

Ont., June 5th, 8.

Report of Ore Dressing & Metallurgical Division.

Test No. 89

Gold Ore from Sudbury, Ont.

A shipment of 3½ bags of gold ore was received on December 11th, 1917, from J.S. Black, Sudbury, Ontario.

Gross weight received-----220 pounds.

Net weight received-----215 pounds.

Analysis----- Gold-----1.70 ozs., per ton.

The gold was associated with arsenopyrite in the ore and although free gold was visible to the naked eye it was proven that it was not free milling.

Tests were conducted to recover the gold values by amalgamation, by Table Concentration and Flotation, and by cyaniding the table tailings.

The ore was first crushed to pass 40 mesh and sampled from which the above analysis of 1.70 ozs, to the ton was obtained. A portion of this sample was held for a Flotation test.

Amalgamation: The ore crushed to pass 40 mesh less the sample was panned to recover any free gold. It was given a second panning to see if any more gold values were recoverable by this method.

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Tailings after 1st, Amalgamation- 1.20 ozs. gold per ton.

Tailings after 2nd, Amalgamation- 1.13 ozs. gold per ton.

Recovery by Amalgamation-----33.5% of gold value.

Table Concentration- The Tailings from the Amalgamation Tests were concentrated on an Overstrom Table with the following results.

Weight of pulp to table-----800 pounds.

Analysis -----gold-----1.13 ozs.

Content-----gold-----0.113 ozs.

Concentrates obtained -----17 pounds.

Analysis-----gold-----7.15 ozs.

Content-----gold-----0.0698 ozs.

Recovery of Gold Values-----53.8%

Middlings obtained -----74 pounds.

Analysis-----gold-----0.74 ozs.

Content-----gold-----0.0274 ozs.

Percentage of Gold Values-----24.3%

Tailings obtained-----54 pounds

Analysis-----gold-----0.34 ozs.

Content-----gold-----0.0092 ozs.

Percentage of Gold Values-----6.1%

Slime loss-----65 pounds.

Analysis-----gold-----0.57 ozs.

Content-----gold-----0.0156 ozs.

Percentage of Gold Values-----13.9%

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Figuring on a recovery of 70% of the gold values in the middlings being recovered with the concentrates in returning the middlings to the milling circuit in actual practice, the recovery by table concentration would be 70.8%. This would leave 29.2% of the gold values left in the slime and table tailings. The slime loss from the table concentration would not be a loss if further treatment by Cyanidation would be resorted to.

Flotation Concentration:- A sample of the crude ore crushed to 40 mesh was taken for this test, and the concentration made on the Callow Pneumatic Testing Machine.

Ore used-----1000 grams.

Oil used-----2 pounds per ton of Mixture;
 10% Coal tar.
 50% Coal tar creosote;
 40% Hardwood oil F.P.L. #36.

Concentrates obtained:- -----151 grams.

Analysis-----gold-----7.54 ozs. per ton.

Content-----gold-----11.3654 gram-ozs.

Recovery of Gold Values-----67.0%

Middlings obtained:- -----77 grams.

Analysis-----gold-----1.06 ozs. per ton.

Content-----gold-----0.9162 gram-ozs;

Percentage of Gold Values-----4.8%

Tailings obtained:- -----772 grams.

Analysis-----gold-----0.62 ozs; per ton.

Content-----gold-----4.7864 gram-ozs.

Percentage of Gold Values-----28.2%

Figuring on a recovery of 70% of the gold values in the middlings being recovered with the concentrates in actual practice, the recovery by flotation would be 70.4%. This would leave 29.6% of the gold values left in the Tailings, which would have to be cyanided. Finer grinding would no doubt give a better recovery by this method.

Cyanidation :- Tests were made on the table middlings and the table Tailings. A sample of each of these products was ground to pass a 100 mesh screen.

Middlings- Analysis----- gold-----0.74 ozs. per ton.
 Amount of Middlings taken-----200 grams.
 Amount of Solution used-----1000 c.c.
 Strength of Solution used-----0.15%
 Lime added-----1 gram.
 Duration of agitation-----12 hours.
 Analysis of Tailings-----0.26 ozs. per ton.
 Recovery of gold values in Middlings-----65%
 Consumption of Cyanide-----2.5 pounds per ton.
Tailings :------Analysis----gold-----0.34 ozs. per ton.
 Amount of Tailings taken-----200 grams.
 Amount of Solution used-----1000 c.c.
 Strength of Solution used-----0.15%.
 Lime added-----1 gram.
 Duration of agitation-----12 hours.
 Analysis of Tailings-----0.02 pzs. per ton.
 Recovery of gold value in Table Tailings-----94%.
 Consumption of Cyanide-----0.5 pounds per ton.

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It will be noted that a poor extraction is made on the table middling but that a high recovery is made on the table tailings. The consumption of Cyanide is high on the middlings and comparatively low on the tailing for this class of ore. The low extraction and high consumption of cyanide on the middlings is due to the arsenopyrite remaining in this product. The test was run on the middlings to determine this point.

Conclusios:- Amalgamation should not be resorted to on this ore. Trouble would be encountered in keeping the plates clean which together with the loss in mercury would prohibit its use.

Table concentration and cyanidation of the table tailings seems to be the better method of procedure with an ore of this class. A recovery of 79% of the gold values in the ore should be obtained in the table concentrates. A futher recovery of $30 \times 94 \div 100 = 28.2\%$ of the gold values in the ore should be obtained by Cyaniding the table tailings, making a total recovery of 98% of the gold Values in the ore.

Flotation Concentration and cyanidation of the Flotation tailings would be equally as good were it not that trouble might be experienced in cyaniding the flotation tailings.