University of South Australia

Processing Roper Bar Iron Ore-Stage 2 (tabling)

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INTRODUCTION

The Ian Wark Research Institute was approached by Bob Howard of Western Desert Resources and Vic Absolon, Consultant, to conduct tabling tests on two samples of iron ore from the Roper Bar deposit in the Northern Territory. Following initial discussions held on April 14, 2010, a sample designated T 301 was received for grinding, desliming and processing on the Wilfley Table.

Initial tabling tests were conducted by the author in the presence of the clients on May 12, 2010, and the balance of the tabling tests on sample T 301 completed by the author on May 17, 2010. At the time of the client's visit, a second, higher iron grade sample of half drill cores was left at the Ian Wark Research Institute. These were crushed, blended and riffled according to the client's instructions, deslimed and tabled similarly to sample T 301. This sample was designated Sample 2. Tabling tests were conducted by the author on May 28 and 31, 2010. The samples were delivered to Amdel for assay on June 2, 2010.

The results for the tabling tests conducted on these two samples of iron ore are presented in this report. A photograph of the Wilfley Table used is given in Photograph 1.

Photograph 1: Wilfley Table used in processing Roper Bar iron ore samples

PREVIOUS TABLING TESTS CONDUCTED ON ROPER BAR IRON ORE

As requested with the client, the author obtained a number of references containing the results of previous tabling studies on Roper Bar iron ore. A report prepared by S.G. Salamy (1958) on behalf of the Broken Hill Proprietary Company Limited containing results obtained after reduction roasting, magnetic separation and jigging was also forwarded to the client for information.

The two reports giving details of tabling Roper Bar oolitic iron ores were written by Blaskett in 1957. These have also been sent to the client and will only be briefly summarised here.

Report number 1 (Report 535) by Blaskett (1957) gives details of five samples of oolitic iron ore tested using roll crushing to pass 14 mesh (1.18 mm), deslimed at 200 mesh (75 µm) and the sands separated into coarse and fine fractions which were tabled separately on the laboratory table. The separation on the table at this size was poor, with the main problem being fine intergrowths of quartz with the hematite. The hematite particles were rounded and porous, with the porosity making these particles act as though they had lower density, even if the pores were filled with water.

Table concentration on one sample was conducted after crushing to all passing 52 mesh (300 µm) and desliming, which gave a concentrate assaying 65% Fe at about 40% Fe recovery. This was seen as the best grade and recovery obtainable using tabling on a sample containing 54% iron in the feed.

Sink-float tests were also conducted on + 200 mesh (+ 75 µm) material showed that 98% of the iron had a density higher than 2.9. Magnetic separation tests showed that, whereas less than 10% of the iron in the two coarsest fractions was actually recovered as table concentrate, 80% was recovered as a magnetic concentrate of comparable assay. It must be remembered that magnetic separation was conducted using a Frantz Iso-dynamic Separator which allows for very closely controlled conditions at a very slow feed rate.

Report number 2 (Report 548) detailed the results obtained by tabling eight composite samples of Roper Bar iron ore. The tabling tests were conducted on deslimed sands by taking off a first concentrate and retabling the tailing. This was the procedure adopted in the current series of tabling tests. Assays of the table feed varied between 28 and 45% Fe. Size fractions were -1.18 + 0.425 mm, -0.425 + 0.212 mm and -212 + 0.063 mm. The overall results for tabling the coarsest and medium size fractions were very poor, with iron recovery closely related to feed assay. Liberation was also poor in these size fractions due to fine quartz associated with the hematite. Even at the finest size fraction (deslimed – 0.212 mm) recovery was also poor. The best results from the composite with the highest feed grade were a concentrate containing 60% Fe at 36% Fe recovery. The other comment was that it was not possible to produce a low iron grade tailing. Finer grinding gave no appreciable increase in iron recovery at similar grades. Sink-float tests showed that liberation was adequate to allow better

separations than those obtained by tabling involving research on the effect of table operating parameters on iron grades and recoveries.

EXPERIMENTAL PROCEDURE

The two samples were processed similarly. Sample T 301 was received as approximately 15 kg of material crushed to 0.5 mm. The target mesh of grind for tabling was all passing 150 µm. The bulk sample was riffled into 1 kg charges. One charge was ground using a smooth stainless steel mill with 15 stainless steel rods. Adelaide tap water (750 ml) gave a good pulp consistency for grinding and a 10 minute grind gave the correct size distribution (97% passing 150 µm).

The second sample (half drill core) was received in labelled bags. These were weighed and all except sample RBDD 010 crushed and blended to generate Sample 2 (see Table 1). The material was crushed using a laboratory jaw crusher, laboratory gyratory crusher and spring rolls crusher to all passing 2.36 mm. A 1 kg sample was rod milled for 15 minutes using the same mill as described above, which gave the correct sizing distribution (97% passing 150 µm).

Table 1: Details of Sample 2 weights

Sample	Interval (m)	Description	Weight (kg)
RBDD 010	47.9-48.71	Medium Si	5.3
RBDD 011	10-11	High Si	6.0
RBDD 011	16.47-17.65	High Si	9.1
RBDD 011	17.65-18.5	High Si	4.2
RBDD 011	18.5-19.45	High Si	5.6
RBDD 011	19.45-20.45	Medium Si	6.4
RBDD 011	26.45-27.65	Low Si	5.4
RBDD 011	27.65-28.37	Low Si	4.2
RBDD 011	28.37-29.4	Low Si	5.6
Total			51.8

The milled material was passed through a 50 mm diameter Mozley hydrocyclone at 50 psig (350 kPa) pressure to generate an underflow product for tabling and a slime overflow. The underflow was wet screened at 38 µm. The material retained on 38 µm was dry sized at 150, 106, 75 and 38 µm, and these size fractions were processed on the Wilfley table under moderate feed rates. The primary concentrate was kept aside and the primary tailing repassed across the table under the same settings as the primary separation to generate a secondary concentrate and secondary tailing. These samples were weighed, sampled if necessary, pulverised and sent to Amdel for assay.

RESULTS

Table 2: Sizing results for underflows from T 301 and Sample 2.

Size (µm)	T 301 weight (g)	T 301 weight (%)	Sample 2 weight (g)	Sample 2 weight (%)
+ 150	5.0	0.6	25.15	3.4
-150 + 106	109.9	13.7	82.3	11.1
-106 + 75	193.7	24.2	186.5	25.1
-75 + 38	191.2	23.9	154.8	20.8
-38	300.0	37.5	294.8	39.7
Total	799.8	99.9	743.55	100.1

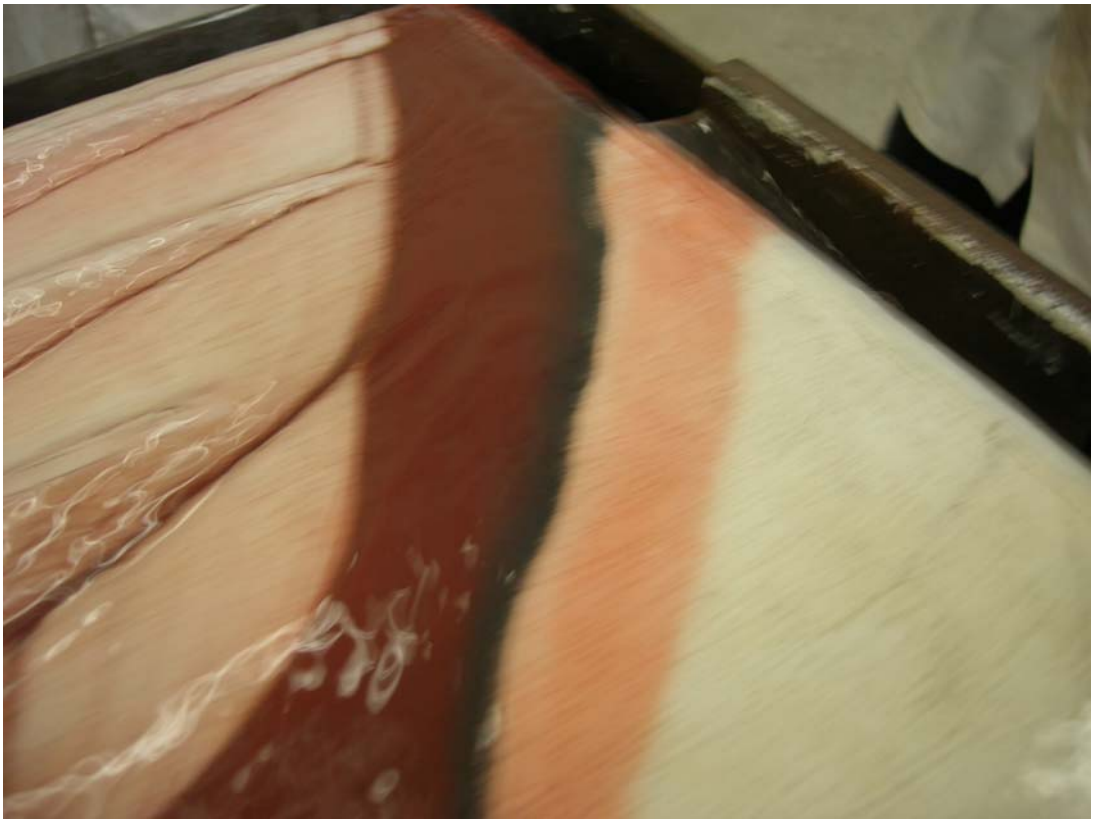
The assays and distributions for Fe, SiO_2 and LOI for tabling T 301 are given in Table 3. (Please note that the + 150 µm fraction was included with the – 150 + 106 µm fraction for the tabling test). The calculated underflow sample is reported in Table 4 and the calculated head sample in Table 5.

The assays and distributions for Fe, SiO_2 and LOI for tabling Sample 2 are given in Table 6. The calculated underflow sample is reported in Table 7 and the calculated head sample in Table 8. All assay results are given in the Appendix.

The Mozley cyclone overflow sizing distributions for the two samples are given as Figures 1 and 2. These were obtained using a Mastersizer 2000.

A number of photographs were taken during both tabling runs, and several examples are given below.

Photograph 2: Primary table concentration on -150 + 106 µm sample T 301.



Photograph 3: Tabling -38 µm sample T 301.

Photograph 4: Primary table concentration on -150 + 106 µm Sample 2

Photograph 5: Tabling -38 µm sample 2.

Table 3: Results for tabling sample T 301

Product	Wt. (g)	Wt. (%)	Assay (% Fe)	Dist. (% Fe)	Assay (% SiO_2)	Dist. (% SiO_2)	Assay (% LOI)	Dist. (% LOI)
-150 + 106 µm								
1 Con	13.0	15.1	53.58	23.9	3.64	1.9	14.6	13.1
2 Con	10.1	11.7	43.83	15.2	5.81	2.4	24.51	17.1
Tail	63.0	73.2	28.16	60.9	37.15	95.7	15.99	69.8
Total	86.1	100.0	33.85	100.0	28.4	100.0	16.78	100.0
-106 + 75 µm								
1 Con	18.21	19.4	60.52	31.6	2.58	2.0	8.2	9.7
2 Con	35.67	38.1	40.37	41.2	10.78	16.7	24.51	56.9
Tail	39.78	42.5	23.92	27.2	47.16	81.3	12.89	33.4
Total	93.66	100.0	37.3	100.0	24.64	100.0	16.4	100.0
-75 + 38 µm								
1 Con	8.41	12.1	62.73	19.1	2.14	1.2	5.13	3.8
2 Con	10.4	14.9	52.81	19.9	3.52	2.5	16.3	15.0
Tail	51.0	73.0	33.01	61.0	28.14	96.3	18.04	81.2
Total	69.81	100.0	39.54	100.0	21.34	100.0	16.23	100.0
- 38 µm								
1 Con	20.62	17.1	57.98	24.0	2.75	2.6	10.66	11.3
Tail	99.84	82.9	37.86	76.0	21.61	97.4	17.35	88.7
Total	120.46	100.0	41.3	100.0	18.38	100.0	16.2	100.0

Table 4: Calculated underflow sample for T 301

Size (µm)	Wt. (g)	Wt. (%)	Assay (% Fe)	Dist. (% Fe)	Assay (% SiO_2)	Dist. (% SiO_2)	Assay (% LOI)	Dist. (% LOI)
-150 + 106	114.9	14.4	33.85	12.5	28.4	18.5	17.68	15.4
-106 + 75	193.7	24.2	37.3	23.3	24.6	27.1	16.4	24.1
-75 + 38	191.2	23.9	39.54	24.3	21.3	23.1	16.23	23.6
-38	300	37.5	41.3	39.9	18.4	31.3	16.2	36.9
Total	799.8	100.0	38.84	100.0	22.0	100.0	16.47	100.0

Table 5: Calculated head for sample T 301

Product	Wt. (g)	Wt. (%)	Assay (% Fe)	Dist. (% Fe)	Assay (% SiO_2)	Dist. (% SiO_2)	Assay (% LOI)	Dist. (% LOI)
U/flow	794.8	85.4	38.84	81.0	22.0	91.5	16.47	93.6
O/flow	136.2	14.6	53.09	19.0	11.91	8.5	6.53	6.4
Total	931.0	100.0	40.92	100.0	20.5	100.0	15.0	100.0

Table 6: Results for tabling Sample 2

Product	Wt. (g)	Wt. (%)	Assay (% Fe)	Dist. (% Fe)	Assay (% SiO_2)	Dist. (% SiO_2)	Assay (% LOI)	Dist. (% LOI)
-150 + 106 µm								
1 Con	24.9	38.2	61.6	54.0	6.17	7.9	2.08	32.5
2 Con	18.4	28.2	49.24	31.9	20.86	19.8	2.99	34.5
Tail	21.9	33.6	18.33	14.1	64.06	72.3	2.40	33.0
Total	65.2	100.0	43.6	100.0	29.8	100.0	2.44	100.0
-106 + 75 µm								
1 Con	52.9	49.1	58.54	58.7	9.21	20.3	2.19	44.7
2 Con	32.9	30.6	54.22	33.7	13.9	19.1	2.94	37.4
Tail	21.9	20.3	18.26	7.6	66.32	60.6	2.12	17.9
Total	107.7	100.0	49.0	100.0	22.3	100.0	2.36	100.0
-75 + 38 µm								
1 Con	31.0	23.4	61.49	38.3	5.53	3.4	1.96	19.5
2 Con	21.8	16.5	54.38	23.8	14.58	6.2	3.01	21.0
Tail	79.7	60.1	23.61	37.9	58.09	90.4	2.33	59.5
Total	132.5	100.0	37.54	100.0	38.63	100.0	2.36	100.0
- 38 µm								
1 Con	10.0	15.3	58.91	22.5	9.3	4.2	2.59	15.5
Tail	55.3	84.7	36.66	77.5	38.3	95.8	2.55	84.5
Total	65.3	100.0	40.07	100.0	33.86	100.0	2.56	100.0

Table 7: Calculated underflow for Sample 2

Size (µm)	Wt. (g)	Wt. (%)	Assay (% Fe)	Dist. (% Fe)	Assay (% SiO_2)	Dist. (% SiO_2)	Assay (% LOI)	Dist. (% LOI)
+ 150	25.15	3.4	39.08	3.1	33.92	3.6	2.74	3.8
-150 + 106	82.3	11.1	43.58	11.4	29.8	10.5	2.44	10.9
-106 + 75	186.5	25.1	49.03	29.2	22.3	17.7	2.40	24.4
-75 + 38	154.8	20.8	37.54	18.6	38.6	25.5	2.36	19.9
-38	294.8	39.6	40.1	37.7	33.9	42.7	2.56	41.0
Total	743.55	100.0	42.16	100.0	31.5	100.0	2.47	100.0

Table 8: Calculated head for Sample 2.

Product	Wt. (g)	Wt. (%)	Assay (% Fe)	Dist. (% Fe)	Assay (% SiO_2)	Dist. (% SiO_2)	Assay (% LOI)	Dist. (% LOI)
U/flow	743.55	77.0	42.1	71.9	31.45	89.1	2.47	81.7
O/flow	222.3	23.0	55.16	28.1	12.83	10.9	1.85	18.3
Total	965.85	100.0	45.1	100.0	27.2	100.0	2.33	100.0

Using the data provided by the author, Vic Absolon verified the calculations. The minor differences are due to rounding off the data as calculated by the author, but the summary tables calculated by Vic Absolon and given in Tables 9 to 12 should be used for any design purposes. For simplicity, the + 150 µm material was included in the tabling results.

Table 9: Summary table for Sample T 301 underflow

Product	Wt Dist %	% Fe	% SiO_2	% LOI	Fe Dist %	SiO_2 Dist %	LOI Dist %
Con	16.18	58.97	2.71	9.49	24.56	1.99	9.39
Mid	14.47	43.83	8.41	22.59	16.33	5.52	19.99
Tails	69.35	33.10	29.40	16.66	59.11	92.49	70.63
Calc Head	100.00	38.84	22.05	16.36	100.00	100.00	100.00

Con +Mid	30.65	51.83	5.40	15.68	40.89	7.51	29.37

Table 10: Summary table for Sample T301 including slimes (overflow).

Product	Wt Dist %	% Fe	% SiO_2	% LOI	Fe Dist %	SiO_2 Dist %	LOI Dist %
Con	13.81	58.97	2.71	9.49	19.90	1.82	9.12
Mid	12.35	43.83	8.41	22.59	13.23	5.06	19.43
Tails	59.21	33.10	29.40	16.66	47.89	84.65	68.65
Slimes	14.63	53.09	11.91	2.74	18.98	8.47	2.79
Calc Head	100.00	40.93	20.56	14.36	100.00	100.00	100.00
Con +Mid	26.16	51.83	5.40	15.68	33.13	6.88	28.55

Table 11: Summary table for Sample 2 underflow

Product	Wt Dist %	% Fe	% SiO_2	% LOI	Fe Dist %	SiO_2 Dist %	LOI Dist %
Con	28.78	59.70	8.02	2.21	40.63	7.37	25.91
Mid	15.17	52.92	15.93	2.97	18.97	7.70	18.30
Tails	56.05	30.48	47.50	2.45	40.40	84.93	55.79
Calc Head	100.00	42.30	31.35	2.46	100.00	100.00	100.00
Con +Mid	43.95	57.36	10.75	2.47	59.60	15.07	44.21

Table 12: Summary table for Sample 2 including slimes (overflow).

Product	Wt Dist %	% Fe	% SiO_2	% LOI	Fe Dist %	SiO_2 Dist %	LOI Dist %
Con	22.16	59.70	8.02	2.21	29.23	6.56	21.15
Mid	11.68	52.92	15.93	2.97	13.65	6.86	14.94
Tails	43.15	30.48	47.50	2.45	29.07	75.67	45.55
Slimes	23.02	55.16	12.83	1.85	28.05	10.90	18.36
Calc Head	100.00	45.26	27.09	2.32	100.00	100.00	100.00
Con +Mid	33.83	57.36	10.75	2.47	42.88	13.43	36.09

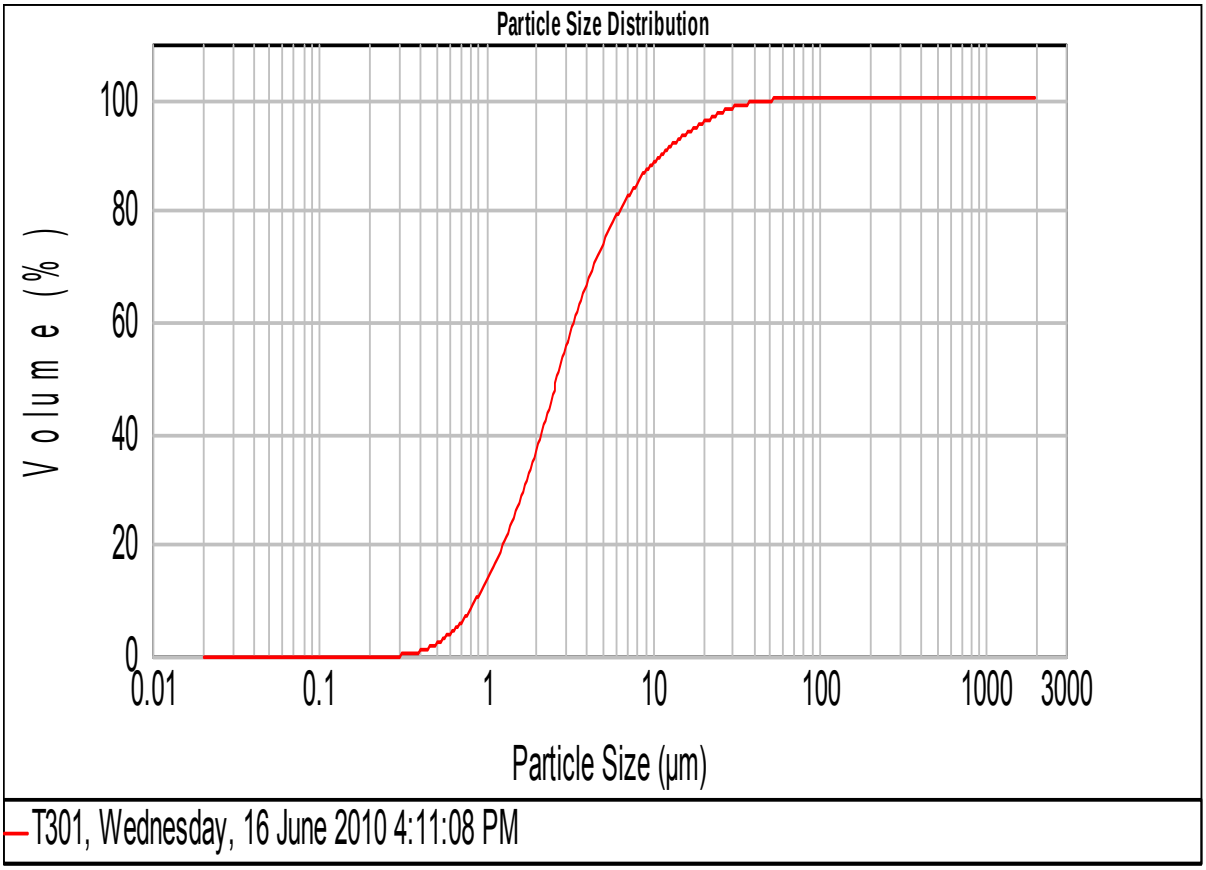


Figure 1: Mozley overflow sizing distribution for Sample T 301

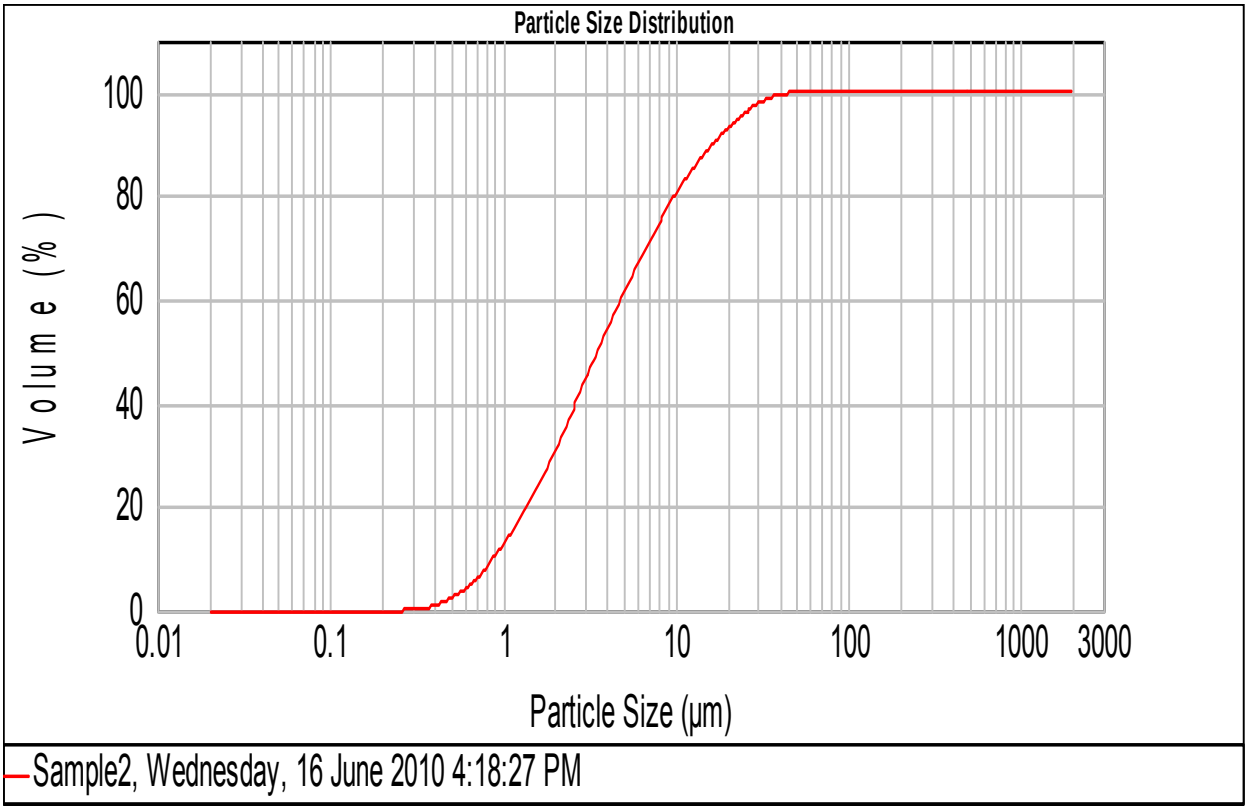


Figure 2: Mozley overflow sizing distribution for Sample 2.

DISCUSSION

From previous tabling tests conducted on Roper Bar iron ores, the liberation of the fine silica together with the porous nature of the hematite meant that the results were never as good as anticipated. Relatively high iron grades could be obtained but at the expense of iron recovery. As with any mineral processing operation, all tests will fall on grade-recovery curves, and the one-off tests conducted in the current series of tests are no exception. The current series of tabling tests followed the procedure described in the second report of Blaskett (1957) where a primary concentrate was removed followed by a scavenger concentrate generated by scavenging the primary tailing. Even so, Blaskett made the comment that it was not possible to produce a low-iron table tailing even though sink-float testing showed that liberation was adequate.

Both samples used in the current series of tests were milled and deslimed prior to tabling. Tabling tests were conducted on closely sized fractions of feed, as recommended by Wills (1992). Sample T 301 contained about 41% Fe and 20% SiO_2, similar to samples reported by Blaskett (1957). From Tables 3 to 5, the hematite grade increased as the particle size reduced, with the highest assay being the cyclone overflow at 53% Fe. This would suggest that the quartz, being harder, remained coarser than the hematite. As reported by Blaskett (1957), it was not possible to produce a low iron table tailing, with grades in the range 24 to 38% Fe. Primary concentrate grades were between 54 and 63% Fe, with the higher grades following the feed grades except for the finest fraction. The LOI values tend to follow the weight percent showing that it was not possible to produce a separate siderite concentrate. It must be remembered that gravity circuits normally have many intermediate product recycle streams which allow the production of a high grade concentrate and low grade tailing. The simulation of plant operation would need to use a pilot plant containing a large number of tables. From the overall summary shown in Tables 10 it has been possible to produce a combined concentrate assaying 51.8% Fe and 5.4% SiO_2 at overall recoveries of 33 % Fe and 7% SiO_2 from a feed assaying 41% Fe and 20.5% SiO_2. The LOI of the slimes was low (2.7%) and that of the combined concentrate much higher (15.7%) showing that the siderite tended to follow the table concentrate, especially the middling fraction.

The overall iron grade for Sample 2 was only 4% higher that T 301, since it contained a number of high Si core intervals (see Table1). According to drill core data supplied by the client, this sample should contain approximately 42 % Fe and 32% SiO_2. The calculated heads in Table 8 show 45% Fe and 27% SiO_2, similar to expected values. There is a puzzling pattern in the calculated iron assays for the size fractions. In this sample, the -106 + 75 µm fraction had a high calculated iron assay, and this was the dominant size fraction, which may have skewed the overall iron assay. This may be due to a change in cutter position during the scavenging stage since virtually no concentrate was being generated early in the run. The primary concentrates obtained with this sample were of higher iron grade and recovery than those obtained with sample T 301. The LOI values obtained in Sample 2 indicate that this sample does not contain much siderite. The results for tabling the – 38 µm fraction of the cyclone underflow

were similar for each sample, showing the difficulty of processing this material even on a table modified to handle fines.

A summary of the results of tabling Sample 2 is given in Tables 11 and 12. From Table 11 it has been possible to upgrade the Fe content from 45 % to 57% and reduce the SiO2 content from 27% to 10.75%. Recoveries (based on total feed) are Fe 42.9% and SiO2 13.4% for the combined con plus middlings product.

Comparing the current results with those of Blaskett (1957) in his first report for a similar head grade (44-45% Fe and 30% SiO_2) shows that where Blaskett obtained primary concentrate grades of 51% at 15% recovery and 58% at 31% recovery, it must be remembered that these were obtained at a coarse size (-1.18 mm). Crushing the feed finer gave a primary concentrate grade of 65% Fe at only 23% recovery. From the second report, the comparable composite is No. 8. Tabling the coarse sands gave a concentrate grade of 62.8% at 36% recovery. Tabling the medium sands gave a concentrate grade of 63% at 20.7% recovery. Tabling the fine sands gave a concentrate grade of 62.6% at 25.9% recovery, all values referring to iron. Overall, it was possible to produce a concentrate containing 45% Fe at almost 100% recovery, 50% Fe at 86% recovery, 55% Fe at 50% recovery and 60% Fe grade at 38% recovery. Although it is not possible to directly compare these data with those obtained in the current study, the findings are very similar (see Figure 3). It appears that the oolitic nature of the hematite prevents the production of a high grade concentrate at similar recoveries to those expected if the hematite was massive in habit.

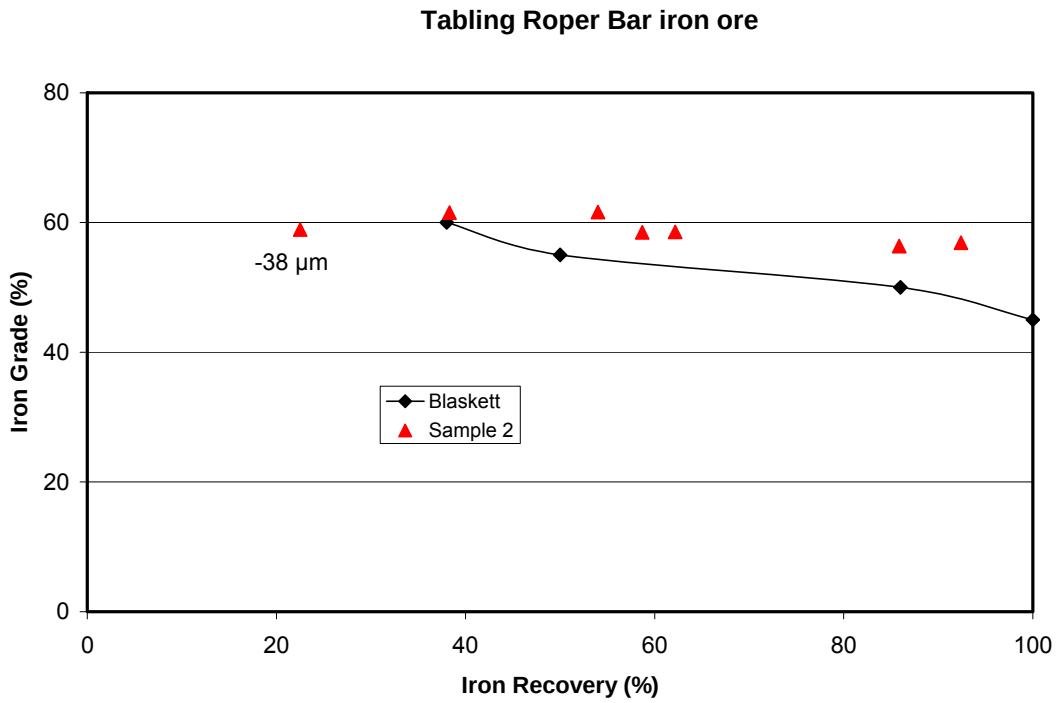


Figure 3: Comparison of results obtained on Sample 2 with those of Blaskett (1957).

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APPENDIX ASSAY RESULTS

Sample T 301

Sample	% Fe	% SiO_2	% Al_2O_3	% CaO	% S	% P_2O_5	% TiO_2
-150 + 106 µm							
1 Con	53.58	3.64	0.21	0.12	0.04	<0.01	<0.01
2 Con	43.83	5.81	0.37	0.21	0.03	<0.01	0.01
Tail	28.18	37.15	1.21	0.20	0.02	0.01	0.05
-106 + 75 µm							
1 Con	60.52	2.58	0.14	0.07	0.06	<0.01	0.01
2 Con	40.37	10.78	0.48	0.23	0.02	<0.01	0.02
Tail	23.92	47.16	1.09	0.19	0.02	0.01	0.06
-75 + 38 µm							
1 Con	62.73	2.14	0.11	0.04	0.08	<0.01	0.01
2 Con	52.81	3.52	0.22	0.13	0.06	<0.01	0.01
Tail	33.01	28.14	0.79	0.20	0.02	0.01	0.04
- 38 µm							
Con	57.98	2.75	0.28	0.10	0.10	0.01	0.03
Tail	37.86	21.61	1.10	0.22	0.04	0.02	0.05
Mozley O/flow	53.09	11.91	2.88	0.11	0.02	0.02	0.08

Sample	% Na_2O	% K_2O	% MgO	% MnO	LOI	%Zn
-150 + 106 µm						
1 Con	<0.01	<0.01	2.66	0.67	14.60	<0.01
2 Con	<0.01	<0.01	4.73	1.12	24.51	<0.01
Tail	0.06	0.05	3.46	0.68	15.99	<0.01
-106 + 75 µm						
1 Con	0.01	<0.01	1.38	0.38	8.20	<0.01
2 Con	0.02	<0.01	4.64	1.12	24.51	<0.01
Tail	0.07	0.05	2.72	0.54	12.89	<0.01
-75 + 38 µm						
1 Con	<0.01	<0.01	0.83	0.24	5.13	<0.01
2 Con	0.01	<0.01	2.98	0.75	16.30	<0.01
Tail	0.05	0.03	3.57	0.79	18.04	<0.01
- 38 µm						
Con	0.02	<0.01	2.01	0.50	10.66	<0.01
Tail	0.05	0.04	3.51	0.76	17.35	<0.01
Mozley O/flow	0.04	0.03	2.06	0.26	6.53	0.02

Sample 2

Sample	% Fe	% SiO_2	% Al_2O_3	% CaO	% S	% P_2O_5	% TiO_2
+ 150 µm	39.08	33.92	4.09	0.07	0.05	0.04	0.20
-150 + 106 µm							
1 Con	61.60	6.17	1.58	0.23	0.11	0.03	0.08
2 Con	49.24	20.86	2.94	0.17	0.03	0.04	0.15
Tail	18.33	64.06	5.10	0.05	0.02	0.04	0.23
-106 + 75 µm							
1 Con	58.54	9.21	1.71	0.09	0.15	0.04	0.09
2 Con	54.22	13.90	2.23	0.11	0.06	0.04	0.12
Tail	18.26	66.32	3.87	0.05	0.02	0.03	0.17
-75 + 38 µm							
1 Con	61.49	5.53	1.33	0.07	0.28	0.04	0.08
2 Con	54.38	14.58	2.11	0.11	0.10	0.05	0.21
Tail	23.61	58.09	3.29	0.06	0.03	0.04	0.15
- 38 µm							
Con	58.91	9.30	1.82	0.13	0.26	0.05	0.13
Tail	36.66	38.30	3.83	0.07	0.09	0.05	0.17
Mozley O/flow	55.16	12.83	3.59	0.07	0.05	0.05	0.13

Sample	% Na_2O	% K_2O	% MgO	% MnO	LOI	%Zn
+ 150 µm	<0.01	0.11	1.30	0.06	2.74	0.02
-150 + 106 µm						
1 Con	0.01	0.04	0.62	0.08	2.08	<0.01
2 Con	<0.01	0.08	1.27	0.09	2.99	0.03
Tail	<0.01	0.13	1.51	0.03	2.40	0.02
-106 + 75 µm						
1 Con	0.01	0.04	0.69	0.08	2.19	<0.01
2 Con	<0.01	0.05	1.08	0.10	2.94	0.02
Tail	<0.01	0.09	1.26	0.04	2.12	0.02
-75 + 38 µm						
1 Con	0.01	0.02	0.49	0.07	1.96	<0.01
2 Con	<0.01	0.05	1.05	0.11	3.01	0.03
Tail	<0.01	0.07	1.18	0.05	2.33	0.02
- 38 µm						
Con	0.03	0.04	0.69	0.09	2.59	0.02
Tail	<0.01	0.09	1.21	0.06	2.55	0.02
Mozley O/flow	0.03	0.09	0.87	0.04	1.85	0.03