A REPORT

ON A SAMPLE OF TAILINGS FROM THE PRINCE ALBERT MINE, CENTRAL MINING DISTRICT, BOULDER COUNTY, COLORADO.

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CHARACTER OF SAMPLE:

This sample was tailings from a concentrating test. It had been ground to 30 mesh. The original ore contained tellurides of gold and silver with other minerals in sulphide form.

Three preliminary tests were run with different oxidizing agents to learn the most desirable method of applying the cyanide process.

TEST NO. 1:

The ore was ground to 100 mesh in a tube mill, with an equal amount of water and one pound of litharge per ton of ore.

The pulp was then placed in a bottle agitator and water added so that there was one part ore to two parts (by weight) of water. Lime was added to the extent of two pounds of lime per ton of ore, and one pound of picric acid was added per ton of ore.

It was agitated two hours with the picric acid, then one pound of K. Cn. per ton of solution. It was then agitated six hours with the cyanide.

RESULTS:

ORE.

Heads - - .13 oz. gold, 2.85 oz. silver,

4 hour Tails, .005 " " 1.50 " "

6 " " trace " 1.16 " "

Total percentage of values, taking gold at $20.00 and silver at 50¢ = 86%.

SOLUTION.

Heads - - .1 lb. per ton of solution,

4 hour Tails, .92 lbs. " " " "

6 " " .86 " " " " "

Loss in K. Cn. = .26 lbs. per ton of ore = $4\frac{68}{100}$¢ (cyanide at 18¢)

Lime used, = 2 " " " " " = 8 mills (Lime at $8.00)

TEST No. 2:

The ore was ground to 100 mesh in a tube mill with an equal weight of water. It was then placed in a bottle agitator with two pounds of lime per ton of ore, one pound of amonium chloride per ton of solution. It was agitated ten hours with .05% Cyanide Solution.

RESULTS:

ORE.

Heads - - .10 oz. gold, 3.58 oz. silver,

10 hour Tails, trace " .98 " "

Extraction, = 90%.

SOLUTION.

Heads, - - 1 lb. per ton of solution,

Tails, - .76 " " " " "

Loss per ton of ore, .48 lbs. = 4 64/100¢ (Cyanide at 18¢)

Lime used = 2 lbs. per ton = 8 mills (Lime at $8.00)

TEST No. 3:

25 lbs. of ore was ground to 100 mesh with an equal weight of water, and 1 lb. of litharge per ton of ore ground with it.

It was then transferred to a Hendryx agitator and agitated for 8 hours at a temperature of 90° F. with twice its weight of water, one pound K. Cn. per ton of solution, and 2 lbs. Lime per ton of ore.

RESULTS:

O R E.

Heads, - -	.13	oz.	gold,	2.85	oz. silver
4 hour Tails,	.02	"	"	1.85	" "
6 " "	.005	"	"	1.47	" "

At this point one pound of picric acid was added per ton of ore and agitation continued.

8 hour Tails, trace of gold, 1.16 oz. silver.

Total extraction, = 82%.

SOLUTION.

Heads, - - 1 lb. K.Cn. per ton of solution,
4 hour Tails, .92 " " " " " "
6 " " .90 " " " " " "
8 " " .88 " " " " " "

Loss of K. Cn. = .24 lbs. per ton of ore = $4\frac{32}{100}$%.

Lime loss = 2 lbs. per ton = 8 mills.

TEST NO. 4 - FINAL TEST:

A sample ton of ore,(= 10 Kilos) was ground in a tube mill with one-half its weight of water, one pound of litharge per ton of ore, two and one-half pounds of Lime per ton of ore, and one pound of K. Cn. per ton of solution.

It was ground four hours to 100 mesh.

It was then transferred tp a Hendryx agitator and water added to make twice the weight of solution as that of ore. Cyanide was also added to make one pound K. Cn. per ton of Solution (.05%).

It was then agitated eight hours at a temperature of 90°F.

RESULTS:

O R E.

Heads - - .10 oz. gold, 1.47 oz. silver,
4 hour Tails, .01 " " 1.47 " "
6 " " .005 " " 1.28 " "
8 " " trace " " 1.28 " "

Total extraction, - 77%.

SOLUTION.

Heads - - 1 lb. K. Cn. per ton solution,

4 hour Tails, .89 " " " " " "

6 " " .85 " " " " " "

8 " " .83 " " " " " "

Loss - .54 lbs. per ton of ore = 9 72/100 ¢.

Lime Loss - 1¢ per ton of ore.

DISCUSSION AND SUMMARY:

All of the tests show a good extraction and low consumption of chemicals. Test No. 2 shows that the addition of a small amount of amonium chloride will greatly increase the silver extraction. Test No. 4 shows that adding K. Cn. in the tube mill increases the cyanide loss without increasing the extraction. Tests No's 1, 3 and 4 show that eight hours is plenty long enough to agitate.

It is evident that the better method is to grind wet in a tube mill with one pound litharge per ton of ore. Add two pounds Lime per ton of ore and one pound of amonium chloride and agitate eight hours with .05% cyanide solution heated to about 90° F.