

GIANT
Yellowknife Mines Limited

MEMO TO: Don Cooper
FROM: Doug Bartlett *DB*
CC: J.S. McAlpine, S.E. El-Alfy
DATE: November 7, 1988
RE: GOLD AND PARTICLE SIZE DISTRIBUTIONS IN TRP FEED AND TAILINGS

SUMMARY

A one week composite sample of TRP feed and tailings solids was prepared using assay rejects to investigate gold distribution and recovery by particle size. Samples of both streams were wet and dry screened, and each size fraction was weighed and assayed for gold.

The key findings were:

1. There was negligible +65 mesh material in the feed and tailings samples.
2. Both stream solids are extremely fine, 70 to 75% minus 325 mesh.
3. Cycloning and grinding a portion of the T.R.P. feed does not look promising. The gold concentrates to the finest fractions.

+150 mesh 8% of weight containing 5.6% of the gold
+200 mesh 18.4% of the weight containing 12.3% of the gold.

Even if grinding doubles the gold extraction from the above mesh fraction, the overall plant recovery would only increase from say 30% to 32-34%.

4. The % extraction of gold was the same from each size fraction of T.R.P. feed solids, about 26%. On the plant this would have been 32% due to incremental extraction in the surge tank.

INTRODUCTION

With 1988 TRP recovery being less than expected, the question was raised as what particle size range incurred the heaviest gold loss. The +65 mesh fraction of one grab sample of tailings taken September 30, 1988 assayed 0.41 oz/ton. Other associated points were:

- o How much fine carbon (if any) is there in the coarse tailings fraction and in what size range?
- o If the coarser feed particles (say cyclone split at 150 mesh) were ground to minus 200 mesh, could extra recovery be gained?

To answer all the above questions, a program was started to prepare, screen, and assay composite samples representative of TRP feed and tailings streams.

PROCEDURE

Assay sample rejects of TRP feed and tailings were obtained for the period September 25, 1988 to October 1, 1988. During this period the high cyanide addition test (increase from 1.0 to 2.0 lb/ton) was conducted.

For each operating shift there were two samples of each stream. These two samples were combined in total and blended by rolling. Then a one week composite was prepared by taking a weighted amount from each shift composite. The weighting factor was based on the total tons of dry solids fed to the TRP during that shift. Table 1 contains the sample compositing details along with the routine shift solids and solution gold assays. Blending of the week composites was achieved by bottle rolling, riffing and mat rolling.

Approximately 800 g of feed and tailings was separated into nine size fractions. This was done by first wet screening everything on 200 mesh and then dry screening (35 to 200 mesh nest) the plus 200 mesh fraction. The minus 200 mesh fraction was wet screened on 325 mesh and the plus fraction dry screened at 270 and 325 mesh. All screen fractions were weighed, sampled, and assayed.

RESULTS

Detailed screening data are included in Tables 2 and 3. The key results are summarized in Table 4.

DISCUSSION

Microscopic and carbon analysis work have not yet been conducted on the coarse size fractions. This will be undertaken on the 100 mesh and 150 mesh fractions. With the exception of the few grains of +65 mesh solids, all solids gold assays were within the routine range of TRP data. Thus a significant loss of gold to carbon fines is not expected.

The gold in both feed and tailings concentrates to the finer size fractions. This trend does not contribute to potential benefits from separating and regrinding a coarse feed fraction. Nevertheless, the cyanidation response to regrinding will be investigated for each size fraction.

About the same % gold extraction from solids was noted for each size fraction in the 100 to 325 mesh range. This is an extremely interesting result. It means that whatever changed the refractory gold to liberated gold in the tailings dams, did so uniformly on a size basis down to minus 325 mesh. However, it should be noted that about 20% of the gold solubilized prior to the feed samples being taken. The distribution of this "surge tank" gold between the feed size fractions cannot be determined using routine TRP samples.

RECOMMENDATION

Work should continue to investigate the metallurgical response of each size fraction of TRP feed and tailings. This will provide the database to search for low cost flowsheet additions to improve overall project economics.

TABLE 1

PREPARATION OF TRP ONE WEEK COMPOSITE FEED AND TAILINGS

Day	Date/Shift	Feed Tons	Solids Assay		Solution Assays		(1) Sample wts, grams Removed for Composite	
			<u>oz/ton Au</u>		<u>oz/ton Au</u>		<u>oz/ton Au</u>	
			<u>Feed</u>	<u>Tails</u>	<u>Feed</u>	<u>Tails</u>	<u>Feed</u>	<u>Tails</u>
Sun.	Sept. D/S	3070	0.044	0.047	0.0052	0.0010	399	254
	25 N/S	3881	0.050	0.048	0.0060	0.0010	504	322
Mon.	Sept. D/S	3261	0.053	0.044	0.0063	0.0009	424	271
	26 N/S	2987	0.066	0.048	0.0051	0.0009	388	248
Tues.	Sept. D/S	2822	0.064	0.050	0.0040	0.0007	367	234
	27 N/S	3361	0.074	0.050	0.0046	0.0006	437	279
Wed.	Sept. D/S	2678	0.061	0.049	0.0041	0.0008	348	222
	28 N/S	2841	0.082	0.049	0.0034	0.00055	369	236
Thurs.	Sept. D/S	2749	0.061	0.048	0.0032	0.0008	357	228
	29 N/S	2734	0.066	0.048	0.0040	0.0008	355	227
Fri.	Sept. D/S	3200	0.059	0.051	0.0043	0.0009	416	266
	30 N/S	4102	0.080	0.051	0.0051	0.0011	533	340
Sat.	Oct. D/S	2180	0.058	0.049	0.0041	0.0008	283	181
	1 N/S	2550	0.061	0.043	0.0041	0.0008	331	212
		42,416	0.063	0.048	0.0045	0.0008	5511	3520

(1) Basis:

Feed - 0.13 g sample per ton of TRP feed.

Tails - 0.083 g sample per ton of TRP feed.

TABLE 2

TRP FEED SIZING DATA

<u>Screen Size</u>		<u>Weight Fraction</u>			<u>Gold</u>			
<u>Mesh</u>	<u>Microns</u>	<u>g</u>	<u>%</u>	<u>Cum % Ret</u>	<u>Assay oz/ton</u>	<u>Fraction oz/100 ton</u>	<u>% Dist</u>	<u>Cum % Ret</u>
35	420	Nil						
48	297	<0.1	0.01	.01 }				
65	210	0.6	0.07	.08 }	0.185	0.015	0.17	
100	149	14.3	1.73	1.81	0.074	0.128	1.43	1.60
150	105	52.0	6.30	8.11	0.057	0.359	4.00	5.60
200	74	85.3	10.34	18.45	0.058	0.600	6.69	12.29
270	53	48.9	5.93	24.38	0.064	0.380	4.24	16.53
325	44	38.6	4.68	29.06	0.068	0.318	3.55	20.08
-325		585.2	70.94	100.00	0.101	7.165	79.92	100.00
TOTAL		825.0	100.00		*0.076	8.965		

NOTE:

*indicates Direct Assay

TABLE 3

TRP TAILINGS SIZING DATA

<u>Screen Size</u>		<u>Weight Fraction</u>			<u>Gold</u>			
<u>Mesh</u>	<u>Microns</u>	<u>g</u>	<u>%</u>	<u>Cum % Ret</u>	<u>Assay oz/ton</u>	<u>Fraction oz/100 ton</u>	<u>% Dist</u>	<u>Cum % Ret</u>
35	420	Nil						
48	297	<0.1	0.01	0.01				
65	210	0.5	0.06	0.07	0.274	0.019	0.28	
100	149	10.3	1.28	1.35	0.059	0.076	1.13	1.41
150	105	39.2	4.89	6.24	0.043	0.210	3.12	4.53
200	74	66.7	8.32	14.56	0.040	0.333	4.95	9.48
270	53	49.0	6.11	20.67	0.048	0.293	4.36	13.84
325	44	36.4	4.54	25.21	0.057	0.259	3.85	17.69
-325		599.8	74.79	100.00	0.074	5.534	82.31	100.00
TOTAL		802.0	100.00		*0.056	6.724		

NOTE:

*indicates Direct Assay

TABLE 4

SUMMARIZED RESULTS

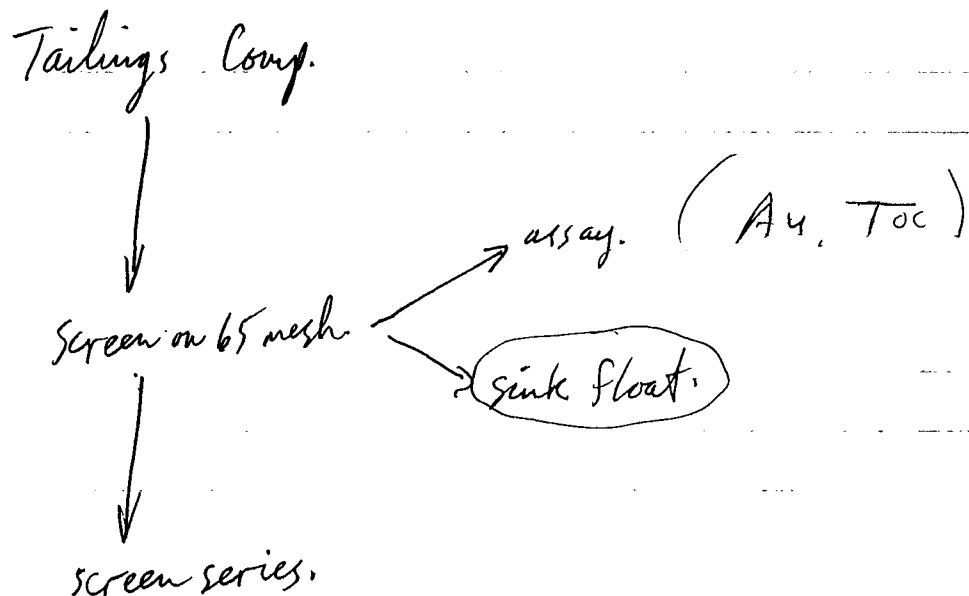
<u>Mesh Size</u>	<u>Cum % Wt Retain</u>		<u>Cum % Gold Retain</u>		<u>Recovery from</u>	
	<u>Feed</u>	<u>Tailings</u>	<u>Feed</u>	<u>Tailings</u>	<u>Solids</u>	<u>*TRP Feed</u>
+65	0.1	0.1	0.2	0.3	-	-
+100	1.8	1.3	1.6	1.4	20.3	26.9
+150	8.1	6.2	5.6	4.5	24.6	32.5
+200	18.4	14.6	12.3	9.5	31.0	38.2
+270	24.4	20.7	16.5	13.8	25.0	32.1
+325	29.1	25.2	20.1	17.7	16.2	23.7
-325	100.0	100.0	100.0	100.0	26.7	31.3
Total					26.3	32.3

*Based on 40% solids and solution containing 0.0045 oz/ton gold.

Filante: DAD

Oct 10/88.

- To Record a Conversation with Don Cooper on
Coarse Gold in TRP Tailings.



Feed.

Tails

