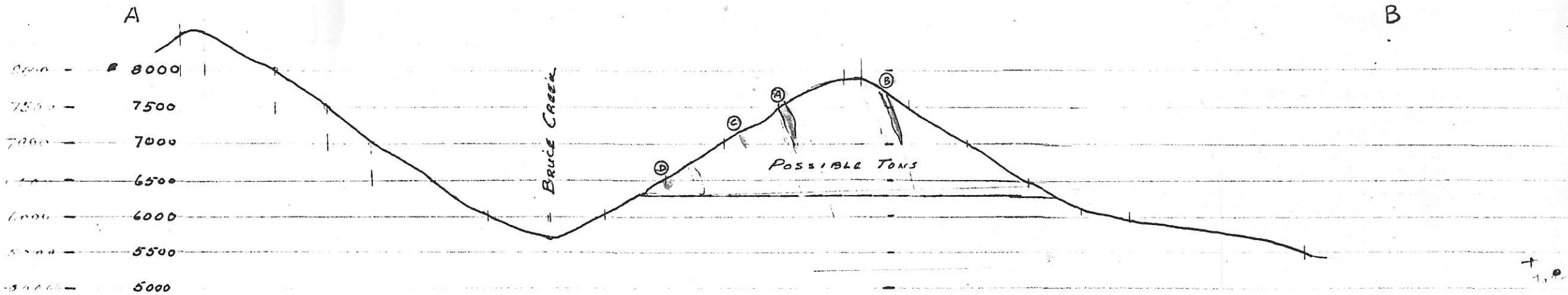


Drawn by: G. MASON		Traced by:	
Revised by	Date	Revised by	Date

THE HAT BARITE



Date: JUNE 27, 1977 Plate: 1



Possible Tonnage
above 6300' elev.
in fault
assuming 4' width

$$5500 \times \frac{1500}{2} \times \frac{4}{7.37 \text{ cu ft/ft}} = 2,200,000 \text{ tons}$$

if only 10% fault was ore
then 220,000 tons.

Drawn by G. MASON	

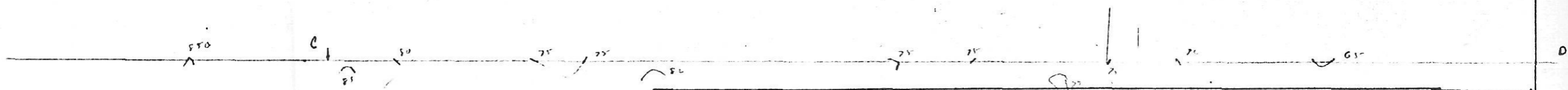
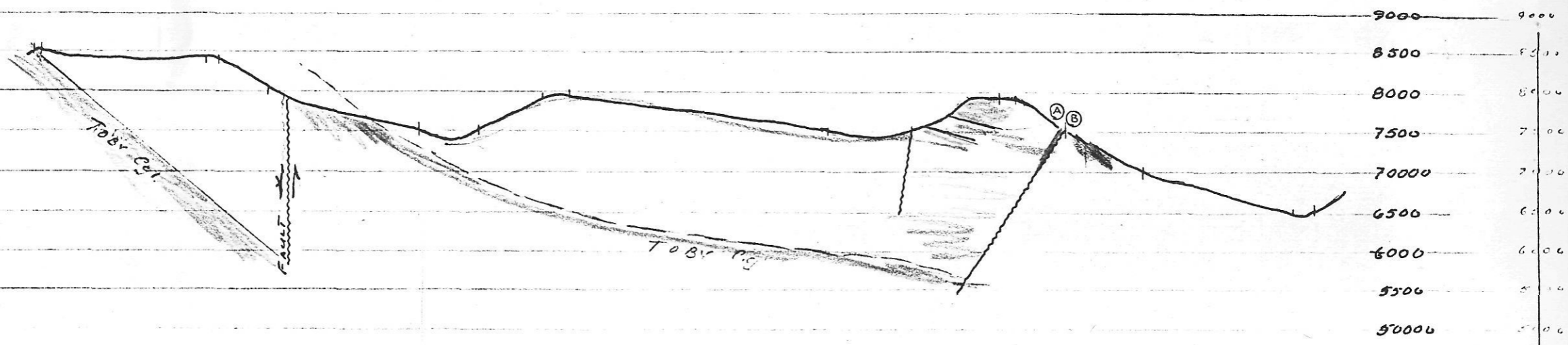
THE HAT BARITE

VERTICAL SECTION A B
looking north-east.

Scale: 1 inch : 20000, = 16666
Date JUNE 27 1977
Plate 2

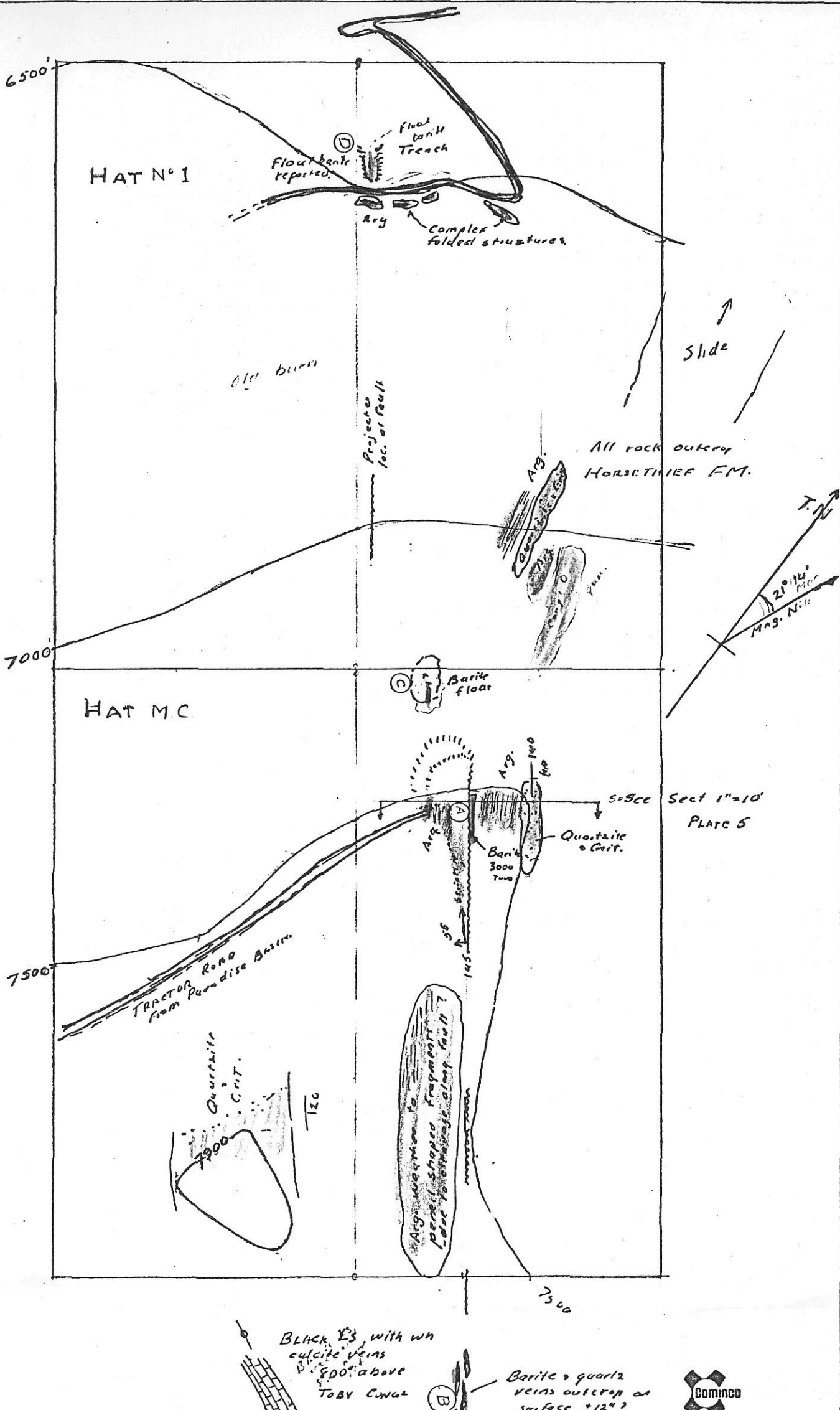
C

D



Drawn by
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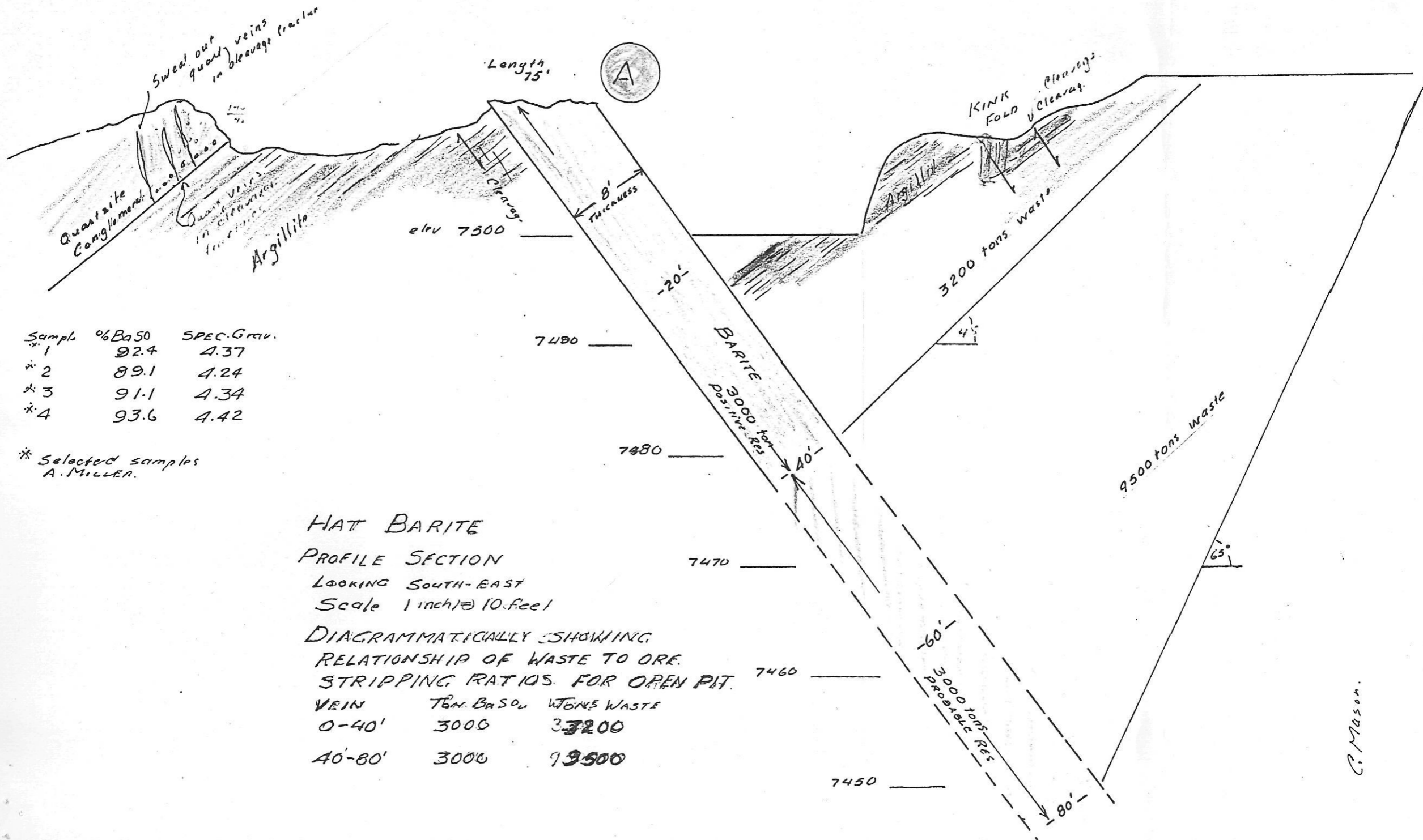
THE HAT BARITE
VERTICAL SECTION CD
Looking north-west
Scale 1:20000 Date June 27 1927 Page 3



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THE HAT BARITE
Surface geology sketch JUNE 17, 1977.

Scale: 1 inch = 300 feet Date: July 2 1977 Plate: 4



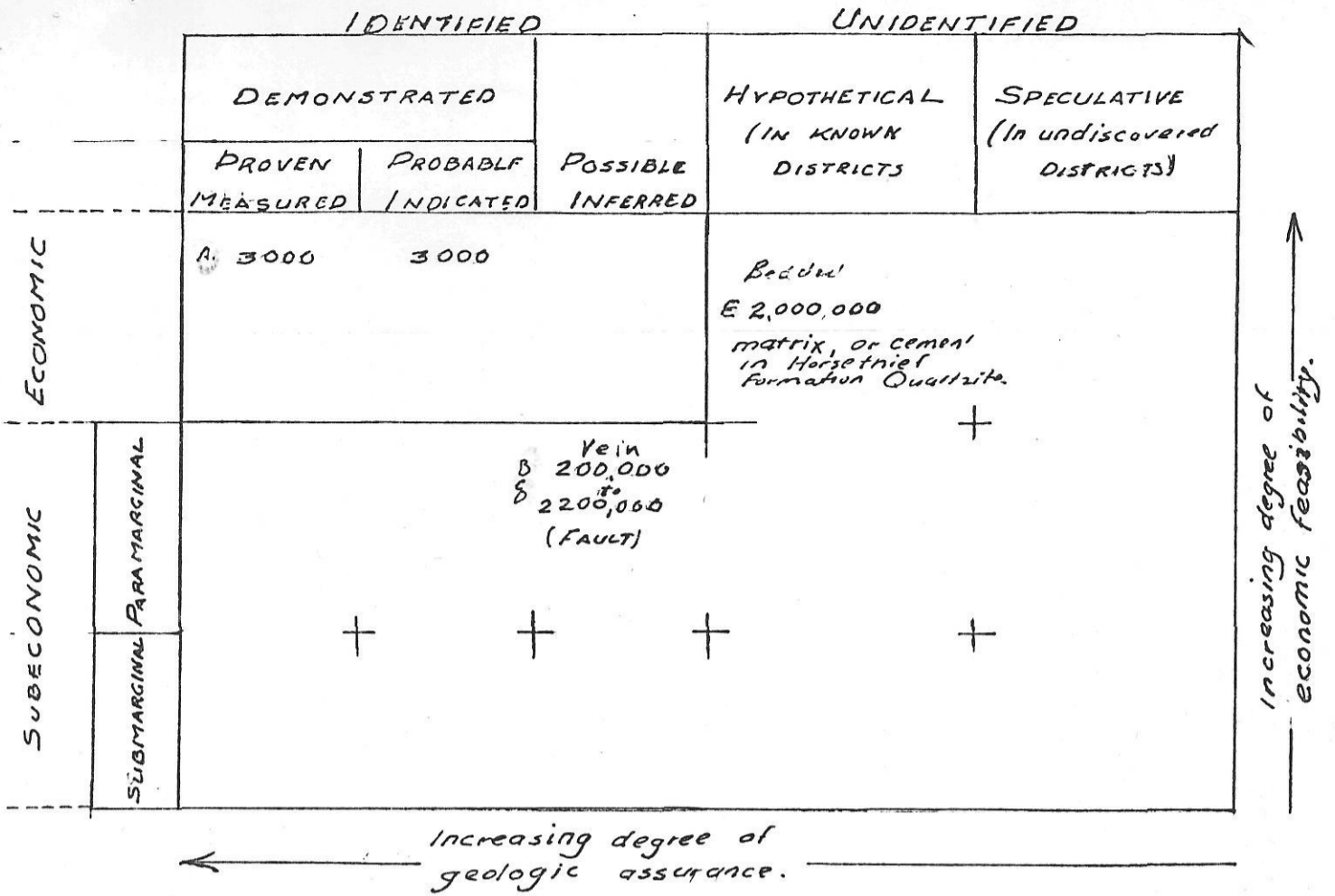
Sample	% BaSO ₄	SPEC. Grav.
* 1	92.4	4.37
* 2	89.1	4.24
* 3	91.1	4.34
* 4	93.6	4.42

* Selected samples
A. MILLER.

HAT BARITE
 PROFILE SECTION
 LOOKING SOUTH-EAST
 Scale 1 inch @ 10 feet
 DIAGRAMMATICALLY SHOWING
 RELATIONSHIP OF WASTE TO ORE.
 STRIPPING RATIOS FOR OPEN PIT.

VEIN	TONS BaSO ₄	TONS WASTE
0-40'	3000	3200
40-80'	3000	9500

C. Mason.



U.S. PR 940

A Hat Hydrothermal Vein.

B, C, D Other vein deposits along Fault

E possible bedded barite.