R 19278/35-42

PRELIMINARY REPORT ON PROPERTIES OF GEORGE RIVER TIN MINING COMPANY NO LIABILITY

Introduction

A small portion of the land holdings of this Company was held and worked many years ago by the late Royal Ruby Company of Melbourne. At that time the other leases were held by individuals who were unable to work the alluvial deposits because of lack of water. The Royal Ruby Company worked under great difficulties; a poor supply of water; a pressure of 30 feet only of water; the hardness of the cemented upper wash, and the low price of tin all contributed to their downfall. Except the Royal Ruby ground no attempt had been made to prospect the area until the coming of the George River Tin Mining Company, No Liability. Since that time the properties have been systematically tested by the sinking of pits spaced at close intervals and by the sampling of the deposits thus exposed for examination.

Location

The properties form a large block abutting George River about four miles from St. Helens. Main Road between the port of St. Helens and Herrick the terminus of North-Eastern Railway, passes through the Western leases.

Areas

The Company holds leases of the following properties charted in the name of W. Lascelles:

9920 M	of	11 acres
9901 M		60 "
9919 M		60
10066 M		40
9900 M		40
9916 M		40
9923 M		40
9918 M		40
9917 M		35
10051 M		20
10035 M		40
		426 acres

In addition to these the Company holds an option over T. Berwick's 15 acre lot, and also certain water-rights on George River.

Geologic Relations

The basal rock around George Bay is Devonian granite except that lying to the south of the head of Medea's Cove where are the intruded slates and sandstones of Cambro-Ordovician age. Granite extends westward beyond Blue Tier and a longway northward. At Ryengana slates, sandstones and tuffs occupy the surface and extend toward Groome River where the line of granite contact is met again. These outcropping rock formations mark the boundaries of alluvial ground which in places has been proved to extend westward as a deep lead with numerous tributaries. The main line of alluvial ground (the old bed of George River) is known as Thureau's Deep lead and its outlines were closely defined by early investigators.

Thureau's Deep Lead was formed during the period between early and mid-Tertiary times as the result of the gradual subsidence of the land. River valleys formed prior to the subsidence were filled with the waste of the granite hills at a fairly rapid rate, and, this material not having been subjected to long continued sorting action of running water, is therefore comparatively poor in tin ore. It is thought however, that the gutter of the old Tertiary River is rich in tin ore, but no sustained attempt has been made to explore it by drilling. The gutter deposits would contain a considerable proportion of the tin ore shed from the wasting of the granite that once occupied the valley of the old Tertiary streams. A little tin ore is found in the upper layers of Tertiary sediments. This indicates that the older streams were tin carriers and confirms the idea of rich concentrations at their bases.

Land subsidence was interrupted by the eruption of basalt in mid-Tertiary time and the concomitant elevation of the land surface. New streams came into being and began to carve channels in the uncompacted Tertiary sediments close to the boundary edges of the old streams. This is accounted for by the fact that the porosity of the sediments did not allow of running water in the centre of the old valley, but at the sides only where the boundary granite rocks confined the water to particular courses.

Later streams, now non-existent, have laid down in channels out in the barren Tertiary sediments deposits of well-worn gravels fairly rich in tin ore. It is these younger gravels that this report deals with in particular.

Surficial Deposits

1. Overburden

The cover deposits vary in thickness from point to point, but do not vary greatly in nature and composition. A section fairly typical of the whole is that shown in No. 10 shaft on a lead coursing towards the workings of the old Royal Ruby Co. is as follows:-

3	3 feet	black soil and quartz sand (angular to sub-angular) with a little tin ore
7	4 feet	quartz drift sand and clayey material with very little tin ore.
13	6 feet	uncompacted quartz sand with a little tin ore.
13.25	0.25	band of quartz sand cemented with iron oxide
14.25	1 foot	decomposed waste of granitic rock (feldspar and quartz).
15.25	1 foot	coarse, well-worn, quartz gravel containing a high proportion of tin ore.

resting on granite waste, soft.

In Smith and Fenton's cut near the road the materials are similar, but close to surface a bed of quartz gravel (up to ¾" particles) is cemented with silica to a depth of three feet, and there is a rich upper bed of gravel and drift. The cemented material is firm and difficult of disintegration. The arenaceous clay bed near the surface of the deposit breaks up easily under pressure of water and presents no serious difficulty.

2. Gravel Beds

In one lead are two beds of quartz gravel rich in tin ore; in the other one bed only. The upper bed of gravel consists of well rounded pebbles of quartz, ¼" to 2" in diameter, set in well-assorted quartz drift, the proportion in bulk of the former to the latter being as 1 to 4. This bed varies in thickness from 6 inches to 24 inches. The lower or basal bed is the richer and consists almost wholly of well rounded quartz pebbles up to 3 inches in diameter which are closely set and packed loosely with quartz sand and tin ore. In association with the tin ore are pleonaste, zircon, sapphire, and ilmenite, with in places a little iron oxide.

3. Bed Rock

Although the wash from 2 to 15 feet thick extends over the greater part of the area the richest and deepest is confined to certain narrow channels up to 100 feet in width all of which lead towards the present channel of George River. The deepest beds lie as a rule close to the boundaries of the old Tertiary stream and therefore close to the granite valley sides, but the bottom wash rests upon granite waste laid down by the old streams. The bed-rock is very soft. In it tin ore penetrates to a depth of six inches. Where the ground is shallow the bed-rock is of soft porphyritic granite in which are veins of tin-bearing quartz greisen. These veins have shed the sub-angular grains of tin ore which form a portion of that found in the wash.

4. Ground Water

Except during the rainy times of the seasons the amount of ground water is inconsiderable. A little soakage water, enough to keep the alluvial ground from hardening.

5. The Grade of the Ore

The tin ore is of high grade and much of it is coarse in texture. Although several other minerals of fairly high specific gravity are associated with it, a separation can be made by ordinary sluicing methods. Ore from the Royal Ruby workings was concentrated by such means to 70 per cent grade.

6. The Tin Ore Content of the Ground

The Company, in order to prove the tin ore content of the ground and the applicability of the hydraulic sluicing methods to that class of material, sank 205 pits in the eastern part of the holdings. An area of 200 acres was tested in this manner and it was estimated by the Company's Engineer that 150 acres contained tin ore in profitable proportion, the average value (assuming tin at £270 per ton) being 1/3 per cubic yard.

The following record of the results of testing has been supplied by the Company. A large number of pits spaced at regular intervals were sunk through the deposits to bedrock by Peter Hodge, the prospector, and samples were taken by the process of channelling from top to bottom. The broken material was panned, the concentrated tin ore weighed and assayed, and the proportion of tin ore was calculated on the basis of 120 dishes per cubic yard.

This system of sampling and estimation of value cannot be regarded as accurate, but as a rough indication only. The results are given here for what they are worth. In confirmation of the indicated value however, numbers of dish prospects were taken by the prospector in the presence of the writer, and were panned and estimated. Apparently the record is an approximate index of the value.

Details of the tests are given in the subjoined tables:

LEASE 9918 M: 40 acres

No. of Pit	Depth of Pit in feet	Sampled to	Remarks.
1	2.5	2.5	The average value of the tin bearing wash within the boundaries of this lease is stated to be at the rate of 0.2lb of tin ore per cubic yard. It will be noted that the ground is generally very shallow and of no economic importance
2	2.5	2.5	
3	9.0	6.0	
4	11.0	8.0	
5	8.0	4.0	
6	2.0	2.0	
7	2.25	2.25	
8	2.30	2.0	
9	2.0	2.0	
10	2.5	2.5	
11	3.0	3.0	
12	3.0	3.0	
13	2.25	2.25	
14	2.0	2.0	
15	2.0	2.0	
16	2.3	2.3	

No. of Pit	Depth of Pit in feet	Sampled to
17	5.0	5.0
18	4.0	1.5
19	4.5	3.0
20	9.0	1.5
21	5.5	5.5
22	6.0	6.0
23	3.0	3.0
24	4.0	4.0
25	4.0	2.25

LEASE 10051 M : 20 ACRES

No. of Pit	Depth of Pit in ft.	Weight of Sample	Tin ore conc. per cubic yd.	Sample taken from
1	6.5	173 grs	2lb. 15 ozs.	top
1		2.5 ozs	20lb.	bottom
2	11.0	1oz.141gr	10lb.	top
2		6¾oz.	54lb.	bottom
3	10.0	28grs.	7.5oz	top to bottom
4		96 grs.	11b. 10 oz.	top
4	7.5	270 grs.	14lb. 9 oz.	bottom
5	5.5	32 grs.	8.5ozs.	top
5		86 grs.	11b. 8 oz.	bottom
6	6.0	70 grs.	11b.2.5oz.	top
6		1 oz.10grs.	81b. 4oz.	bottom
7	7.75	6 grs.	trace	top to bottom

The foregoing record is of little actual value. It certainly shows that there are rich sections of gravel, but it does not convey an idea of the average content of tin ore.

LEASE 9917 M : 35 acres

No. of Pit	Depth in Feet	Sampled to	Remarks.
1A	2.5	2.5	It is estimated by the Company's Engineer that in this area the deposit amounts to 96,800 cubic yds containing tin ore in the proportion of 1.16 lb. per cubic yard. The tin bearing ground is very shallow, and the cost of operation will, therefor be relatively high.
1	4.0	4.0	
2	2.0	2.0	
3	3.0	3.0	
4	2.5	2.5	
5	2.0	2.0	
6	2.0	2.0	
7	2.0	2.0	
8	3.0	3.0	
9	3.0	3.0	
10	7.0		
11	2.5	2.5	
12	2.5	2.5	
13	2.5	2.5	
14	5.0	5.0	
15	3.5	3.5	
16	2.25	2.25	
17	2.0	2.0	
18	2.0	2.0	

LEASE 9916 M : 40 acres

No. of Pit	Depth in Feet	Sampled to	Remarks
1	8.0		It is estimated by the Company that this area contains 121,000 cubic yards of an average value of. 0.93 lb. of tin ore per cubic yard.
2	3.0	3.0	
3	4.0	4.0	
4	4.5	4.5	
5	5.0	5.0	
6	3.0	3.0	
7	6.0	6.0	
8	4.5	4.5	
9	9.0	9.0	
10	4.0	4.0	Bottom section only sampled: Rich gravel.
11	6.25	6.25	
12	4.0	4.0	
13	3.0	3.0	
14	4.5	4.5	
15	4.5	4.5	
16	4.5	4.5	
17	5.0	5.0	

T. BERWICK'S LAND : 15 acres

2	2.5	2.5	
3	3.0	3.0	This ground is very shallow but could be worked cheaply because of the slope to the river.
4	2.5	2.5	
5	2.5	2.5	
6	3.0	3.0	
7	3.0	3.0	
8	3.0	3.0	
9	3.0	3.0	
10	3.0	3.0	

LEASE 9919 M : 60 acres

No. of Pit	Depth in feet	Sampled to	Remarks
1	3.75	3.75	The tin bearing wash is overlain with sandy clay and rests upon older but barren alluvium. The overburden although clayey disintegrates rapidly under pressure of water
2	3.3	3.3	
3	6.25	6.25	
4	6.0	6.0	
5	2.7	2.7	
6	2.7	2.7	
7	4.0	4.0	
8	3.0	3.0	
9	4.7	4.7	
10	5.5	5.5	
11	6.3	6.3	
12	4.5	4.5	
13	10.0	10.0	
14	8.75	8.75	
15	2.3	2.3	
16	2.5	2.5	
17	4.5	4.5	
18	4.6	4.6	
19	4.5	4.5	
20	6.5	6.5	
21	4.7	4.7	
22	7.6	7.6	
23	4.5	4.5	
24	3.0	3.0	

LEASE No. 10035M : 40 Acres

No.of Pit	Depth in ft.	Weight Sample	Tin ore conc. per cub. yd.	Sample from	Remarks
29	8.75	5½oz.	7.5 lbs.	Bottom 15" sectn.	Distributed over total depth
30	6.0	60 gr.	1.0 lb.	Top to bottom	
31		246 gr.		" "	
31		1.4 oz.		18" from bottom	
31	9.0	345 gr.	5.75 lb.	Top to Bottom	
32	8.6	28 grs.	7.5 oz.	" "	
33	4.7	66 grs.	1.2 lb.	" "	
34	4.0	17 grs.	4.5 oz.	" "	
35	2.0	11 grs.	3.0 oz.	" "	
36	7.5	45 "	12.5 oz	" "	
37	6.0	22 "	6.0 "	" "	
38	4.3	60 "	1.0 lb.	" "	
39	2.7	12 "	3.5 oz.	" "	
40	2.5	8 "	2.0 "	" "	
41	3.0	29 "	8.0 "	" "	
42	7.7	34 "	9.2 "	" "	
43	6.75	32 "	8.8 "	" "	
44	4.25	32 "	8.8 "	" "	
45	6.0	31 "	8.5 "	" "	
46	4.5	52 "	14.0 "	" "	
47	4.25	46 "	12.5 "	" "	
48	4.0	40 "	10.6 "	" "	
49	3.0	25 "	6.8 "	" "	
50	2.3	20 "	5.5 "	" "	
51	2.0	12 "	3.0 "	" "	
52	2.0	4 "	trace	" "	
53	4.0	66 "	1 lb 1½oz	" "	
54	2.75	30 "	8 ozs.	" "	
55	2.75	20 "	5½ "	" "	
56		29 "	7.5 "	" "	
57	3.75	11 "	3 "	" "	
58	4.0				No sample
59	4.0	22 "	8 oz.	Top sect.	
60	[illegible]	170 "	2 lb 14	Bottom	

7. The Distribution of the Tin Ore

Although the tin bearing wash extends over the greater part of the area under lease, the depth varies greatly and not in accordance with the topographic relief. For instance, the ground is shallower near George River than it is above the road 85 feet higher. Moreover, open workings and shafts clearly indicate two distinct leads about 15 feet in depth and about 100 feet in width. These leads contain the most important deposits. One is marked by No. 10 shaft, 15 feet deep, leading from Royal Ruby workings and at that point it is reported the average proportion of tin ore is 4 lb. per cubic yard. The bottom wash is very rich.

Another lead is exposed in Smith and Fenton's cut the continuation of which may be that exposed in a cut and shafts on lease 10035M where the materials are of similar nature and associations.

It may be recorded here that one Brannan drilled to 60 feet in Tertiary sediments from the bottom of Smith and Fenton's cut, but did not reach bottom. The old deep lead here is probably very deep - 120 feet?

Conditions affecting Mining

1. Topography

The area is one of gentle undulations lying at the western end of St. Helens Plain between low hills of granitic rocks.

It is drained by George River, which follows on the north side the edge of granite hills. The highest point is about 260 feet above sea-level.

2. Water supply

In connection with the working of this deposit the best plan to adopt is to arrange with the Pioneer Tin Mining Company for the use of their race and water rights. This race conducts water to their Argonaut Mine through the George River Company's higher ground, and therefore, would serve the whole area especially the lower parts. The conduit is carrying at present about 20 sluice-heads (24 cubic feet per minute per sluice head) but when running full 25 to 30 heads can be delivered.

No high level water supply is available, and no other gravitational scheme is worthy of consideration.

Mining

1. Preparation of Ground

The ground is covered with heath and rash, with occasional eucalyptus trees. The cost of clearing would be very low.

2. Excavating and Handling

The greater part of the wash can be broken and removed to George River by ground sluicing, the fall being 1 in 60 and the difference in level between the race and the river being 85 feet. As the lower ground is shallow and loosely compacted the whole of it can be broken and treated cheaply by hydraulic sluicing. For the higher ground the pressure of water available would be useless for treatment by hydraulicing. In order to deliver the water under pressure at the higher levels provision will be made for power.

If the Argonaut race is available the cost will not amount to much; if not water will be pumped from the river by means of a wood-gas generating plant or by electric power. Pumping from river level would be very costly and would involve a heavy initial outlay for either scheme. Machinery of 200 H.P. would be necessary. A hydro-electric scheme is available down George River capable of generating 145 H.P. The tin ore in the alluvial ground on these properties could not be separated and concentrated at a profit to the operators if it is necessary to pump water from the river: Neither scheme is worthy of consideration The only plan is to make arrangements with the Pioneer Tin Mining Company for the use of their Argonaut water-supply and by that agent ground sluice all the lower country first. If the estimates of the Company's engineer as regards tin ore content and cost of treatment of the ground are correct, then sufficient profit on earnings should accrue for the provision of the machinery required in the working of the ground at the higher levels.

3. Estimates of Yardage, Value & Costs

It is estimated by the Company's engineer that on 150 acres of land is 1,500,000 cubic yards of ground containing tin ore to the value of 1/3 per cubic yard. This it is stated can be treated at a cost of 6d. per cubic yard.

These estimates could not be verified in the time available for the examination by the writer.

Production of Tin ore from the area

It is not on record what amount of tin ore has been produced but the Royal Ruby Company sluiced over three acres of ground to a depth of 16 feet, and Fenton & Smith removed 10 to 15 feet of wash from two acres of ground.

No attempt has been made of late years to work these deposits owing to the lack of water, the whole available supplies having been secured by other Companies.

A. McIntosh Reid
DIRECTOR OF MINES

Mines Department,
Hobart.

14th December, 1927.