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GEOLOGY OF THE PROPERTY OF  
THE SOUND COPPER SYNDICATE  
HOWE SOUND, B. C.  
21st Nov. 1958 DR. A. C. SKERL  
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*Copy of report by  
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C O P Y

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T H E G E O L O G Y O F T H E P R O P E R T Y O F  
T H E S O U N D C O P P E R S Y N D I C A T E.

S U M M A R Y

The Britannia Shear Zone is present for at least  $2\frac{1}{2}$  miles on the west side of Howe Sound directly on strike with the zone at Britannia Mine on the other side of the Sound. This indicates that it must also be present under the Sound for another  $2\frac{1}{2}$  miles. Thus a length of 5 miles must be added to the 7 miles already known on the east side of the Sound in Britannia ground.

The presence of scattered sulphides, of cross-faults and of rock types similar to those in Britannia Mine suggest that this five mile section of the shear zone could contain ore-bodies.

A self potential geophysical survey is proposed to test the  $2\frac{1}{2}$  miles of the shear zone on land and also for trying out under water.

I N T R O D U C T I O N

Under the guidance of Mr. S.C. Sangster, the chief partner in the Sound Copper Syndicate, I spent five days examining their group of claims on the west side of Howe Sound, adjacent to Woodfibre.

Mr. Sangster has displayed considerable ability in recognising the existence of the important Britannia Shear Zone on this side of Howe Sound. During the past two years he has prospected the zone for a distance of  $2\frac{1}{2}$  miles and is therefore familiar with the exposures.

## S I T U A T I O N

The property is ideally situated at tidewater on Howe Sound, thirty miles from Vancouver.

The company town of Woodfibre, where cellulose acetate is made, is just north of the claims on the east side of the Sound. This plant is closed down indefinitely so that a number of excellent houses and ancillary facilities are presumably available for rental.

The town of Britannia Beach, belonging to the Howe Sound Mining Company, is on the east side of the Sound. It is 31 miles from North Vancouver with which it is connected by the Pacific Great Eastern Railway and a new hard-topped highway. It is 8 miles by rail or gravel road to Squamish at the head of Howe Sound.

## T O P O G R A P H Y

The property occupies a length of 5 miles from Britannia Beach in a northwesterly direction across Howe Sound for  $2\frac{1}{2}$  miles and then obliquely across the high ridge between Boulder Creek and Woodfibre Creek.

On the land claims the elevations range from sea level to 2500 feet. The deepest part of the Sound is 1300 feet below sea level near the west side.

## P O W E R, W A T E R & T I M B E R.

A power line of the B.C. Electric Company passes through the claims near the shore line on the west side of the Sound.

Ample water is available in Boulder Creek. Woodfibre obtains a large supply of water for both power and plant use from Woodfibre Creek with the intake at 1200 feet elevation.

A considerable amount of medium sized timber is present on the property although held by various timber limits.

## P R O P E R T Y

There are 45 claims stretching from Britannia Beach across Howe Sound and to the middle of Woodfibre Creek as indicated on the plan ( scale 1 inch to 1 mile ). They are arranged in six groups held by five people, namely, W.E. Jackson, L.E.C. Rhodes, S.C. Sangster, W. Straith and F.W. Wright.

## G E N E R A L G E O L O G Y

The major source of information concerning the geology of the district is Memoir 158 of the Canadian Geological Survey entitled ' Britannia Beach Map Area ' by H.T. James, 1929. More recent information by W.T. Irvine concerning the Britannia Mine itself was published in ' Structural Geology of Canadian Ore Deposits ', 1948. In addition I spent three days as a visitor studying the geology of the mine in 1953 under the guidance of Mr. A. Killin.

The accompanying map ( scale 1 inch equals 1 mile ) has been constructed from the one that accompanies Memoir 158 and from the mapping that I was able to do recently.

Briefly described the general area is underlain by the Coast Range Batholith that consists of a variety of types ranging from granite to diorite with a large irregular roof pendant of Triassic rocks consisting of sediments, pyroclastics and volcanic flows. The southern part of these layered rocks has been folded on northwesterly axes and intruded by large sills and dykes of dacite or latite composition for a length of at least 12 miles.

A strong shear zone up to 2000 feet wide strikes at N 60<sup>o</sup> W and dips steeply south along this belt of dykes for the 12 miles and the topography suggests that it could extend for another ten miles to the northwest.

The ore-bodies of Britannia Mine are all contained within a section of the shear zone that is 8000 feet long near the middle of the 7 miles of shear zone at the southeast end that is controlled by the Howe Sound Mining Company. The apparent twist in the strike of the shear zone at the ore-bearing section as shown on the map is due to the combination of the dip to the south and the high ridge where it crosses over from Britannia Creek side to Furry Creek.

No overall structural explanation for the restriction of the ore-bodies to this one section has been published. It may, however, be significant that a strong northerly striking fault was mapped by James on Empress Creek on the north side of the east end of the ore-bearing section. There is also a possibility that another fault is present along the west southwest section of Furry Creek on the south side which again would meet the shear zone at the east end of the ore-bodies.

Two major rock types in the shear zone were recognized by James, namely green mottled schist and sericite schist of which the first was the host rock of the ore-bodies but the second was not. Ore has since been found in the sheared fragmental rocks. Irvine stresses the close association of the ore-bodies with a strong thrust fault within the shear zone.

#### G E O L O G Y O F T H E W E S T S I D E O F H O W E S O U N D.

The second accompanying map has been made from an enlarged aerial photograph, scale approximately 1 inch to 850 feet, to show the geology that I observed. The percentage of exposed rock is better than average probably because the steep topography did not provide lodgement for glacial material. However there are still large areas of the shear zone that are covered.

There is an excellent continuous section for 1700 feet of true width across the Britannia shear zone along the west shore of Howe Sound. The highly cleaved nature of most of the rock made the identification of the original rock types doubtful in the short time available to examine the exposures. The commonest rock type is a fine-textured, gray, sericite-quartz schist with cleavage at N 40° W to 50° W. It probably represents sheared latite and dacite sills as at Britannia Mine.

At the centre of the zone near the mouth of Boulder Creek and best seen in the open-cut made for the power line pole near by there is a 50 feet wide band of partly sheared volcanic fragmental rock containing about 2% finely scattered pyrrhotite.

Some dense, grey-green rock types are probably sericite-chlorite-quartz schists formed from sills. A well-banded gray and white siliceous rock may be a sheared tuff.

At the north contact on the shore there is a twenty feet wide vertical sill of fresh dacite containing fragments of diorite.

To the north and south of the shear zone the main rock types are granodiorites. On the north side there is one type characterized by numerous large grey xenoliths often amounting to 50%. Another type has numerous coarse quartz crystals that on weathering gives a warty appearance.

The section immediately inland along Boulder Creek at the south end of the area shows that here the shear zone is bounded on the west by a large dyke of fresh, unsheared, medium-grained diorite 500 feet wide. It can be traced to the northwest along the shear zone for 7500 feet before it appears to pinch out. Where exposed, as in Boulder Creek, the contact zone of the diorite dyle is usually mineralized with the sulphides pyrite, pyrrhotite and occasional specks of chalcopyrite.

5000 feet along the strike to the northwest the shear zone has diminished in width to 1000 feet of which 500 feet is diorite dyke. At Woodfibre Creek it may be only 300 feet wide but the widespread overburden conceals the south contact.

A number of features that appear on the aerial photograph are shown on the map. These consist of straight sections of cliffs or creeks some of which were found to be directly due to faults.

At the north end of the property between posts 4 and 5 on the location line (see map) in an area of steep cliffs on the south side of Woodfibre Creek Mr. Sangster has found a zone of quartz-chlorite stringers up to 50 feet wide and 300 feet long straddling the contact between the shear zone and the granodiorite. There is an offset of 200 feet to the contact here as shown on the map. Immediately to the east of this zone is the projection of a fault whilst just to the west is the apparent north end of the diorite sill. In addition a very strong lineament that can be traced for two miles on the air photo heads towards this area from the west-southwest. No sulphide mineralization has been found in this zone and a series of over 20 samples of the quartz taken by Mr. Sangster were barren of gold.

Further north the same contact is cut by a north-striking fault with an unknown displacement just south of Woodfibre Creek and the rock on each side is well mineralized with pyrite for two feet.

A northerly striking, strong photographic feature on the south side of Boulder Creek was found to be a steep sided gully along a fault that dips to 80° S. In the bed of this gully about 800 feet above its junction with Boulder Creek there is a small outcrop of quartz that contains both molybdenite and pyrite. It probably averages 2% MoS<sub>2</sub> over 1; feet. The vein strikes at S 75° E into the position of the fault only 3 feet away under some gravel and does not appear in the



continuous outcrop of granodiorite on the farther bank of the gully. In the other direction of the vein pinches out rapidly within 10 feet. It dips at 45° S and some is present 10 feet higher on the north bank but only pyrite is present. Other small quartz veins and dykes of aplite were seen in the gully that were cut off by the fault.

This fault apparently crosses the shear zone near No 2 post on the location line.

#### D I S C U S S I O N

The prospecting by Mr. Sangster has demonstrated the presence of the Britannia Shear Zone on the west side of Howe Sound for a distance of  $2\frac{1}{2}$  miles. Some scattered pyrrhotite and pyrite mineralization with a little chalcopyrite has been found but nothing with an appreciable copper content. Much of the ground is covered with overburden so that concealed ore-bodies could be present. Their discovery will probably depend on geophysical surveying by electrical methods. In this connection it should be noted that interference can be expected in the neighbourhood of the power line.

There must be an unseen section of the Britannia Shear Zone that is  $2\frac{1}{2}$  miles long beneath the waters of Howe Sound where the maximum depth recorded on navigation charts is 1300 feet towards the west side. There may well be ore-bodies in this section but a special technique will be needed to locate them by geophysical means. If the unconsolidated material resting on the sea floor is too thick it will mask any effects that are being measured. It will certainly be worthwhile experimenting with the self potential method first.

I estimate that for the 2; miles of the shear zone from the shore to Woodfibre Creek it would take two men one month to cut the necessary lines and another month for two men to do the instrument work.

R E C O M M E N D A T I O N S

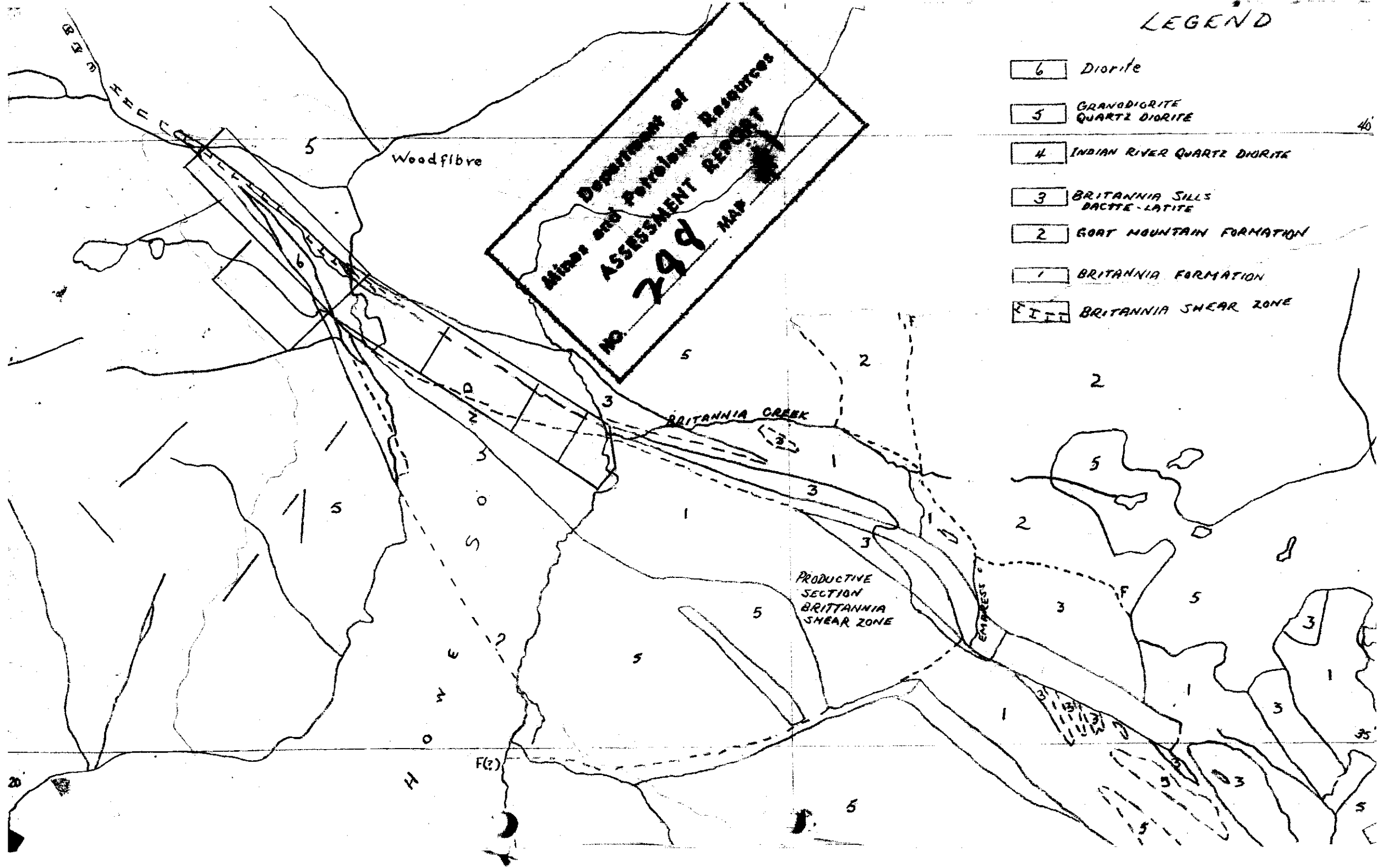
1. Survey the location line and place stations every one hundred feet.
2. With this as a base line set out cross-lines from each station to the limits of the shear zone with stations at 100 feet as well.
3. Use this grid to map all the outcrops within the shear zone on a scale of 1 inch to 100 feet.
4. Conduct a self potential survey of this grid of stations.
5. Experiment using the apparatus for under-water prospecting by lowering one well-insulated electrode to the sea floor and keeping the other on shore with the instrument.
6. Prospect the northwestern extension of the shear zone up Woodfibre Creek, over the divide and down Taquat Creek to Clowhom River.

"A.C. SKERL"

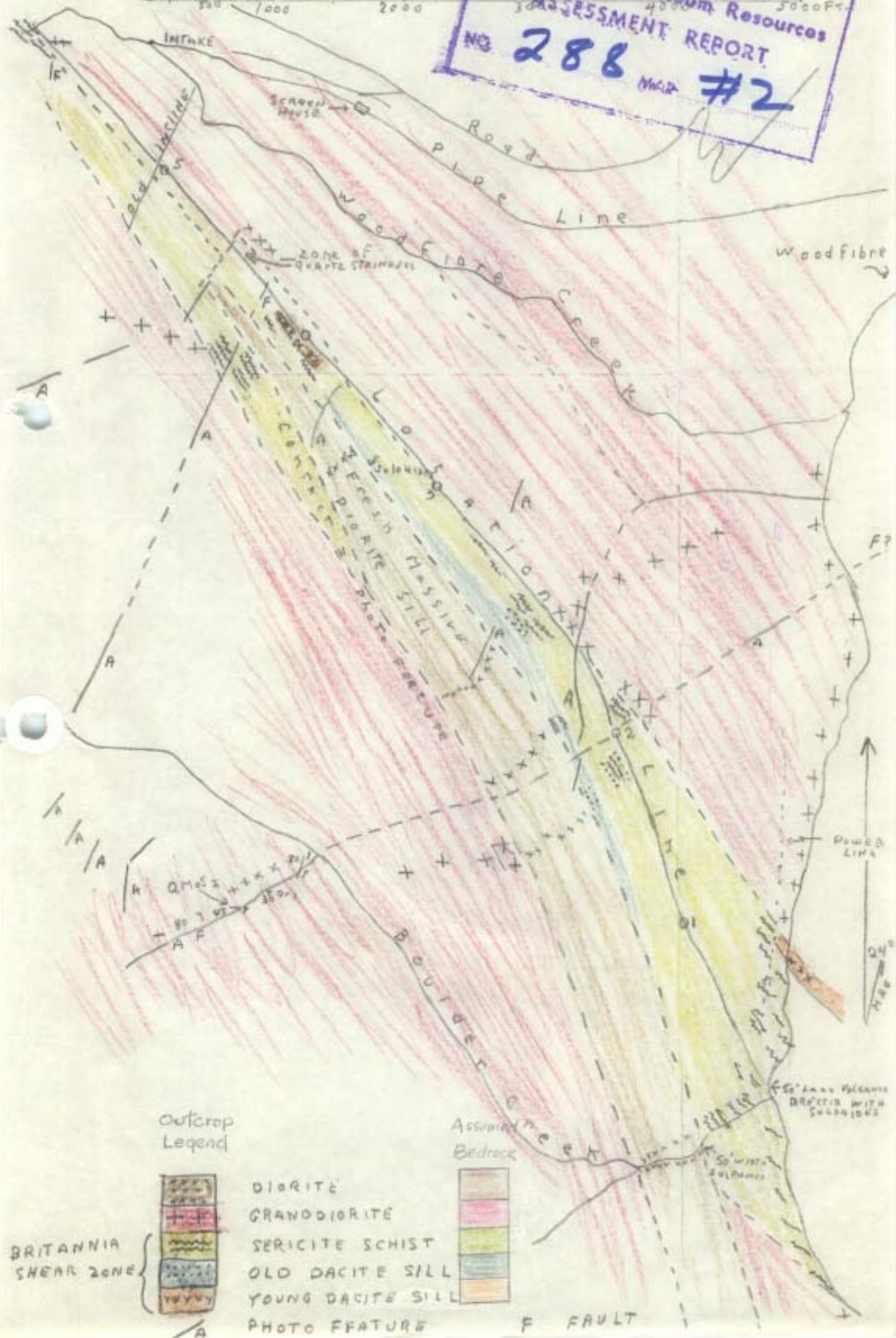
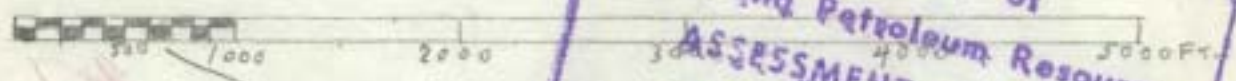
# LEGEND

- 6 Diorite
- 5 GRANODIORITE QUARTZ DIORITE
- 4 INDIAN RIVER QUARTZ DIORITE
- 3 BRITANNIA SILLS DACTE-LATITE
- 2 GOAT MOUNTAIN FORMATION
- 1 BRITANNIA FORMATION
- ||||| BRITANNIA SHEAR ZONE

Department of  
 Mines and Petroleum Resources  
 ASSESSMENT REPORT  
 No. 799 MAP



Department of  
 Mines and Petroleum Resources  
 ASSESSMENT REPORT  
 NO. 288 M.A.P. #2



Outcrop Legend



- DIORITE
- GRANODIORITE
- SERICITE SCHIST
- OLD DACITE SILL
- YOUNG DACITE SILL
- PHOTO FEATURE

Assumed Bedrock



F FAULT

BRITANNIA SHEAR ZONE

St. Anne Volcano  
 Diorite with  
 Sulfur 1942

So with  
 Sulphur