

Box 4

103-K-2

**REPORT  
ON**

SHAG ROCK MANGANESE

1965

SKEENA

**MINING DIVISION**

J. J. McDougall

19274

REPORT ON

SHAG ROCK MANGANESE, 1965

Vancouver, B.C.  
February 15, 1966

J. J. McDougall,  
Geologist.

## C O N T E N T S

	<u>Page</u>
INTRODUCTION.....	1
PROPERTY AND OWNERSHIP.....	1
LOCATION AND ACCESS.....	1
ORE.....	2
HISTORY AND DEVELOPMENT.....	2
GENERAL GEOLOGY.....	4
LOCAL GEOLOGY.....	5
RESULTS OF 1965 WORK.....	6
TEST PITS.....	8
ASSAYS, RESERVES, SPECIFICATIONS AND DISCUSSIONS.....	9
CONCLUSIONS AND RECOMMENDATIONS.....	10
REFERENCES.....	12

### MAPS AND ILLUSTRATIONS

- |   |       |
|---|-------|
| (1) Photocopy, Report by B.C. Dept. of Mines, 1960              | Bound |
| (2) Map and Sections, Shag Rock Deposit<br>1965 J. J. McDougall | Bound |
| 1" = 100'   |       |

REPORT ON

SHAG ROCK MANGANESE, 1965

J. J. McDougall

INTRODUCTION

The following report is prepared following a small amount of work undertaken on the manganese property by F.B.N.M. in May of 1965. At that time two short drill holes, designed to test for mineralogical changes at shallow depth and to obtain more accurate cross-sectional samples of the deposit, were attempted. Bulk samples were collected for metallurgical tests and a sketch map made of the showing. The writer, who had visited the property in 1960, laid out the program. Details of the deposit and the area are covered in earlier publications and reference is made to these rather than repeat the contained data here.

NAME

Shag Rock Manganese

PROPERTY AND OWNERSHIP

Approximately 14 (?) located claims now held by Naden Harbour Manganese Ltd., 605 Courtney Street, Victoria, B.C. (Ian M. Sherwin). A Letter of Intent, dated May 7, 1965, gave Falconbridge the right to investigate the occurrence until early June of 1966 at which time an option or lease was to be drawn up on established terms.

LOCATION AND ACCESS

(54°08'N, 132°38'W)

The property is near a small island called Shag Rock which is near Klashun Point on the northern tip of the Queen Charlotte Islands.

It is 25 miles northwest of Masset, the Territories' #1 settlement, and 100 miles north of Tasu, the settlement due to take over this position. The deposit, unique (?) to the Pacific Northwest, outcrops along the rim of a boulder-strewn tidal flat near an abandoned Indian village in an area where elevations seldom exceed 200 feet.

Access is by way of boat or float plane from Masset. While in the area, however, our helicopter was used to set up camp and transport bulk samples.

#### ORE

Manganese oxide(s) (Maganite, pyrolusite)

#### HISTORY AND DEVELOPMENT

Minable deposits of manganese are virtually unknown in western Canada. In his study of volcanoes in north central B.C., Jack Souther (GSC) reports "flat-lying accumulations of  $MnO_2$  up to 30 feet thick plus intraformational sheets of 'metallic  $MnO_2$ ' in the flows but related to 'springs' as far as origin goes" --- (pers. comm.) From time to time queries are received, even from our own company, asking for information regarding prospects containing this strategic element. Since on the Queen Charlottes a completely untested and undeveloped deposit similar in most geological respects to those actively producing in other parts of the world was known, and since we are committed to spending the next twenty or thirty years mining copper and iron in the vicinity, it was felt that preliminary work, including mill tests, of the Shag Rock deposit was in order at a time when no property payments were required.

The deposit was located many years ago by prospector Joe Pauloski of Masset. Two claims were staked in 1955. The writer, while in the Charlottes doing air mag work in 1960, visited the property with the helicopter and was accompanied on this trip by Dr. Sutherland-Brown of the Mines Department whose report made following the examination is included here in photocopy form. The only work done to this time was for minimum assessment and little information had been added by this. Although the grade was obviously very low, the structure was unusually strong and heading inland when last seen. Problems involved besides the grade were a possible change at depth to valueless manganese silicates to which no one had an answer, and the probability of the deposit continuing inland under an overburdened area of unknown thickness. It was felt that some cheap leaching method could possibly counteract the grade and a saleable product produced. Japanese interests had standing offers for moderate amounts of manganese, the specifications for which could best be met by increasingly efficient pelletizing processes.

About this time Mr. Pauloski sent a "better than average" bulk sample to the Federal Mines Department. The results of this work were published in a private report and although no suggestion as to economics was forthcoming, it was shown that a concentrate could be produced. However, still no real interest was shown in the property until 1964 (?) when a Masset-based (?) logging company - Cowichan Salvage Loggers Ltd., run by Ian M. Sherwin of Victoria, made a deal with Pauloski and a private company called Naden Harbour Manganese Ltd. was formed. Additional claims were staked and pictorial reports prepared by Mr. Sherwin. Discussions with Pauloski early in 1965 led to our entering into a deal with Mr. Sherwin

via a Letter of Intent. During a two week period in May, Rod McPhee and Dave Kimball, assisted for a time by Mr. Pauloski, carried out a short program laid out by the writer. This included the drilling of two pack-sack holes totalling 254 feet and the removal of about 75 yards of rock in two "cobra" cuts. A sketch map (SR #1/65) was made of the property by the writer during one of the visits to the property. Two 205 pound samples of "manganese breccia" from the cuts were forwarded to our Lakefield Laboratories for assaying and metallurgical testing with special emphasis being asked for on "costs". Investigations into an extraction process developed by a lab in Arizona showed the reported company to be essentially 'out of business'. Physical work for assessment purposes totalling \$3540.00 was reported to Mr. Sherwin as having been expended on the property up to June 16, 1965. Total expenditures to date are probably 50 - 75% greater than this.

#### GENERAL GEOLOGY

The northern part of the Queen Charlotte Islands is generally a tree-covered, somewhat swampy lowland area underlain by up to several thousand (+) feet of low to flat-lying, generally basaltic, Tertiary lavas plus included sediments and known as the Masset Formation. Some twenty miles to the west and to the northwest of Shag Rock, this formation thins out and Mesozoic sediments and the occasional Jurassic (?) Intrusive appear. No great structure has yet been recognized on the land areas. Oil-well test drilling to the southeast of Masset has added considerably to the knowledge of these little-studied rocks.

### LOCAL GEOLOGY

In the vicinity of the deposit the only rock types exposed are grey amygdaloidal basalts and thin bedded grey shales. These Tertiary rocks strike north to northeast and dip gently ( $5 - 20^{\circ}$ ) to the east.

Two structural features of importance are recognized. One of these, a strong 5 - 20 ft. wide breccia zone which trends about north  $20^{\circ}$  east and marks a contact between volcanics and shale. The second feature is a fairly sharp, gently northeasterly plunging fold in the shales and volcanics a couple hundred feet east of the most southerly exposure of the breccia zone.

A relation may or may not exist; limited time between tides and lack of outcrop on the boulder-strewn flat prevented mapping and correlation at this time.

The breccia zone, which would appear to mark a strong fault contact, consists of variable sized volcanic fragments of up to 2 or 3 feet in width, in a crushed groundmass of similar material. Black manganese oxide has erratically replaced the groundmass and this material constitutes the "ore". Differential weathering has resulted in a dyke-like appearance of the breccia zone. Examination on surface suggests a steep dip of from vertical to  $70^{\circ}$  easterly. In only one small section can the contact with hanging wall (?) shale be seen and here the dip appears to be  $70^{\circ}$ . Within the zone the manganese oxide may constitute up to 50 or 60% of the rock in patches up to 10 feet square or may occur as lone minute veinlets in widely spaced fractures in the lavas. No clearly defined fragments of shale are evident in the breccia, nor has any manganese been noted in the limited shale outcrops adjacent to the zone.



RESULTS OF 1965 WORK

With considerable difficulty because of outcrop and tidal conditions, two packsack diamond drill holes were laid out on the deposit. The first of these was about 200 feet north of the most southerly manganese outcrop and the second about 350 feet beyond the first. Both were collared in the footwall volcanics, this being the most advantageous location possible equating tide, drill capabilities, and object. The zone, for about 600 feet of relatively well exposed length, appeared steep so that footwall-collared holes were possible. Preliminary test holes collared in the deposit to help with test cuts showed that the breccia cored well.

#1 hole was collared about 60 feet west of the centre of a well exposed 20 - 25 foot width of manganiferous breccia and driven at  $-48^{\circ}$  in a direction  $S72^{\circ}E$  for a distance of 133 feet. The hole, (see section) assuming surface dip of about  $-75^{\circ}$  to hold, should have encountered the breccia zone at about 90 feet and established an overall vertical depth of at least 80 to 90 feet. Although the hole was slow and difficult to drill, encountering numerous short open caves, the well defined breccia zone was not intersected nor was the expected hanging wall shale. Only minor amounts of manganese oxides were noted in widely spaced fractures in the lavas.

The second hole to the north was meant to be the first of two from that location. The first of these was purposely made steep to establish depth of at least the most westerly exposed portion of the zone while at the same time remaining in better drilling (more competent) rock. If failing, a second flatter hole was laid out which would intersect the breccia at shallow (30 - 50 foot) depths. The first hole (#2) was run on

a S72°E bearing also with an inclination of -70°. It was abandoned after good drilling at 121 feet at which point the effect of salt water on supposedly "aluminum" drill rod made itself felt. Core recovery was almost 100% and there was no sign of oxide or rock change, according to the drillers, in the hole. Vertical surface attitudes should have allowed intersection of some oxide at least 10 feet before abandonment although still considerably short of the main "ore zone".

The flatter hole was then contemplated but deteriorating equipment brought about by the enforced use of salt water (no rain), the sudden appearance of a float plane from Prince Rupert for pickup during hazardous weather, and commitments elsewhere (i.e. McPhee at the Red Group) dictated that the drilling cease.

Rough logs of the holes were made by the drillers and a few type sections brought out. No sampling was warranted and the writer had no opportunity to re-visit the property.

Logs presented are as follows:

#1 Drill Hole

Approx. elevation - 5 feet above high tide mark (tides in this area to 27 ft. +)

Location - as on map SR 1/65, 60 feet west of a centrally located point on the ore body 200 feet north of the most southerly breccia outcrop.

Bearing - S72°E, Inclination --48°, Length 133 ft.

Recovery - 0 - 25 (87%), 25 - 50 (80%),  
50 - 75 (87%), 75 - 100 (75%),  
100 - 125 (80%), 125 - 133 (95%).

Description - Rock same as collared in for complete length (gray, slightly amygdaloidal basalt)

#1 Drill Hole - (cont'd.)

- Ore - negative except for minor  $MnO_2$  on occasional fractures in bottom half of hole.
- Drilling - Poor, due to caves and blocking.
- Bit wear - very little compared to other rocks.
- Drillers - McPhee, Kimball.

#2 Drill Hole

- Elevation - several feet lower than #1
- Location - 325 feet  $N18^{\circ}E$  of #1
- Bearing -  $S72^{\circ}E$ , Inclination  $-70^{\circ}$ , Length 121 feet.
- Recovery - 100%
- Description - Rock same as collared in all the way (volcanics as #1). No ore or sign of well developed breccia.
- Drilling - Excellent, but lack of fresh water caused use of salt water to complete resulting in loss of the erroneously included magnesium rods and couplings.
- Bit wear - Excellent.
- Drillers - McPhee, Kimball.

TEST PITS

Two sizable test pits were put in on the manganiferous breccia on section with the two drill holes. The first one measured 15' x 12' x 7' and the second 15' x 12' x 5'. As these were in areas where the breccia stood like a wall above the surrounding rubble, the cuts after a few months of coastal exposure will be hardly noticeable. Over 200 pounds of the freshest material was collected from each cut and sent for metallurgical testing. The grade of these was probably a percent or two above the

average as some of the larger unmineralized breccia blocks were ignored; a more accurate grade was expected (at that time) to be obtained from at least 3 drill holes yet to be collared.

Prospecting along the proposed "depression continuation" area inland proved futile as overburden is too extensive to allow outcrop.

ASSAYS, RESERVES, SPECIFICATIONS AND DISCUSSIONS

#1 and #2 test pit bulk samples assayed respectively as follows:

% Mn	--	14.32, 20.30
% Total Iron	--	2.30, 1.97
% SiO <sub>2</sub>	--	48.30, 38.25
% Al <sub>2</sub> O <sub>3</sub>	--	0.53, 0.30
% CaO	--	2.44, 2.55
% MgO	--	0.42, 0.95
% P	--	0.12, 0.14

Picked samples assaying over 50% manganese can be easily obtained. Elsewhere in the world, as described in the Economic Geology article referred to, "At most underground mines (in the U.S.) the product rarely contains more than 20 percent manganese, and it is necessary to sort or concentrate in mills to obtain a marketable product that contains more than 40% manganese." In some of the large surface mines (i.e. Luis Lopez where as much as 300 tons/day are occasionally mined) the ratio of concentration is 10 to 1. This would indicate a grade in the order of 4 or 5%. The writer feels that this is probably the average content of the Shag Rock deposit as mapped on the surface. Assuming an average width of 15 feet and a length of 600 feet a factor of about 900 tons per vertical foot is

established. Elsewhere, astonishingly similar deposits on which work has been done showed sudden terminations (of the "crush" zone) in Tertiary volcanics at depths of only 100 feet while others were still producing at 500 feet. However most U.S. veins have "ceased to be profitable" at depths of between 100 and 200 feet: Neglecting the results of our drilling, the Shag Rock deposits, given a 600 foot length (which is greater than all but a few being worked) would reasonably be expected to hold out to depths of 300 feet. This would establish about 270,000 tons of reasonably expected ore. Our feeling was that such depths would be required and an increased strike length inland necessary in order to gain more than potential "high grading" status for the property. The many variables possible at depth, judging from similar occurrences elsewhere, could seriously complicate exploration and if in fact the deposits are of only shallow (50 foot?) depth, tonnage potential would be nil.

Results of mill tests carried out by Falconbridge on samples #1 and #2 as received show that with a 46% Mn end product in mind 33% of the manganese would be recoverable as a saleable (pelletized) product with an uncalcined grade of 32%. The value of the ore under these conditions would thus be about \$5.00/ton rather than the 15 - \$20.00 envisioned. Calcining can increase the grade somewhat, but recovery would certainly not improve. No hope could be offered that any known leaching process could do the job more cheaply except in theory.

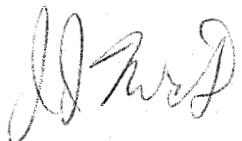
#### CONCLUSIONS AND RECOMMENDATIONS

It would appear, considering several alternatives, that as presently known the Shag Rock deposits can not be mined and milled for less than \$5.00/ton, a liberal value which is set on the ore following

metallurgical testing. Our 1965 work was designed to obtain this end figure which was lacking before such was undertaken. As such has now been obtained further investigation seems pointless at this time.

Recommendations are that, unless prospecting (geochemical or otherwise) can turn up larger targets (i.e. along projected breaks, etc.), nothing more be done on the property at this time and the owners so advised. Lakefield express willingness to do more exhaustive testing of the material on hand should the owners wish to proceed.

Vancouver, B.C.  
February 15, 1966

  
J. J. McDougall.

REFERENCES

- (1) Shag Rock Manganese Report - 1960, J. J. McDougall  
- on file bound with Q.C.I. Report
- (2) Monthly Reports, J. J. McDougall - May 1965  
- on file
- (3) Metallurgical Report, #IR 61-47  
Department of Mines, Ottawa (1961)
- (4) Metallurgical Report, #LR 1007  
Shag Rock Project, Lakefield, (1966)  
- on file

An average crew of twenty men was employed. Coastal boats and float-equipped aircraft were used for transportation to Bonanza Creek landing, and trucks were used on the access road to the camp.

Work ceased in June, 1960, and all buildings and equipment were removed from the property.

### QUEEN CHARLOTTE ISLANDS\*

#### GRAHAM ISLAND

##### *Manganese*

##### **Shag Rock**

(54° 132° S.W.) This property is 25 miles west of Masset on the east side of Klashwun Point near Shag Rock. It can be reached by sea or air, but landing may present difficulties in either case. The property is held by Joseph Pauloski, of Masset, by two claims located in 1955. The claims extend northward along the east side of the point from Indian Reservation No. 13, and extend 300 feet or more offshore.

Rock is exposed in the area only along the wide tidal zone, and the showings are on the shore. Basaltic lavas of the Masset formation here strike north to northeast and dip 15 to 20 degrees eastward. The lavas are cut by a north-trending fault, on the east of which the lavas are underlain by dark-grey shale and buff calcareous shale to sandstone of about 75 feet exposed thickness. The fault strikes north 15 degrees east, subparallel to the shore, and dips about 80 degrees eastward. It is filled with 5 to 15 feet of basalt breccia that is cemented by variable amounts of manganite. Fragments in the breccia are angular and as much as 2 feet across, although commonly the large fragments are only 6 to 8 inches across. Fragments range downward in size from these dimensions to a few millimetres; still smaller sizes were not seen. Veinlets of manganite also extend into the volcanic rocks of the west wall of the fault. The mineralization is primary and is Tertiary in age. It is probably related to the Masset volcanism.

The fault and the showings are exposed along the shore for about 550 feet from the beach near the Indian reservation northward to where the shore trends sharply to the west. The best showings appear to be in the northern third of the exposure. Large hand specimens may be taken that contain as much as 50 per cent manganese. At the northern end, where the breccia outcrops like a dyke, one of the higher-grade lenses, about 8 feet high by 50 feet long by 5 feet wide is estimated to contain between 30 and 40 per cent manganese.

#### MORESBY ISLAND

##### *Iron*

##### **Harriet Harbour (Silver Standard Mines Limited)**

(52° 131° S.E.) Company office, 808, 602 West Hastings Street, Vancouver 2. H. B. Gilleland, manager; A. C. Ritchie, general superintendent. Harriet Harbour is on Skincuttle Inlet, on the southeastern coast of Moresby Island, and is 70 miles south of Sandspit. The properties on Harriet Harbour controlled by Silver Standard Mines Limited were reviewed fully in the 1959 Annual Report. The general geological setting is shown on the preliminary geological map of the southern Queen Charlotte Islands issued by this Department in March, 1960. The main orebody is east of the south end of Harriet Harbour on the Jessie (Lot 1861) Crown-granted claim and the Limestone recorded claim. Additional orebodies have been explored on the Adonis (Lot 1865) Crown-granted claim east of the Jessie on the trail to Ikeda Cove, and on the Magnet (Lot 79) and

\* By A. Sutherland Brown.



