

Since the first inspection of the pyrite prospect at Branch Creek in October, 1953, several visits have been paid to the locality and two previous reports, (26.11.53 and 9.3.54) furnished. The first report, recommended that some costeening should be carried out and sites selected for this. As the result of samples taken from the two trenches, further recommendations were made. Firstly that a bulk sample should be broken from the trench and certain gravity and flotation tests carried out, to estimate possible recovery; and secondly that a planned diamond drilling campaign be commenced. Drilling began at this site on 7.12.54 and by 26.9.55, five holes had been completed and certain valuable data collected.

Before discussing the results of this drilling, it would be wise to quote from two previous reports. The 1953 report is a general description of the deposits and is quoted almost in full.

"...These outcrops occur within a few chains of the Seven Mile Beach Road at a Point three miles from the Frankford Highway. This road leaves the highway at the 16 mile peg from Devonport so that the distance from the deposits to the Devonport Wharf would be about 20 miles. A small arm of tidal water runs eastward from the East Arm of Port Sorell almost to the road at this point and it may be possible to construct a wharf for vessels of shallow draft within half a mile of the deposit.

The pyrite occurs in a series of well bedded slates and allied rocks which outcrop over a width of 1,600 feet across the strike, mainly in the creek bed. These rocks, which in places are intensely sheared, belong to the Carbine Group, that is they occupy a position somewhere between the top of the Pre-Cambrian and the base of the Cambrian; and they form part of the western leg of a large anticline in which there is a great thickness of Pre-Cambrian schists underlying this Carbine Group. At the immediate base of the slates, however, are some fairly narrow beds of grey-blue, very siliceous quartzites which may be seen outcropping to the east of the slates. These latter rocks then have a strike to the west of north averaging about 310° in this locality, although the general strike of the country rock is more nearly 330° . As they form the western limb of an anticline they usually dip to the west but minor folding is apparent and in one place along the creek the dip is easterly. The degree of metamorphism varies from place to place according to the composition of the beds and although narrow bands of, on the one hand schistose rock and, on the other of shaley rock, do occur, the general description of the rock is a black slate, containing much carbonaceous matter.

The first thing to make clear is that the pyrite is not the result of mineralisation but is an original constituent of the rock.

These black slates have been laid down in deep still water under extremely unaerobic conditions and the association of pyrite with this type of rock is very common. Indeed the black colour in this type of sediment is often partly due to the presence of very fine grained iron sulphides though in the main, of course, it is caused by carbonaceous matter.

As the pyrite occurs as a bedded deposit there should not be any doubts of the quantities of the parent rock available. On the other hand, because of its original nature, the percentage of pyrite in the individual beds will vary very much from place to place and careful sampling will be necessary to determine whether any part of the deposit is of economic value. Four samples were taken during the present examination, rather at random, but where the eye showed the most pyrite occurring. However, it is rather dangerous to go by the look of the sample as some of the pyrite is in such a finely divided condition as to be invisible. The results of this sampling showed that although the percentage of sulphur in the various samples differed enormously from place to place, there was sufficient sulphur present to warrant further intensive sampling.

The hill behind the creek rises fairly steeply and after a certain amount of clearing of soil etc. the slate could probably be mined by opencut methods.....

It is, therefore, recommended that the company concerned investigate these slates more carefully. Trenches should be cut to the north side of the creek until solid rock is encountered. The recommended position of these trenches is shown in red on the attached plan. They should be at right angles to the strike of the beds and approximately parallel to the creek bed and in length of the order of 150 feet.

When these trenches are cut, channel samples of the beds can be taken. "

The 1954 report is a description of, and the result of sampling the rocks exposed in the trenches. Relevant details may be quoted as follows:-

"..The Company have now cut one trench of 100 by 15 feet and commenced a second one. These trenches are on the north side of the Creek and have been cut approximately at right angles to the strike of the rocks.

The first trench is 25 feet from the creek and is cut for 101 feet on a bearing of 28° , the average strike of the rocks being 315° . at the north-eastern end of the trench, the over-burden of soil and creek alluvium is six feet, of which the bottom two feet consists of a heavy wash cemented by iron oxide into a solid material that required shooting. Twenty feet of the trench, at the south-western end, do not contain this cemented wash and the overburden is 4 feet of normal alluvium.

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The second trench is closer to the creek and the operators have difficulty in keeping out water. At the northern end is eight feet of overburden, mainly detrital material but cemented wash occurs overlying the slates at the southern end.

The rock types exposed in the trenches consist mainly of slates, but narrow beds of quartzites up to 2" in thickness occur here and there. Black slate is the commonest variety but grey slates do occur interbedded with the black. In general, the black has greater percentages of pyrite than the grey. Both varieties are very soft, almost clay-like in places, where exposed in the trench near the surface, although harder beds do occur. Small irregular seams and bunches of both calcite and quartz traverse the slates but rather infrequently. At 24 and 63 feet in the first trench are bands of a foot in thickness carrying much fine white clayey material.

	1	2	3	
Sample No.	From	To	Length	% S
1	0'	9'	9 feet	23.1
2	9'	18'	9	20.1
3	18' (excluding 24-26')	27'	7	11.4
4	27'	37'	10	14.5
5	37'	40'	3	0.8
6	40'	50'	10	20.7
7	50'	58'	8	22.8
8	61'	67'	6	13.9
9	67'	76'	9	2.4
10	76'	89'	13	0.2
11	89'	101'	12	10.8
12 x	0	14'	14	10.4
13 x	14'	28'	14 #	19.9

x Trench 2
Intermittent Sample.

An explanation of this table is as follows:-

Column 2 shows the horizontal length of the sample and, as the beds are very steeply dipping, it is not much greater than the actual width of the beds sampled. Samples 1 to 11 are from trench 1 and samples 12 and 13 from trench 2; measurements are from the southern end of trench 1 and the northern end of trench 2. Sample 13 is not a true channel sample as the slates were only exposed intermittently here."

The report then went on to recommend the breaking of a bulk sample from the trench for Laboratory Sampling and after this a drilling campaign.

The results of the laboratory investigations are the subject of a separate report by the Chief Chemist and Metallurgist. The results of drilling may now be discussed. Four holes were put down in the vicinity of the trenches to test the beds exposed in these at depth and along their strike and a fifth bore was drilled some distance from these beds. Samples were taken at approximately nine feet lengths. Unfortunately, the slates are very soft and do not core well. Those beds rich in pyrite (and low in silica) particularly did not yield much core. For this reason sludge samples, as well as core samples, were sometimes assayed.

Details:-

No. 1 Bore	Direction 230°	Inclination 50°
Footage	% Sulphur (In core)	% Sulphur (In Sludge)
0-7	(Surface Wash)	
7-16	22.1)	
16-25	11.4)	
25-34	12.9)	14.6
34-43	7.4)	
43-52	21.7)	
52-61	9.8)	
61-70	8.0)	
70-79	23.8)	
79-88	7.2)	
88-97	0.8)	
97-106	1.2)	
106-115	2.0)	10.0
115-124	0.7)	5.4
124-133		5.3
133-142	4.7)	6.9
142-151	5.3)	
151-160	5.7)	
160-169	3.3)	
169-178	1.5)	6.0
178-187		4.5
187-196		5.0
196-205		5.3
205-214		4.9
214-224		4.3
178-202	2.7	
202-204	3.7	

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No. 2A Bore	Direction 230°	Inclination 50°
Footage	% Sulphur (In Core)	% Sulphur (In Sludge)
0-22	Surface	
22-31		4.3
31-40		2.4
40-49		2.3
49-58		1.9
58-67		7.5
61-69	9.9	
67-76		10.6
76-81	15.3	
76-85		6.5
81-85	0.7	
85-94		2.5
85-92	0.3	
92-96	0.7	
94-103		1.8
96-101	0.5	
101-109	1.2	
103-112		3.5
109-119	6.5	
112-121		5.7
119-124	6.3	
121-130		8.6

No. 2A Bore	Direction 230°	Inclination 50°
Footage	% Sulphur (In Core)	% Sulphur (In Sludge)
124-133	9.9)	
130-139)	16.0
133-136	16.6)	
136-138	20.0)	
139-148) 15.3	14.0
148-157	11.2)	17.5
157-166	28.5)	18.4
166-175	11.7)	15.3
175-184	3.2)	3.1
184-193	0.8)	2.3
193-202	0.4)	1.6
202-211	12.9)	11.3
211-220	17.4)	16.4
220-229	19.3) 15	12.9
229-238	11.9)	10.2
238-247	13.2)	13.2
247-256	15.6)	12.4
256-265	0.6)	2.4
265-274	0.8)	1.9
274-283	3.9)	2.8
283-292	5.3)	4.4
292-301	4.2)	5.7

No. 3 Bore Direction 230° Inclination 45°

Footage	% Sulphur (In Core)	% Sulphur (In Sludge)
0-11	Surface Wash	
11-20		0.5
20-29		0.5
29-38		0.1
38-47	1.1	3.8
47-56	6.8	1.2
56-65	3.5	2.9
65-74	2.0	2.4
74-83	1.4	1.7
83-92	2.5	2.2
92-101	1.0	1.4
101-110	0.9	1.4
110-119	0.1	0.6
119-128	0.1	0.5
128-137	2.3	0.5
137-146	0.07	0.27
146-155	0.18	0.39
155-164	0.31	0.67
164-173	1.24	1.1
173-182	0.91	0.89
182-191	2.21	1.48
191-200	3.99	0.30
200-209	3.05	2.62
209-218	2.97	2.34
218-227	2.17	

No. 4 Bore Direction 35° Inclination 45°

Footage	% Sulphur (In Sludge)	
0-17	Surface Soil and Clay	
17-26	11.4) 12.5
26-35	9.5	
35-44	14.4	
44-53	10.7	
53-62	13.7	
62-71	15.2)
71-80	9.4	
80-89	5.0	
89-98	5.0	
98-107	3.4	
107-116	4.2	
116-125	3.0	
125-134	2.7	
134-143	3.3	
143-152	2.3	
152-161	3.5	
161-170	2.6	

No. 5 Bore	Direction 10°	Inclination 35°
Footage	% Sulphur (In Sludge)	
0-26	Surface Soil and Clay	
26-40	Decomposed Slate	
40-49	5.7	
49-58	10.9	
58-67	6.6	
67-76	6.3	
76-85	4.7	
85-94	10.5)	
94-103	12.8)	
103-112	13.1)	
112-121	18.8)	15
121-130	14.8)	
130-139	15.0)	
139-148	15.7)	
148-150	27.5)	

In the surface trench, contiguous slate beds with a width of 60 feet, showed 17.5% of Sulphur; above these 20 feet of slates were low in sulphur and above again 12 feet showed 10% Sulphur. The trench ended here, still in Sulphur values. No. 2 Trench showed about 15% of Sulphur over 28 feet but the samples taken in this trench were not in a continuous channel.

No. 2A Bore has proved that these values continue at depth. A glance at the attached plan and sections will show the relationship. The beds marked "A" exposed in the trench with a value of 17.5% were cut in the bore from 202 to 256 feet and here averaged 15%. The beds (B) in the north-eastern part of the trench were cut in the bore from 124 to 175 feet and averaged 15.3% Sulphur. Another lot of beds (C) from 61 to 81 feet in the bore averaged over 10% Sulphur. The beds (D) in No. 2 trench were apparently not intersected in the bore. Thus in this area with the aid of one bore and two trenches, four district beds of slate, averaging over 10% Sulphur, have been revealed. The widths of these beds are of the order of 50 feet, 50 feet, 20 feet and 25+ feet. Between the first two beds are 20 feet of low grade slates. The dip of the beds is 70° to the north-east.

No. 1 Bore has been placed to intersect the "A" beds, which were cut from 7 to 79 feet and averaged about 15% with a width of 60 feet. This bore is too far to the South-west to intersect any of the other beds. No. 4 Bore on the other hand has missed "A" and intersected either "B" or "C". From 17 (surface) to 71 feet the sulphur content averaged 12.5%, but samples were taken of sludge only and actual values may be higher. As this bore was sunk, in the same direction as the dip of the beds, the width of these latter proved is only 70 feet and the values occur only across 25 feet.

Bore No. 3 did not intersect any

beds containing more than 6.8% Sulphur although it crossed a width of beds of 200 feet.

In first report the opinion was expressed that the mineralisation of the black slates was syngenetic, that is, that the pyrite was original, and that therefore no great variation in sulphur content would be expected in individual beds (except of course where a facies change occurs). No evidence obtained since then has caused this opinion to change. It can be seen from the plan, however, that number 3 bore is so sited that if the normal strike of the beds were continued, at least one formation carrying over 10% Sulphur should have been encountered. It has been suggested that the strike has swung rapidly to the East. This may be so, as, during major folding, the incompetent weak slate beds would tend to be folded and distorted in all directions about the solid quartzite beds just to the East. However, the break is more likely caused by a fault which has thrown the higher value beds either to the east or west. The diminution in values in No. 3 Bore is not due to the lensing out of the Sulphur values to the north but rather to the fact that, due to structural factors, the beds containing over 10% Sulphur found in bores 1, 2A and 4 have not been intersected in bore 3.

Bore No. 5, situated in another part of the area, has proved beds 60+ feet in thickness containing 15% Sulphur. These values were first intersected at 85 feet in the bore; and at 150 feet, when the bore finished, the slates still carried plentiful pyrite. No lateral extent of these slates has been tested for sulphur content and it would appear that (if no faulting has occurred in between) the extension of these particular beds in Branch Creek have been eroded away at the surface.

No. 6 bore was only put down 47 feet and was still in decomposed slate and apparently not below the zone of oxidation.

No. 2 Bore was abandoned at 50 feet and No. 2A commenced close by.

RESERVES

For some time in Australia, some sort of standard nomenclature on ore reserves has been sought. It has been found, however, that there are nearly as many ways of classifying ore reserves as there are mines and such names as "probable", "inferred", "existing", "measured", reserves have overlapping meanings.

On the assumption that individual beds of slates in this locality contain amounts of pyrite of the same order, then the potential reserves of rock containing over 10% Sulphur are enormous. These slates do not outcrop freely on the surface and the few small outcrops in the area are of course oxidised at the surface

so that the only pyritic slates that can be seen naturally are in the Creek bed, where water prevents their oxidation. A sample taken from a small outcrop about half a mile south of the Creek, showed in analysis 25% of iron, suggesting that before oxidation the pyrite percentage must have been high.

Of these potential reserves then, those more or less proved by drilling are but a small fraction. In the vicinity of the trenches are three and possibly four beds containing more than 10% Sulphur and of from 20 to 60 feet in thickness. If the two larger beds were considered of merit for an open cut proposition, then the width of the cut would be of the order of 200 feet. In the centre of this cut would be 20 feet of low grade material and, as the dip of the beds is about 70°, on the hanging wall side there would be a certain amount of overburden, the thickness of which would increase with the depth of the cut. Suppose the cut were taken to 200 feet in depth and the length 400 feet which so far has been partly proved. A cut of these dimensions, assuming that "ore" was over 10% Sulphur and thus conditioning the width of the ore beds to 100 feet, would yield eight million cubic feet, or about three quarters of a million tons of ore. However, as has been pointed out, of the possible pyrite beds, this is only one segment that has been proved.

Sgd. Terence D. Hughes

ACTING CHIEF GEOLOGIST

Department of Mines,
HOBART

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