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R. 567

MATHINNA, GOLD RECOVERY BY AMALGAM TREATMENT

At the request of Mr. R. Taylor, tests were carried out on two samples of sand stated to be from Mathinna, to determine the recovery of gold possible, using a simple method.

Sample

Examination of a panned concentrate submitted on an earlier date showed that the gold was present as very small particles and the shape of the particles was honeycombed in nature where the gold had previously partly enclosed quartz grains. Some gold particles still had quartz grains entrained. The angular shape of the gold indicated that it had not travelled far.

Two samples were submitted on this occasion:

Sample 1, said to be a panned concentrate, was a sample of sand weighing about 11 lb.

Sample 2, said to be a sample of feed, was a sample of sand weighing about 21 lb.

Note 1. No responsibility will be accepted for the results shown in this report except insofar as they apply to the samples received.

Note 2. All screens used were from the British Standard Screen Series.

Test Work

Sample No. 1 was screened on a 7 mesh screen to remove oversize material. The —7 mesh fraction was assayed. The results were as follows:—

	Per Cent Weight	Au Assay
+ 7 mesh	1.8	
— 7 mesh	98.2	3.8 dwts/ton

This assay was much lower than what was indicated by the panned concentrate previously submitted, and also lower than the feed sample—Sample No. 2. It indicates, therefore, that either the sample was taken from relatively barren ground, or that gold was lost during pan concentration. The honeycombed nature of the gold would tend to make the gold float readily on the surface of water.

No further work was done on Sample No. 1.

Sample No. 2 was screened on a 7 mesh screen to remove oversize material and the size fractions were assayed for gold. The results were as follows:—

Mesh	% Weight	Au assay-dwts/ton	% distribution
+ 7	3.7	6.0	1.8
— 7	96.3	13.0	98.2
	100.0	12.7 (calculated)	100.0

The —7 mesh fraction was riffled to provide a smaller sample for further screening. The size fractions were assayed for gold with the following results:—

Mesh	% Weight	Au assay-dwts/ton	% distribution
+ 36	30.1	0.8	1.9
— 36 + 52	15.9	0.8	1.0
— 52 + 72	21.1	2.4	4.1
— 72 + 100	13.2	6.6	7.0
— 100	16.0	65.8	84.2
Total	96.3	12.7 (calculated)	98.2

The calculated assay of the —7 mesh fraction of 12.7 dwts/ton compares with the actual assay obtained of 13.0 dwts/ton.

Combining the two screen analyses above, we have the following:—

Mesh	% Weight	% Weight Cumulative	Au Assay dwts/ton	Au % Distribution	Au Distribution Cumulative %
+ 7	3.7	3.7	6.0	1.8	1.8
— 7 + 36	30.1	33.8	0.8	1.9	3.7
— 36 + 52	15.9	49.7	0.8	1.0	4.7
— 52 + 72	21.1	70.8	2.4	4.1	8.8
— 72 + 100	13.2	84.0	6.6	7.0	15.8
— 100	16.0	100.0	65.8	84.2	100.0
	100.0		12.5 (calculated).		

The calculated head assay of 12.50 dwts/ton compares with the calculated head assay of 12.7 dwts/ton obtained on the 7 mesh screening.

Examination of the above distribution of the gold shows that, if the ore were screened on a 52 mesh screen, 95.3 per cent of the gold would report in the undersize which consisted of 50.3 per cent of the feed.

Accordingly, about 2,000 grams of material were split from the undersize of the initial 7 mesh screening. This sample was then screened on a 52 mesh screen, and the undersize was placed in an earthen jar at a pulp density of 60 per cent solids and 550 grams of mercury was added. No other reagents were added. The contents in the earthen jar were tumbled for 21 hours.

The results of the amalgam test were as follows:—

	dwts/ton	% Distribution
Calculated assay of untreated − 52 mesh material (from screen analysis)	23.7	100.0
Amalgam residue assay	2.4	10.1
∴ Gold extraction	21.3	89.9

This result indicates that the gold is amenable to amalgam treatment. Note that the above assays refer to weight of −52 mesh material.

A summary of the overall result is as follows:—

Product	Weight (lb)	Au Assay dwts/ton	Au distribution in dwts	Au distribution per cent
Feed	2,240	12.5	12.5	100.0
+ 7 mesh	83	6.0	0.22	1.8
− 7 + 52 mesh	1,030	0.8	0.37	2.9
− 52 mesh amalgam residue	1,127	2.4	1.21	9.7
Extracted gold			10.7	85.6

Conclusions

The gold present is very finely sized. By screening on a 52 mesh screen, 50 per cent of the feed can be rejected with a 5 per cent loss of gold. The gold responds well to amalgam treatment. 90 per cent of the gold in the −52 mesh fraction can be recovered by amalgam treatment, giving an overall gold recovery of 85 per cent.