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REPORT
of the
ORE DRESSING AND METALLURGICAL LABORATORIES

Test No.193

Amalgamation and cyanide tests on the ore
from the Ophir Lode Mine, British Columbia
by R. K. Carmochan

A shipment of ore, gross weight 20 pounds, was received May 7th. 1923, from Dr. H. B. Morrison, Nelson, B.C. This ore came from the Ophir Lode mine, situated on the divide between Gainer Creek, a fork of the Lardeau River, and Marsh Adams Creek, a fork of the Westfall River, or west fork of the Duncan river.

The ore contains values in gold and silver. The sample received was well weathered and contained a considerable quantity of iron sulphide.

Tests were desired on the sample to determine if amalgamating at 80 mesh would be better than amalgamating at 40 mesh, and if it would be necessary to cyanide after amalgamating.

Head Sample: The ore was crushed to 40 mesh, some metallics being obtained. A sample for assay was cut out and ground to pass 80 mesh, some more metallics being obtained. The -80 mesh material and the two lots of metallics were assayed with the following result:

	Au. oz/ton	Ag. oz/ton
+ 40 mesh metallics	0.38	0.06
+ 80 mesh metallics	0.80	0.08
- 80 mesh	1.76	0.46
Heads	2.94	0.60

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Amalgamation: Amalgamation tests were made on the ore by mixing in a

small pebble jar for three hours about 1000 grams of ore, 400 cc of water, and 100 grams of mercury. After mixing the mill charge was put through a hydraulic classifier to separate the mercury from the tailings The tailing was then dried, weighed, and sampled for assay. Three tests were made on ore ground to -40 mesh, and three on ore ground to -80 mesh. The results were:

	Au. oz/ton	Ag. oz/ton
-40 amalgamation tailing	0.35	0.24
-40 amalgamation tailing	0.36	0.23
-40 amalgamation tailing	0.28	0.15
Average	0.33	0.21
-80 amalgamation tailing	0.38	0.20
-80 amalgamation tailing	0.28	0.16
-80 amalgamation tailing	0.33	0.21
Average	0.33	0.19

Amalgamation at 40 mesh gives in metallics and amalgam a gold recovery of 88.8% and a silver recovery of 65.0%. Amalgamation at 80 mesh gives in metallics and amalgam a gold recovery of 88.8% and a silver recovery of 68.3%

Cyanidation: Cyanidation tests were made on all amalgamation tailings About 200 grams of tailing was taken for each test, a 24 hour agitating period was used. and the tailings were ground to -100 and -200 mesh. The average results obtained are:

	Au. oz/ton	Ag. oz/ton
-40 amalgamation tailing cyanided at -100 mesh	0.01	0.03
-40 amalgamation tailing cyanided at -200 mesh	0.02	0.01
-80 amalgamation tailing cyanided at -100 mesh	0.00	0.05
-80 amalgamation tailing cyanided at -200 mesh	0.03	0.02

The above table shows that the lowest tailings in gold are apparently secured by cyaniding at -100 mesh. This would not be the case however, as cyaniding at -200 mesh will always give as good, and usually better, results than at -100. The tests show that cyaniding at either -100 or -200 will give a tailing running about 0.02 oz. gold and 0.03 oz. silver per ton. With this tailing the recoveries made on the ore by amalgamating and cyaniding are, gold 99.3%; silver 95.0%.

The average cyanide consumption in the tests was 5.5 pounds per ton of amalgamation tailing treated, and the average lime consumption

was 7.2 pounds per ton.

Conclusions:

1. Amalgamation followed by cyanidation is a suitable method of treating the ore submitted, as the recoveries are very high, and the tailings very low.

2. Amalgamation at 40 mesh is preferable to amalgamation at 80 mesh, as the gold recovery at 40 mesh is the same as that at 80 mesh, the silver recovery is only a shade lower, and the mercury does not flower to nearly the same extent.

3. Cyanidation will be necessary after amalgamation, as the increase in recovery certainly warrants it, and the amalgamation tailings are too high to discard.

4. For cyaniding the amalgamation tailings will need to be ground to 100 mesh. Finer grinding than 100 mesh is not necessary.

5. The consumption of cyanide is fairly high, probably due to the oxidized condition of the ore. It would be expected on fresh unoxidized ore, that this consumption would be materially less.