FALCON CENTRIFUGAL CONCENTRATOR FOR GRAVITY UPGRADING OF TACONITE CONCENTRATE

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Introduction

The Falcon Centrifugal Concentrator, or Gravitational Concentrator, separates materials based on differentiation of specific gravity in the centrifugal field. The Falcon Concentrator has been successfully applied in recovering ultra-fine gold from tailings. Recent work on recovery of fine hematite in Quebec has shown limited success. This project was funded by the Permanent University Fund, Minnesota Technology Institute (MTI), and USX. The project was funded in two phases, first to study its feasibility; second to investigate its application in place of flotation process that could do away with flotation reagent. The first part of this report contains the initial operation data and analysis, and the second part was to report the tests on pre-classified material, which was parallel to the project of pre-classification of flotation feed, also funded by MTI.

As presented in Figure 1, Falcon Concentrator contains a rotor assembly which rotate up to 1800 rpm to create 300 G of force. The slurry fed through the tube to the bottom of the rotator where centrifugal force immediately separates solids and water. The solids are pinned to the cone wall forming a compact blanket. Because of the expanding configuration of the cone, the solids move progressively towards the large diameter and ultimately to discharge. During this upward and outward progression, the blanket of solids diminishes in thickness. Light particles are drawn into the pulp stream by the overlying layer of fast-moving water and pass out with the tailings. The heavy particles migrate underneath the layer will discharged by a pinch valve assembly at control interval. These setup allowed continues operation at through put of 30 LTPH with a C10 model.

Initial Testing and Understanding of Falcon Separator

A Falcon C10 model was installed at Coleraine Mineral Research Laboratory. The testing material was circulated in a loop with a 30-gallon tank, later switched to a 200-gallon tank. Several parameters were tested including feed slurry density and size consist, thickness of compacted blanket/bed, split of concentrate and tails, rotation speed/G force. From test results, it appears the feed slurry density in the range from 10% to 35% yields satisfactory separation results. Feed size consist appears to be the most dictating factor of the outcome. The coarser the particle size, the more effective is the separation. Tests were

conducted with "as is" flotation feed, 6" cyclone underflow, and 6" cyclone overflow of the "as is" flotation feed. Thickness of the bed should be controlled as thin as possible, however, it is easy to lose the compacted bed when it is thin. The split of concentrate and tails are controlled by timing of concentrate discharge pinch valve open and close. High frequency of open and close the pinch valve gives better control of split. Open and close timing usually at 0.5 ~ 1.5 and 1.5~3.0 seconds respectively. Discharge to concentrate over 50% by weight was the upper limit for achieving any meaningful separation. Rotation speed generally the higher the better for the separation however, higher the speed, more difficult to control the split.

Results and Discussion

Initial test was conducted on cleaner concentrate. As summarized in table 1, there were 10 sets of tests conducted to establish the testing parameters and effectiveness of Falcon Separator for upgrading the taconite. In this table, the column listed with %solids of concentrate provides the information indicating if a sustained run was established for the particular test. If the %solids are less than 70%, usually it indicates that there is no stabilized bed for the separation.

Test #1 and 2 had the impeller left out because of the operation difficulties of solids plugging the apex, however, without impeller, the slurry would not be brought up to speed before discharging and therefore no concentrate bed was formed during this tests. A rather steady run established during test #3 however it was discovered that a feed slurry density started at 35% solids drop to 21% solids, a large recirculating load tank is needed to establish a stable and sustained test.

Test #4 was the first run that achieved a solid bed with a sustained run over 30 minutes, however, the silica analysis indicated a down grade of the concentration of the feed material. By analyze the size fraction of each product, as presented in table 2 and 3, test #1 through test #3 since there is no bed formed on the bowl, the separation character is very much similar to what could happened in a cyclone. In test #4, as presented in detail in table 4, there is a significant amount of material reporting to the overflow and their silica concentrations were significantly higher than that reported to the concentrate. Despite the density separation effect existed, the upgrading the concentrate was not achieved; this was due to the weight of high-grade fine material reporting to the tails.

Test #5 and test #8 was to test if demagnetize or remagnetize of the feed material would change the ore characteristics and therefore change the behavior in Falcon separator. Other than a noticeable change in the flow characteristic such as lower slurry density in the concentrate, the separation efficiency and upgrading effect were essentially same. Detailed size analysis of the products is presented in table 5 and 8.

A noticeable change was recorded when 6-inch cyclone products were tested. In test #6 and test #7, the cyclone overflow were simply too fine for any stable test condition can be established. There is a significant upgrading on cyclone underflow where %solids on the concentrate reached 80%. It has been upgraded a percentage or so in silica. The results do not present significant merit for any commercial use, however, it opens an area worth looking into, that is if the feed material can be preclassified and then apply the Falcon concentrator to the cyclone underflow and treat the cyclone overflow with magnetic separator.

Test #9 and #10 were conducted to test more of the Falcon Separator parameters to see any of these changes could result any significant outcome. The changes include the size of the discharge ring, apex size, and rotation speed of the bowl. Detailed size analysis data are presented in table 9 and 10.

Comprehensive Testing on Falcon Concentrator

Falcon Concentrator tests were renewed after several improvements including a major change in the bowl profile, from a 10-degree angle to a 12-degree angle. This change allowed higher turnover ratio of the bed and resulted higher gradient for the density separation. First noticeable upgrading of taconite concentrate was recorded in test #11 after the installation of 12-degree angle bowl. When tested at 30 rpm rotating speed, the concentrate contained 3.80% silica, upgrading from 6.30% silica feed, however the recovery only achieved 15%. Higher bowl rotating appears to produce lower grade concentrate with high recovery. As presented in tables 11, the dominant upgrading came from the weight split, the higher the weight recovery, the lower concentrate grade it achieves.

Test #12 was conducted using different timing on the apex discharge to achieve approximately same weight split at different bowl speed. As presented in table 12, this set of testing indicated the optimal speed for testing with flotation feed was at 1000-rpm bowl speed creating 160 G force, where it produced a concentrate at 3.98% silica with 25% weight recovery. Higher bowl speed did not achieve a sustained run due to the difficulty of the controlling the apex. At 1400 rpm, it produces 300 G force that made the closing of the apex sluggish.

Test #13 was to test the effective weight split at 1000-rpm bowl speed. As presented in table 13, the concentrate can be upgraded higher with lower recovery; however, the level of recovery is generally not acceptable for any of the practical operation. Due to wide size distribution of the feed material and wide spread on the specific gravity of the middling particles, the intermediate band in the bed is wide and therefore, only small portion of the band is in high grade range. The thickness of the high-grade band in this condition is about 25% of the bed thickness as indicated in run #3. To limit the size and density effect on

the separation, pretreatment of the material is necessary to produce a reasonable split.

Test #14 was conducted using 10-inch cyclone underflow from which most of fine concentrate has been removed to its overflow. As presented in table 14, the upgrading is much more effective that it can produce 3.89% silica with 40% weight recovery. The thickness of high-grade concentrate band was widened since fines are removed. Higher bowl speed was also tested, however the operational difficulty still exists. When tests were conducted using cyclone overflow, since the separation bed is consisted with mostly coarse material, the recirculating loop set cause most of coarse fraction stayed on the bowl and could not achieve a meaningful balance data. Detailed data are presented in test #15.

Testing Falcon Separator in Stages

"As is" flot feed was pre-classified with a 10" cyclone to a coarse and a fine fraction and then treated separately with Falcon Concentrator and magnetic separator respectively. The concentrate and tails from the rougher stage can be reprocessed with Falcon Concentrator as cleaner and scavenger. A 50/50 split was produced on first stage with concentrate containing 4.00% SiO_2 and tails contain 12% SiO_2. Cleaner produced 3.50% SiO_2 and 6.50% SiO_2 tails from first stage concentrate, and scavenger produced 6.50% SiO_2 concentrate and 18.00% SiO_2 tails. Weight splits were all controlled around 50/50 split. The flowsheet can be designed as open circuit or closed circuit as presented in figures 2 and 3 respectively. With this circuit, a concentrate of 3.62% silica can be produced with 75.9% weight recovery. The tails from scavenger contained relatively high iron can be reground to liberate more iron from the middlings and reprocessed through the system.

Summary and Conclusions

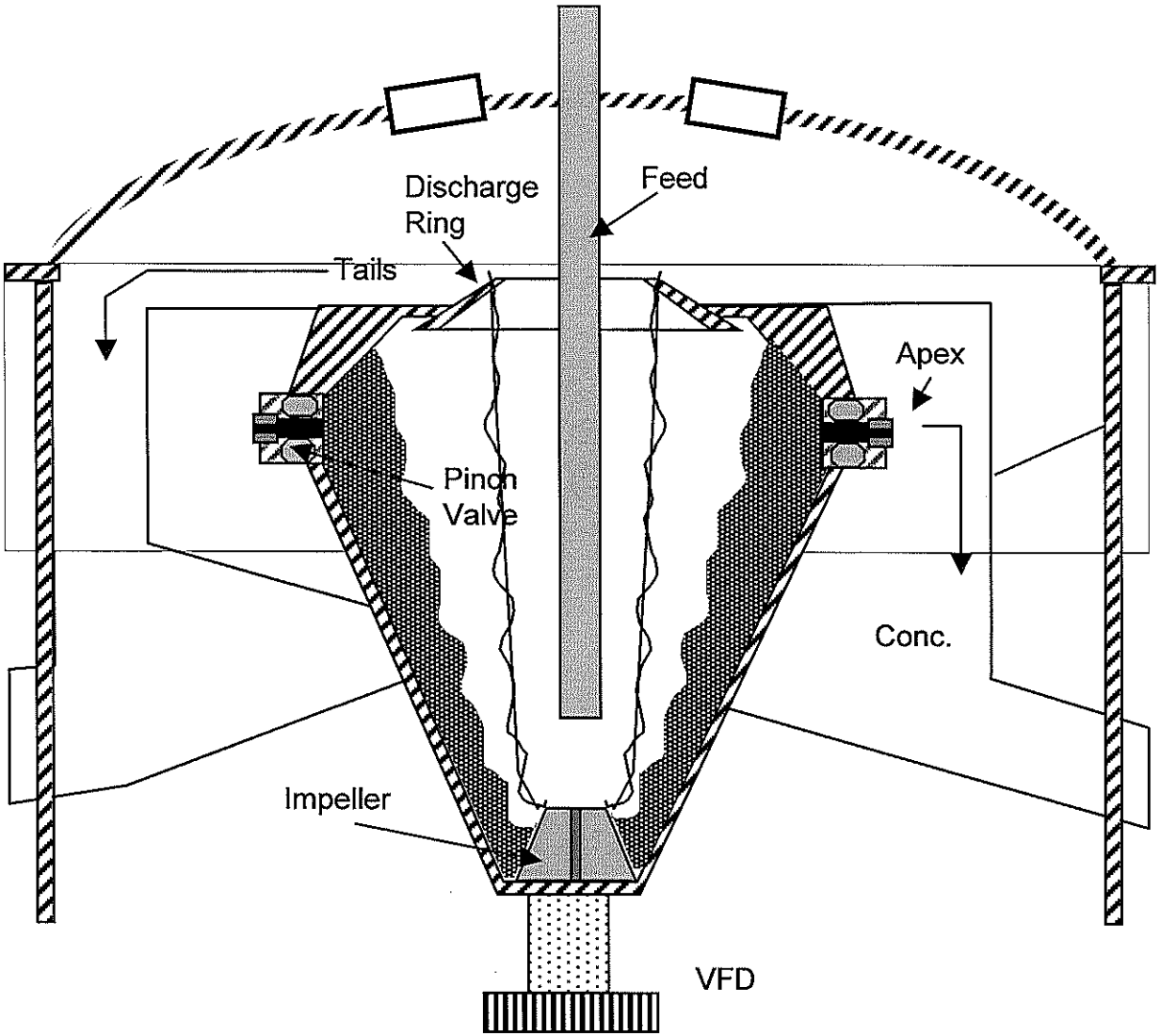
To apply Falcon Concentrator to taconite industry, it encounters the same problem facing other mineral processing technology such as cyclone, screen, and flotation that is the wide size distribution and wide range of specific gravities. No data can provide significant evidence that Falcon Concentrator can accomplish better separation than other devices. However, Falcon Concentrator uses no chemical reagents.

The bowl profile appears to be major factor of producing and upgrading the ore. With the 12-degree bowl, Falcon Concentrator could upgrade cyclone underflow to 3.5% at a modest recovery. Since the existing applications of the Falcon Concentrator were coal washing and gold scavenging that majority of the

material reports to the lighter part of the separation spectrum, operation in the concentrating the taconite is opposite. The bowl shape design, tail and concentrate discharge geometry have to be changed to suit for the industry.

When feed material was pre-classified, the treating the coarse fraction has shown promises of the application of the Falcon Concentrator. Use Falcon Concentrator in place of flotation could save the operational cost by eliminating the chemical reagents and may also have down stream benefit.

Although the data analysis and the flowsheet have presented a promising of application of Falcon Separator to the taconite industry, there are several obstacles for its implementation. The maintenance of machine presents the most challenge for the operators. If pinch valve and nozzle assembly once plugged, there were no easy way for cleaning up. There is no control system to determine the bed depth or if the bed is lost. 300 to 500G force presents a problem for the wear and tear for various points in the machine where changing of linings could be expensive. The machine can be scale to 500 TPH however the extend of scale up factor is yet unknown.



Schematic of Falcon Concentrator, The name of the component was used in the note.

Figure 1

Flowsheet of Falcon Concentrator Testing in Stages (Open Ciruit)

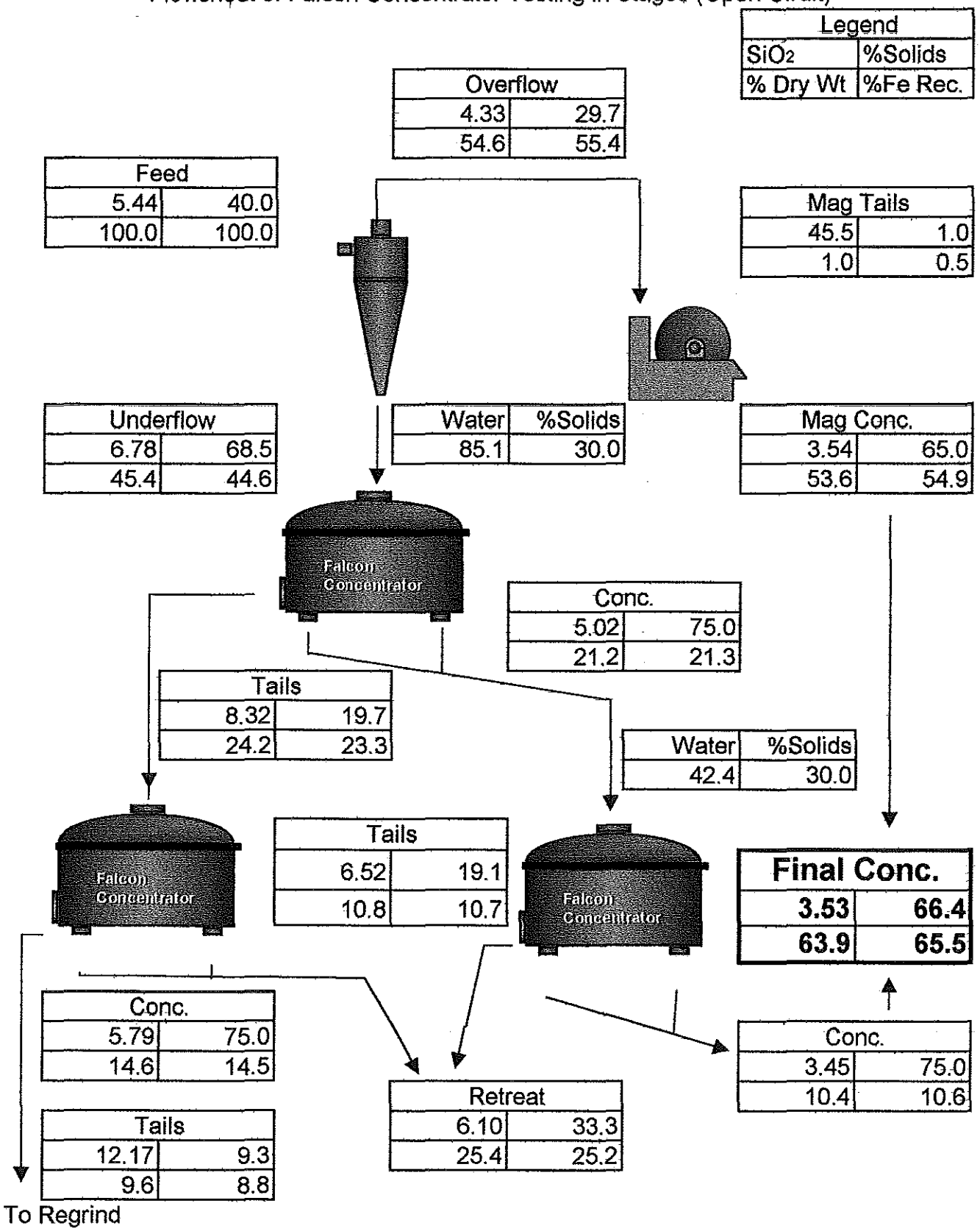


Figure 2

Flowsheet of Falcon Concentrator Testing in Stages (Closed Ciruit)

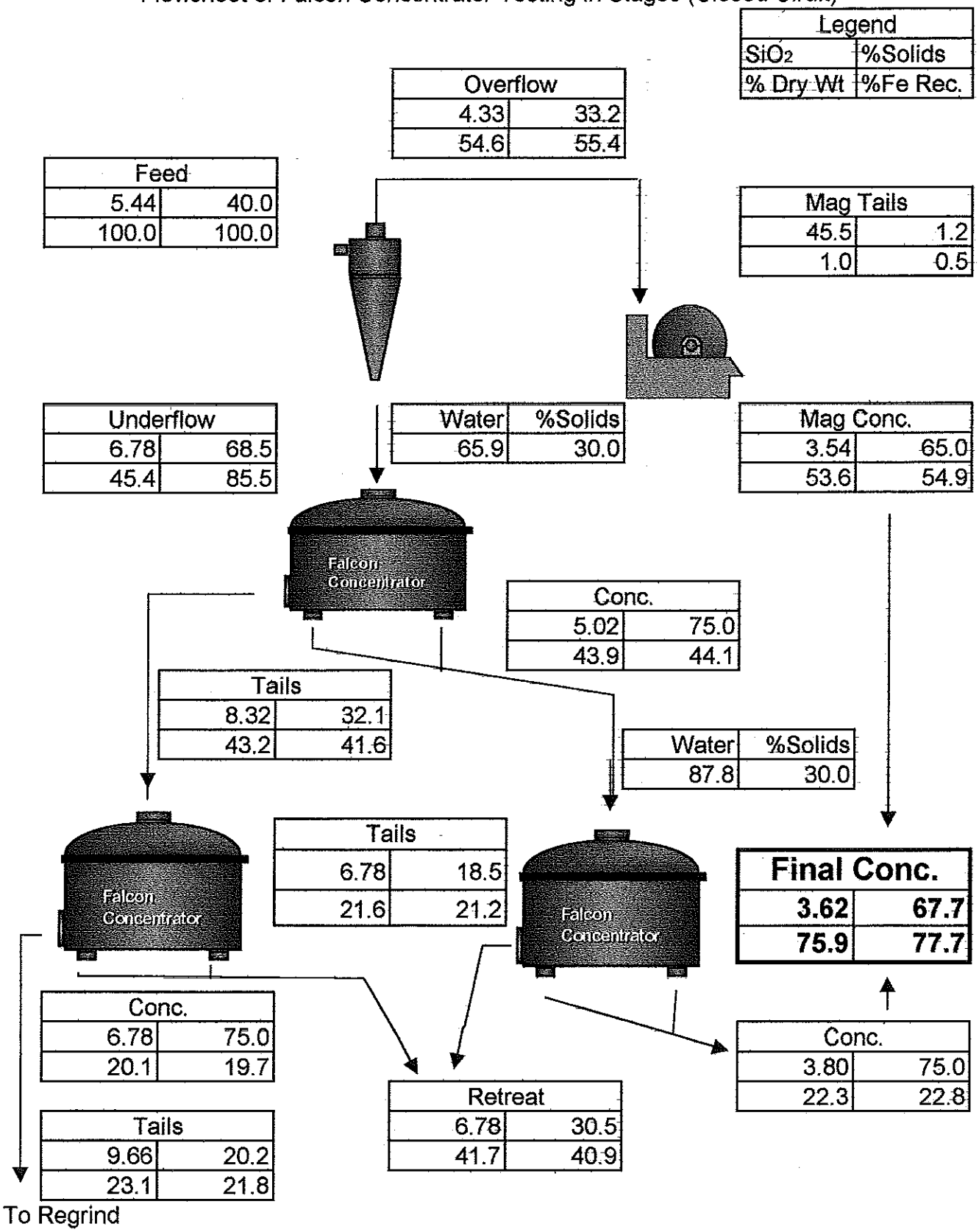


Figure 3

Summary of Initial Tests on Falcon Concentrator

		Operation Parameters								%Solids			Conc.	SiO2			
Date	No.	Open	Close	Speed	Rate	Apex	Rin	Iplr	Feed	Feed	Conc.	Tail	Rec.	Feed	Conc.	Tail	Remarks
		Sec.	Sec.	Hz	GPM	In.	In.						%Wt		%		
4/16/96	R1,#1	1.0	4.0	40	50	3/16	7	out	As is	17.5	40.1	8.4	66.0	5.49	6.17	5.75	30 gallon tank used for the recirculating load is too small. Test were switched to 200 gallon tank for recirculating.
4/18/96	R2,#1	1.0	4.0	40	50	3/16	6	out	As is	35.9	47.7	27.2	56.1	5.19	4.73	4.74	
4/23/96	R3,#1	0.2	4.0	40	50	3/16	6	in	As is	22.8	61.2	14.8	46.5	6.05	7.12	5.27	
	#2	0.2	4.0	40	50	3/16	6	in	As is	21.4	51.7	12.8	53.3	6.00	6.92	5.38	
5/1/96	R4,#1	0.2	4.0	40	50	3/16	6	in	As is	44.4	72.5	34.7	42.0	5.20	5.81	4.73	First run that achieved high solids
	#2	0.2	4.0	40	50	3/16	6	in	As is	43.5	72.0	37.1	30.1	5.34	6.04	5.04	sustained run after 30 minutes
5/6/96	R5,#1	0.2	4.0	40	50	3/16	6	in	Demag	52.7	72.0	44.2	41.7	5.38	5.59	5.18	Demagnetized feed
	#2	0.2	4.0	40	50	3/16	6	in	Demag	38.2	67.4	32.0	31.1	5.33	5.90	5.01	diluted sample
	#3	0.2	4.0	40	50	3/16	6	in	Demag	26.2	60.7	20.6	32.3	5.35	6.30	4.97	further diluted sample
5/24/96	R6,#1	0.4	4.0	40	60	3/16	6	in	Cyc O'F	17.4	38.5	8.4	66.2	4.85	4.68	4.20	6" hydrocyclone Overflow
	#2	0.2	4.0	40	30	3/16	6	in	Cyc O'F	16.7	61.4	11.3	39.6	4.18	4.87	4.78	lower feed rate
	#3	0.4	4.0	40	30	3/16	6	in	Cyc O'F	16.5	52.2	11.2	40.9	4.63	4.62	4.66	shorter apex opening time
5/29/96	R7,#1	0.1	4.0	40	50	3/16	6	in	Cyc Un'	22.5	78.7	9.3	66.5	9.38	9.19	12.70	Run after 20 minutes
	#2	0.1	4.0	40	50	3/16	6	in	Cyc Un'	20.0	79.5	5.2	79.2	9.12	8.16	11.60	Sustained Run after two hours
6/14/96	R8,#1	0.2	4.0	40	50	3/16	6	in	Mag	38.6	62.1	12.6	84.5	5.60	5.62	5.26	Magnetized right before feed
	#2	0.1	4.0	40	50	3/16	6	in	Mag	36.9	66.7	21.0	62.9	5.53	5.73	5.39	shorter opening time
	#3	0.2	4.0	40	50	3/16	6	in	Mag	24.6	70.4	17.1	40.5	5.43	6.13	5.12	diluted sample
6/25/96	R9,#1	0.2	4.0	40	50	3/16	5	in	As is	47.0	61.9	22.6	81.8	5.99	6.07	5.20	Use smaller tail discharge ring
	#2	0.1	4.0	40	50	3/16	5	in	As is	45.1	74.1	35.6	40.5	5.93	6.79	5.48	short opening time
	#3	0.2	4.0	40	50	3/16	5	in	As is	31.6	65.3	19.8	53.6	5.89	6.54	5.21	diluted sample
8/12/96	10,#1	0.1	4.0	50	35	5/32	7	in	As is	7.1	16.0	5.2	38.8	5.86	6.13	5.76	Use larger tail discharge ring, 50 Hz
	#2	0.4	4.0	40	35	5/32	7	in	As is	6.7	36.6	4.96	30.5	6.04	6.60	5.98	Use larger tail discharge ring, 40 Hz
	#3	open	-	30	35	5/32	7	in	As is	5.9	24.5	4.11	36.9	5.85	6.27	5.56	Use larger tail discharge ring, 30 Hz

Open, Close - conc. discharge timing; Speed - VFD frequency; Rate - slurry feed rate; Apex - conc. discharge apex size; Ri - tails discharge ring size

Iplr - Impeller at the bottom of the bowl; Feed Condition - Feed type; Rec. - Weight Recovery to Concentrate;

Table 1

Felcon Concentrator Test #1

Initiation Test

	Raw Data			%Wt		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	1.0	2.5	0.4	0.27	0.62	0.15
200	6.2	12.0	2.9	1.66	3.00	1.05
270	21.6	38.3	8.4	5.77	9.57	3.05
325	23.1	36.6	7.6	6.17	9.15	2.76
400	11.8	9.9	4.1	3.15	2.47	1.49
500	55.0	72.4	18.0	14.69	18.10	6.55
-500	255.7	228.4	233.6	68.30	57.09	84.95
Total	374.4	400.1	275.0	100.0	100.0	100.0

	Fe			SiO2		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	27.6	29.6	27.1	53.26	51.84	53.13
200	40.7	43.1	40.2	38.15	34.98	41.97
270	56.7	56.1	55.0	17.14	17.40	19.65
325	64.3	64.3	62.8	7.67	8.58	10.01
400	66.2	65.6	64.5	7.31	6.85	8.48
500	68.4	67.7	66.9	4.40	4.75	5.93
-500	68.1	69.3	66.8	3.67	2.98	4.77
Total	66.6	66.2	66.0	5.62	6.55	5.96

	Fe Distribution			SiO2 Distribution		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	0.11	0.28	0.06	2.53	4.94	1.30
200	1.01	1.95	0.64	11.24	16.01	7.42
270	4.91	8.12	2.55	17.60	25.41	10.07
325	5.95	8.89	2.63	8.42	11.98	4.64
400	3.13	2.45	1.46	4.10	2.59	2.12
500	15.08	18.52	6.64	11.50	13.12	6.51
-500	69.80	59.79	86.02	44.60	25.96	67.95
	100.0	100.0	100.0	100.0	100.0	100.0

Table 2

Felcon Concentrator Test #3

Run With As is Feed (In the 30 Gallon Sample that sample may deteriated)

	Raw Data			%Wt		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	1.4	2.7	0.4	0.35	0.68	0.10
200	7.6	14.7	2.5	1.91	3.70	0.63
270	21.0	43.8	6.4	5.28	11.04	1.62
325	19.0	39.9	5.2	4.77	10.06	1.31
400	5.3	9.2	1.9	1.33	2.32	0.48
500	1.9	3.1	0.4	0.48	0.78	0.10
-500	341.8	283.4	379.2	85.88	71.42	95.76
Total	398.0	396.8	396.0	100.0	100.0	100.0

	Fe			SiO2		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	25.0	25.7	24.2	55.05	55.68	56.59
200	36.8	37.5	30.3	40.97	39.00	47.83
270	52.4	52.8	42.1	21.05	18.25	32.06
325	62.0	63.6	54.8	10.65	8.65	18.79
400	64.4	65.9	58.9	8.07	6.65	14.09
500	65.8	66.9	59.4	6.35	5.40	11.78
-500	68.3	69.1	67.8	3.81	3.05	4.32
Total	66.3	65.2	66.9	6.00	7.08	5.34

	Fe Distribution			SiO2 Distribution		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	0.13	0.27	0.04	3.22	5.35	1.07
200	1.06	2.13	0.29	13.03	20.40	5.65
270	4.17	8.94	1.02	18.50	28.44	9.70
325	4.46	9.81	1.08	8.47	12.28	4.62
400	1.29	2.34	0.42	1.79	2.18	1.27
500	0.47	0.80	0.09	0.50	0.60	0.22
-500	88.41	75.70	97.07	54.49	30.76	77.46
	100.0	100.0	100.0	100.0	100.0	100.0

Table 3

Felcon Concentrator Test #4

Run #1 With As is Feed

	Raw Data			%Wt		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	1.3	2.7	0.0	0.33	0.70	0.00
200	7.2	13.4	3.5	1.83	3.45	0.89
270	31.6	57.7	12.6	8.05	14.87	3.21
400	40.6	62.2	22.2	10.34	16.03	5.65
500	72.0	94.1	47.2	18.34	24.25	12.02
-500	239.8	157.9	307.3	61.10	40.70	78.23
Total	392.5	388.0	392.8	100.0	100.0	100.0

	Fe			SiO2		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	32.2	34.1	0.0	47.43	42.74	0.00
200	40.2	43.1	33.5	35.80	31.06	43.71
270	56.9	59.3	52.1	16.17	13.25	22.35
400	65.8	66.9	63.1	6.96	5.44	9.65
500	68.5	69.3	67.4	3.88	3.04	5.07
-500	69.3	69.9	69.0	2.97	2.33	3.25
Total	67.1	66.5	67.6	5.36	5.90	4.80

	Fe Distribution			SiO2 Distribution		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	0.16	0.36	0.00	2.93	5.04	0.00
200	1.10	2.24	0.44	12.25	18.19	8.11
270	6.82	13.26	2.47	24.28	33.41	14.92
400	10.14	16.12	5.27	13.43	14.79	11.35
500	18.72	25.27	11.98	13.27	12.50	12.68
-500	63.06	42.76	79.83	33.84	16.08	52.93
	100.0	100.0	100.0	100.0	100.0	100.0

Table 4

Test 4, #2 Run With As is Feed

	Raw Data			%Wt		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	1.4	2.8	0.0	0.35	0.71	0.00
200	7.3	13.8	5.3	1.81	3.49	1.34
270	30.1	60.9	18.3	7.48	15.41	4.62
400	41.9	63.1	27.5	10.41	15.97	6.94
500	73.4	104.6	55.8	18.23	26.47	14.09
-500	248.5	150.0	289.2	61.72	37.96	73.01
Total	402.6	395.2	396.1	100.0	100.0	100.0

	Fe			SiO2		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	32.5	35.0	0.0	44.87	42.66	0.00
200	39.7	42.5	37.0	34.51	31.86	38.98
270	56.6	59.0	53.9	16.25	13.13	19.49
400	65.4	66.8	63.9	7.00	5.43	8.75
500	68.5	69.5	67.8	3.86	3.02	4.59
-500	69.3	70.2	69.1	2.92	2.28	3.11
Total	67.1	66.5	67.4	5.23	5.97	4.95

	Fe Distribution			SiO2 Distribution		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	0.17	0.37	0.00	2.98	5.06	0.00
200	1.07	2.23	0.73	11.96	18.64	10.54
270	6.00	10.67	6.69	20.00	30.89	16.00
400	10.14	16.03	6.58	13.93	14.52	12.28
500	18.60	27.65	14.17	13.45	13.39	13.07
-500	63.72	40.05	74.83	34.45	14.50	45.90
	100.0	100.0	100.0	100.0	100.0	100.0

Table 4, cont.

Felcon Concentrator Test #5

Run #1 With Demagnetized Feed

	Raw Data			%Wt		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	1.3	2.9	1.0	0.33	0.70	0.25
200	9.0	15.1	7.3	2.29	3.62	1.84
270	27.0	49.8	21.4	6.87	11.94	5.40
400	31.0	53.0	26.4	7.89	12.70	6.66
500	76.4	115.5	67.8	19.45	27.68	17.10
-500	248.1	180.9	272.5	63.16	43.36	68.74
Total	392.8	417.2	396.4	100.0	100.0	100.0

	Fe			SiO2		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	29.3	31.4	27.4	50.22	46.58	51.96
200	41.6	44.9	39.4	33.75	29.13	35.95
270	50.2	60.0	56.7	16.66	10.60	10.00
400	65.4	66.9	64.3	7.28	5.75	8.31
500	68.5	69.3	68.4	4.16	3.22	4.39
-500	69.4	70.0	69.4	2.98	2.43	3.08
Total	67.3	67.0	67.5	5.27	5.55	5.15

	Fe Distribution			SiO2 Distribution		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	0.14	0.33	0.10	3.16	5.84	2.55
200	1.42	2.42	1.08	14.68	19.01	12.86
270	5.84	10.68	4.46	20.14	26.91	18.15
400	7.67	12.68	6.35	10.91	13.17	10.75
500	19.80	28.62	17.33	15.37	16.07	14.58
-500	65.13	45.27	70.69	35.74	19.00	41.12
	100.0	100.0	100.0	100.0	100.0	100.0

Table 5

Run #2 With Demagnetized Feed

	Raw Data			%Wt		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	1.4	2.8	0.0	0.35	0.71	0.00
200	7.3	13.8	5.3	1.81	3.49	1.34
270	30.1	60.9	18.3	7.48	15.41	4.62
325	0.0	0.0	0.0	0.00	0.00	0.00
400	41.9	63.1	27.5	10.41	15.97	6.94
500	73.4	104.6	55.8	18.23	26.47	14.09
-500	248.5	150.0	289.2	61.72	37.96	73.01
Total	402.6	395.2	396.1	100.0	100.0	100.0

	Fe			SiO2		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	32.5	35.0	0.0	44.87	42.66	0.00
200	39.7	42.5	37.0	34.51	31.86	38.98
270	56.6	59.0	53.9	16.25	13.13	19.49
325	0.0	0.0	0.0	0.00	0.00	0.00
400	65.4	66.8	63.9	7.00	5.43	8.75
500	68.5	69.5	67.8	3.86	3.02	4.59
-500	69.3	70.2	69.1	2.92	2.28	3.11
Total	67.1	66.5	67.4	5.23	5.97	4.95

	Fe Distribution			SiO2 Distribution		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	0.17	0.37	0.00	2.98	5.06	0.00
200	1.07	2.23	0.73	11.96	18.64	10.54
270	6.30	13.67	3.69	23.22	33.89	18.20
325	0.00	0.00	0.00	0.00	0.00	0.00
400	10.14	16.03	6.58	13.93	14.52	12.28
500	18.60	27.65	14.17	13.45	13.39	13.07
-500	63.72	40.05	74.83	34.45	14.50	45.90
	100.0	100.0	100.0	100.0	100.0	100.0

Table 5, cont.

Felcon Concentrator Test #6

Run #1 With Cyclone Overflow

	Raw Data			%Wt		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	0.0	0.0	0.0	0.00	0.00	0.00
200	0.6	1.0	0.0	0.15	0.25	0.00
270	3.1	4.2	0.0	0.78	1.06	0.00
400	5.2	7.6	0.0	1.31	1.91	0.00
500	13.1	21.7	0.1	3.30	5.46	0.03
-500	375.1	362.8	277.4	94.46	91.32	99.96
Total	397.1	397.3	277.5	100.0	100.0	100.0

	Fe			SiO2		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	0.0	0.0	0.0	0.00	0.00	0.00
200	31.5	27.9	0.0	45.49	49.55	0.00
270	41.7	36.8	0.0	33.97	39.50	0.00
400	48.8	47.4	0.0	25.95	27.54	0.00
500	56.7	56.5	0.0	17.04	17.26	0.00
-500	68.4	69.2	68.1	3.83	2.92	4.17
Total	67.5	67.6	68.1	4.85	4.68	4.20

	Fe Distribution			SiO2 Distribution		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	0.00	0.00	0.00	0.00	0.00	0.00
200	0.07	0.10	0.00	1.42	2.66	0.00
270	0.48	0.58	0.00	5.47	8.92	0.00
400	0.95	1.34	0.00	7.01	11.25	0.00
500	2.77	4.56	0.00	11.59	20.14	0.00
-500	95.73	93.42	100.00	74.52	57.02	100.00
	100.0	100.0	100.0	100.0	100.0	100.0

Table 6

Test 6, Run #2 With Cyclone Overflow

	Raw Data			%Wt		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	0.0	0.0	0.0	0.00	0.00	0.00
200	0.0	1.2	0.0	0.00	0.30	0.00
270	3.3	6.1	0.0	0.83	1.54	0.00
400	1.8	4.0	0.0	0.45	1.01	0.00
500	12.4	30.2	3.1	3.12	7.62	0.78
-500	376.9	347.9	394.0	94.87	87.81	99.22
Total	397.3	396.2	397.1	100.0	100.0	100.0

	Fe			SiO2		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	0.0	0.0	0.0	0.00	0.00	0.00
200	0.0	29.3	0.0	0.00	47.97	0.00
270	38.1	39.5	0.0	38.04	36.45	0.00
400	49.0	49.0	0.0	25.73	25.73	0.00
500	56.1	57.2	49.4	17.71	16.47	25.28
-500	69.0	69.6	67.7	3.15	2.47	4.62
Total	68.1	67.5	67.6	4.18	4.87	4.78

	Fe Distribution			SiO2 Distribution		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	0.00	0.00	0.00	0.00	0.00	0.00
200	0.00	0.13	0.00	0.00	2.98	0.00
270	0.46	0.90	0.00	7.56	11.51	0.00
400	0.33	0.73	0.00	2.79	5.33	0.00
500	2.57	6.46	0.57	13.23	25.76	4.13
-500	96.14	90.58	99.43	71.46	44.52	95.87
	100.0	100.0	100.0	100.0	100.0	100.0

Table 6, cont.

Test 6, Run #3 With Cyclone Overflow

	Raw Data			%Wt		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	0.0	0.0	0.0	0.00	0.00	0.00
200	0.4	1.2	0.0	0.10	0.30	0.00
270	2.6	5.9	0.0	0.66	1.48	0.00
325	2.9	6.3	0.0	0.73	1.58	0.00
400	1.5	3.7	0.0	0.38	0.93	0.00
500	11.7	27.3	3.3	2.95	6.87	0.83
-500	377.5	353.2	393.9	95.18	88.83	99.17
Total	396.6	397.6	397.2	100.0	100.0	100.0

	Fe			SiO2		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	0.0	0.0	0.0	0.00	0.00	0.00
200	31.2	29.3	0.0	45.83	47.97	0.00
270	39.6	39.6	0.0	36.34	36.34	0.00
325	46.7	46.7	0.0	28.33	28.33	0.00
400	49.4	48.9	0.0	25.28	25.84	0.00
500	56.4	57.0	51.2	17.37	16.70	23.25
-500	68.5	69.7	67.8	3.71	2.36	4.50
Total	67.7	67.7	67.7	4.63	4.62	4.66

	Fe Distribution			SiO2 Distribution		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	0.00	0.00	0.00	0.00	0.00	0.00
200	0.05	0.13	0.00	1.00	3.14	0.00
270	0.38	0.87	0.00	5.14	11.68	0.00
325	0.50	1.09	0.00	4.47	9.73	0.00
400	0.28	0.67	0.00	2.06	5.21	0.00
500	2.46	5.78	0.63	11.06	24.84	4.14
-500	96.33	91.46	99.37	76.27	45.40	95.86
	100.0	100.0	100.0	100.0	100.0	100.0

Table 6, cont.

Felcon Concentrator Test #7

Test 7, #1 Run With Cyclone Underflow

	Raw Data			%Wt		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	3.2	4.6	2.6	0.80	1.14	0.73
200	21.3	28.5	13.6	5.34	7.05	3.82
270	76.3	107.8	37.3	19.12	26.66	10.48
400	68.3	80.8	40.8	17.11	19.98	11.46
500	131.6	131.9	94.1	32.97	32.62	26.43
-500	98.4	50.8	167.6	24.66	12.56	47.08
Total	399.1	404.4	356.0	100.0	100.0	100.0

	Fe			SiO2		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	29.5	29.6	27.1	48.02	47.63	50.45
200	38.8	41.0	33.5	42.40	34.76	43.23
270	55.7	57.8	47.9	18.84	14.52	28.98
400	64.6	65.5	60.3	7.98	6.12	14.74
500	68.8	69.2	65.3	3.59	2.12	8.17
-500	68.0	69.5	67.1	4.31	2.58	5.23
Total	63.5	63.0	62.3	9.86	9.10	11.37

	Fe Distribution			SiO2 Distribution		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	0.37	0.53	0.32	3.90	5.95	3.24
200	3.26	4.58	2.06	22.95	26.92	14.53
270	16.78	24.45	8.06	36.52	42.53	26.71
400	17.42	20.77	11.10	13.85	13.44	14.86
500	35.75	35.81	27.72	12.00	7.60	19.00
-500	26.42	13.85	50.74	10.78	3.57	21.66
	100.0	100.0	100.0	100.0	100.0	100.0

Table 7

Test 7, #2 Run With Cyclone Underflow

	Raw Data			%Wt		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	2.8	3.4	0.0	0.70	0.84	0.00
200	17.5	22.3	2.7	4.34	5.54	1.80
270	69.2	92.0	5.4	17.18	22.85	3.61
400	67.8	79.2	8.5	16.83	19.67	5.68
500	133.0	145.9	18.9	33.02	36.24	12.63
-500	112.5	59.8	114.2	27.93	14.85	76.29
Total	402.8	402.6	149.7	100.0	100.0	100.0

	Fe			SiO2		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	29.5	28.9	0.0	48.02	48.42	0.00
200	38.8	41.6	30.9	42.40	34.08	46.16
270	55.7	58.1	43.0	18.84	15.46	32.50
400	64.6	66.3	57.2	7.98	6.20	16.47
500	68.8	69.0	66.1	3.59	3.15	7.47
-500	68.0	70.0	64.8	4.31	2.02	8.85
Total	64.0	64.3	63.1	9.14	8.49	10.63

	Fe Distribution			SiO2 Distribution		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	0.32	0.38	0.00	3.65	4.82	0.00
200	2.63	3.59	0.88	20.14	22.24	7.83
270	14.94	20.66	2.46	35.39	41.60	11.02
400	16.98	20.29	5.14	14.69	14.36	8.79
500	35.47	38.91	13.22	12.96	13.44	8.87
-500	29.66	16.18	78.30	13.16	3.53	63.48
	100.0	100.0	100.0	100.0	100.0	100.0

Felcon Concentrator Test #8

Test 8, Run #1 With Magnetized Feed

	Raw Data			%Wt		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	1.7	2.3	0.0	0.42	0.58	0.00
200	7.7	9.6	0.0	1.91	2.43	0.00
270	33.1	39.9	1.6	8.22	10.11	0.45
400	41.3	48.8	2.3	10.26	12.37	0.64
500	70.1	83.6	7.9	17.42	21.19	2.20
-500	248.6	210.3	347.6	61.76	53.31	96.71
Total	402.5	394.5	359.4	100.0	100.0	100.0

	Fe			SiO2		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	32.8	33.9	0.0	44.02	42.78	0.00
200	42.0	42.2	0.0	33.63	33.41	0.00
270	57.2	57.8	42.7	16.47	15.79	32.84
400	64.7	65.1	55.6	8.00	7.55	18.28
500	68.3	68.3	63.3	3.94	3.94	9.58
-500	68.8	69.8	67.2	3.37	2.25	5.18
Total	66.7	66.8	66.9	5.78	5.63	5.49

	Fe Distribution			SiO2 Distribution		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	0.21	0.30	0.00	3.22	4.43	0.00
200	1.21	1.54	0.00	11.14	14.45	0.00
270	7.06	8.75	0.28	23.45	28.39	2.66
400	9.96	12.05	0.53	14.22	16.61	2.13
500	17.84	21.67	2.08	11.88	14.84	3.83
-500	63.73	55.70	97.11	36.09	21.28	91.21
	100.0	100.0	100.0	100.0	100.0	100.0

Table 8,

Test 8, Run #2 With Magnetized Feed

	Raw Data			%Wt		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	1.5	2.4	0.2	0.39	0.61	0.05
200	7.2	10.4	1.8	1.88	2.64	0.45
270	31.0	45.0	7.4	8.07	11.44	1.84
400	38.3	55.2	10.2	9.97	14.04	2.53
500	67.1	90.0	29.8	17.47	22.88	7.39
-500	238.9	190.3	353.6	62.21	48.39	87.74
Total	384.0	393.3	403.0	100.0	100.0	100.0

	Fe			SiO2		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	32.3	34.1	0.0	45.36	41.52	0.00
200	41.7	42.6	33.7	33.24	32.09	43.06
270	57.3	58.5	50.1	15.48	14.60	23.52
400	65.2	65.6	60.4	7.21	6.92	12.59
500	68.4	69.5	67.9	4.30	3.84	6.57
-500	69.2	70.2	71.5	3.30	2.34	4.01
Total	67.0	67.1	70.4	5.57	5.75	4.95

	Fe Distribution			SiO2 Distribution		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	0.19	0.31	0.00	3.18	4.40	0.00
200	1.17	1.68	0.21	11.18	14.75	3.89
270	6.90	9.97	1.31	22.42	29.03	8.73
400	9.70	13.72	2.17	12.90	16.88	6.44
500	17.83	23.70	7.14	13.48	15.27	9.82
-500	64.22	50.62	89.17	36.83	19.68	71.12
	100.0	100.0	100.0	100.0	100.0	100.0

Table 8, cont.

Test 8, Run #3 With Magnetized Feeed

	Raw Data			%Wt		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	1.6	3.0	0.0	0.40	0.75	0.00
200	7.5	12.7	4.6	1.86	3.18	1.14
270	31.1	57.1	16.7	7.72	14.31	4.13
400	39.7	64.7	21.6	9.85	16.21	5.34
500	69.0	98.9	48.8	17.12	24.78	12.07
-500	254.1	162.7	312.5	63.05	40.77	77.31
Total	403.0	399.1	404.2	100.0	100.0	100.0

	Fe			SiO2		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	30.6	31.6	0.0	47.21	45.37	0.00
200	41.8	42.8	36.1	33.89	31.89	40.29
270	57.2	58.9	53.8	15.75	13.95	20.31
400	65.0	67.0	62.7	7.44	5.92	10.26
500	68.4	68.7	67.1	4.29	3.62	5.04
-500	69.2	70.1	68.6	3.22	2.04	3.51
Total	67.1	66.5	67.1	5.53	6.04	5.17

	Fe Distribution			SiO2 Distribution		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	0.18	0.36	0.00	3.39	5.65	0.00
200	1.16	2.05	0.61	11.40	16.80	8.87
270	6.66	10.67	0.00	20.97	30.09	16.00
400	9.55	16.34	4.99	13.25	15.89	10.61
500	17.46	25.60	12.07	13.28	14.85	11.77
-500	65.06	42.98	79.02	36.71	13.77	52.51
	100.0	100.0	100.0	100.0	100.0	100.0

Table 8, cont.

Felcon Concentrator Test

Test 9, #1 Run With 5-Inch Ring

	Raw Data			%Wt		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	2.1	2.5	0.0	0.53	0.62	0.00
200	7.5	9.1	0.9	1.88	2.27	0.23
270	34.3	39.7	3.7	8.59	9.90	0.94
400	47.9	47.3	5.2	12.00	11.80	1.32
500	67.7	85.1	18.0	16.95	21.22	4.56
-500	239.8	217.3	366.5	60.06	54.19	92.94
Total	399.3	401.0	394.3	100.0	100.0	100.0

	Fe			SiO2		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	27.2	27.0	0.0	50.34	50.57	0.00
200	40.1	40.5	37.7	35.78	35.33	38.49
270	56.9	56.4	43.8	16.81	17.37	31.60
400	64.8	64.5	56.4	7.89	8.23	17.37
500	68.1	68.0	64.7	4.17	4.28	8.00
-500	68.6	69.3	68.3	3.60	2.81	4.58
Total	66.3	66.3	67.7	6.20	6.24	5.24

	Fe Distribution			SiO2 Distribution		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	0.22	0.25	0.00	4.27	5.05	0.00
200	1.14	1.39	0.13	10.85	12.85	1.68
270	7.37	8.43	0.61	23.31	27.57	5.65
400	11.72	11.48	1.10	15.28	15.56	4.37
500	17.41	21.78	4.36	11.40	14.55	6.97
-500	62.14	56.67	93.80	34.90	24.41	81.18
	100.0	100.0	100.0	100.0	100.0	100.0

Table 9

Felcon Concentrator Test #10

Test 10, #1 Run With 7-Inch Ring, Diluted Feed

	Raw Data			%Wt		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	0.5	1.5	0.6	0.25	0.38	0.16
200	2.1	6.5	3.1	1.07	1.63	0.83
270	10.3	44.3	15.5	5.22	11.13	4.16
400	14.6	47.3	20.0	7.42	11.88	5.36
500	28.8	96.1	37.0	14.64	24.15	9.92
-500	140.5	202.3	296.8	71.40	50.83	79.56
Total	196.8	398.0	373.0	100.0	100.0	100.0

	Fe			SiO2		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	0.0	38.2	37.4	0.00	37.92	38.83
200	43.0	43.6	43.3	32.50	31.83	32.16
270	56.4	59.2	56.1	17.37	14.21	17.71
400	62.5	64.1	62.2	10.49	8.68	10.83
500	66.7	67.5	66.0	5.75	4.84	6.54
-500	67.9	69.0	67.7	4.39	3.15	4.58
Total	66.3	66.4	66.5	6.21	6.05	5.95

	Fe Distribution			SiO2 Distribution		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	0.00	0.22	0.09	0.00	2.36	1.05
200	0.69	1.07	0.54	5.77	8.60	4.49
270	4.45	9.92	3.51	15.11	26.17	12.38
400	7.00	11.47	5.02	12.95	17.06	9.76
500	14.73	24.53	9.84	14.00	19.34	10.90
-500	73.14	52.79	81.00	52.18	26.47	61.27
	100.0	100.0	100.0	100.0	100.0	100.0

Table 10

Felcon Concentrator Test #11

Run #1 Steep Bowl, 700 rpm

Wt Recovery to Conc: 0.18

	Raw Data			%Wt		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	1.6	1.1	2.5	0.40	0.28	0.62
200	6.7	9.8	7.7	1.68	2.45	1.91
270	32.8	79.1	27.1	8.21	19.78	6.73
400	44.3	92.7	31.4	11.09	23.19	7.80
500	58.5	104.2	46.4	14.64	26.06	11.53
-500	255.7	112.9	287.4	63.99	28.24	71.40
Total	399.6	399.8	402.5	100.0	100.0	100.0

	Fe			SiO2		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	31.6	37.4	26.4	45.37	38.83	51.24
200	38.2	52.9	34.7	37.92	21.33	41.87
270	55.5	64.9	50.9	18.39	7.78	23.58
400	64.0	68.3	61.3	8.79	3.94	11.84
500	67.6	69.6	66.8	4.73	2.47	5.63
-500	68.6	70.0	68.9	3.60	2.02	3.26
Total	66.2	68.0	65.9	6.30	4.30	6.62

	Fe Distribution			SiO2 Distribution		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	0.19	0.15	0.25	2.88	2.49	4.81
200	0.97	1.91	1.01	10.10	12.17	12.11
270	6.88	18.89	5.20	23.97	35.82	23.99
400	10.72	23.29	7.25	15.48	21.26	13.96
500	14.95	26.68	11.68	10.99	14.99	9.81
-500	66.30	29.08	74.61	36.58	13.28	35.20
	100.0	100.0	100.0	100.0	100.0	100.0

Table 11

Test 11, #2 Run Steep Bowl, 950rpm

Wt Recovery to Conc: 0.35

Raw Data

	Feed	Conc.	Tail
150	1.6	1.8	1.8
200	6.7	9.5	5.7
270	33.0	67.5	18.3
400	43.5	83.8	20.1
500	62.5	112.9	34.6
-500	251.1	124.5	318.1
Total	398.4	400.0	398.6

%Wt

	Feed	Conc.	Tail
150	0.40	0.45	0.45
200	1.68	2.38	1.43
270	8.28	16.88	4.59
400	10.92	20.95	5.04
500	15.69	28.23	8.68
-500	63.03	31.13	79.80
Total	100.0	100.0	100.0

Fe

	Feed	Conc.	Tail
150	27.5	32.1	26.1
200	37.7	44.6	32.9
270	54.9	59.5	46.2
400	64.4	67.0	58.7
500	67.6	68.9	65.4
-500	68.4	69.7	69.2
Total	66.0	66.4	66.6

SiO2

	Feed	Conc.	Tail
150	50.00	44.81	51.58
200	38.49	30.70	43.91
270	19.07	13.87	28.89
400	8.34	5.41	14.78
500	4.73	3.26	7.21
-500	3.83	2.36	2.92
Total	6.49	6.06	5.89

Fe Distribution

	Feed	Conc.	Tail
150	0.17	0.22	0.18
200	0.96	1.59	0.71
270	6.89	15.12	3.19
400	10.65	21.13	4.45
500	16.06	29.28	8.53
-500	65.28	32.66	82.96
	100.0	100.0	100.0

SiO2 Distribution

	Feed	Conc.	Tail
150	3.09	3.33	3.95
200	9.97	12.03	10.66
270	24.33	38.64	22.51
400	14.03	18.69	12.65
500	11.43	15.19	10.63
-500	37.15	12.12	39.60
	100.0	100.0	100.0

Test 11, #3 Run Steep Bowl, 1200 rpm

Wt Recovery to Conc: 0.43

Raw Data

	Feed	Conc.	Tail
150	1.6	2.2	1.2
200	6.4	9.1	4.8
270	34.0	61.6	15.9
400	48.0	77.7	18.6
500	55.8	103.8	23.7
-500	253.2	146.8	335.0
Total	399.0	401.2	399.2

%Wt

	Feed	Conc.	Tail
150	0.40	0.55	0.30
200	1.60	2.27	1.20
270	8.52	15.35	3.98
400	12.03	19.37	4.66
500	13.98	25.87	5.94
-500	63.46	36.59	83.92
Total	100.0	100.0	100.0

Fe

	Feed	Conc.	Tail
150	27.8	28.6	28.2
200	38.2	40.1	37.2
270	55.5	58.2	48.3
400	65.0	67.2	59.1
500	68.0	69.1	65.6
-500	68.5	69.7	68.0
Total	66.3	66.4	66.2

SiO2

	Feed	Conc.	Tail
150	49.66	48.76	49.21
200	37.92	35.78	39.05
270	18.39	15.34	26.52
400	7.66	5.18	14.33
500	4.28	3.04	6.99
-500	3.71	2.36	4.28
Total	6.25	6.09	6.35

Fe Distribution

	Feed	Conc.	Tail
150	0.17	0.24	0.13
200	0.92	1.37	0.68
270	7.14	13.46	2.91
400	11.80	19.60	4.16
500	14.35	26.93	5.89
-500	65.61	38.41	86.24
	100.0	100.0	100.0

SiO2 Distribution

	Feed	Conc.	Tail
150	3.19	4.39	2.33
200	9.73	13.33	7.40
270	25.07	38.70	16.64
400	14.75	16.49	10.52
500	9.57	12.91	6.54
-500	37.70	14.18	56.57
	100.0	100.0	100.0

Felcon Concentrator Test #12

Test 12, #1 Timing, 700 rpm

Wt Recovery to Conc: 0.08

	Raw Data			%Wt		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	1.9	1.9	1.4	0.81	0.63	0.43
200	7.4	11.0	6.2	1.82	3.66	1.90
270	37.0	63.2	27.0	9.08	21.02	8.28
400	41.5	72.9	32.5	10.19	24.24	9.97
500	85.2	58.3	64.4	20.91	19.39	19.75
-500	234.4	93.4	194.5	57.54	31.06	59.66
Total	407.4	300.7	326.0	100.0	100.0	100.0

	Fe			SiO2		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	31.1	54.6	28.7	46.56	18.18	52.03
200	38.4	54.6	37.1	39.94	18.06	43.91
270	56.3	66.9	58.2	16.04	5.50	19.81
400	66.1	69.5	66.8	6.44	2.59	7.97
500	68.3	70.4	69.7	3.34	1.79	3.59
-500	69.8	70.6	70.0	2.68	1.65	2.83
Total	67.2	68.8	67.8	5.46	3.42	5.90

	Fe Distribution			SiO2 Distribution		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	0.37	0.50	0.18	6.92	3.36	3.79
200	1.04	2.90	1.04	13.30	19.32	14.15
270	7.60	20.43	7.11	26.70	33.81	27.80
400	10.01	24.48	9.82	12.02	18.37	13.46
500	21.24	19.83	20.30	12.80	10.15	12.02
-500	59.73	31.86	61.56	28.26	14.99	28.61
	100.0	100.0	100.0	100.0	100.0	100.0

Table 12

Test 12, #2 Run Timing, 950Hz

Wt Recovery to Conc: 0.11

Raw Data

	Feed	Conc.	Tail
150	1.0	3.8	1.1
200	7.1	12.8	4.8
270	27.5	89.4	31.2
400	39.6	81.4	41.1
500	54.0	133.9	61.6
-500	178.0	121.2	222.8
Total	307.2	442.5	362.6

%Wt

	Feed	Conc.	Tail
150	0.33	0.86	0.30
200	2.31	2.89	1.32
270	8.95	20.20	8.60
400	12.89	18.40	11.33
500	17.58	30.26	16.99
-500	57.94	27.39	61.45
Total	100.0	100.0	100.0

Fe

	Feed	Conc.	Tail
150	27.5	32.1	26.1
200	37.7	44.6	32.9
270	54.9	59.5	46.2
400	64.4	67.0	58.7
500	67.6	68.9	65.4
-500	68.4	69.7	69.2
Total	65.7	65.9	64.8

SiO2

	Feed	Conc.	Tail
150	50.00	44.81	51.58
200	38.49	30.70	43.91
270	19.07	13.87	28.89
400	8.34	5.41	14.78
500	4.73	3.26	7.21
-500	3.83	2.36	2.92
Total	6.88	6.70	7.92

Fe Distribution

	Feed	Conc.	Tail
150	0.14	0.42	0.12
200	1.33	1.96	0.67
270	7.48	18.25	6.14
400	12.64	18.72	10.27
500	18.09	31.66	17.15
-500	60.33	28.99	65.64
	100.0	100.0	100.0

SiO2 Distribution

	Feed	Conc.	Tail
150	2.36	5.74	1.98
200	12.92	13.25	7.34
270	24.80	41.82	31.39
400	15.62	14.84	21.15
500	12.08	14.72	15.47
-500	32.21	9.64	22.68
	100.0	100.0	100.0

Table 12, cont.

Test 12, #3 Run Timing, 1200 rpm

Wt Recovery to Conc: 0.26

Raw Data

	Feed	Conc.	Tail
150	2.3	1.9	1.8
200	9.0	11.2	5.8
270	41.0	63.7	20.4
400	47.3	92.1	22.5
500	98.1	92.9	50.3
-500	271.8	109.9	212.6
Total	469.5	371.7	313.4

%Wt

	Feed	Conc.	Tail
150	0.49	0.51	0.57
200	1.92	3.01	1.85
270	8.73	17.14	6.51
400	10.07	24.78	7.18
500	20.89	24.99	16.05
-500	57.89	29.57	67.84
Total	100.0	100.0	100.0

Fe

	Feed	Conc.	Tail
150	27.8	28.6	28.2
200	38.2	40.1	37.2
270	55.5	58.2	48.3
400	65.0	67.2	59.1
500	68.0	69.1	65.6
-500	68.5	69.7	68.0
Total	66.1	65.9	64.9

SiO2

	Feed	Conc.	Tail
150	49.66	48.76	49.21
200	37.92	35.78	39.05
270	18.39	15.34	26.52
400	7.66	5.18	14.33
500	4.28	3.04	6.99
-500	3.71	2.36	4.28
Total	6.39	6.70	7.78

Fe Distribution

	Feed	Conc.	Tail
150	0.21	0.22	0.25
200	1.11	1.83	1.06
270	7.33	15.14	4.84
400	9.90	25.28	6.54
500	21.49	26.22	16.22
-500	59.97	31.29	71.08
	100.0	100.0	100.0

SiO2 Distribution

	Feed	Conc.	Tail
150	3.81	3.72	3.63
200	11.37	16.10	9.28
270	25.12	39.26	22.18
400	12.08	19.17	13.21
500	13.98	11.33	14.41
-500	33.63	10.41	37.28
	100.0	100.0	100.0

Test 12, #4 Run Timing, 1400rpm

Wt Recovery to Conc: 0.20

Raw Data

	Feed	Conc.	Tail
150	1.4	2.8	1.1
200	8.0	9.0	9.1
270	31.9	61.3	29.7
400	53.9	72.3	40.1
500	70.2	117.1	65.6
-500	240.0	125.1	258.5
Total	405.4	387.6	404.1

%Wt

	Feed	Conc.	Tail
150	0.35	0.72	0.27
200	1.97	2.32	2.25
270	7.87	15.82	7.35
400	13.30	18.65	9.92
500	17.32	30.21	16.23
-500	59.20	32.28	63.97
Total	100.0	100.0	100.0

Fe

	Feed	Conc.	Tail
150	31.1	51.4	28.2
200	38.4	53.4	37.2
270	56.3	65.7	48.3
400	66.1	69.4	59.1
500	68.3	70.5	65.6
-500	69.8	70.4	68.0
Total	67.2	69.0	64.5

SiO2

	Feed	Conc.	Tail
150	46.56	23.12	52.08
200	39.94	22.81	42.54
270	16.04	7.57	22.72
400	6.44	3.39	7.91
500	3.34	2.16	3.93
-500	2.68	1.91	2.96
Total	5.23	3.80	6.09

Fe Distribution

	Feed	Conc.	Tail
150	0.16	0.54	0.12
200	1.13	1.80	1.30
270	6.59	15.07	5.51
400	13.07	18.77	9.10
500	17.59	30.88	16.52
-500	61.46	32.95	67.46
	100.0	100.0	100.0

SiO2 Distribution

	Feed	Conc.	Tail
150	3.07	4.40	2.33
200	15.06	13.96	15.74
270	24.12	31.55	27.44
400	16.36	16.66	12.90
500	11.05	17.19	10.48
-500	30.32	16.24	31.11
	100.0	100.0	100.0

Test 12, #5 Run Steep Bowl, 1400 rpm

Wt Recovery to Conc: 0.30

	Raw Data			%Wt		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	2.1	0.8	2.5	0.56	0.23	0.69
200	7.5	5.0	8.8	1.98	1.45	2.45
270	33.6	42.3	30.4	8.88	12.26	8.45
400	38.2	76.7	27.3	10.10	22.23	7.59
500	76.3	93.1	50.7	20.17	26.99	14.09
-500	220.5	127.1	240.2	58.30	36.84	66.74
Total	378.2	345.0	359.9	100.0	100.0	100.0

	Fe			SiO2		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	31.1	51.4	28.2	46.56	23.28	52.04
200	38.4	53.4	37.2	39.94	21.85	41.84
270	56.3	65.7	48.3	16.04	8.02	21.92
400	66.1	69.4	59.1	6.44	2.93	10.41
500	68.3	70.5	65.6	3.34	1.97	5.42
-500	69.8	70.4	68.0	2.68	1.78	3.14
Total	67.1	69.3	64.3	5.36	3.19	6.88

	Fe Distribution			SiO2 Distribution		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	0.26	0.17	0.30	4.82	1.69	5.25
200	1.14	1.12	1.41	14.77	9.92	14.86
270	7.46	11.62	6.35	26.57	30.80	26.89
400	9.95	22.25	6.97	12.13	20.40	11.47
500	20.54	27.44	14.37	12.57	16.65	11.09
-500	60.66	37.40	70.59	29.14	20.54	30.44
	100.0	100.0	100.0	100.0	100.0	100.0

Table 12, cont.

Felcon Concentrator Test 13

Test 13, Run #1, Split, 700 rpm

Wt Recovery to Conc: 0.20

	Raw Data			%Wt		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	1.7	1.6	1.8	0.71	0.40	0.46
200	7.0	8.8	6.6	1.76	2.22	1.68
270	36.4	86.4	27.3	9.14	21.81	6.95
400	39.2	70.4	30.5	9.84	17.77	7.76
500	75.8	110.1	63.4	19.04	27.80	16.14
-500	238.1	118.8	263.2	59.79	29.99	67.00
Total	398.2	396.1	392.8	100.0	100.0	100.0

	Fe			SiO2		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	29.7	43.0	28.1	48.57	30.99	48.45
200	36.3	55.0	31.5	43.03	20.18	45.47
270	57.8	67.6	52.0	16.46	6.06	19.77
400	66.1	70.5	63.9	6.80	3.10	8.25
500	69.0	70.8	68.5	3.68	2.02	4.23
-500	69.4	70.5	69.3	2.92	1.96	3.19
Total	67.3	69.5	66.7	5.72	3.60	5.83

	Fe Distribution			SiO2 Distribution		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	0.32	0.25	0.19	6.06	3.48	3.81
200	0.95	1.76	0.79	13.22	12.47	13.11
270	7.85	21.22	5.42	26.29	36.76	23.57
400	9.67	18.03	7.44	11.70	15.32	10.99
500	19.52	28.32	16.57	12.24	15.62	11.71
-500	61.69	30.43	69.59	30.50	16.35	36.67
	100.0	100.0	100.0	100.0	100.0	100.0

Test 13, Run #2 Split, 950rpm

Wt Recovery to Conc: 0.11

Raw Data

	Feed	Conc.	Tail
150	1.0	3.8	1.1
200	7.1	12.8	4.8
270	27.5	89.4	31.2
400	39.6	81.4	41.1
500	54.0	133.9	61.6
-500	178.0	121.2	222.8
Total	307.2	442.5	362.6

%Wt

	Feed	Conc.	Tail
150	0.33	0.86	0.30
200	2.31	2.89	1.32
270	8.95	20.20	8.60
400	12.89	18.40	11.33
500	17.58	30.26	16.99
-500	57.94	27.39	61.45
Total	100.0	100.0	100.0

Fe

	Feed	Conc.	Tail
150	27.5	32.1	26.1
200	37.7	44.6	32.9
270	54.9	59.5	46.2
400	64.4	67.0	58.7
500	67.6	68.9	65.4
-500	68.4	69.7	69.2
Total	65.7	65.9	64.8

SiO2

	Feed	Conc.	Tail
150	50.00	44.81	51.58
200	38.49	30.70	43.91
270	19.07	13.87	28.89
400	8.34	5.41	14.78
500	4.73	3.26	7.21
-500	3.83	2.36	2.92
Total	6.88	6.70	7.92

Fe Distribution

	Feed	Conc.	Tail
150	0.14	0.42	0.12
200	1.33	1.96	0.67
270	7.48	18.25	6.14
400	12.64	18.72	10.27
500	18.09	31.66	17.15
-500	60.33	28.99	65.64
	100.0	100.0	100.0

SiO2 Distribution

	Feed	Conc.	Tail
150	2.36	5.74	1.98
200	12.92	13.25	7.34
270	24.80	41.82	31.39
400	15.62	14.84	21.15
500	12.08	14.72	15.47
-500	32.21	9.64	22.68
	100.0	100.0	100.0

Test 13, Run #3, Split, 1050 rpm

Wt Recovery to Conc: 0.26

Raw Data

	Feed	Conc.	Tail
150	1.6	1.6	1.4
200	6.4	8.6	6.0
270	30.6	81.7	22.8
400	35.7	66.4	26.8
500	67.6	108.7	55.5
-500	253.9	129.8	284.0
Total	395.8	396.8	396.5

%Wt

	Feed	Conc.	Tail
150	0.40	0.40	0.35
200	1.62	2.17	1.51
270	7.73	20.59	5.75
400	9.02	16.73	6.76
500	17.08	27.39	14.00
-500	64.15	32.71	71.63
Total	100.0	100.0	100.0

Fe

	Feed	Conc.	Tail
150	29.2	36.0	24.7
200	34.9	45.8	29.2
270	58.4	64.5	48.5
400	65.5	69.4	63.3
500	68.9	70.5	69.2
-500	69.1	70.4	69.6
Total	67.2	68.4	67.1

SiO2

	Feed	Conc.	Tail
150	47.94	37.33	54.53
200	40.12	25.70	42.48
270	24.05	6.30	29.62
400	7.85	3.26	9.49
500	3.78	2.10	4.64
-500	3.03	1.87	3.18
Total	6.00	3.74	6.11

Fe Distribution

	Feed	Conc.	Tail
150	0.18	0.21	0.13
200	0.84	1.45	0.66
270	6.72	19.42	4.15
400	8.79	16.99	6.37
500	17.51	28.25	14.43
-500	65.96	33.68	74.26
	100.0	100.0	100.0

SiO2 Distribution

	Feed	Conc.	Tail
150	3.23	4.03	3.15
200	10.81	14.90	10.53
270	30.99	34.71	27.89
400	11.80	14.60	10.50
500	10.76	15.39	10.63
-500	32.40	16.37	37.30
	100.0	100.0	100.0

Test 12, Run #4, Split, 1050 rpm

Wt Recovery to Conc: 0.35

Raw Data

	Feed	Conc.	Tail
150	1.7	2.4	1.6
200	7.0	10.3	5.7
270	35.7	74.3	17.6
400	39.3	66.6	18.3
500	68.2	123.4	39.5
-500	246.0	121.0	313.6
Total	397.9	398.0	396.3

%Wt

	Feed	Conc.	Tail
150	0.43	0.60	0.40
200	1.76	2.59	1.44
270	8.97	18.67	4.44
400	9.88	16.73	4.62
500	17.14	31.01	9.97
-500	61.82	30.40	79.13
Total	100.0	100.0	100.0

Fe

	Feed	Conc.	Tail
150	26.5	30.1	24.8
200	35.5	41.3	28.8
270	57.9	61.6	45.1
400	66.9	67.8	60.3
500	69.1	70.2	67.2
-500	69.6	70.6	69.3
Total	67.4	67.3	66.8

SiO2

	Feed	Conc.	Tail
150	54.22	50.34	57.95
200	45.01	38.96	51.10
270	13.82	9.01	34.68
400	6.90	3.93	13.49
500	3.45	2.29	5.61
-500	2.94	1.77	3.08
Total	5.35	4.90	6.13

Fe Distribution

	Feed	Conc.	Tail
150	0.17	0.27	0.15
200	0.93	1.59	0.62
270	7.71	17.08	3.00
400	9.80	16.85	4.17
500	17.57	32.33	10.02
-500	63.83	31.88	82.05
	100.0	100.0	100.0

SiO2 Distribution

	Feed	Conc.	Tail
150	4.33	6.20	3.82
200	14.79	20.58	11.99
270	23.16	34.33	25.13
400	12.73	13.42	10.16
500	11.04	14.49	9.12
-500	33.95	10.98	39.77
	100.0	100.0	100.0

Test 13, Run #5, Split, 1050 rpm

Wt Recovery to Conc: 0.41

Raw Data

	Feed	Conc.	Tail
150	1.6	2.9	1.1
200	6.8	12.5	4.0
270	34.2	88.6	13.5
400	40.7	66.0	17.7
500	72.3	118.0	45.0
-500	243.2	106.9	312.3
Total	398.8	394.9	393.6

%Wt

	Feed	Conc.	Tail
150	0.40	0.73	0.28
200	1.71	3.17	1.02
270	8.58	22.44	3.43
400	10.21	16.71	4.50
500	18.13	29.88	11.43
-500	60.98	27.07	79.34
Total	100.0	100.0	100.0

Fe

	Feed	Conc.	Tail
150	26.5	30.1	24.8
200	35.5	41.3	28.8
270	57.9	61.6	45.1
400	66.9	67.8	60.3
500	69.1	70.2	67.2
-500	69.6	70.6	69.3
Total	67.5	66.8	67.3

SiO2

	Feed	Conc.	Tail
150	58.18	50.08	65.41
200	41.57	32.41	55.61
270	17.45	8.96	33.74
400	6.43	3.58	13.48
500	3.69	2.16	5.45
-500	2.94	1.75	3.10
Total	5.56	5.12	5.59

Fe Distribution

	Feed	Conc.	Tail
150	0.16	0.33	0.10
200	0.90	1.96	0.43
270	7.36	20.70	2.30
400	10.12	16.97	4.03
500	18.57	31.42	11.42
-500	62.90	28.62	81.72
	100.0	100.0	100.0

SiO2 Distribution

	Feed	Conc.	Tail
150	4.20	7.18	3.27
200	12.76	20.03	10.10
270	26.93	39.25	20.69
400	11.81	11.68	10.84
500	12.04	12.60	11.14
-500	32.26	9.25	43.97
	100.0	100.0	100.0

Felcon Concentrator Test #14

Test 14, Run #1, 10-Cyclone Underflow, 700 rpm

Wt Recovery to Conc: 0.42

Raw Data

	Feed	Conc.	Tail
150	3.7	2.6	4.1
200	12.4	13.1	16.5
270	63.8	87.4	42.9
400	71.1	95.6	58.5
500	147.8	165.6	130.4
-500	99.8	34.6	146.2
Total	398.6	398.9	398.6

%Wt

	Feed	Conc.	Tail
150	0.93	0.65	1.03
200	3.11	3.28	4.14
270	16.01	21.91	10.76
400	17.84	23.97	14.67
500	37.08	41.51	32.71
-500	25.04	8.67	36.67
Total	100.0	100.0	100.0

Fe

	Feed	Conc.	Tail
150	29.7	43.0	28.1
200	36.3	55.0	31.5
270	57.8	67.6	52.0
400	66.1	70.5	63.9
500	69.0	70.8	68.5
-500	69.4	70.5	69.3
Total	65.4	69.3	64.4

SiO2

	Feed	Conc.	Tail
150	40.25	28.23	47.31
200	40.25	28.23	47.31
270	12.42	8.95	22.53
400	4.58	3.32	6.71
500	2.20	1.76	2.63
-500	2.25	1.61	2.59
Total	5.81	4.74	7.67

Fe Distribution

	Feed	Conc.	Tail
150	0.42	0.40	0.45
200	1.73	2.61	2.02
270	14.14	21.37	8.69
400	18.03	24.38	14.56
500	39.12	42.41	34.80
-500	26.57	8.82	39.47
	100.0	100.0	100.0

SiO2 Distribution

	Feed	Conc.	Tail
150	6.43	3.88	6.34
200	21.55	19.57	25.52
270	34.22	41.39	31.60
400	14.06	16.79	12.83
500	14.04	15.42	11.21
-500	9.70	2.95	12.38
	100.0	100.0	100.0

Table 14.

Test 14, Run #2, 10-Cyclone Underflow, 950 rpm

Wt Recovery to Conc: 0.44

Raw Data

	Feed	Conc.	Tail
150	3.8	2.3	4.5
200	14.3	15.2	15.2
270	72.0	71.0	54.0
400	83.0	98.9	56.4
500	152.8	166.0	125.1
-500	73.1	46.2	144.3
Total	399.0	399.6	399.5

%Wt

	Feed	Conc.	Tail
150	0.95	0.58	1.13
200	3.58	3.80	3.80
270	18.05	17.77	13.52
400	20.80	24.75	14.12
500	38.30	41.54	31.31
-500	18.32	11.56	36.12
Total	100.0	100.0	100.0

Fe

	Feed	Conc.	Tail
150	27.5	32.1	26.1
200	37.7	44.6	32.9
270	54.9	59.5	46.2
400	64.4	67.0	58.7
500	67.6	68.9	65.4
-500	68.4	69.7	69.2
Total	63.3	65.7	61.5

SiO2

	Feed	Conc.	Tail
150	41.15	31.32	48.70
200	41.15	31.32	48.70
270	13.44	8.43	23.10
400	4.20	3.34	7.35
500	1.96	1.81	2.82
-500	2.57	1.53	2.99
Total	6.39	4.62	8.53

Fe Distribution

	Feed	Conc.	Tail
150	0.41	0.28	0.48
200	2.13	2.58	2.03
270	15.64	16.09	10.15
400	21.15	25.23	13.46
500	40.87	43.55	33.27
-500	19.79	12.26	40.61
	100.0	100.0	100.0

SiO2 Distribution

	Feed	Conc.	Tail
150	6.14	3.90	6.43
200	23.09	25.76	21.72
270	37.97	32.39	36.59
400	13.68	17.87	12.16
500	11.75	16.26	10.35
-500	7.37	3.82	12.66
	100.0	100.0	100.0

Test 14, Run #3, 10-Cyclone Underflow, 1200 rpm

Wt Recovery to Conc: 0.41

	Raw Data			%Wt		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	3.2	1.7	4.8	0.80	0.43	1.20
200	16.7	7.9	22.6	4.19	1.98	5.66
270	59.0	66.0	58.0	14.79	16.53	14.54
400	73.4	72.6	63.1	18.40	18.18	15.81
500	134.5	190.6	117.3	33.71	47.73	29.40
-500	112.2	60.5	133.2	28.12	15.15	33.38
Total	399.0	399.3	399.0	100.0	100.0	100.0

	Fe			SiO2		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	29.2	36.0	24.7	39.33	31.55	42.14
200	34.9	45.8	29.2	39.33	31.55	42.14
270	58.4	64.5	48.5	12.77	7.47	15.79
400	65.5	69.4	63.3	4.64	3.41	6.75
500	68.9	70.5	69.2	2.18	1.97	2.79
-500	69.1	70.4	69.6	2.37	1.49	2.75
Total	65.0	68.7	62.6	6.10	3.78	7.99

	Fe Distribution			SiO2 Distribution		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	0.36	0.22	0.47	5.17	3.55	6.34
200	2.25	1.32	2.64	26.96	16.52	29.86
270	13.28	15.53	11.26	30.93	32.67	28.71
400	18.53	18.38	15.99	13.98	16.40	13.35
500	35.71	49.01	32.50	12.04	24.88	10.26
-500	29.88	15.54	37.12	10.92	5.97	11.48
	100.0	100.0	100.0	100.0	100.0	100.0

Test 14, Run #4, 10-Cyclone Underflow, 1400 rpm

Wt Recovery to Conc: 0.55

Raw Data

	Feed	Conc.	Tail
150	3.2	3.1	3.3
200	13.0	13.1	12.2
270	69.4	84.1	47.6
400	78.9	76.8	53.7
500	157.0	175.7	115.6
-500	78.1	46.2	166.4
Total	399.6	399.0	398.8

%Wt

	Feed	Conc.	Tail
150	0.80	0.78	0.83
200	3.25	3.28	3.06
270	17.37	21.08	11.94
400	19.74	19.25	13.47
500	39.29	44.04	28.99
-500	19.54	11.58	41.73
Total	100.0	100.0	100.0

Fe

	Feed	Conc.	Tail
150	29.2	36.0	24.7
200	34.9	45.8	29.2
270	58.4	64.5	48.5
400	65.5	69.4	63.3
500	68.9	70.5	69.2
-500	69.1	70.4	69.6
Total	65.0	67.9	64.5

SiO2

	Feed	Conc.	Tail
150	54.07	47.84	56.49
200	37.81	30.56	42.91
270	14.28	10.36	18.28
400	4.45	3.70	6.43
500	2.19	2.06	2.84
-500	2.89	1.53	2.88
Total	6.45	5.36	6.85

Fe Distribution

	Feed	Conc.	Tail
150	0.36	0.41	0.32
200	1.75	2.21	1.38
270	15.60	20.01	8.97
400	19.89	19.66	13.21
500	41.63	45.70	31.09
-500	20.77	12.00	45.02
	100.0	100.0	100.0

SiO2 Distribution

	Feed	Conc.	Tail
150	6.72	6.94	6.82
200	19.08	18.74	19.16
270	38.47	40.78	31.84
400	13.63	13.30	12.63
500	13.35	16.94	12.01
-500	8.76	3.31	17.54
	100.0	100.0	100.0

Test 14, Run #5, 10-Cyclone Underflow, 950 rpm

Wt Recovery to Conc: 0.67

	Raw Data			%Wt		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	2.3	3.0	2.8	0.58	0.75	0.69
200	12.2	14.7	10.7	3.08	3.69	2.64
270	74.0	99.5	33.6	18.71	24.94	8.29
400	93.2	107.3	63.6	23.57	26.90	15.70
500	113.9	121.9	91.6	28.80	30.56	22.61
-500	99.9	52.5	202.9	25.26	13.16	50.07
Total	395.5	398.9	405.2	100.0	100.0	100.0

	Fe			SiO2		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	29.2	36.0	24.7	47.94	37.33	54.53
200	34.9	45.8	29.2	40.12	25.70	42.48
270	58.4	64.5	48.5	24.05	6.30	29.62
400	65.5	69.4	63.3	7.85	3.26	9.49
500	68.9	70.5	69.2	3.78	2.10	4.64
-500	69.1	70.4	69.6	3.03	1.87	3.18
Total	64.9	67.5	65.4	9.72	4.56	8.09

	Fe Distribution			SiO2 Distribution		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	0.26	0.40	0.26	2.87	6.15	4.66
200	1.66	2.50	1.18	12.73	20.75	13.87
270	16.84	23.83	6.15	46.29	34.43	30.38
400	23.78	27.65	15.19	19.03	19.21	18.42
500	30.57	31.91	23.92	11.20	14.06	12.97
-500	26.89	13.72	53.29	7.87	5.39	19.69
	100.0	100.0	100.0	100.0	100.0	100.0

Table 14, cont.

Felcon Concentrator Test 15

Test 15, Run #1, 10-Cyclone Underflow, 950 rpm

Wt Recovery to Conc: 0.50

	Raw Data			%Wt		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	0.3	0.3	0.3	0.07	0.07	0.07
200	3.2	2.6	2.9	0.79	0.65	0.72
270	11.2	8.2	8.5	2.75	2.04	2.11
400	13.6	8.8	7.1	3.34	2.19	1.76
500	96.7	37.1	34.9	23.75	9.22	8.67
-500	282.1	345.5	348.8	69.30	85.84	86.65
Total	407.1	402.5	402.5	100.0	100.0	100.0

	Fe			SiO2		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	29.7	43.0	28.1	61.00	64.04	70.55
200	36.3	55.0	31.5	61.00	64.04	70.55
270	57.8	67.6	52.0	41.41	52.74	56.52
400	66.1	70.5	63.9	22.42	34.44	40.30
500	69.0	70.8	68.5	3.43	6.75	9.22
-500	69.4	70.5	69.3	1.61	3.18	3.26
Total	68.6	70.3	68.5	4.34	5.64	6.10

	Fe Distribution			SiO2 Distribution		
	Feed	Conc.	Tail	Feed	Conc.	Tail
150	0.03	0.05	0.03	1.04	0.85	0.86
200	0.42	0.51	0.33	11.04	7.33	8.34
270	2.32	1.96	1.60	26.23	19.05	19.57
400	3.22	2.19	1.65	17.25	13.35	11.66
500	23.90	9.28	8.67	18.76	11.03	13.11
-500	70.12	86.02	87.71	25.69	48.39	46.33
	100.0	100.0	100.0	100.0	100.0	100.0

Test 15, Run #2, 10-Cyclone Underflow, 1400 rpm

Wt Recovery to Conc: 0.20

Raw Data

	Feed	Conc.	Tail
150	0.2	0.3	0.2
200	2.8	3.7	2.6
270	8.1	12.3	7.8
400	7.8	14.8	8.9
500	36.9	90.5	24.3
-500	334.5	277.8	355.7
Total	390.3	399.4	399.5

%Wt

	Feed	Conc.	Tail
150	0.05	0.08	0.05
200	0.72	0.93	0.65
270	2.08	3.08	1.95
400	2.00	3.71	2.23
500	9.45	22.66	6.08
-500	85.70	69.55	89.04
Total	100.0	100.0	100.0

Fe

	Feed	Conc.	Tail
150	29.2	36.0	24.7
200	34.9	45.8	29.2
270	58.4	64.5	48.5
400	65.5	69.4	63.3
500	68.9	70.5	69.2
-500	69.1	70.4	69.6
Total	68.5	70.0	68.7

SiO2

	Feed	Conc.	Tail
150	67.06	58.85	68.19
200	67.06	58.85	68.19
270	54.49	43.20	56.55
400	38.15	23.99	38.52
500	8.01	3.73	8.78
-500	3.09	1.83	3.50
Total	5.81	4.93	6.09

Fe Distribution

	Feed	Conc.	Tail
150	0.02	0.04	0.02
200	0.37	0.61	0.28
270	1.77	2.84	1.38
400	1.91	3.68	2.05
500	9.51	22.84	6.12
-500	86.43	70.00	90.15
	100.0	100.0	100.0

SiO2 Distribution

	Feed	Conc.	Tail
150	0.59	0.90	0.56
200	8.27	11.07	7.29
270	19.45	27.00	18.13
400	13.11	18.04	14.09
500	13.02	17.15	8.77
-500	45.55	25.84	51.17
	100.0	100.0	100.0

Table 15, cont.