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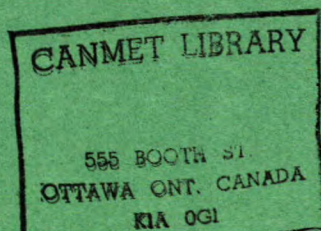
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CANADA

DEPARTMENT OF MINES AND TECHNICAL SURVEYS

OTTAWA



MINES BRANCH INVESTIGATION REPORT TR. 62-66

**CYANIDATION TESTS ON TWO ORES
FROM BEVCON MINES LIMITED,
PERRON, QUEBEC**

by

T. F. BERRY

MINERAL PROCESSING DIVISION

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Mines Branch Investigation Report IR 62-66

CYANIDATION TESTS ON TWO ORES FROM BEVCON MINES LIMITED,
PERRON, QUEBEC

by

T. F. Berry^{*}

SUMMARY OF RESULTS

The two ores appear to have nearly identical grinding characteristics.

An increase in both the fineness of grind and in the retention time of the pulp in the cyanide agitators resulted in an increased gold extraction as shown by the results in the following table:

Ore	Bevcon				Alkasaba				Mixture			
Test No.	2	18	6	20	7	21	11	23	12	14	15	17
Grind, % -200 M	73.6	70.6	97.6	93.3	71.8	68.0	97.8	92.0	70.4	93.0	70.8	93.2
Agitation Time, hr.	24	48	24	48	24	48	24	48	24	24	48	48
Extraction %, Au	87.5	88.8	90.6	92.5	91.1	91.1	95.6	95.6	90.2	92.0	92.0	95.7

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INTRODUCTION

During a recent visit to Bevcon Mines Limited, by two scientific officers from the Mineral Processing Division, it was suggested to the Mill Superintendent, Mr. Boyd Demarsh, that the Mines Branch might be of assistance in solving a gold-milling problem being experienced at the property.

Location of Property

Bevcon Mines Limited is a gold producer located in the Val d'Or area of northwestern Quebec.

Nature of Investigation Requested

Bevcon Mines Limited is currently milling a mixture of ore made up of three parts from their own mine and one part from Akasaba Gold Mines Limited.

In a letter dated June 22, 1962, Mr. Demarsh specifically asked the Mines Branch to ascertain whether finer grinding of either of the two ores, and of a mixture of the two ores, would result in an increased gold extraction.

Shipment

On June 28, 1962, a shipment of ore from Bevcon Mines Limited was received at the Mines Branch in Ottawa. It comprised the following:

1 can - 74 lb - 1/4 in. mill feed - Bevcon Mines Limited;

1 can - 78 lb - 1/4 in. " " - Akasaba Gold Mines Limited.

Sampling and Analysis

Each ore was crushed to -10 M and a head sample riffled out of each for a chemical analysis.

TABLE 1

Chemical Analysis of Head Samples

Element	Bevcon	Akasaba
Gold (Au) oz/ton	0.08	0.135
Sulphur (total S) %	0.54	1.68
Iron (soluble Fe) %	2.84	6.90
Insoluble %	81.08	74.33

From Internal Report MS-AC-62-840 and MS-AC-62-843.

DETAILS OF INVESTIGATION

Test 1

In the mill of Bevcon Mines Limited, the feed to the cyanidation circuit is ground to approximately 68.0% -200 M, and with a 20-hr retention time in the cyanide agitators, a gold extraction of about 91.0% is obtained.

In order to determine the relative grinding characteristics of the Bevcon and the Akasaba ores, a series of 5 grinding tests was done on each ore. The results of these tests may be seen in Table 2-A and Table 2-B which follow. In Figure 1 a graphical presentation of the grinding characteristics of the two ores is presented. This curve also contains the results of the screen tests carried out on all of the cyanidation residues of the two ores and on mixtures of the two ores.

TABLE 2-A
Results of Screen Tests on Ground Pulp - Bevcon Ore

Mesh Size	5 min Grind		10 min Grind		15 min Grind		25 min Grind		35 min Grind	
	Wt %	% Pass	Wt %	% Pass	Wt %	% Pass	Wt %	% Pass	Wt %	% Pass
+20 m	4.4	95.6	0.5	99.5	-	-	-	-	-	-
-20+28 m	5.0	90.6	0.4	99.1	-	-	-	-	-	-
-28+35 m	12.2	78.4	1.4	99.7	0.4	99.6	-	-	-	-
-35+48 m	12.0	66.4	5.0	92.7	1.2	98.4	0.3	99.7	-	-
-48+65 m	11.8	54.6	12.2	80.5	5.2	93.2	0.7	99.0	-	-
-65+100 m	10.2	44.4	15.0	65.5	12.2	81.0	2.8	96.2	1.0	99.0
-100+150 m	7.4	37.0	12.0	53.5	14.3	66.7	6.9	89.3	2.9	96.1
-150+200 m	6.1	30.9	9.5	44.0	11.9	54.8	11.0	78.3	7.0	89.1
-200+325 m	7.6	23.3	11.2	32.8	15.0	39.8	21.2	57.1	19.1	70.0
-325 m	23.3	-	32.8	-	39.8	-	57.1	-	70.0	-
Total	100.0	-	100.0	-	100.0	-	100.0	-	100.0	-

TABLE 2-B
Results of Screen Tests on Ground Pulp - Alkasaba Ore

Mesh Size	5 min Grind		10 min Grind		15 min Grind		25 min Grind		35 min Grind	
	Wt %	% Pass	Wt %	% Pass	Wt %	% Pass	Wt %	% Pass	Wt %	% Pass
+20 m	12.2	87.8	2.6	97.4	1.1	98.9	0.3	99.7	-	-
-20+28 m	7.2	80.6	2.0	95.4	0.6	98.3	0.2	99.5	-	-
-28+35 m	10.6	70.0	5.2	90.2	1.2	97.1	0.2	99.3	-	-
-35+48 m	9.2	60.8	8.0	92.2	3.0	94.1	0.4	98.9	-	-
-48+65 m	9.2	51.6	10.6	71.6	7.6	86.5	0.8	98.1	-	-
-65+100 m	8.6	43.0	11.8	59.8	12.0	74.5	3.6	94.5	1.0	99.0
-100+150 m	7.0	36.0	10.0	49.8	11.5	63.0	7.8	86.7	3.1	95.9
-150+200 m	5.6	30.4	7.8	42.0	9.2	53.8	10.8	75.9	6.2	89.7
-200+325 m	7.8	22.6	10.4	31.6	12.7	41.1	18.0	57.9	18.1	71.6
-325 m	22.6	-	31.6	-	41.1	-	57.9	-	71.6	-
Total	100.0	-	100.0	-	100.0	-	100.0	-	100.0	-

Tests 2 - 23

In the following cyanidation tests, the results of which are shown in Table 3, a solution strength of 1.0 lb NaCN/ton and 1.0 lb CaO/ton was maintained in a pulp having a dilution of 2:1.

A graphical presentation of the results is shown in Figure 2 in which the extraction of gold was plotted against fineness of grind. Cyanidation times of 24 hr and 48 hr were used.

TABLE 3
Results of Cyanidation Tests

Test No.	Grind Time min	Grind %		Charge Weight g		Agitation Time hr	PbO added lb/ton ore	Reagent Consumption lb/ton ore		Head oz/ton Au	Assay * Residue oz/ton Au	Extraction (3) % Au
		-200m	-325m	Dev	Aka			NaCN	CaO			
2	22	73.6	52.2	1000	nil	24	nil	0.56	2.40	0.08(1)	0.01	87.5
3	30	86.8	72.1	"	"	"	"	0.96	2.56	"	0.01	87.5
4	40	94.1	76.7	"	"	"	"	1.06	2.78	"	0.0092	88.5
5	50	97.0	83.8	"	"	"	"	1.23	2.72	"	0.0080	90.0
6	55	97.6	86.3	"	"	"	"	1.60	2.90	"	0.0075	90.6
7	22	71.8	56.6	nil	1000	"	"	1.02	3.40	0.135(1)	0.0120	91.1
8	30	86.0	70.6	"	"	"	"	1.88	3.42	"	0.0092	93.2
9	40	92.6	78.9	"	"	"	"	1.88	3.52	"	0.0075	94.4
10	50	96.3	86.2	"	"	"	"	2.52	3.63	"	0.0075	94.4
11	60	97.8	90.1	"	"	"	"	2.48	3.64	" (2)	0.0060	95.6
12	20	70.4	56.0	750	250	"	0.25	1.56	2.40	0.094	0.0092	90.2
13	30	86.6	70.6	"	"	"	"	1.56	2.60	"	0.0080	91.5
14	40	93.0	79.0	"	"	"	"	1.48	2.60	"	0.0075	92.0
15	20	70.8	54.5	"	"	48	"	1.88	2.80	"	0.0075	92.0
16	30	86.7	71.7	"	"	"	"	2.12	3.20	"	0.0060	95.7
17	40	93.2	79.8	"	"	"	"	2.20	3.16	"	0.0060	95.7
18	20	70.6	55.4	500	nil	"	"	1.00	1.80	0.08(1)	0.0090	88.8
19	30	86.2	69.2	"	"	"	"	1.00	1.96	"	0.0080	90.0
20	40	93.3	82.6	"	"	"	"	1.00	2.20	"	0.0060	92.5
21	20	68.0	54.0	nil	500	"	"	2.12	2.60	0.135(1)	0.0120	91.1
22	30	85.6	70.8	"	"	"	"	2.40	2.80	"	0.0070	94.8
23	40	92.0	78.8	"	"	"	"	2.38	2.80	"	0.0060	95.6

* From Internal Report MS-AC-62-875, MS-AC-62-876, MS-AC-62-889.

- (1) assayed
- (2) calculated
- (3) calculated by difference

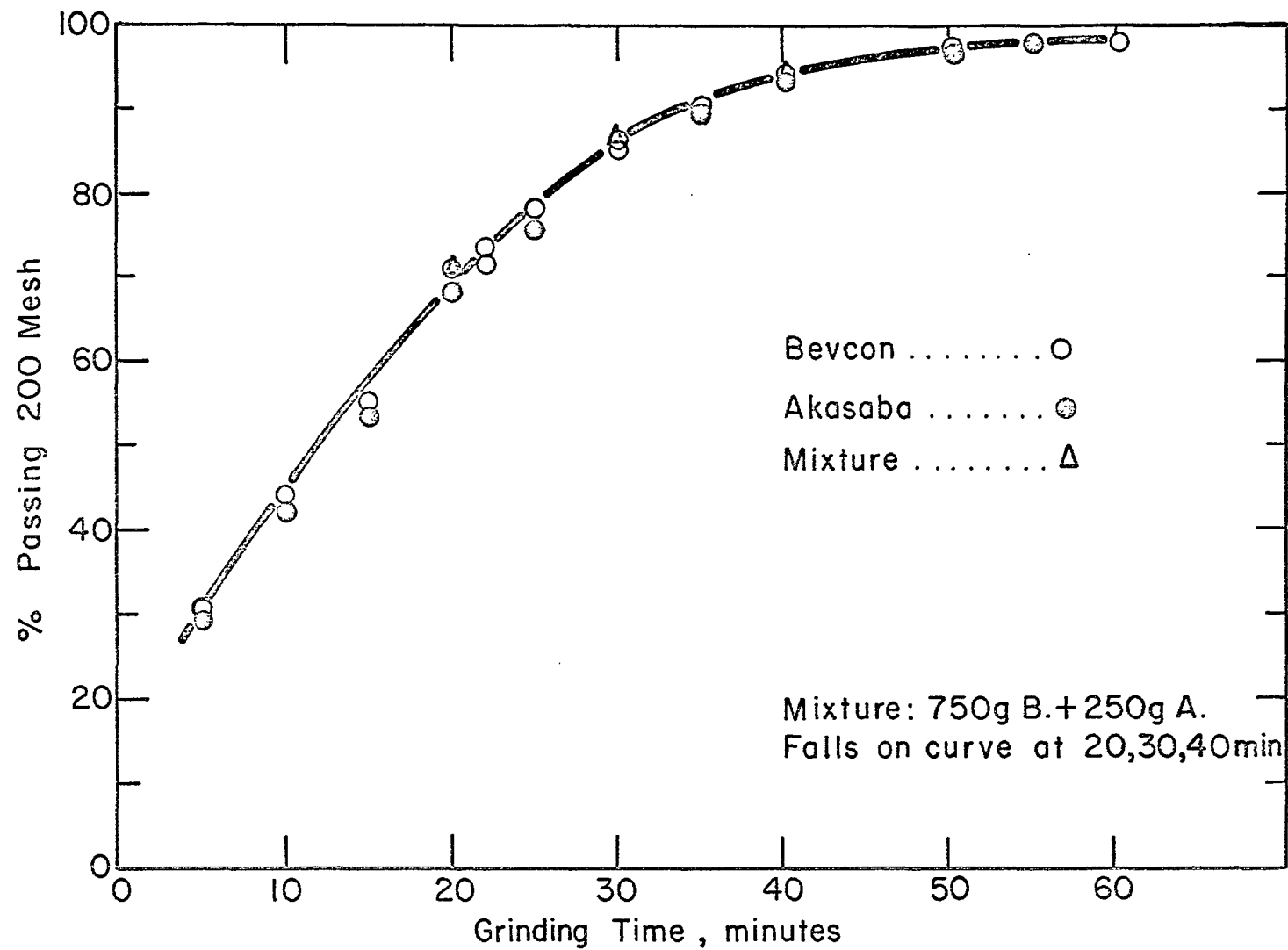


Figure 1 - A Comparison of Grinding Characteristics of Bevcon and Akasaba Ores and of a Mixture of the two Ores.

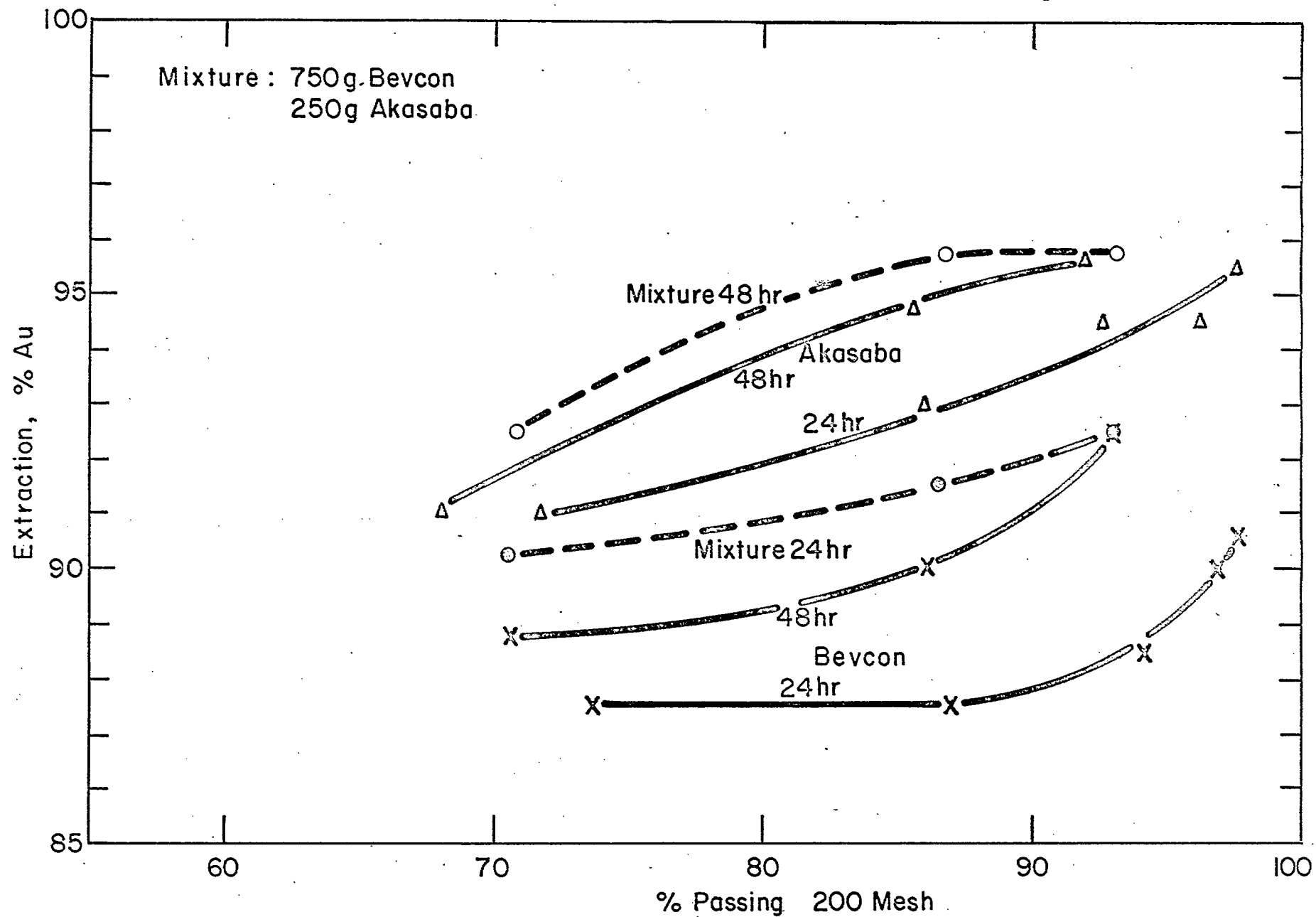


Figure 2 - Effect of Increasing Grinding Time and Cyanidation Time on Extraction of Gold from Bevcon and Akasaba Ores and from a Mixture of the two Ores.

CONCLUSIONS

As may be seen in Figure 1, the grinding characteristics of the Bevcon ore and the Akasaba ore were almost identical.

In Figure 2, in which the results of the cyanidation tests on each of the two ores and on mixtures of the two ores are plotted, it may be seen that an increase in the fineness of grind resulted in an increased gold extraction. A prolonged retention time of the pulp in the cyanide agitators also resulted in an increased gold extraction.

ACKNOWLEDGEMENT

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