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WESFROB MINES LIMITED

REPORT

ON

1961 FIELD SEASON AT

TASU, Q. C. I.

MINING DIVISION

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WESTROB PINES LIMITED

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Vancouver, B. C.
January 30, 1962.

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WESFROB MINES LIMITED

S U M M A R Y

This report describes the work done at Tasu during the period March to December, inclusive, 1961 and includes a short discussion of the geology of the property.

During the past field season diamond drilling was confined to the No. 1 Zone, the zone believed to have little or no copper with the magnetite, and the intention was to investigate the possibility that appreciably more ore existed in this zone than had been reported by preliminary drilling done in 1957.

In the area drilled it is estimated conservatively that one block contains 3,452,000 short tons averaging 47.0% soluble iron and another block contains 1,569,000 short tons of 43.4% soluble iron. Adding in the tonnage estimated from 1956-57 drilling it is apparent that some 9.4 million tons of ore are presently known on the Tasu property.

In the area drilled last season there are places where ore boundaries are not known and it is confidently expected that additional tonnage will be found.

Diamond drilling will be resumed in February, 1962, first to continue the exploration of the No. 1 Zone at its north, east and west boundaries and second, as snow recedes from the higher elevations, to continue the exploration of the No. 1 Zone to the south, then to explore the No. 2 Zone and finally, the No. 1 Zone.

Towards the end of 1961 a new semi-permanent camp was built to provide weather-proof accommodation for the exploration personnel.

SECTION A - Summary of Activities during 1961

Work commenced on the 1st of March and continued until December 18th at which time the camp was closed for the Christmas and New Year period.

(a) Diamond Drilling - An AX drill and a Pack Sack machine were run. An additional Pack sack machine was run on occasion, whenever possible.

Footages obtained are as follows:

AX -	10,428 feet	-	32 holes		
P.S.-	<u>5,759 feet</u>	-	38 holes	Abandoned holes (short) -	5
Total -	16,187 feet				

Drilling was confined almost exclusively to the No. 1 Zone with the objective of outlining the Zone in order to assess its tonnage potential and to determine how it should be mined. As most of the previous drilling was confined to the ore outcrop area, it was necessary to determine ore limits on the west, north and east of the No. 1 Zone. The N.W. corner remains "open". The west boundary remains "Open" at depth.

Sufficient drilling has been done to indicate that the No. 1 Zone exists as a continuous mass over a considerable area. More drilling will be necessary before a realistic idea of total tonnage and grades can be obtained. See geological report, Section B.

(b) Ground Survey - 1.) A triangulation base line has been established on the S.E. side of Horn Island. Points are set in rock. This triangulation system establishes control for the ground survey and for points along the shoreline - all set in rock, painted and flagged. A tie has been made with the Hydrographic Survey and with the Claim Survey. The Meridian for the triangulation base line was obtained from Army Survey Establishment Topographic Map 10XC/16E.

2.) Ground Survey consists of Transit and Chain Traverses to underground survey standards. Linear error acceptable less than 1 in 2500. Acceptable closure error (angular) less than $N\sqrt{X} \times \frac{1.5}{15}$, where N is 1 minute (1 east vernier reading) and X is number of stations within traverse.

All traverses plotted by co-ordinate system. All closed traverses. All hubs picketed, marked and flagged. Additional ground control points are taken by stadia every 50 feet except in critical areas where points are spaced closer to 30 feet. Stadia points are marked with painted, numbered pickets. Each picket is flagged nearby.

3.) Area covered by survey to date comprises all of the No. 1 Zone and almost the whole of the area of Drill Point (See Geological Plans - 50 scale).

h.) Ten foot contours have been established from form lines taken at the aforementioned control points.

(c) Magnetometer Survey - See plan overlay for Sheets A & B (50 Scale). A detailed magnetometer survey has been run over the area covered by the ground survey. Readings were with Sharpe A-3 mags at all ground control points. Due to breakage of the Mag an area to the N.W. of the No. 1 Zone was covered roughly with a dip needle only. This area will be covered with the A-3 Mag as soon as possible.

Base station check readings were made to allow for diurnal corrections.

(d) Geological Survey - A 50 scale Geological Plan has been prepared on the ground survey base. See Sheets A & B. Contours and control points are indicated. All outcrops have been hammered extensively and all surface data has been correlated with drill information both on section and on plan. In order to do this properly the location of outcrops must be quite

exact, hence the need for an accurate survey base. In future, data from underground workings, pits, etc. may be tied directly to the 50 scale plans and sections as accuracy is also sufficient for this purpose.

It is significant that this method allows for the accurate projection of geological data in a very difficult area of thin lensy beds of variably altered and weathered pyroclastics. This need for accurate ground control is, for my purposes, necessary within the ore zones, but is hardly warranted for the remainder of the property.

(e) Sampling - All sampling data is indicated on the geological sections. Samples are assayed for soluble iron only. Pulps are held by Lakefield Research of Canada Limited for later use for composite assays, etc. Sample transport is via Northland Navigation and C.N.R. Express.

(f) Camps - A tent camp was originally established at the site of the former Westrob Camp. A wooden office building and a cookery were erected. As the old camp site is at some distance from the orebody, and as dock facilities could not readily be established at that location (necessitating expensive and often dangerous water transportation) and as the camp was not adequate for existing personnel requirements and for existing weather conditions over a long period of time, it was deemed necessary to establish a building camp on the point immediately to the north of the orebody. This camp was brought in by barge on November 2nd and was constructed by Sentinel Construction Ltd.

We are presently occupying the new camp which consists of an office building, three bunkhouses, an A-frame dry building and a cookhouse. Facilities are available for 30 men.

Company personnel built a float at the new campsite and

erected two 10,000 gallon tanks for petroleum products. The float is suitable for docking aircraft and has been strengthened to accommodate small oil tankers.

SECTION B - General Geology

See - "Notes on the Geology of the Southern Queen Charlotte Islands"

To accompany preliminary map issued 1960.

By A. Sutherland Brown and W. J. Jeffery, B.C. Dept. of Mines.

Deposits: The magnetite-copper deposits at Tasu have been previously described as contact metasomatic deposits occurring along and near the contact between greenstones or "Older Volcanics" and an overlying basal limestone facies of the sedimentary "Kunga" formation.

Three principal deposits are known to date and have been termed zones 1, 2 and 3.

For purposes of this report only the No. 1 Zone will be considered. Sufficient drilling has been done on this zone to indicate ore continuity over a considerable area.

No. 1 Zone

Description - Trend - North-South down dip.

Strike - a) Whole Zone N60E Dip 20 - 30 NW

b) Components N40E to N70E Dip 10 - 50 NW

Strike - Indefinite - Tailing down dip to west probable

Shape - a) Whole Zone - Tabular - Comprises of coalescing and splaying component horizons.

b) Components - Tabular to Lensoid. Splaying to west. Some cross-cutting mineralization.

Mineralization - a) Magnetite:- Mainly fine grained. Some medium grain.
Coarse grain quite rare.

b) Pyrite:- Average 1-1/2 to 3%. Mainly patchy as flecks and small cubes. Occasionally up to 20%. Concentrated apparently in areas near faults.

c) Chalcopyrite:- In small amounts. Occasionally visible.

d) Pyrrhotite:- Occasional patches.

Size - Width - (down dip) - 950' North-South from section 73 to Section 90
Open to south and open at depth to west.

Strike Length - Section 76 - 1000 feet from 1000 West to 0+00
Section 84 - 1100 feet probable. 800 W probable to 300 E.

Thickness - Section 86 - 170 feet @ 3 E. }	Average Total Zone thickness between 130 - 150 feet.
Section 78 - 170 feet @ 7 W. }	
Section 76 - 140 feet @ 8 W. }	

The eastern portion of the zone has been largely eroded off South of Section 79 and east of 400 W on Section 73; East of 300 W on Section 76 and East of 130 W on Section 78.

<u>Known Limits (To Date)</u>	S.W.	17,650 N - 19,400 E.
	N.W.	18,050 N - 19,450 E.
	N. Central	18,450 N - 20,025 E.
	N.	18,780 N - 20,250 E.
	N.E.	18,650 N - 20,475 E.
	E. Central	18,250 N - 20,300 E.
	S.E.	17,900 N - 20,200 E.
	S. Central	17,700 N - 17,900 E.

Open completely to South. Open to N.W. Open at depth to West. North Extension fault offset to east? (No. 1 Zone East Offset).

Ore Reserves and Grade: Drilling and sampling results are too limited to provide a basis for formal calculations.

The following reserve figures should not be considered as final but rather as a close approximation subject to some change as additional drilling is done.

The No. 1 Zone is naturally divided into "East" and "West" portions by the Contact Creek intrusive system.

Reserves are as follows:

- (A) Total Zone - Outlined in red. Includes material thought to be amenable to mining methods. Both Surface and Underground.
- (B) Component Zones - Consists of actual ore horizons, indicated by sample intercepts. Zones quite well defined but data is incomplete.

Sampling within the #1 East Zone is insufficient to allow for the breakdown of reserves into separate section panels showing grade and tonnage. The use of this method would be misleading.

Such a breakdown will be done on the West Zone in the immediate future. Grades within the zones are thought to be quite conservative. Safety factors for tonnages are indicated. -

#1 EAST ZONE (A) TOTAL ZONE

4,904,328 Short Tons @ 33.75% Sol. Fe.

Factor - 7.84 - Volume 38,449,735 cu. ft.

FACTOR	{	46.62% Magnetite @ 6.2 cu. ft./ton (short)
		5.00% Gabbro @ 10.75 cu. ft./ton (short)
		35.00% Skarn @ 8.22 cu. ft./ton (short)
		13.38% Remainder @ 11.45 Cu. ft./ton (short)

for SAFETY FACTOR - use 8.5 cu.ft./ton instead of 7.84

= 4,523,496 Short Tons @ 33.75% Sol Fe.

#1 EAST ZONE (B) COMPONENT ZONES

3,752,000 Short Tons @ 46.99% Fe (sol.)

Factor - 7.36 Volume - 27,618,444 cu. ft.

64.9% Magnetite @ 6.2 cu.ft./ton

5.0% Gabbro @ 10.75 cu.ft./ton

10.0% Remainder @ 11.75 cu.ft./ton

20.1% Skarn @ 8.22 cu.ft./ton

for SAFETY FACTOR - use 8.0 cu.ft./ton (short)

3,452,300 tons @ 46.99% Sol. Fe.

#1 WEST ZONE (A) TOTAL ZONE

2,058,465 short tons @ 32.98% Fe. (sol.)

Factor - 8.19 Volume 16,858,830 cu. ft.

FACTOR	{	45.55% Magnetite @ 6.20 cu.ft./ton	}	8.19
		27.00% Skarn @ 8.22 cu.ft./ton		
		27.45% Remainder @ 11.45 cu.ft./ton		

for SAFETY FACTOR - use 9.0 cu.ft./ton (short)

1,873,203 tons (short) @ 32.98% Fe.

#1 WEST ZONE (B) COMPONENT ZONES

1,677,845 short tons @ 43.4% Fe

Factor 7.76 Volume 13,020,074 cu.ft.

{ 54.94% Magnetite @ 6.20 cu.ft./ton

25.00% Skarn @ 8.22 cu.ft./ton

20.06% Remainder @ 11.45 cu.ft./ton

for SAFETY FACTOR - use 8.3 cu.ft./ton (short)

1,568,684 short tons @ 43.4% Fe (sol.)

SUMMATION

#1 EAST ZONE (A) TOTAL - 4,523,498 Short Tons @ 33.75% Sol.Fe.

Factor 8.5 cu.ft./ton

(B) COMPONENTS - 3,452,000 Short Tons @ 46.99% Sol.Fe.

Factor 8.0 cu.ft./ton

EAST ZONE RESERVES JANUARY 1962 - (Section 76 to Section 88)

#1 WEST ZONE (A) TOTAL - 1,873,203 Short Tons @ 32.98% Sol.Fe.

Factor 9.0 cu.ft./ton

(B) COMPONENTS - 1,568,684 Short Tons @ 43.40% Sol.Fe.

Factor 8.3 cu.ft./ton

WEST ZONE RESERVES JANUARY 1962 - (Section 75 - Section 82)

Geology: The No. 1 Zone area is underlain by a sequence of volcanic rocks. (Older Volcanics?) These apparently strike N50-65E and dip N10-50. The rocks underlying the drill point to the north however are mainly thinly bedded limy argillites that have been highly altered to a feldspathic pyritic hornfels. These sediments are thought to be part of the upper Kunga formation (Late Triassic). A zone of feldspathic dioritic intrusives separates the sediments from the volcanics. These diorites were probably intruded along an old N60°W fault system separating the volcanics from the sediments. The diorites, or at least one of the diorite derivatives, were almost certainly the source of the Tasu magnetite bodies.

The volcanics, sediments and the ore itself have been intruded by several systems of dykes. Many of these dykes are apparently genetically related to the diorite. A late sequence of basalt dykes cuts ore, volcanics, sediments and intrusives as well. Most of the dykes dip to the west at

about 60 to 75 degrees.

- Ore Controls:
- 1) Mineralization has followed certain porous horizons within the volcanics, or along zones of brecciation.
 - 2) Proximity of the limestone contact.
 - 3) Proximity to the diorite intrusive.
 - 4) Proximity to fault features.
 - 5) Folding within volcanics? Accumulation along crestal planes?

Faults: A well developed system striking N60W to N.W. Apparently both pre ore and post ore in age. No. 1 Zone is cut off on the N.E. by one of these faults. Dips uncertain but probable steep to 75° to the north.

A late system of step faults trending N10°W to N30°. Most dip 75° W.

Most of these high angle faults appear to have relative movement of west side down. The main fault of this system is indicated topographically by the canyon of Contact Creek.

Theory: Although data is extremely limited, various rock relationships suggests the following sequence of events:-

- 1) Older volcanics laid down. Topped by "Smoky Horizon".
- 2) A phase of the diorite was then apparently both intruded and extruded. Various rock features and interfingering with normal pyroclastics suggest that the rocks constituted part of a volcanic dome structure. Intruded along N60W fault system (?).
- 3) Kunga formation laid down. Basal section is massive limestone. Upper section is thin bedded sediments. (Argillites)
- 4) Additional faulting along N60°W fault lines. Some dioritic intrusives.

- 5) Ore deposition accompanied by alteration of host rocks (SKARN)
Both mineralization and skarn apparently followed various beds and brecciation within the volcanics. Ore deposition concomitant probably with diorite intrusion which also altered the sediments to a pyritic-feldspathic hornfels.
- 6) Post ore faulting. A system of dykes intruded along this fault system. Most of these dykes strike N10-30W and dip 60-75 to the east. Mainly diorite porphyry and porphyritic varieties of the diorite. Latest dykes are basalt.
- 7) Step faulting. West side down relative movement. Faults strike N-S to N25W. Most of these dip 60 to 75 west.
- 8) Erosion to date.

Rocks: See Rock Descriptions.

Alteration: Mainly garnet epidote skarn. Minor actinolite. Apparently quite selective alteration in that skarns follow certain beds and horizons. Usually brownish garnets.

Conclusions and Recommendations:

1. The number 1 Zone constitutes a large mass of iron bearing material that should be readily amenable to open-pit methods of mining.
 - a) Additional drilling is required within the known zone limits.
This fill-in drilling is necessary for sampling purposes.
 - b) Exploratory drilling should be carried on in the NW quadrant and in a southerly direction where the zone remains "open".
2. The potential of the #1 East Offset Zone should be determined as soon as possible. This zone lies within a triangular fault block immediately to the NE of the #1 Zone. There is a good chance that an appreciable quantity of good grade ore may be outlined in this area.

3. Known occurrences of magnetite in the vicinity of the Mill Site Area (See 600 scale plan) should be drilled.
Ore potential here is slight, but the area should be tested as soon as drills are available. The presence of appreciable quantities of ore would make this area impractical for a mill site.
4. As drilling progresses up the hill towards the #2 and #3 Zones it would be wise to establish a satellite camp near the lower ^{CENTRAL} portion of the ~~#1~~ ^{#2} Zone.
5. Access to the orebody must be greatly improved. Facilities for the transport of a 60-ton bulk sample must be established. A "punchon" tractor road is suggested. These roads are commonly used by loggers on the west coast in terrain that is far rougher than at Tasu. They are cheap and are very easy to build with materials at hand and with a minimum of equipment. Without a "tote" road, the servicing of development crews on the upper two zones would be inordinately expensive.
6. A core shack should be built at some central point near the orebodies. There is presently nearly 40,000 feet of core in small piles at the old drill sites scattered over the three orebodies.
7. Large tonnages of iron bearing material have been indicated at Tasu. There is every indication that further development work will add appreciably to these reserves. I believe that an intensive drilling program is indicated for the three main zones. These should all be delineated as quickly as possible. Until recently we have not had the facilities or equipment for such a program, but the new camp and dock facilities will allow us much greater scope in our approach.
8. The #1 Zone will be almost completely drilled off in the near future. Logging and stripping of the zone could start at any time after early summer.

Suggested Program for Immediate Future:

1. Drill off remainder of "fill-in" holes on the #1 Zone. See Ore Reserve Sections.
2. Continue drilling to NW and to South of the #1 Zone. Immediate need for magnetometer work to NW of the #1 Zone.
3. Prepare geological and Mag maps of #1 Zone East Offset. (While doing #1 and #2).
4. Drill #1 Zone East Offset and trace north through suggested Mill Site Area. If only scattered mineralization is found in the Mill Site Area, only a few holes will suffice.
5. Build rough tote road of log "punchon" suitable for tractor and sled.
6. Establish small satellite camp and core shack on ^{LOWER} upper central portion of the #2 Zone. Tractor road should go to this site.
7. Geological, magnetometer and ground surveys to be carried on ahead of all development work.

Respectfully submitted,

Vancouver, B. C.
January 30, 1962.

G. R. Folk,
Geologist.