

L. CAMP

FIOTATION TEST

1" UNIT - JIG CONCENTRATE

CREST EXPLORATION LTD.

ABOUT 5 MARCH '65

DATE DUE

CONCLUSION

Ten tests were completed on Crest Jig Concentrate. Eight of them, using deslimed feed, gave products assaying better than 65% Fe and recoveries ranging from 53 to 85%. The phosphorus analyses on all ten underflow concentrates were greater than .06%. The collectors' consumption was reduced from 2.5 to 0.63 pound per short ton. A summary of results is shown on Page 4.

Complete samples of all runs have been sent to Calgary. This is normal procedure but in this instance it has added significance. The Mines Branch were asked to check the phosphorus on run #11. The original result reported by the independent laboratory was 0.052% P. The Mines Branch results were 0.063 and 0.0625 as a recheck. We placed more emphasis on the result from the Mines Branch and as a result had the independent laboratory redo all phosphorus. The results in this report are the second set of analyses and may be compared to the hand written summary of results sent to Mr. Camp two weeks ago.

From the results we have obtained it is obvious that extensive tests should be carried out on Crest Ore. A two inch unit should be used and at least seven barrels of deslimed ore should be made available.

Commercial Units

Based on ore of the Opemiska type, the ore with which we are most familiar, column capacities are as follows:

Size	Approx. Horizontal Dimensions	Approx. Rougher Cap. TPD	Approx. Cleaner Cap. TPD
1	1' x 1'	20	60
2	2' x 2'	90	200
3	3' x 3'	200	500
4	4' x 4'	350	900
5	5' x 5'	500	1400
6	6' x 6'	800	2100
7	7' x 7'	1100	2800
8	8' x 8'	1400	3700
9	9' x 9'	1750	4700
10	10' x 6'	2200	5800

At this time it is very difficult to give a price on such units. Enough work has not been done on various ores to determine unit life, etc. The main item which will determine the monthly rental rate, or sale price, will be the type of bubbler used as the instrumentation and shell should require very little maintenance.

As a rough estimate, the monthly rental on a No. 6 unit would be \$2,500.00. This price would cover installation and maintenance. No other charges would be involved.

INTRODUCTION

In the Fall of 1964, Mr. L. Camp met Column Flotation Co. of Canada Ltd. at the Department of Mines in Ottawa. The principle of operation of the column was explained to Mr. Camp and shortly after Crest Exploration Ltd. requested some test work be carried out on their ore by Column Flotation Co.

Our sincerest thanks go to the Mines Branch, in particular Messrs. B. Fickett and G. Hayslip, for allowing us the use of their facilities in order to carry out this work.

A barrel of Crest jig concentrate (60.2% Fe) was ground to 96% -400 mesh and this material was utilized in the test work.

Due to the lack of ore, the two inch diameter column could not be used in the test work. A one inch unit was used. This size is a rather difficult unit to work with due to the low flowrates and the pronounced wall effects. Sigma pumps had to be used for both feed and underflow.

Approximately a week and a half was used to familiarize ourselves with the Crest ore.

Mr. K. Culver of Crest came to Ottawa to see the column in operation during the early stages of the test work.

SUMMARY OF RESULTS

TEST NO	PRODUCT	WEIGHT %	ANALYSIS			Fe DISSEM	G/T	FLOTATION TANKS	FA-2	lb/ton AM-825																																																																																																																																															
			Fe	P	SiO2																																																																																																																																																				
3	Concentrate	44.6	57.3	.146	14.9	42.3	1.25	1.0	1.5																																																																																																																																																
	Tailings	55.4	63.0	-	-	57.7				4	Concentrate	52.5	58.6	.119	8.4	50.4	1.25	1.0	1.5	Tailings	48.5	62.9	-	-	49.6	5	Concentrate	64.1	65.9	.065	4.5	70.2	1.25	1.0	1.5	Tailings	30.2	51.9			24.5	Slime	5.7	44.8	.41		4.3	6	Concentrate	58.3	65.4	.069	4.5	70.2	1.25	0.75	1.12	Tailings	38.2	51.8			24.5	Slime	3.5	44.8			4.3	7	Concentrate	64.9	66.0	.093	3.7	70.9	1.25	0.75	1.12	Tailings	29.6	50.6			23.8	Combined Slime	5.5	42.2			5.3	9	Concentrate	48.4	66.1	.085	3.9	52.8	1.25	0.25	0.375	Tailings	45.1	54.8			41.9	Combined Slime	5.5	42.2			5.3	10	Concentrate	55.6	66.1	.062	4.3	60.8	1.25	1.0	1.50	Tailings	38.9	52.7			34.9	Combined Slime	5.5	42.2			5.3	11	Concentrate	60.0	66.0	.072	4.4	66.4	1.25	1.25	1.85	Tailings	34.5	50.8			28.3	Combined Slime	5.5
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SUMMARY OF RESULTS

TEST NO	PRODUCT	WEIGHT %	ANALYSIS			Fe DISTRIBUTION %	FLOTATION RESULTS		
			Fe	P	SiO ₂		TAPROCA	FR-2	IB/MS
12	Concentrate	41.6	65.1	0.131	5.4	67.1	1.25	0.25	0.375
	Tailings	32.9	51.8			27.6			
	Combined Slime	5.5	42.2			5.3			
13	Concentrate	75.5	65.2	0.114	5.7	81.1	1.25	0.25	0.375
	Tailings	19.0	42.4			13.6			
	Combined Slime	5.5	42.2			5.3			

CRIST - 3

FEED	weight of slurry	68.0	lb		
	density	1.327	g/ml		
	solids	32.0	%		
	weight of solids	21.8	lb		
REAGENTS	NaOH	11.9	ph		
	Na ₄ P ₂ O ₇ 10H ₂ O	0.5	lb/ton		
	Tapioca Flour	1.5	lb/ton		
	FA-2	1.0	lb/ton		
	825	1.5	lb/ton		
TEST	<u>Time</u>	<u>Flowrate</u>	<u>Density</u>	<u>Air</u>	
	min.	ml/min	g/ml	s.c.f.h.	
	0	144	1.039	0.8	
	15	147	1.060	0.8	
	30	140	1.107	0.8	
	45	142	1.123	0.8	
60	146	1.133	0.8		
	weight of underflow collected		1.036	Kg	
	weight of overflow collected		1.287	Kg	
RESULTS	underflow analysis				
		Fe	57.3	%	
		P	0.146	%	
		SiO ₂	14.9	%	
	overflow analysis				
		Fe	63.0	%	
	Fe Recovery		42.3	%	

CREST - 4

FRED	weight of slurry	44.6	lb
	density	1.318	g/ml
	solids	31.7	%
	weight of solids	14.1	lb

REAGENTS same as in Crest 3

TEST	Time min	Flowrate ml/min	Density g/ml	Air s.c.f.h.
	0	138	1.035	0.8
	15	147	1.064	0.8
	30	150	1.066	0.8
	45	150	1.100	0.8
	60	147	1.110	0.8

weight of underflow collected	1.011 Kg
weight of overflow collected	1.074 Kg

RESULTS underflow analysis

Fe	58.6 %
P	0.119 %
SiO ₂	8.4 %

overflow analysis

Fe	62.9 %
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Fe Recovery	50.4 %
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CREST - 5

FEED	weight of slurry	166	lb
	density	1.122	g/ml
	solids	14.3	%
	weight of solids	23.7	lb
DESLIMING	NaOH	2.0	lb/ton
	NaAlPO ₃ 102H ₂ O	0.5	lb/ton
	Tapioca Flour	0.25	lb/ton
	Weight of Slurry Slime	109	lb
	Solids	12.3	%
	Weight of Slime	1.34	lb
	Slime Removal	5.6	%
TEST	Feed	33.1	% Solids
	Tapioca Flour	1.25	lb/ton
	NaOH	11.9	pH feed
	FA-2	1.0	lb/ton
	825	1.5	lb/ton

<u>Time</u> min	<u>Flowrate</u> ml/min	<u>Density</u> g/ml	<u>Air</u> s.c.f.h.	<u>pH</u>
0	153	1.121	0.6	
15	146	1.122	0.5	
30	145	1.118	0.4	11.5
45	151	1.121	0.4	
60	152	1.138	0.4	
75	148	1.130	0.4	
90	150	1.139	0.4	
105	148	1.134	0.4	
120	147	1.093	0.4	
140	146	1.094	0.4	

weight of underflow collected	8.32 lb
weight of overflow collected	3.91

RESULTS

Underflow analysis

Fe	65.9 %
P	0.065 %
SiO ₂	4.5 %

Overflow analysis

Fe	51.8 %
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Slime analysis

Fe	44.8 %
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Fe Recovery	70.2 %
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CREST - 6

FUEL DESLIMING

weight of slurry	1831	lb
solids	15.3	%
weight of solids	280	lb
NaOH	1.25	lb/ton
Na4 P207 10H2O	0.32	lb/ton
Tapioca Flour	0.16	lb/ton
weight of slurry slime	1211	lb
weight of slime	9.1	lb
slime removal	3.5	%

TEST	Feed	30.7	% solids
	tapioca flour	1.25	lb/ton
	NaOH	11.9	pH
	FA-2	0.75	lb/ton
	825	1.12	lb/ton

<u>Time</u> min	<u>Flowrate</u> ml/min	<u>Density</u> g/ml	<u>Air</u> s.c.f.h.
0	150	1.113	0.4
15	151	1.096	0.4
30	152	1.055	0.2
45	150	1.029	0.2
60	147	1.063	0.2
75	148	1.082	0.2
90	148	1.067	0.2
113	150	1.125	0.2

weight of underflow collected	4.37	lb
weight of overflow collected	2.88	lb

RESULTS

underflow analysis

Fe	65.4	%
P	0.069	%
SiO2	4.5	%

overflow analysis

Fe	53.6	%
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slime analysis

Fe	47.8	%
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Fe Recovery	63.4	%
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CREST - 7

FIELD
DESLEIMING Deslimed feed from Crest - 6 repulped to 15% solids and
the desliming step repeated

Na2 P207 10M20	0.5	lb/ton
NaOH	1.6	lb/ton
Tapioca Flour	.25	lb/ton
Slime Removal including Crest 6 above	5.5	%

FEED TEST	Feed	32.0	% solids
	Tapioca Flour	1.25	lb/ton
	NaOH	11.9	pH
	FA-2	0.75	lb/ton
	825	1.12	lb/ton

<u>Time</u> min	<u>Flowrate</u> ml/min	<u>Density</u> g/ml	<u>Air</u> s.c.f.h.
0	149	1.192	0.2
15	146	1.088	0.2
30	150	1.099	0.2
45	150	1.114	0.2
60	149	1.112	0.2

weight of underflow collected	2.75 lb
weight of overflow collected	1.60 lb

RESULTS underflow analysis

Fe	66.0 %
P	0.09
SiO2	3.7 %

overflow analysis

Fe	50.6 %
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slime analysis

Fe	34.0 %
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Combined slime
analysis (Crest 6
& 7)

Fe	42.2 %
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Iron Recovery	70.9 %
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CREST - 9

Description

same as in Crest - 7

TEST

Feed 30.0% Solids
 Tapioca Flour 1.25 lb/ton
 NaOH 11.9 pH
 FA-2 .25 lb/ton
 S.S. .375 lb/ton

<u>Time</u> min	<u>Flowrate</u> ml/min	<u>Density</u> g/ml	<u>Air</u> s.c.f.h.
0	150	1.078	0.3
15	150	1.115	0.3
30	150	1.091	0.3
45	150	1.113	0.3
60	150	1.133	0.3
70	150	1.158	0.3

weight of underflow collected 2.94 lb
 weight of overflow collected 2.56 lb

RESULTS

underflow analysis

Fe 66.1 %
 P 0.085 %
 SiO₂ 3.9 %

overflow analysis

Fe 54.8 %

combined slime analysis

Fe 42.2 %

Fe Recovery 52.8 %

CREST - 10

same as in Crest - 7

TEST Feed 31.5 % solids
 Tapioca Flour 1.25 lb/ton
 NaOH 11.9 pH
 FA-2 1.0 lb/ton
 S25 1.5 lb/ton

<u>Time</u> min	<u>Flowrate</u> ml/min	<u>Density</u> g/ml	<u>Air</u> s.c.f.h.
0	150	1.140	0.2
15	150	1.130	0.2
30	150	1.105	0.2
45	150	1.121	0.2
60	149	1.100	0.2
75	150	1.126	0.2

weight of underflow collected 3.68 lb
 weight of overflow collected 2.32 lb

RESULTS underflow analysis

Fe	66.1 %
P	0.062 %
SiO ₂	4.3 %

overflow analysis

Fe	52.7 %
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combined slime analysis

Fe	42.2 %
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Fe Recovery	60.6 %
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CREST - 11

DESCENDING same as in Crest - 7

TEST	Feed	31.5 % solids
	Tapioca Flour	1.25 lb/ton
	NaOH	11.9 pH
	FA-2	1.25 lb/ton
	S25	1.85 lb/ton

<u>Time</u> min	<u>Flowrate</u> ml/min	<u>Density</u> g/ml	<u>Air</u> s.c.f.h.
0	149	1.162	0.2
15	150	1.159	0.2
30	150	1.159	0.2
45	150	1.125	0.2
60	150	1.109	0.2

weight of underflow collected	3.40 lb
weight of overflow collected	1.64 lb

RESULTS

underflow analysis

Fe	66.0 %
P	0.072 %
SiO ₂	4.4 %

overflow analysis

Fe	50.8 %
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combined slime analysis

Fe	42.2 %
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Fe Recovery	66.4 %
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CREST - 12

FEED &
DESIGNING same as in Crest - 7

TEST	Feed	35.3	% Solids
	Tapioca Flour	1.25	lb/ton
	NaOH	11.33	ph
	FA-2	0.25	lb/ton
	825	0.375	lb/ton

<u>Time</u> min	<u>Flowrate</u> ml/min	<u>Density</u> g/ml	<u>Air</u> s.c.f.h.
0	149	1.144	0.3
15	146	1.140	0.3
30	150	1.149	0.3
45	148	1.083	0.3
60	148	1.082	0.3
75	150	1.120	0.3
90	152	1.182	0.3
105	149	1.222	0.3
120	150	1.192	0.3

weight of underflow collected	6.35 lb
weight of overflow collected	2.36 lb

RESULTS underflow analysis

Fe	65.1 %
P	0.131 %
SiO ₂	5.4 %

overflow analysis

Fe	51.8 %
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combined slimo analysis

Fe	42.2 %
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Fe Recovery	67.1 %
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CREST - 13

same as in Crest - 7

TEST Feed 39.0 % Solids
 Tapioca Flour 1.25 lb/ton
 NaOH 11.8 pH
 FL-2 0.25 lb/ton
 S25 0.375 lb/ton

<u>Time</u> min	<u>Flowrate</u> ml/min	<u>Density</u> g/ml	<u>Air</u> s.c.f.h.
0	160	1.186	.2
15	154	1.212	.2
30	150	1.232	.2
45	150	1.243	.2
60	150	1.254	.2
75	150	1.259	.2

weight of underflow collected 7.02 lb
 weight of overflow collected 1.31 lb

RESULTS

underflow analysis

Fe	65.2 %
P	0.114 %
SiO2	5.7 %

overflow analysis

Fe	42.4 %
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combined slime

Fe	42.2 %
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Fe Recovery	81.1 %
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