metcon
LABORATORIES

LEACHING CHARACTERISTICS OF SULPHIDE MINERALIZATION FROM THE KAY TANDA PROSPECT, PHILIPPINES

FOR

MRL GOLD PHILIPPINES INC.
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REPORT M1499
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ALAN ESLAKE

It is important to recognise that the results reported relate only to the sample submitted

CONTENTS

SUMMARY

Metcon report M1374 of July 2007 covered heap leaching tests on composite samples representing the oxide and transition mineralization at Kay Tanda. This current report presents heap leaching and other testwork completed on a composite sample of the sulphide mineralization.

For all three types of mineralization heap leaching tests were completed at two crush sizes of minus 12.7mm and minus 50mm. Complimentary to these were agitation leach tests at a grind size of 80% passing 75µm to indicate the maximum gold extractions that might be achieved from each type of mineralization.

The results of the heap leach tests on each type of mineralization are summarized below, where it can be seen that gold extractions from the sulphide mineralization were significantly lower at both crush sizes, and also much slower at the minus 12.7mm crush size.

Composite	**Oxide**		**Transition**		**Sulphide**	
Crush size	-50mm	-12.7mm	-50mm	-12.7mm	-50mm	-12.7mm
Leach time (days)	70	29	70	23	77	151
Calculated head grade (g/t Au)	1.09	1.14	0.95	1.06	1.43	1.96
Residue grade (g/t Au)	0.21	0.20	0.19	0.23	0.66	0.66
Final % Gold extraction	**80.7**	**82.4**	**80.1**	**78.3**	**53.8**	**66.4**
% Gold extraction after 10 days	69.8	80.3	62.6	76.6	44.9	51.8

The table below compares the gold extractions obtained by heap leaching at the minus 12.7mm crush size with the indicated maximums achievable by agitation leaching.

Composite	**Oxide**		**Transition**		**Primary**	
	Heap Leach	**Agitation leach**	**Heap Leach**	**Agitation leach**	**Heap Leach**	**Agitation leach**
Calc Head (g/t Au)	1.14	1.14	1.06	1.05	1.96	2.44
Residue (g/t Au)	0.20	0.08	0.23	0.12	0.66	0.25
% Gold extraction	82.4	93.4	78.3	88.6	66.4	89.7
Decreased residue (g/t)	0.12		0.11		0.41	
Increased extraction (%)	11.0		10.3		23.3	

The gold extractions obtained by heap leaching of the oxide and transition mineralization were within 10 to 11% of the indicated maximums achievable, which indicates that both types of mineralization should be highly amenable to heap leaching. However, for the sulphide mineralization the difference in the gold extractions by heap leaching and agitation leaching was significantly higher. This suggests that agitation leaching might be the preferred option for processing the sulphide mineralization.

Consequently, a programme of testwork was completed to determine the optimum conditions for agitation leaching under carbon-in-pulp (CIL) conditions. This included an assessment of the amount of gold that could be recovered by gravity concentration, and comminution testwork to establish the basic design parameters for comminution circuit design and cost estimation.

The indicated optimum conditions for CIL processing were a grind size of 80% passing 75µm and a leach time of 20 hours. Under these conditions a leach residue grade of 0.188g/t Au was obtained from a calculated head grade of 1.34g/t Au, which equates to a gold extraction of 85.9%. Indicated reagent consumptions were 0.56g/t cyanide and 0.78g/t lime.

This 85.9% extraction is lower than the 89.7% obtained in the original maximum extraction test because of the very high (2.44g/t Au) calculated head grade obtained in that test. The calculated head grades for all the tests completed on the sulphide composite were quite variable, ranging from 1.16g/t to 2.44g/t Au, which is attributed to the presence of some relatively coarse and spotty gold. However, the average calculated head grade for all the tests completed was 1.49g/t Au, which was close to the expected head grade of 1.55g/t Au derived from the exploration assays. If the indicated residue grade of 0.188g/t Au obtained under the optimum CIL conditions is applied to a head grade 1.49g/t Au, then the % gold extraction by CIL would increase to 87.3%.

The average gold extraction by gravity concentration was relatively low at 21.1%. Gravity concentration is more efficient in the laboratory than would be the case in the plant, particularly in the finer size ranges. Consequently, the actual plant recovery will be lower and may be insufficient to justify the inclusion of gravity concentration in any future CIL plant flowsheet. Nevertheless, a few relatively coarse gold flakes up to approximately 500µm in size were observed in some of the gravity concentrates.

The results of the comminution testwork are summarized below.

Abrasion index Ai	Rod mill work index		Ball mill work index	
	Product P80µm	WI kWh/t	Product P80µm	WI kWh/t
0.0288	853	17.2	78	12.9

The very low abrasion index and the low ball mill work index indicate that the capital and operating costs for grinding should be relatively low.

1. INTRODUCTION

In earlier testwork (Metcon Report M1374, July 2007) samples representing the oxide and transition zones in the Kay Tanda deposit were tested for amenability to heap leaching. The results are summarised in Table 1.

Table 1. Results obtained on previous composites (% Gold extractions)

COMPOSITE	OXIDE	TRANSITION
By agitation leaching at P80 75µm grind size	93.4	88.6
By heap leaching at 12.7mm crushed size	82.4	80.7
By heap leaching at 50mm crushed size	78.3	80.1

This report presents the results of replicate heap leaching testwork on a composite sample representing the sulphide zone of the deposit. It also includes the results of:

(i) a more detailed study of the response of the sample to gravity concentration and agitated leaching under carbon-in leach (CIL) conditions;

(ii) and comminution tests on the sample to determine the abrasion index and rod and ball mill grinding work indices.

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2. SAMPLES RECEIVED

Two 200L drums of sample were received at Metcon on July 25th, 2007. The drums contained samples of quarter NQ, HQ & PQ core from 15 different drill holes, weighing a total of 246kg. A detailed list of the samples supplied is given in Appendix 1.

The following is the geological description that was provided with the samples:

The samples sent to METCON for metallurgical tests this month consist of unoxidized composites of ¼ cores of holes KTDH-03, 04, 05, 07, 08, 10, 11, 12, 15, 16, 19, 20 and PLDH-01, PLDH-02. Ore material is of varied lithology but commonly cut by weak to strong fractures commonly filled with stockworks of quartz, chlorite, sericite and pyrite and at times by gouge. The samples submitted vary in character from solid (competent) to strongly-fractured (strong stockwork). Strongly-fractured material has a tendency to be finer-grained because of gouge as fracture infill and due to mechanical breakdown from cutting whilst weakly fractured rocks are solid. The table below shows the percentage distribution of fractures in the submitted samples."

Item	***Length in meters***	***% distribution***
Weak-moderate fractured rock	*80.3*	*44.22*
Strongly fractured rock (fines)	*32.2*	*17.73*
Unfractured / very weakly fractured rock (solid/competent)	*69.1*	*38.05*
Total length of sample submitted	*181.6*	

The samples did not appear as competent as the previously tested oxide and transition zone samples, as they contained a significant amount of fines. However, like the samples from the other two zones, the presence of voids ('vugs') was noted. The following photographs show some of the larger pieces of unbroken core:

3. SCOPE OF WORK

The following testwork was completed on the composite sample, which was made up from all the samples received:

- Detailed head assays
- Column heap leach tests at two crush sizes
- Determination of the amount of gravity recoverable gold
- CIL tests on the gravity tailings
- Determination of the abrasion index and Bond rod and ball mill work indices.

Figure 1 overleaf shows the initial phase of sample preparation and the testwork associated with the assessment of heap leaching performance. Figure 2 on the subsequent page shows the second phase of testwork covering the comminution, gravity concentration and CIL testwork.

4. SAMPLE PREPARATION

The 246kg of samples received were combined and crushed to minus 50mm. However, one dimension of the crushed material was limited by the radius of the quarter core, which even for the PQ core was <50mm. Crushing was carried out using a jaw crusher with the gap set to 50mm and with the sample choke fed in order to reduce the core pieces to approximately 50mm in length.

The crushed material was blended and sub-divided by cone and quartering to supply the following splits for subsequent testwork:

- 150kg for the coarse crush size column heap leach test (see Figure 1)
- 30kg for the finer crush size column heap leach test and the associated maximum gold recovery test (see Figure 1)
- 66kg of excess material, which was subsequently used in the comminution, gravity concentration and CIL testwork (see Figure 2).

Figure 1. Sample preparation & heap leaching testwork.

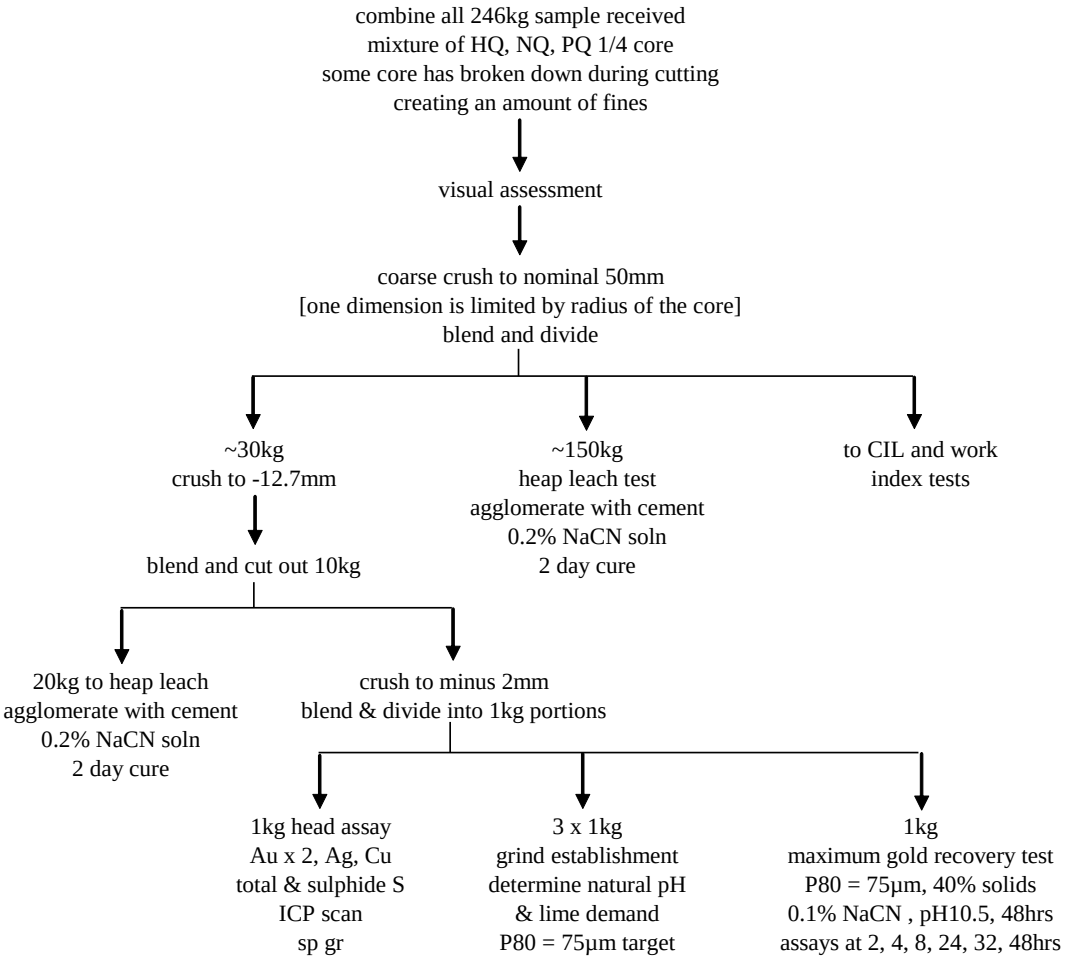
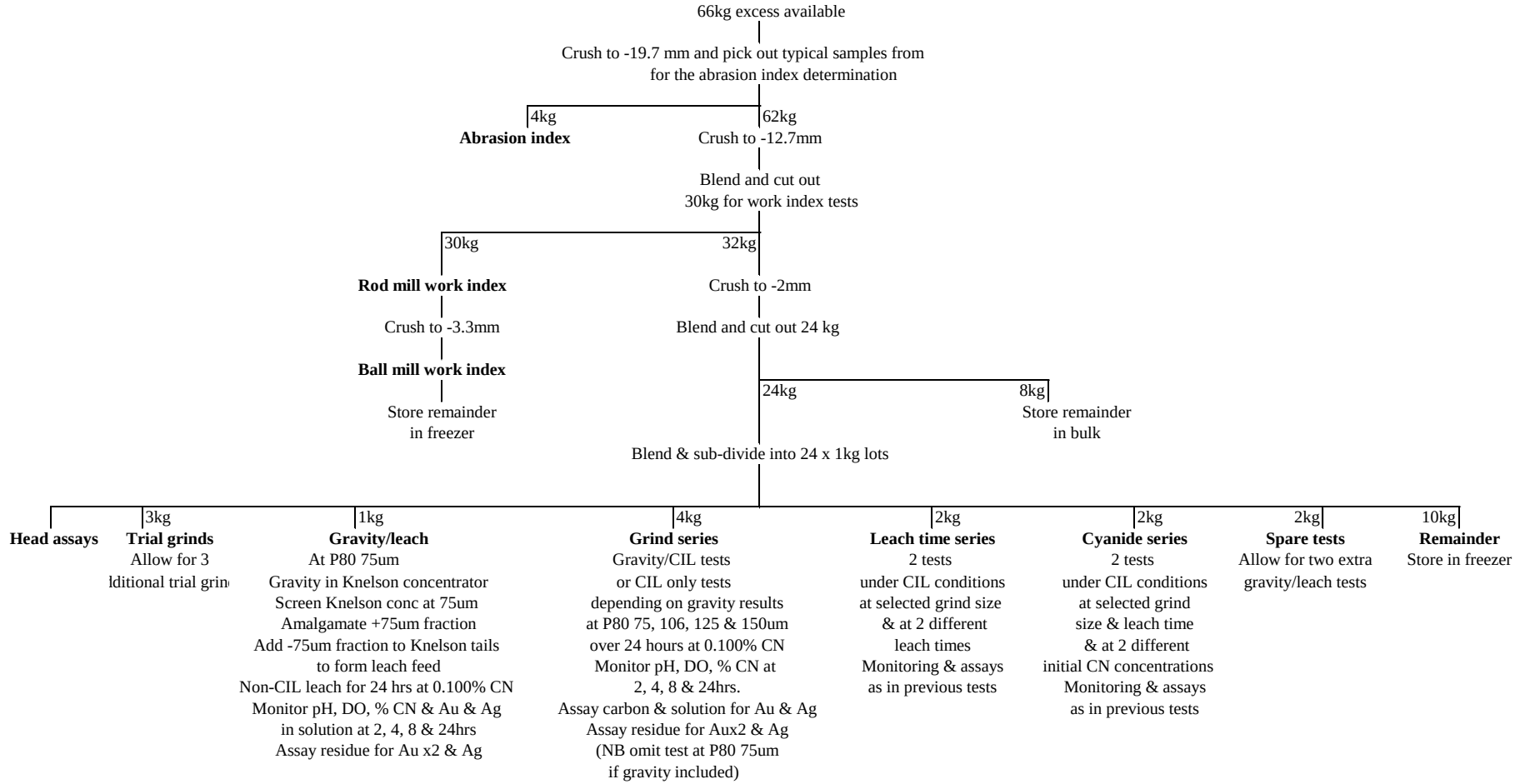


Figure 2 CIL and comminution testwork



5. HEAD ASSAYS

5.1 Detailed head assays

A 150 gram head assay portion was pulverised and sent to two commercial laboratories (ALS in Brisbane & SGS in Townsville) for detailed analyses. The detailed head assays obtained on the sulphide composite are shown in Table 2, where they are compared with those previously obtained on the oxide and transition composites (Metcon Report M1374).

Table 2. Detailed head assays

Determination	Laboratory	Method	Oxide Composite	Transition Composite	Sulphide Composite
g/t Au	SGS	fire assay	1.16	1.05	**1.75, 3.03 resample: 2.51, 2.75 = 2.51**
ppm Ag	SGS	AAS	4	2.3	**1.2**
% total S	ALS	S-IR08	0.98	1.13	**2.01**
% sulphate S	ALS	S-ICP16	0.24	0.13	**0.08**
% sulphide S	ALS	difference	0.74	1.00	**1.93**
%Al2O3	ALS	ICP81x	12.4	14.6	**13.7**
% CaO	ALS	ICP81x	0.06	0.08	**0.46**
% MgO	ALS	ICP81x	0.33	3.69	**4.54**
% SiO2	ALS	ICP81x	71.9	66.6	**65.0**
% Fe2O3	ALS	ICP81x	5.21	4.78	**4.72**
% TiO2	ALS	ICP81x	0.54	0.43	**0.39**
%K2O	ALS	ICP81x	1.49	3.25	**2.93**
%P2O5	ALS	ICP81x	0.18	0.11	**0.14**
%MnO	ALS	ICP81x	<0.006	0.095	**0.13**
ppm Ag	ALS	ICP61s	4	1.4	**1.2**
ppm As	ALS	ICP61s	137	39	**22**
ppm Ba	ALS	ICP61s	420	200	**350**
ppm Bi	ALS	ICP61s	<2	<2	**3**
ppm Cd	ALS	ICP61s	<0.5	2.1	**12**
ppm Co	ALS	ICP61s	<1	10	**12**
ppm Cr	ALS	ICP61s	86	69	**49**
ppm Cu	ALS	ICP61s	40	326	**330**
ppm Mo	ALS	ICP61s	13	2	**6**
% Na	ALS	ICP61s	0.08	0.05	**0.31**
ppm Ni	ALS	ICP61s	1	16	**23**
ppm Pb	ALS	ICP61s	462	1040	**927**
% S	ALS	ICP61s	0.72	0.99	**2.12**
ppm Sb	ALS	ICP61s	5	<5	**<5**
ppm Sr	ALS	ICP61s	480	35	**38**
ppm V	ALS	ICP61s	143	113	**103**
ppm Zn	ALS	ICP61s	30	718	**2140**
ppm Zr	ALS	ICP61s	58	26	**19**

Note: The ICP results are semi-quantitative. Values expressed as the common oxide were determined on an element basis, but are expressed as the oxide to allow for the overall composition of the sample to be estimated.

There was poor agreement between the initial duplicate gold head assays on the sulphide composite (1.75 & 3.03g/t Au), so a second portion was taken and also

submitted for duplicate gold assays. The wide variation in gold head assays indicated the probable presence of some relatively coarse, free gold in the sulphide composite. The average gold head assay was significantly higher than the expected head assay of 1.55g/t Au (see Appendix 1).

5.2 Calculated head assays

Table 3 shows the calculated gold and silver head assays from all the tests completed.

Table 3. Calculated head assays for gold and silver

	g/t Au	g/t Ag	Test wt (kg)
CIL test KS1	2.44	1.42	1.00
CIL test KS2	1.16	1.39	1.00
CIL test KS4	1.56	1.50	1.00
CIL test KS5	1.55	1.46	1.00
CIL test KS6	1.37	1.37	1.00
CIL test KS7	1.39	0.88	1.00
CIL test KS8	1.45	1.31	1.00
CIL test KS9	1.43	1.33	1.00
CIL test KS11	1.38	1.45	1.00
CIL test KS12	1.22	1.01	1.00
50mm heap leach test	1.43	1.24	149.82
12.5mm heap leach test	1.96	2.00	19.93
Weighted average	**1.49**	**1.33**	**179.75**

Table 4 compares the assayed and average calculated gold and silver head grades and the expected gold head grade derived from the exploration assays.

Table 4. Comparison of gold and silver head assays

	g/t Au	g/t Ag
Expected from exploration assays	1.55	na
Assayed head grades	2.51	1.20
Average of calculated head grades	1.49	1.33

Although Table 3 shows a considerable scatter in the calculated gold head assays between tests, the average calculated gold head assay based on the total 180kg of sample tested was in close agreement with the expected head assay.

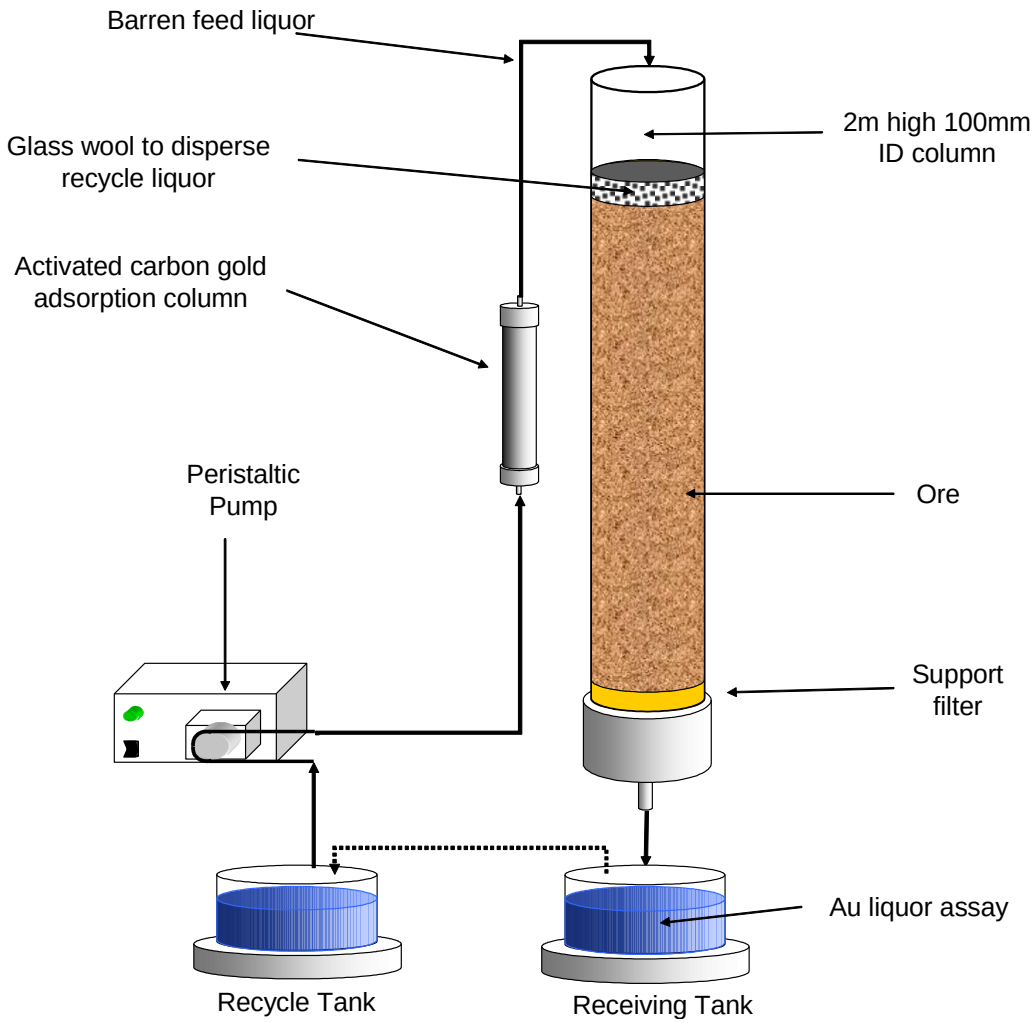
6. HEAP LEACHING TESTS

6.1 Procedure

Two column tests simulating heap leaching were completed at crush sizes of minus 12.7mm and minus 50mm.

The minus 12.7mm test was carried out in a 100mm diameter column using just less than 20kg of sample. The minus 50mm test was carried out in a 300mm diameter column on 150kg of sample. In both cases the column height was 2m. Figure 3 shows the circuit arrangement for the heap leach column tests.

Figure 3 Heap leach circuit



The test procedure applied at both crush sizes was essentially the same. The crushed ore was first agglomerated with cement, which acted as both a binder and pH modifier, together with cyanide solution representing part of the expected cyanide requirement. The cyanide addition was based on two thirds of the consumption determined in test KS1 (see Section 6.4).

In both tests the reagent additions to the agglomeration stage were 0.93kg/t NaCN and 3kg/t cement. Agglomeration was carried out in a stainless steel cement mixer, with the cyanide solution added until visually the fines were sufficiently bound to the coarser particles so that good percolation of the leach solution would occur in the column. Although agglomeration may not necessarily be required from a percolation point of view, it was undertaken more as a pre-conditioning step to ensure adequate reagent dispersion throughout the column.

The agglomerated material was then loaded into the column and allowed to cure for two days, before applying the initial 0.1% NaCN leach solution at a rate of 10L/m^2/hr. The volume, pH and NaCN concentration of the pregnant discharge liquor that had collected in the receiving tank were measured. The liquor was then sampled and assayed for gold. Initially this was done on a daily basis, with less frequent sampling as the rate of gold dissolution decreased. After each sampling step the pregnant liquor was transferred to the recycle tank, from where it was pumped to the head of the column via an activated carbon column. NaCN was added as required to maintain a suitable feed liquor concentration, and NaOH was added to maintain pH.

Each column test was terminated once the gold assay of the column discharge was near to or less than the analytical detection limit for gold*. The solution remaining in the column was allowed to drain and was collected. Wash water was then added to flush out any remaining solubilised gold and silver, and this was also collected. The column was then emptied and the residue was crushed to minus 2mm. The final discharge solution, the wash solution and the carbon were assayed for gold and silver. A 2kg sub-sample was taken from the crushed residue, ground to 80% passing 75µm and then leached with cyanide for 24 hours. The calculated gold and silver head grades from this test were used as the heap leach residue assays. Because of the higher weight of residue used, compared to the smaller sample that would normally be taken for direct assay, this procedure was considered to provide more reliable residue grades. Once all assays were available, full metallurgical balances for both gold and silver were completed.

(*Based on the very low discharge liquor assays being obtained it was initially decided to terminate both column tests after 77 days. However, this decision was reversed for the 12.7mm column test when some outstanding liquors assays (for days 64 to 71) were received containing higher levels of gold. The liquor assays for days 57 & 60, on which the initial decision was based, now appear to have been erroneously low. The 12.7mm column test was eventually terminated after 151 days.)

6.2 Results

Table 5 shows the final metallurgical balances for both column tests. The heap leach test data sheets and those for the leach tests on the residues are contained in Appendix 2. Figure 4 shows the gold dissolution rate curves.

At the finer crush size of minus 12.7mm 66.4% gold dissolution was obtained after 151 days, and 53.8% dissolution was achieved after 77 days at the coarser crush size of minus 50mm. In both cases the residue grade was 0.66g/t Au.

Table 5. Column leach tests results

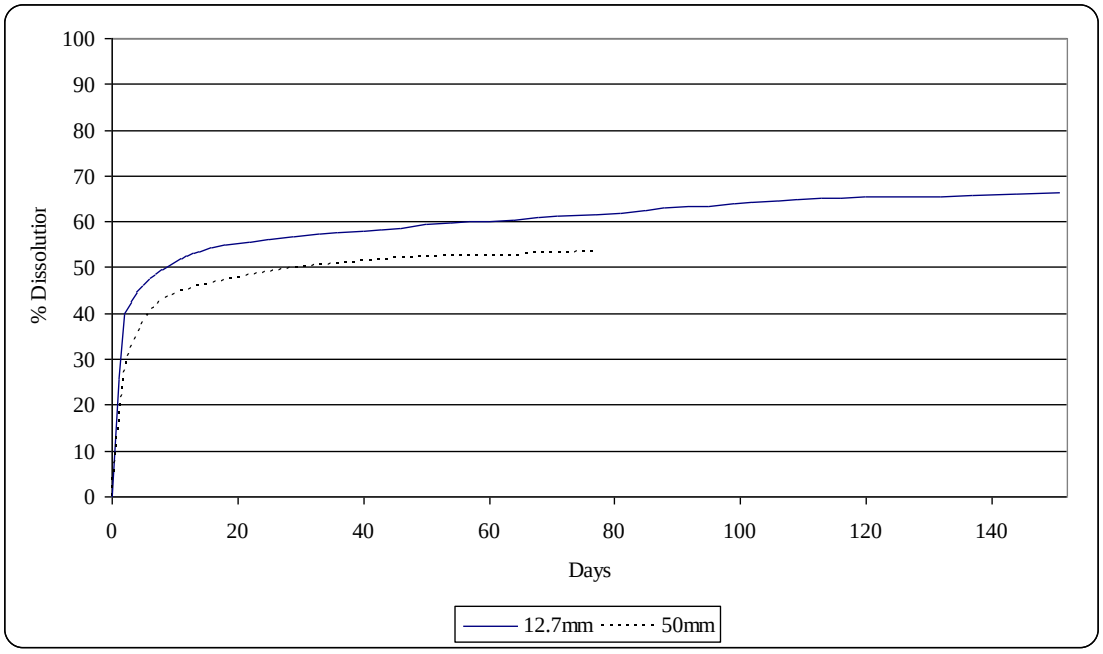
12.7mm crush size

FINAL MASS BALANCE TEST K-8 (SULPHIDE @ 12.7mm)								
		GOLD		SILVER			GOLD	SILVER
Product	Quantity	assay	mg	assay	mg			
Carbon I	159.35g	147	23.42	88	14.02	**Extraction %**	66.4	38.0
Carbon II	155.41g	11	1.71	4	0.62	**Calculated Feed g/t**	1.96	0.9
Residue	19.93kg	0.66	13.15	1.24	24.71	**Assayed Head g/t**	2.51	1.2
Final discharge	7336mL	0.02	0.15	0.07	0.514	**Reagent additions (kg/t)**		
Wash solution	10489mL	<0.01	--	<0.01	--	Cement 3		
Liquor sub-samples	--	--	0.65	--	--	NaCN 3.15		
Total		1.96	39.08	2.00	39.86	NaOH 0.4		

50mm crush size

FINAL MASS BALANCE TEST K-9 (SULPHIDE @ 50mm)								
		GOLD		SILVER			GOLD	SILVER
Product	Quantity	assay	mg	assay	mg			
Carbon	337.5g	337	113.738	150	50.63	**Extraction %**	53.8	27.9
Residue	149.82 kg	0.66	98.881	0.89	133.34	**Calculated Feed g/t**	1.43	1.2
Final discharge	19.45mL	0.03	0.584	0.02	0.39	**Assayed Head g/t**	2.51	1.2
Wash solution	45.35mL	0.01	0.454	0.01	0.45	**Reagent additions (kg/t)**		
Liquor sub-samples	--	--	0.228	--	--	Cement 3		
						NaCN 1.07		
Total		1.43	213.89	1.23	184.8	NaOH 0.003		

Figure 4 Heap leach gold dissolution rates



As Figure 4 shows, the initial rate of gold dissolution was higher at the finer crush size, as would be expected. Normally a shorter time for near-to-complete gold dissolution would be expected at the finer crush size, but a much longer leach time (151 vs 77 days) was required at 12.7mm before the dissolution curve flattened out. This is probably partly or wholly explained by the much higher calculated gold head

grade (1.96g/t vs 1.43g/t) for the 12.7mm test. That is, it took longer to extract the greater amount of gold present. This would have been exacerbated if the additional gold present occurred at a coarser size, which would naturally take longer to dissolve.

As the gold residue grades were the same for both tests, it could be argued that if the same calculated head grades had been obtained for both tests there would have been no benefit from crushing finer than 50mm, other than perhaps a greater initial rate of gold dissolution.

6.3. Comparison with Oxide & Transition composites

Table 6 compares the heap leach results obtained on the sulphide composite with those obtained in previous testwork (Metcon report M1374) on the oxide and transition composites.

Table 6. Comparison of heap leach results.

Composite	**Oxide**		**Transition**		**Sulphide**	
Crush size	-50mm	-12.7mm	-50mm	-12.7mm	-50mm	-12.7mm
Leach time (days)	70	29	70	23	77	151
Calculated head grade (g/t Au)	1.09	1.14	0.95	1.06	1.43	1.96
Residue grade (g/t Au)	0.21	0.20	0.19	0.23	0.66	0.66
Final % Gold extraction	**80.7**	**82.4**	**80.1**	**78.3**	**53.8**	**66.4**
% Gold extraction after 10 days	69.8	80.3	62.6	76.6	44.9	51.8
Calculated head grade (g/t Ag)	3	3	1	2	1.2	2.0
Residue grade (g/t Ag)	2	2	0.5	1	0.89	1.2
% Silver extraction	29	32	56	42	28	38
Cyanide consumption (kg/t)	1.42	1.43	1.57	1.47	1.07	3.15
NaOH consumption (kg/t)	0.35	0.46	0.62	2.69	0.003	0.40

The lower gold extractions obtained on the sulphide composite from higher gold head grades show clearly that the sulphide mineralization at Kay Tanda is much less amenable to heap leaching than the oxide and transition mineralization.

6.4. Maximum gold extraction test

As shown in Figure 2 of Section 3, an agitated leach test was completed over 48 hours at a grind size of 80% passing 75µm (P80 75µm). This was done to determine the maximum potential gold extraction for comparison with the gold extractions obtained by heap leaching.

The test data sheet for this test (KS1) is included in Appendix 4. A gold extraction of 89.7% was obtained. Although this was significantly higher than that obtained in the heap leach tests, the difference in the gold extractions would have been exaggerated by the very high calculated gold head assay of 2.44g/t Au that was obtained in test KS1. Nevertheless, the residue grade was substantially lower at 0.25g/t Au compared to the 0.66g/t Au obtained in both heap leach tests.

Table 7 compares the gold extractions and residue grades obtained by heap leaching the oxide, transition and sulphide zone composites at 12.7mm crush size with those obtained from agitation leaching at a grind size of P80 75µm. This shows that a greater proportion of the gold can be extracted by agitation leaching of the sulphide mineralization compared to the oxide and transition composites.

Table 7. Comparison of gold extractions by heap leaching & agitation leaching

Composite	Oxide		Transition		Primary	
	Heap Leach	Agitation leach	Heap Leach	Agitation leach	Heap Leach	Agitation leach
Calc Head (g/t Au)	1.14	1.14	1.06	1.05	1.96	2.44
Residue (g/t Au)	0.20	0.08	0.23	0.12	0.66	0.25
% Gold extraction	82.4	93.4	78.3	88.6	66.4	89.7
Decreased residue (g/t)	0.12		0.11		0.41	
Increased extraction (%)	11.0		10.3		23.3	

6.5. Pregnant solution colour

As shown in the photograph below, the pregnant solution discharging from the heap leach columns had a distinct pink colour. This was also the case for transition composite in the previous testwork. An investigation into this phenomenon in Report M1374 could find no explanation for the pink colour.

7. INVESTIGATIONS INTO AGITATION LEACHING

7.1. Introduction

Table 7 in Section 6.4 shows that for the sulphide mineralization approximately 23% more gold extraction should be possible by agitation leaching compared to heap leaching. Consequently, it was decided to investigate the optimum conditions required for agitation leaching. This involved a series of agitation leach tests at different grind sizes, leach times and cyanide additions. In addition comminution tests were completed to determine the abrasion index and the rod and ball mill work indices for the sulphide mineralization, the results of which are given in section 8.

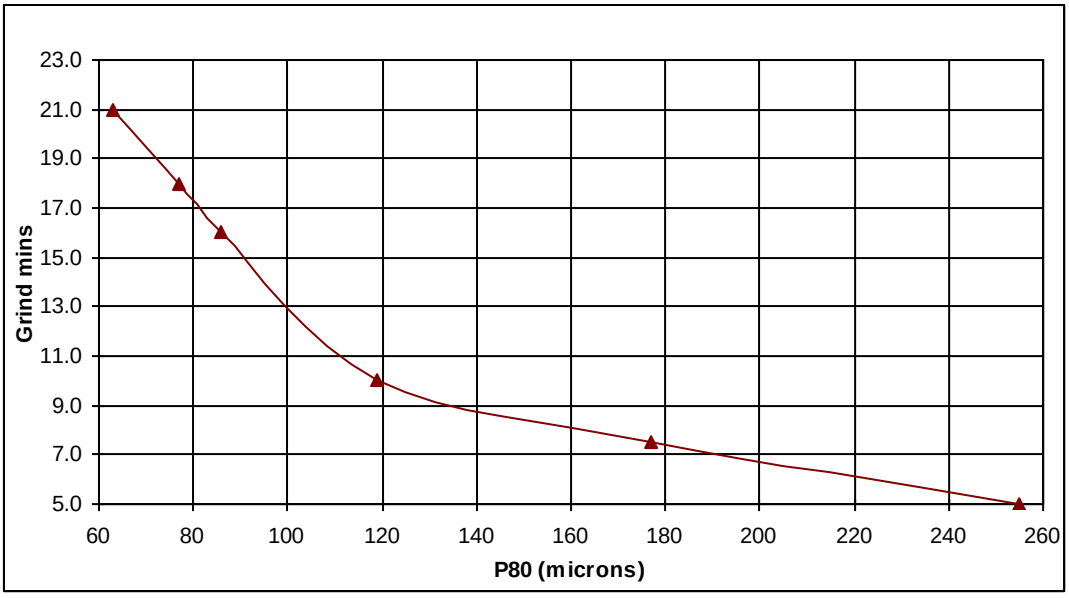
The full testwork programme is shown schematically in Figure 2 of Section 3.

7.2. Trial grinds

As tests were to be completed at grind sizes ranging from 80% passing 75µm to 80 % passing 150µm, it was first necessary to complete a series of trial grinds to determine the grinding times required for each 80% passing (P80) size.

The trial grinds were carried out in a laboratory stainless steel rod mill, measuring 300mm long by 200mm diameter, with a 12kg rod charge. A rod mill was used to give a size distribution similar to that expected from a closed circuit ball mill grind. The grinds were completed at 55% solids w/w for times that were selected to span the desired size range. Each ground product was then sized and its size analysis plotted on a graph, from which the P80 size was determined. The latter were then plotted against the grinding times, and the times required for each P80 size were determined. The full results of the trial grinds are presented in Appendix 3. Figure 5 shows the relationship between grinding time and P80 size.

Figure 5. Grinding time vs P80 size



The selected grind times for each P80 size are shown in Table 8.

Table 8. Selected grind times

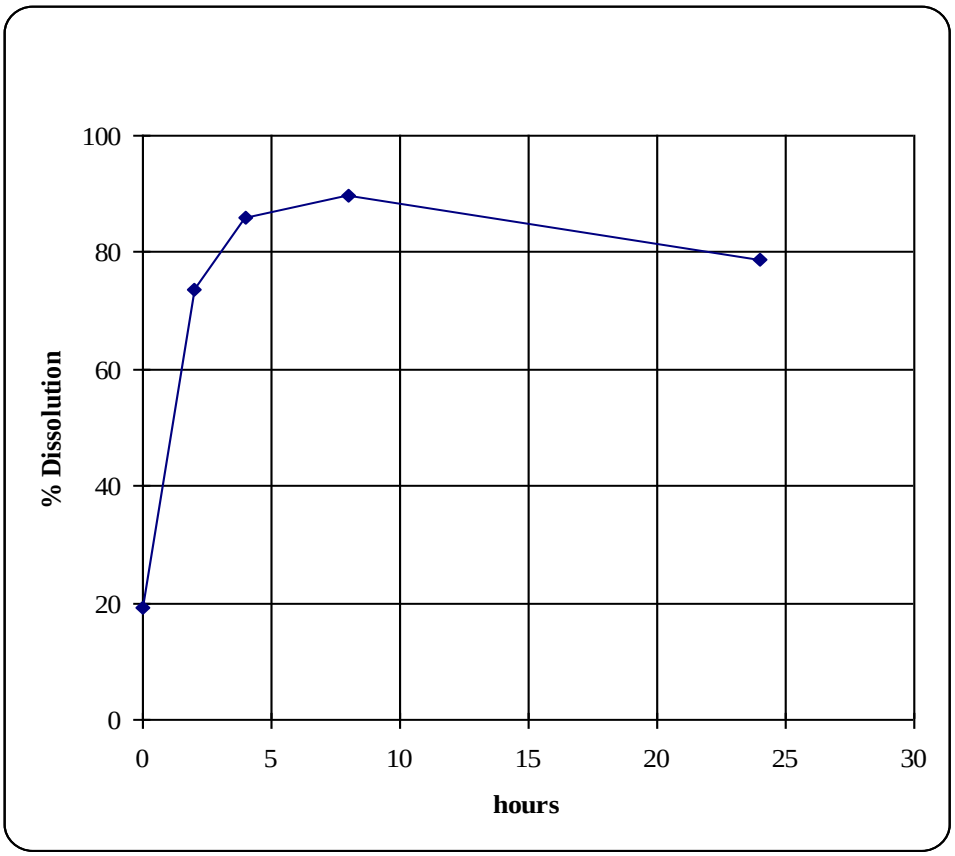
P80 size (µm)	Grind time (min)
75	18.5
90	15.0
106	12.0
125	9.5
150	8.25

7.3 Initial kinetic leach test

The first test (KS2) was completed over 24 hours in the absence of activated carbon, i.e. under non carbon-in-leach (CIL) conditions. This was to provide an indication of the rates of gold and silver extraction. This test included a gravity concentration stage ahead of leaching. The test data sheet is included in Appendix 4.

19.2 % of the gold was extracted in the gravity concentration stage and total gold extraction was 78.8% from a relatively low calculated head grade of 1.16g/tAu. Silver extraction was much lower at 28% from a calculated head grade of 1.39g/t Ag. Figure 6 shows the rate of gold dissolution for test KS2

Figure 6. Gold dissolution rate under non-CIL conditions



The decrease in gold extraction between 8 and 24 hours suggested that, in the absence of carbon, some re-precipitation of the gold was occurring. Consequently, all

subsequent tests were completed in the presence of activated carbon, i.e. under CIL conditions.

7.4 Grind series tests

Four CIL tests were completed over 24 hours at grind sizes ranging from P80 75µm to 150µm to determine the relationship between grind size and gold extraction. Each test included a gravity concentration stage ahead of leaching. The test data sheets are included in Appendix 4, and the results are summarized in Table 9.

Table 9. Results of grind series tests.

Test No	KS4	KS5	KS6	KS7
Test conditions				
Grind P80 um	**75**	**106**	**125**	**150**
Leach time	24	24	24	24
Natural pH	7.7	7.7	7.6	7.6
Initial pH	10.6	10.6	10.5	10.5
Final pH	10.2	10.1	10.1	10.1
Initial % CN concentration	0.100	0.100	0.100	0.100
Final % CN concentration	0.062	0.066	0.068	0.052
Initial DO	7.7	8.0	7.8	8.0
Final DO	9.1	9.1	8.9	8.9
Gold				
Calc head (g/t)	1.56	1.55	1.37	1.39
Residue (g/t)	0.218	0.260	0.250	0.255
% extraction - gravity	24.0	18.0	29.7	22.0
% extraction - leach	62.0	65.3	52.0	59.7
% extraction - total	86.0	83.3	81.7	81.7
Silver				
Calc head (g/t)	1.50	1.46	1.37	0.88
Residue (g/t)	1.0	1.0	1.0	0.5
% extraction	33.5	31.5	26.9	43.4
Consumptions (kg/t)				
Cyanide	0.58	0.51	0.49	0.72
Lime	0.65	0.61	0.61	0.59

As can be seen in Table 9, there is some variation in the calculated gold head grades. This is a common occurrence when testing gold ores. It is due mainly to the inherent difficulty in splitting out 1kg test samples from a bulk sample so that they have the same amount of gold present. This situation is exacerbated as the amount of coarse and/or spotty gold present in the bulk sample increases. To a lesser extent some of the variations will be due to the accuracy of gold assaying that can be achieved. Although the residue assays for tests KS5, KS6 & KS7 are slightly different, they can, within the limits of assaying accuracy, be considered to be essentially the same.

Calculated gold extractions depend on both the residue grades and the calculated head grades. For any given residue grade the calculated gold extraction will increase as the calculated head grade increases. For this reason it is better to compare CIL test results by the residue grades obtained rather than the gold extractions. On this basis the best result was obtained at P80 75µm, and all subsequent tests were completed at this grind size.

The leach residue from test KS4 was subjected to diagnostic assays to determine the deportment of the unrecovered gold. Gold locked in sulphides was determined by roasting followed by an aqua regia digest. Gold locked in silicates was determined by fire assaying the aqua regia residue.

As shown in Table 10, 95% of the unrecovered gold was locked within the sulphide minerals, which is the normal situation for unoxidised gold mineralization.

Table 10. Deportment of gold in Test KS4 leach residue

	Assay g/t	Distribution %
Sulphide locked	0.18	95
Silicate locked	0.01	5
total	0.19	100

7.5 Leach time series tests

The next series of tests examined the effect of leach time on gold extraction. Two CIL tests were completed at a grind size of P80 75um over 16 and 20 hours duration with an initial NaCN concentration of 0.100%. The test data sheets are included in Appendix 4. The results are summarized in Table 11, where they are compared with those of the previous test KS4, which was completed over 24 hours but otherwise under exactly the same conditions.

Table 11. Results of leach time series tests.

Test No	KS8	KS9	KS4
Test conditions			
Grind P80 um	75	75	75
Leach time	**16**	**20**	**24**
Natural pH	7.6	7.7	7.7
Initial pH	10.6	10.6	10.6
Final pH	10.2	10.2	10.2
Initial % CN concentration	0.100	0.100	0.100
Final % CN concentration	0.056	0.062	0.062
Initial DO	7.2	8.0	7.7
Final DO	9.1	9.3	9.1
Gold			
Calc head (g/t)	**1.54**	**1.43**	**1.56**
Residue (g/t)	**0.280**	**0.180**	**0.218**
% extraction - gravity	24.6	20.6	24.0
% extraction - leach	57.0	66.8	62.0
% extraction - total	**81.6**	**87.4**	**86.0**
Silver			
Calc head (g/t)	1.31	1.33	1.50
Residue (g/t)	1.0	1.0	1.0
% extraction	23.7	24.6	33.5
Consumptions (kg/t)			
Cyanide	0.65	0.56	0.58
Lime	0.69	0.66	0.65

The much higher residue grade obtained in test KS8 showed that a leach time of 16 hours is insufficient to achieve complete gold extraction.

With increasing leach time the residue grade should either decrease or stay the same. However, the residue grade at 24 hours was higher than that at 20 hours, despite duplicate check assays being completed on the residues from tests KS4 & KS9. The lower residue grade obtained in test KS9 may be due to the lower calculated head grade for this test, since a smaller amount of total gold in any sample may also indicate that there is a smaller amount of unrecoverable gold present.

Overall the results indicated that there was no benefit from increasing the leach time beyond 20 hours, and this leach time was used in the last series of tests.

7.6 Cyanide series tests

Up to this point all tests had used a high initial cyanide concentration of 0.100%, and the residual cyanide concentrations were all well in excess of the normal minimum for plant operations of 0.020%. Therefore, although cyanide consumptions had not been high, the possibility existed that a reduction in cyanide consumption might be achieved by reducing the initial cyanide concentration.

Consequently, the last two CIL tests were completed at a grind size of P80 75µm over 20 hours at lower initial cyanide concentrations 0.080 and 0.060%. The test data sheets are included in Appendix 4. The results are summarized in Table 12, where they are compared with those of test KS9, which was completed under exactly the same conditions but with an initial cyanide concentration of 0.100%.

Table 12. Results of cyanide series tests.

Test No	KS9	KS11	KS12	Average
Test conditions				
Grind P80 um	75	75	75	75
Leach time	20	20	20	20
Natural pH	7.7	7.5	7.9	7.7
Initial pH	10.6	10.5	10.6	10.6
Final pH	10.2	10.1	10.0	10.1
Initial % CN concentration	**0.100**	**0.080**	**0.060**	**0.080**
Final % CN concentration	0.062	0.046	0.020	0.043
Initial DO	8.0	7.8	7.8	7.9
Final DO	9.3	9.1	9.0	9.1
Gold				
Calc head (g/t)	1.43	1.36	1.22	1.34
Residue (g/t)	0.180	0.208	0.175	0.188
% extraction - gravity	20.6	20.2	9.6	17.1
% extraction - leach	66.8	64.5	76.1	68.8
% extraction - total	87.4	84.7	85.7	85.9
Silver				
Calc head (g/t)	1.33	1.95	1.51	1.59
Residue (g/t)	1.0	1.0	1.0	1.0
% extraction	24.0	48.8	33.7	37.2
Consumptions (kg/t)				
Cyanide	**0.56**	**0.52**	**0.60**	**0.56**
Lime	0.66	0.82	0.87	0.78

The results did not conform to normal expectations with respect to both the effect on cyanide consumptions and residue grades.

Cyanide consumption did not decrease as the initial cyanide consumption decreased, but reducing the initial cyanide concentration from 0.100% to 0.060% appeared to have no effect on the gold residue grade, since the residue grades for tests KS9 and KS12 were essentially the same. However, the residue grade for tests KS11 was higher. The lack of any consistent pattern in the cyanide consumptions and gold residue grades suggests that the variations are within the limits of the experimental, sampling and assaying accuracies that are achievable.

The average results for the three tests, as shown in the last column of Table 12, probably provide the best indication of the gold and silver extractions and reagent consumptions that will be obtained under the indicated optimum conditions of 20 hours leach time at a grind size of P80 75µm.

The average calculated head grade for these three tests at 1.34g/t Au is lower than the average calculated head grade of 1.49g/t Au for all the tests completed, as shown in Table 3 of Section 5.2. At this higher head grade, and assuming the average residue grade remains the same as the 0.188g/t Au in Table12, the % gold extraction would increase to 87.3%.

8. GRAVITY RECOVERABLE GOLD

In all the agitation leach tests completed gravity concentration was included ahead of the leaching stage.

Gravity concentration consisted of passing the ground product through a 75mm diameter laboratory Knelson concentrator. The Knelson concentrate was examined visually for gold grains, and then amalgamated with mercury in a slow rolling bottle for an hour to remove the free gold. The mercury bead was then removed by panning and assayed for gold. The Knelson concentrator and amalgam tailings were then combined as the feed to the leaching stage.

No gold visible to the naked eye was seen in most of the Knelson concentrates, but in some cases a few flakes of gold were observed. For example, in test KS4 two flakes of gold up to approximately 500µm in size were seen.

Table 13 shows the % gold extraction obtained by gravity concentration in all the agitation leach tests completed.

Table 13. Gravity recoverable gold

Test No	Calculated head (g/t Au)	% Gravity gold extraction
KS2	1.16	19.2
KS4	1.56	24.0
KS5	1.55	18.0
KS6	1.37	29.7
KS7	1.39	22.0
KS8	1.54	24.7
KS9	1.43	20.6
KS11	1.36	20.3
KS12	1.22	9.6
Weighted Average	**1.40**	**21.1**

The weighted average % extraction is relatively low and may be insufficient to justify the inclusion of gravity concentration in any future CIL plant. Gravity concentration in the laboratory is known to be more efficient than that which can be achieved in a plant, particularly in the finer size ranges. Consequently, the indicated extraction based on laboratory tests is always discounted by a fairly substantial amount when estimating the amount of gold that will actually be recovered by gravity in a plant. Such a discount is likely to reduce the predicted plant gravity extraction to below 10%.

9. COMMINUTION TESTS

Abrasion and rod & ball mill work index tests were determined for the sulphide composite. Standard Bond test procedures were employed using a rod mill closing screen size of 1180µm and a ball mill closing screen size of 106µm.

The test data sheets are included in Appendix 5, and the results are shown in Table 14.

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Table 14 Comminution testwork results

Abrasion index Ai	Rod mill work index		Ball mill work index	
	Product P80µm	WI kWh/t	Product P80µm	WI kWh/t
0.0288	853	17.2	78	12.9

The abrasion index is very low and the ball mill work index is at the lower end of the industry range. Therefore, the capital and operating costs for grinding should be relatively low.

APPENDIX 1

SAMPLES RECEIVED

KAY TANDA PRIMARY ZONE SAMPLES

Hole No.	From (m)	To (m)	Length (m)	Au g/t	Expected wt (kg)	Au x Weight	Weighted Ave Au g/t	Received wt (kg)	Au units
KTDH 03	133	134	1.0	0.95	1.3	1.24	0.95		
	Total for hole		**1.0**		**1.3**	1.24	**0.95**	**0.9**	**0.86**
KTDH 04	207	208	1.0	2.32	1	2.32	2.32		
	Total for hole		**1.0**		**1**	2.32	**2.32**	**0.6**	**1.39**
KTDH 05	19	24	5.0	0.87	10	8.70	0.87		
	64	67	3.0	1.12	6.17	6.91	1.12		
	271	276	5.0	1.5	2.83	4.25	1.5		
	Total for hole		**13.0**		**19**	19.86	**1.05**	**17.7**	**18.50**
KTDH 06	231	232.8	1.8	0.88	0.8	0.70	0.88		
	214	215	1.0	1.30	1.7	2.21	1.30		
	221	223	2.0	1.29	2	2.58	1.29		
	Total for hole		**4.8**		**4.5**	5.50	**1.22**	**9.4**	**11.49**
KTDH 07	120	157.3	37.3	1.35	46.35	62.57	1.35		
	160.3	161.3	1.0	2.29	1.8	4.11	2.29		
	169	170	1.0	2.10	2.5	5.24	2.10		
	170	171	1.0	0.64	1.8	1.16	0.64		
	Total for hole		**40.3**		**52.45**	73.09	**1.39**	**49.6**	**69.12**
KTDH 08	36.5	43.5	7.0	1.11	14.52	16.12	1.11		
	164	166	2.0	3.76	2.64	9.93	3.76		
	197	202	5.0	1.04	4.84	5.03	1.04		
	Sub-total		**14.0**		**22**				
	110	113	3.0	1.83	6.1	11.16	1.83		
	119	121	2.0	1.75	2.15	3.76	1.75		
	Sub-total		**5.0**		**8.25**				
	Total for hole		**33.0**		**30.25**	46.00	**1.52**	**28.60**	**43.49**
KTDH 10	256	262	6.0	1.79	11	19.69	1.79		
	378	384	6.0	1.77	3.7	6.55	1.77		
	Total for hole		**12.0**		**14.7**	26.24	**1.78**	**13.7**	**24.45**
KTDH 11	185	186	1.0	4.88	1.9	9.27	4.88		
	205	209	4.0	1.78	5.4	9.61	1.78		
	239.2	240.2	1.0	2.69	0.5	1.35	2.69		
	Total for hole		**6.0**		**7.8**	20.23	**2.59**	**7.3**	**18.93**
KTDH 12	327	331	4.0	1.80	3.6	5.70	1.58		
	339	341	2.0	1.15					
	278.2	278.6	0.4	2.82	3.85	5.98	1.55		
	279.6	280.6	1.0	1.1					
	284.4	286	1.6	1.52					
	331	333	2.0	0.15	1.5	0.23	0.15		
	333	335	2.0	0.35	1.65	0.57	0.35		
	335	337	2.0	0.35	1.65	0.58	0.35		
	337	339	2.0	0.61	1.25	0.76	0.61		
	Total for hole		**17.0**		**13.5**	13.82	**1.02**	**12.3**	**12.59**

KAY TANDA PRIMARY ZONE SAMPLES (Continued)

Hole No.	From (m)	To (m)	Length (m)	Au g/t	Expected wt (kg)	Au x Weight	Weighted Ave Au g/t	Received wt (kg)	Au units
KTDH 15	170	171	1.0	0.91	1.4	1.27	0.91		
	171	172	1.0	1.04	1.4	1.45	1.04		
	172	173	1.0	0.69	1.2	0.83	0.69		
	173	174	1.0	1.47	1.2	1.77	1.47		
	174	174.7	0.7	13.84	1	13.84	13.84		
	174.7	176	1.3	1.28	1.75	2.25	1.28		
	176	177.3	1.3	0.77	1.6	1.24	0.77		
	177.3	178	0.7	0.31	1	0.31	0.31		
	178	179	1.0	2.42	1.2	2.90	2.42		
	179	180	1.0	8.14	1.4	11.39	8.14		
	180	181	1.0	1.12	1.2	1.34	1.12		
	183	184	1.0	0.71	1.3	0.92	0.71		
	187	188	1.0	0.80	1.6	1.27	0.80		
	197	199	2.0	1.37	2.3	3.15	1.37		
	199	200	1.0	13.72	1.6	21.96	13.72		
	200	201	1.0	1.65	1.3	2.14	1.65		
	201	202	1.0	0.80	1.4	1.12	0.80		
	202	203	1.0	0.57	1.4	0.79	0.57		
	203	205	2.0	0.60	2.6	1.55	0.60		
	209.6	210.1	0.5	0.59	0.7	0.41	0.59		
	239	241	2.0	0.87	2.6	2.27	0.87		
	291	292	1.0	3.38	0.5	1.69	3.38		
	299	300	1.0	2.34	0.6	1.40	2.34		
	300	301	1.0	1.78	0.4	0.71	1.78		
	Total for hole		**26.5**		**32.65**	**77.97**	**2.39**	**30.8**	**73.55**
KTDH 16	76	77	1.0	5.27	26.4	52.68	52.68		
	77	78	1.0	1.55					
	78	79	1.0	1.81					
	80	81	1.0	1.57					
	83	84	1.0	1.20					
	86	87	1.0	0.94					
	115	116	1.0	6.30					
	116	118	2.0	0.80					
	125	127	2.0	1.31					
	197	198	1.0	1.09					
	Total for hole		**12.0**		**26.4**	**52.68**	**2.00**	**19.5**	**38.91**
KTDH 19	220	221	1.0	1.06	6.15	7.34	1.19		
	231	232	1.0	1.12					
	233	234	1.0	1.35					
	234	235	1.0	1.13					
	236	237	1.0	1.02					
	240	241	1.0	1.49					
	Total for hole		**6.0**		**6.15**	**7.34**	**1.19**	**5.7**	**6.80**

KAY TANDA PRIMARY ZONE SAMPLES (Continued)

Hole No.	From (m)	To (m)	Length (m)	Au g/t	Expected wt (kg)	Au x Weight	Weighted Ave Au g/t	Received wt (kg)	Au units
KTDH 20	94	95	1.0	0.94	7.6	8.26	1.09		
	95	96	1.0	1.05					
	96	97	1.0	0.83					
	99	100	1.0	1.52					
	Total for hole		**4.0**		**7.6**	**8.26**	**1.09**	**6.2**	**6.74**
PLDH 01	45	53	8.0	1.05	17.9	18.80	1.05		
	Total for hole		**8.0**		**17.9**	**18.80**	**1.05**	**16.5**	**17.33**
PLDH 02	74	76	2.0	2.29	28.65	40.21	1.40		
	125	126	1.0	1.82					
	97	105	8.0	1.13					
	Total for hole		**11.0**		**28.65**	**40.21**	**1.40**	**27.3**	**38.32**
GRAND TOTAL			**195.60**		**263.85**	**413.54**	**1.57**	**246.1**	**382.46**
						Revised head grade		**1.55**	

Note.

When received the individual samples from each hole had already been combined. The weights actually received for each hole were determined and were in most cases different from the expected weights. The received weights were used to re-calculate the overall expected head grade as shown at the bottom of the above table. However, as the actual weights of the individual samples in each hole were unknown, the revised expected head grade is an estimate only.

APPENDIX 2

Column leach
and residue leach data sheets

		AGGLOMERATION		FEED SOLUTION		HEAD ASSAYS	Au g/t	Ag g/t
		Date	21/08/2007			assay head	2.51	1.20
		Weight kg	19.93	Volume tap water	10L	calc head	1.96	2.00
		Crush size	12.7mm	NaCN	0.05%	**RESIDUE ASSAYS**	0.66	1.24
Test	**K8**	Cement kg/t	3	pH	10.5			
SAMPLE	**SULPHIDE**	NaCN kg/t	0.93	application rate	3	**CARBON I**	147	88
		Total water mls	1000			**CARBON II**	11	4
		% moisture	5			Adsorption column replaced with fresh carbon at day 77.		
OBJECTIVE		Heap height m						
Heap leach extraction @ 12.7mm		Heap diameter mm	100					
		Cure	2 days			Final drained moisture content = 8%		
		Slump mm						
		carbon column	~150					

DAY	DISCHARGE			Gold Dissolution					
	Vol (L)	pH	NaCN %	liq Au ppm	Au mg	cum mg	mg Au removed in liq sample	Au diss'n %	
0								0	
1	0.726	11.6	0.905	14.05	10.200	10.200	0.422	25.8	discharge liquor pale(light) p 30 mL liq sample day 1
2	1.362	11.6	0.230	4.12	5.611	15.812	0.103	40.1	then 25 mL samples
3	1.195	11.2	0.065	0.87	1.040	16.851	0.022	42.7	
4	1.240	11.4	0.060	0.61	0.756	17.608	0.015	44.6	
5	1.163	11.3	0.064	0.54	0.628	18.236	0.014	46.2	
6	1.243	11.2	0.066	0.45	0.559	18.795	0.011	47.6	
7	1.245	11.2	0.070	0.37	0.461	19.256	0.009	48.8	
8	1.163	11.2	0.066	0.29	0.337	19.593	0.007	49.6	
11	3.494	11.2	0.052	0.26	0.908	20.502	0.007	52.0	
12	1.158	11.2	0.048	0.22	0.255	20.756	0.006	52.6	
13	1.109	11.3	0.044	0.16	0.177	20.934	0.004	53.0	
14	1.118	11.2	0.038	0.15	0.168	21.101	0.004	53.5	
16	2.777	10.8	0.030	0.11	0.305	21.407	0.003	54.2	
18	2.562	11.2	0.034	0.09	0.231	21.637	0.002	54.8	
22	5.410	10.8	0.024	0.06	0.325	21.962	0.002	55.7	1.91g NaCN added to feed
25	3.532	10.5	0.024	0.06	0.212	22.174	0.002	56.2	
29	5.288	10.6	0.020	0.05	0.264	22.438	0.001	56.9	1.59g NaCN added to feed
33	5.303	10.4	0.018	0.03	0.159	22.597	0.001	57.3	3.0g NaCN added to feed
36	4.220	10.3	0.014	0.03	0.127	22.724	0.001	57.6	
40	3.986	10.4	0.030	0.05	0.199	22.923	0.001	58.1	
43	3.841	10.1	0.012	0.02	0.077	23.000	0.001	58.3	3.0g NaCN added to feed
46	3.644	10.0	0.014	0.04	0.146	23.146	0.001	58.7	3.0g NaCN, 2.0 grams NaOH & 2 litres water added to feed
50	5.363	11.0	0.042	0.05	0.268	23.414	0.001	59.3	
54	5.655	10.9	0.026	0.04	0.226	23.640	0.001	59.9	
57	3.953	10.8	0.020	0.01	0.040	23.680	0.000	60.0	
60	4.324	10.6	0.014	<0.01		23.680		60.0	3.0g NaCN added to feed
64	4.586	10.2	0.020	0.03	0.138	23.817	0.001	60.4	3.0g NaCN, 2.0g NaOH added to feed
68	4.840	10.5	0.032	0.05	0.242	24.059	0.001	61.0	
71	3.517	10.5	0.036	0.03	0.106	24.165	0.001	61.2	
77	4.833	9.8	0.012	0.02	0.097	24.262	0.001	61.5	Adsorption column replaced with fresh carbon, 3g NaCN to feed.
81	4.746	10.4	0.020	0.03	0.142	24.404	0.001	61.8	3g NaCN added to feed
85	4.637	10.6	0.034	0.06	0.278	24.682	0.002	62.5	
88	3.495	10.4	0.028	0.07	0.245	24.927	0.002	63.2	
92	4.751	10.2	0.020	0.02	0.095	25.022	0.001	63.4	
95	3.677	10.3	0.020	0.01	0.037	25.059	0.000	63.5	
99	4.672	10.7	0.040	0.03	0.140	25.199	0.001	63.9	
102	3.624	10.6	0.032	0.04	0.145	25.344	0.001	64.2	
106	4.223	10.2	0.026	0.03	0.127	25.470	0.001	64.5	2L water, 3g NaCN, 1.5g NaOH added to feed
109	3.661	10.4	0.028	0.02	0.073	25.544	0.001	64.7	
113	4.784	10.5	0.026	0.03	0.144	25.687	0.001	65.1	3g NaCN added to feed
116	3.551	10.4	0.024	0.02	0.071	25.758	0.001	65.3	
120	4.829	10.4	0.028	0.01	0.048	25.806	0.000	65.4	3g NaCN added to feed
132	5.048	10.0	0.014	0.01	0.050	25.857	0.000	65.5	2L water, 5g NaCN, 1.0g NaOH added to feed
137	6.270	10.3	0.030	0.01	0.063	25.920	0.000	65.7	1.0g NaOH added to feed
144	5.827	10.3	0.014	0.02	0.122	26.042	0.001	66.0	5g NaCN, 1g NaOH added to feed
151	7.336	10.3	0.024	0.02	0.147	26.189	0.001	66.4	**SCN analysis of final liquor = 113ppm**
wash	10.489	9.9	0.006	<0.01					

IDENTIFICATION		GRIND		LEACH	
Project	M1499	**grams**	2002	**grams**	2002
Sample	K8 Column Leach	**mls water**	1638	**mls water**	3003
objective	Residue (-12.5mm)	**water type**	tap	**% solids**	40
		% solids	55		
	2kg Leach, 0.1% NaCN	**minutes**	18.5		
test number	KS10	**80 % Passing**	75 µm		

Time	NaCN	hyd.lime		diss. O2	%	sample	liquor	mg/l	mg/l	ext'n %	ext'n %
hours	**grams**	**grams**	**pH**	**mg/l**	**NaCN**	**mls**	**mls**	**Ag**	**Au**	**Ag**	**Au**
			8.8								
0	3.00	0.78	10.6	6.7	0.100					0.0	0.0
2			10.9	8.4							
8			10.9	8.3	0.078	5					
24			10.7	8.7	0.078		2986	0.16	0.29	19.3	65.8

TAIL ASSAYS

residue	g/t Au	0.23, 0.22
	g/t Ag	1

NOTES

GOLD BALANCE

amount	material	assay	mg Au	dist. %
		g/t Au		
	liquor	0.29	0.866	65.8
	residue	0.225	0.450	34.2
	total	0.66	1.316	100.0

SILVER BALANCE

amount	material	assay	mg Au	dist. %
		g/t Ag		
	liquor	0.16	0.478	19.3
	residue	1	2.002	80.7
	total	1.2	2.480	100.0

EXTRACTION SUMMARY %

	Au	Ag
calculated	65.8	19.3

REAGENT CONSUMPTION

kg/t NaCN	0.34
kg/t hyd. lime	0.39

HEAD ASSAY

	Au	Ag
assay		
calculated	0.66	1.24

		AGGLOMERATION		FEED SOLUTION					
		Date	21/08/2007			HEAD ASSAYS	Au g/t	Ag g/t	
		Weight kg	149.82	Volume tap water	40L	assay head	2.51	1.20	
		Crush size	50mm	NaCN	0.05%	calc head	1.43	1.23	
Test	**K9**	Cement kg/t	3	pH	10.5				
SAMPLE	**SULPHIDE**	NaCN kg/t	0.93	application rate	~10L/m2/hr	**RESIDUE ASSAYS**	Residue assay determined by 2kg scale leach test (KS3)		
		Total water mls	4932				of column residue = 0.66g/t Au & 0.89g/t Ag		
		% moisture	3						
OBJECTIVE		Heap height m	1.36						
Heap leach extraction @ 50mm		Heap diameter mm	0.3				**g**	**Au g/t**	**Ag g/t**
		Cure	2 days			**CARBON 1**	170.09	668	179
						CARBON 2	167.40	1	121
		Slump mm	75			total	337.49	337	150
		carbon column	2 x~150g in series				(test was carried out with two carbon columns in series)		

DAY	DISCHARGE			Gold Dissolution					COMMENTS
	Vol (L)	pH	NaCN %	liq Au ppm	Au mg	cum mg	mg Au removed in liq sample	Au diss'n %	
0								0	
1	9.194	12.1	0.510	3.30	30.340	30.340	0.099	14.7	discharge liquor pale(light) **pink** in colour.
2	16.49	12.1	0.240	1.50	24.735	55.075	0.038	26.7	30 mL liq sample day 1
3	14.57	12.0	0.225	0.83	12.093	67.168	0.021	32.5	then 25 mL samples
4	9.14	12.0	0.220	0.55	5.027	72.195	0.014	34.9	
5	15.48	11.9	0.210	0.44	6.811	79.007	0.011	38.2	
6	15.64	11.8	0.220	0.26	4.066	83.073	0.007	40.2	
7	15.84	11.7	0.210	0.20	3.168	86.241	0.005	41.7	
8	15.90	11.7	0.195	0.15	2.385	88.626	0.004	42.9	
11	23.92	11.6	0.175	0.15	3.588	92.214	0.004	44.6	
12	8.13	11.6	0.165	0.13	1.057	93.271	0.003	45.2	
13	7.47	11.5	0.155	0.11	0.822	94.093	0.003	45.5	
14	7.68	11.5	0.150	0.10	0.768	94.861	0.003	45.9	
16	16.01	11.4	0.135	0.08	1.281	96.141	0.002	46.5	
18	13.67	11.5	0.130	0.07	0.957	97.098	0.002	47.0	
22	22.19	11.3	0.110	0.12	2.663	99.761	0.003	48.3	
25	19.39	11.3	0.095	0.07	1.357	101.118	0.002	49.0	
29	26.54	11.2	0.074	0.06	1.592	102.711	0.002	49.7	
33	21.46	11.1	0.064	0.06	1.288	103.998	0.002	50.3	
36	23.40	11.1	0.058	0.04	0.936	104.934	0.001	50.8	
40	24.63	10.9	0.050	0.04	0.985	105.920	0.001	51.3	
43	19.17	10.8	0.050	0.03	0.575	106.495	0.001	51.6	
46	20.72	10.6	0.032	0.03	0.622	107.116	0.001	51.9	add 5 litres water, 1.6g NaCN, 0.53g NaOH
50	25.87	10.5	0.024	0.03	0.776	107.892	0.001	52.2	
54	23.49	10.4	0.016	0.02	0.470	108.362	0.001	52.5	10g NaCN added to feed
57	15.47	9.9	0.026	<0.01		108.362		52.5	
60	13.62	10.4	0.024	<0.01		108.362		52.5	10g NaCN added to feed
64	16.07	10.0	0.024	0.03	0.482	108.844	0.001	52.7	
68	18.25	10.3	0.040	0.04	0.730	109.574	0.001	53.0	
71	17.43	10.3	0.044	0.03	0.523	110.097	0.001	53.3	
77	19.45	10.0	0.018	0.03	0.584	110.681		53.6	final discharge liquor Ag = 0.02ppm
wash	45.35	9.9	0.010	0.01	0.454	111.134		53.8	wash liquor Ag = 0.01ppm

IDENTIFICATION		GRIND		LEACH	
Project	M1499	**grams**	2004	**grams**	2004
Sample	K9 Column Leach	**mls water**	1640	**mls water**	3006
objective	Residue (-50mm)	**water type**	tap	**% solids**	40
		% solids	55		
	2kg Leach, 0.1% NaCN	**minutes**	18.5		
test number	KS3	**80 % Passing**	75 µm		

Time hours	NaCN grams	hyd.lime grams	pH	diss. O2 mg/l	% NaCN	sample mls	liquor mls	mg/l Ag	mg/l Au	ext'n % Ag	ext'n % Au
			8.8								
0	3.01	0.61	10.6	7.2	0.100					0.0	0.0
2											
8			10.6	7.2	0.080	5					
24			10.6	8.4	0.062		2918	0.27	0.28	44.0	62.0

TAIL ASSAYS

residue	g/t Au	0.25, 0.25
	g/t Ag	<1 (0.5g/t assumed)

NOTES

GOLD BALANCE

amount	material	assay g/t Au	mg Au	dist. %
	liquor	0.28	0.817	62.0
	residue	0.250	0.501	38.0
	total	0.66	1.318	100.0

SILVER BALANCE

amount	material	assay g/t Ag	mg Au	dist. %
	liquor	0.27	0.788	44.0
	residue	0.5	1.002	56.0
	total	0.89	1.790	100.0

EXTRACTION SUMMARY %

	Au	Ag
calculated	62.0	44.0

REAGENT CONSUMPTION

kg/t NaCN	0.60
kg/t hyd. lime	0.30

HEAD ASSAY

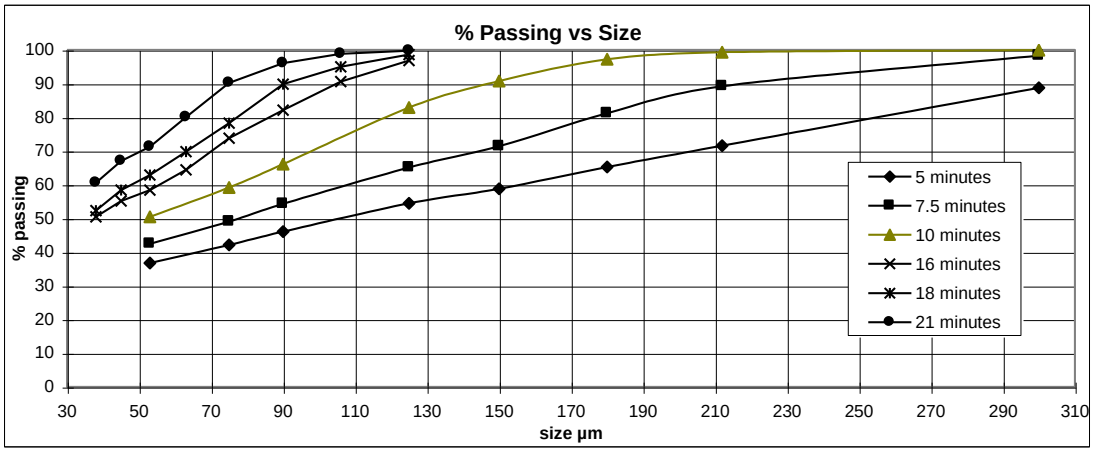
	Au	Ag
assay		
calculated	0.66	0.89

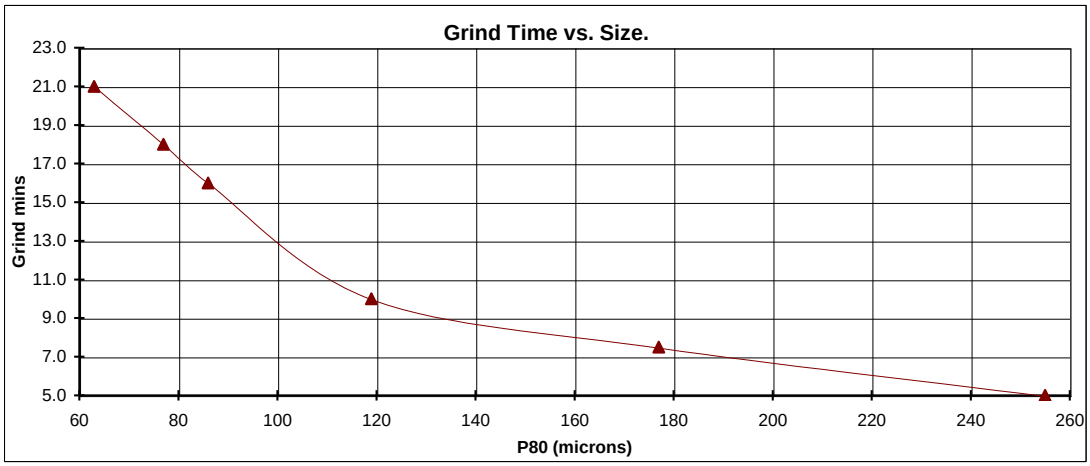
APPENDIX 3

Trial grinds

Green rod mill (silver mill rods + small roller)
1kg / 55% Solids
65 rpm

5 minutes		7.5 minutes		10 minutes		16 minutes		18 minutes		21 minutes	
Size	**% Pass**	**Size**	**% Pass**	**Size**	**% Pass**	**Size**	**% Pass**	**Size**	**% Pass**	**Size**	**% Pass**
300	88.8	300	98.3	300	99.9	125	96.9	125	98.6	125	99.8
212	71.6	212	89.2	212	99.3	106	90.6	106	95.0	106	98.8
180	65.3	180	81.2	180	97.2	90	82.1	90	89.8	90	96.1
150	58.8	150	71.4	150	90.7	75	73.8	75	78.3	75	90.2
125	54.5	125	65.1	125	82.9	63	64.4	63	69.8	63	80.1
90	46.1	90	54.3	90	66.1	53	58.4	53	62.9	53	71.3
75	42.2	75	49.1	75	59.2	45	55.2	45	58.4	45	67.0
53	36.8	53	42.5	53	50.5	38	50.4	38	52.3	38	60.6





APPENDIX 4

Agitation leach tests data sheets

REPORT M1499 KAY TANDA SULPHIDE ORE

IDENTIFICATION		ROD MILL GRIND (green)		LEACH	
Project	M1499	**grams**	1000	**grams**	1000
Sample	Sulphide composite	**mls water**	818	**mls water**	1500
leach detail	48hr CIL test @ 75µm with multiple carbon contacts	**water type**	tap	**% solids**	40
		% solids	55		
		minutes	18.4		
		target P80 (m)	75		
test number	KS1	**actual P80 (m)**			

Time hours	carbon grams	NaCN grams	hyd.lime grams	pH	diss. O2 mg/l	% NaCN	sample mls	liquor mls	carbon assays Au g/t	carbon assays Ag g/t	extr'n % Au	extr'n % Ag
				7.7								
0	15.0	1.50	0.63	10.6	10.5	0.100					0.00	0.0
2			0.05	10.3	8.0	0.084	5					
4			0.05	10.3	7.6	0.074	5					
8	10.0	0.30	0.15	10.3	7.1	0.064	5		131	27	78.9	27.9
24	10.0	0.15		10.4	10.6	0.076	5		20	9	87.4	34.5
32		0.15	0.05	10.4	8.4	0.064	5					
48				10.4		0.046		1548	4	5	89.7	43.6

final liquor assays for Au 0.01mg/L, Ag 0.05mg/L

ASSAYS

residue	g/t Au	0.24	0.26	
	g/t Ag	0.8		

NOTES

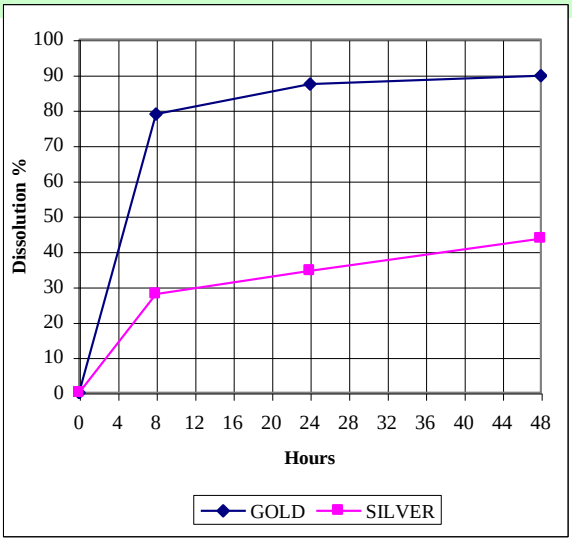
GOLD METALLURGICAL BALANCE

material	amount	assay g/t Au	mg Au	dist. %
carbon 8hr	14.69	131	1.924	78.9
carbon 24hr	10.38	20	0.208	8.5
carbon 48hr	10.37	4	0.041	1.7
liquor	1548	0.01	0.015	0.6
residue	1000	0.25	0.250	10.3
total		2.44	2.44	100.0

SILVER METALLURGICAL BALANCE

material	amount	assay g/t Ag	mg Ag	dist. %
carbon 8hr	14.69	27	0.397	27.9
carbon 24hr	10.38	9	0.093	6.6
carbon 48hr	10.37	5	0.052	3.7
liquor	1548	0.05	0.077	5.5
residue	1000	0.8	0.800	56.4
total		1.4	1.42	100.0

DISSOLUTION KINETICS



EXTRACTION % SUMMARY

	Au	Ag
calculated	89.7	43.6
head & tails calculation	90.0	33.3

REAGENT CONSUMPTION

kg/t NaCN	1.39
kg/t hyd. lime	0.93

HEAD ASSAY

		g/t Au	g/t Ag
assay	1.75, 3.03, 2.51, 2.75 =	2.51	1.2
calculated		2.44	1.4

REPORT M1499 KAY TANDA SULPHIDE ORE

IDENTIFICATION		GRIND		LEACH	
Project	M1499	**grams**	1001	**grams**	1001
Sample	Sulphide composite	**mls water**	816	**mls water**	1503
objective	gravity/leach test	**water type**	tap	**% solids**	40
	P80 = 75µm	**% solids**	55		
	24hrs, 0.1% NaCN	**minutes**	18.5		
test number	KS2	**80 % Passing**	75 µm		

Time hours	NaCN grams	hyd.lime grams	pH	diss. O2 mg/l	% NaCN	sample mls	liquor mls	mg/l Ag	mg/l Au	ext'n % Ag	ext'n % Au
			7.8								
0	1.50	0.41	10.5	10.4	0.100						19.2
2		0.1	10.1	10.6	0.084	25	1498	0.23	0.42	24.8	73.5
4			10.3	10.5	0.078	25	1500	0.24	0.51	26.3	86.1
8	0.11	0.05	10.3	10.3	0.068	25	1495	0.24	0.53	26.6	89.6
24			10.4	10.4	0.058		1488	0.25	0.44	28.0	78.8

TAIL ASSAYS

residue	g/t Au	0.20	0.29
	g/t Ag	1	

GRAVITY GOLD RECOVERY

No free gold was observed in the concentrate from this test, although the amalgamation apparently pick up some free gold

GOLD BALANCE

amount	material	assay	mg Au	dist. %
		g/t Au		
	amalgam		0.223	19.2
	liquor	0.44	0.691	59.6
	residue	0.245	0.245	21.2
	total	1.16	1.159	100.0

SILVER BALANCE

amount	material	assay	mg Ag	dist. %
		g/t Ag		
	amalgam			0.0
	liquor	0.25	0.390	28.0
	residue	1	1.001	72.0
	total	1.39	1.391	100.0

EXTRACTION SUMMARY %

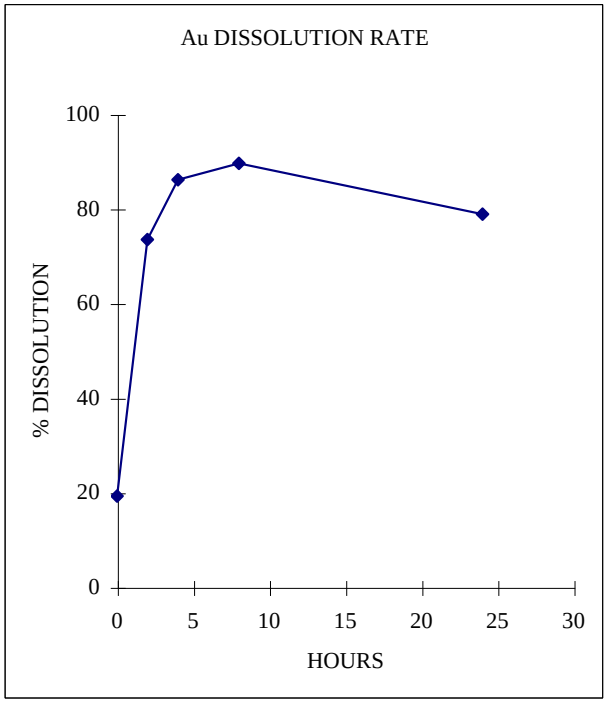
	Au	Ag
calculated	78.8	28.0
head & taisl calculation	90.2	16.7

REAGENT CONSUMPTION

kg/t NaCN	0.75
kg/t hyd. lime	0.56

HEAD ASSAY

	Au	Ag
assay	2.51	1.2
calculated	1.16	1.39



* Note. All the gold liquor assays were checked and found to be correct.

REPORT M1499 KAY TANDA SULPHIDE ORE

IDENTIFICATION		GRIND		LEACH	
Project	M1499	**grams**	1001	**grams**	1001
Sample	Sulphide composite	**mls water**	819	**mls water**	1502
objective	gravity/CIL leach test	**water type**	tap	**% solids**	40
	Grind Series Test	**% solids**	55		
	24hrs, 0.1% NaCN	**minutes**	18.5		
test number	KS4	**80 % Passing**	**75** µm		

Time hours	carbon grams	NaCN grams	hyd.lime grams	pH	diss. O2 mg/l	% NaCN	liquor mls	mg/l Ag	mg/l Au	ext'n % Ag	ext'n % Au
				7.7							
0	15.0	1.50	0.45	10.6	7.7	0.100				0.0	24.0
2			0.10	10.1	7.5	0.080					
4			0.05	10.2	7.5	0.078					
8			0.05	10.3	7.4	0.070					
24	15.39			10.2	9.1	0.062	1490	0.08	0.02	33.5	86.0

TAIL ASSAYS

residue	g/t Au	0.21, 0.22
	resample	0.24, 0.20
	g/t Ag	1

GOLD BALANCE

amount	material	assay	mg Au	dist. %
		g/t Au		
	amalgam		0.375	24.0
	carbon	61	0.939	60.1
	liquor	0.02	0.030	1.9
	residue	0.218	0.218	14.0
	total	1.56	1.562	100.0

SILVER BALANCE

amount	material	assay	mg Ag	dist. %
		g/t Ag		
	amalgam			0.0
	carbon	25	0.385	25.6
	liquor	0.08	0.119	7.9
	residue	1	1.001	66.5
	total	1.50	1.505	100.0

EXTRACTION SUMMARY %

	Au	Ag
calculated	86.0	33.5
head & taisl calculation	91.3	16.7

REAGENT CONSUMPTION

kg/t NaCN	0.58
kg/t hyd. lime	0.65

HEAD ASSAY

	Au	Ag
assay	2.51	1.2
calculated	1.56	1.5

GRAVITY GOLD RECOVERY

2 flakes of gold were observed up to ~500µm

Diagnostic analysis of leach residue

	Au g/t	distribution %	
roast / aqua regia digest:	0.18	95	(sulphide locked)
fire assay residual:	0.01	5	(silicate locked)
total:	0.19	100	

REPORT M1499 KAY TANDA SULPHIDE ORE

IDENTIFICATION		GRIND		LEACH	
Project	M1499	**grams**	1001	**grams**	1001
Sample	Sulphide composite	**mls water**	819	**mls water**	1502
objective	gravity/CIL leach test	**water type**	tap	**% solids**	40
	Grind Series Test	**% solids**	55		
	24hrs, 0.1% NaCN	**minutes**	12.0		
test number	KS5	**80 % Passing**	**106** µm		

Time hours	carbon grams	NaCN grams	hyd.lime grams	pH	diss. O2 mg/l	% NaCN	liquor mls	mg/l Ag	mg/l Au	ext'n % Ag	ext'n % Au
				7.7							
0	15.0	1.50	0.41	10.6	8.0	0.100				0.0	18.0
2			0.10	10.0	7.7	0.078					
4			0.05	10.2	7.7	0.076					
8			0.05	10.3	7.4						
24	15.43			10.1	9.1	0.066	1495	0.04	0.05	31.5	83.3

TAIL ASSAYS

residue	g/t Au	0.28, 0.24
	g/t Ag	1

GRAVITY GOLD RECOVERY

no free gold was observed

GOLD BALANCE

amount	material	assay g/t Au	mg Au	dist. %
	amalgam		0.280	18.0
	carbon	61	0.941	60.5
	liquor	0.05	0.075	4.8
	residue	0.260	0.260	16.7
	total	1.55	1.556	100.0

SILVER BALANCE

amount	material	assay g/t Ag	mg Ag	dist. %
	amalgam			0.0
	carbon	26	0.401	27.4
	liquor	0.04	0.060	4.1
	residue	1	1.001	68.5
	total	1.46	1.462	100.0

EXTRACTION SUMMARY %

	Au	Ag
calculated	83.3	31.5
head & taisl calculation	89.6	16.7

REAGENT CONSUMPTION

kg/t NaCN	0.51
kg/t hyd. lime	0.61

HEAD ASSAY

	Au	Ag
assay	2.51	1.2
calculated	1.55	1.5

REPORT M1499 KAY TANDA SULPHIDE ORE

IDENTIFICATION		GRIND		LEACH	
Project	M1499	**grams**	1002	**grams**	1002
Sample	Sulphide composite	**mls water**	820	**mls water**	1503
objective	gravity/CIL leach test	**water type**	tap	**% solids**	40
	Grind Series Test	**% solids**	55		
	24hrs, 0.1% NaCN	**minutes**	9.5		
test number	KS6	**80 % Passing**	**125** µm		

Time hours	carbon grams	NaCN grams	hyd.lime grams	pH	diss. O2 mg/l	% NaCN	liquor mls	mg/l Ag	mg/l Au	ext'n % Ag	ext'n % Au
				7.6							
0	15.0	1.50	0.36	10.5	7.8	0.100				0.0	29.7
2			0.15	10.0	7.7	0.080					
4			0.05	10.2	7.9	0.078					
8			0.05	10.3	7.5						
24	15.49			10.1	8.9	0.068	1490	0.04	0.02	26.9	81.7

TAIL ASSAYS

residue	g/t Au	0.26, 0.24
	g/t Ag	1

GRAVITY GOLD RECOVERY

1 flake of gold was observed ~500µm

GOLD BALANCE

amount	material	assay	mg Au	dist. %
		g/t Au		
	amalgam		0.407	29.7
	carbon	44	0.682	49.8
	liquor	0.02	0.030	2.2
	residue	0.250	0.250	18.3
	total	1.37	1.369	100.0

SILVER BALANCE

amount	material	assay	mg Ag	dist. %
		g/t Ag		
	amalgam			0.0
	carbon	20	0.310	22.6
	liquor	0.04	0.060	4.3
	residue	1	1.002	73.1
	total	1.37	1.371	100.0

EXTRACTION SUMMARY %

	Au	Ag
calculated	81.7	26.9
head & taisl calculation	90.0	16.7

REAGENT CONSUMPTION

kg/t NaCN	0.49
kg/t hyd. lime	0.61

HEAD ASSAY

	Au	Ag
assay	2.51	1.2
calculated	1.37	1.4

REPORT M1499 KAY TANDA SULPHIDE ORE

IDENTIFICATION		GRIND		LEACH	
Project	M1499	**grams**	1003	**grams**	1003
Sample	Sulphide composite	**mls water**	821	**mls water**	1504
objective	gravity/CIL leach test	**water type**	tap	**% solids**	40
	Grind Series Test	**% solids**	55		
	24hrs, 0.1% NaCN	**minutes**	8.25		
test number	KS7	**80 % Passing**	**150** µm		

Time hours	carbon grams	NaCN grams	hyd.lime grams	pH	diss. O2 mg/l	% NaCN	liquor mls	mg/l Ag	mg/l Au	ext'n % Ag	ext'n % Au
				7.6							
0	15.0	1.50	0.34	10.5	8.0	0.100				0.0	22.0
2			0.15	10.0	7.7	0.076					
4			0.05	10.2	7.9	0.076					
8			0.05	10.2	7.5						
24	15.47			10.1	8.9	0.052	1489	0.03	0.03	43.4	81.7

TAIL ASSAYS

residue	g/t Au	0.25, 0.26	
	g/t Ag	<1	(assumed to be <0.5g/t)

GRAVITY GOLD RECOVERY

no free gold was observed

GOLD BALANCE

amount	material	assay	mg Au	dist. %
		g/t Au		
	amalgam		0.307	22.0
	carbon	51	0.789	56.5
	liquor	0.03	0.045	3.2
	residue	0.255	0.256	18.3
	total	1.39	1.396	100.0

SILVER BALANCE

amount	material	assay	mg Ag	dist. %
		g/t Ag		
	amalgam			0.0
	carbon	22	0.340	38.4
	liquor	0.03	0.045	5.0
	residue	0.5	0.501	56.6
	total	0.88	0.886	100.0

EXTRACTION SUMMARY %

	Au	Ag
calculated	81.7	43.4
head & taisl calculation	89.8	58.3

REAGENT CONSUMPTION

kg/t NaCN	0.72
kg/t hyd. lime	0.59

HEAD ASSAY

	Au	Ag
assay	2.51	1.2
calculated	1.39	0.9

IDENTIFICATION		GRIND		LEACH	
Project	M1499	**grams**	1001	**grams**	1001
Sample	Sulphide composite	**mls water**	819	**mls water**	1502
objective	gravity/CIL leach test	**water type**	tap	**% solids**	40
	Leach duration test	**% solids**	55		
	16hrs, P80 75µm	**minutes**	18.5		
test number	KS8	**80 % Passing**	**75** µm		

Time hours	carbon grams	NaCN grams	hyd.lime grams	pH	diss. O2 mg/l	% NaCN	liquor mls	mg/l Ag	mg/l Au	ext'n % Ag	ext'n % Au
				7.6							
0	15.0	1.50	0.59	10.6	7.2	0.100				0.0	24.7
2			0.10	10.3	6.6						
4											
8											
16	15.15			10.2	9.1	0.056	1521	0.005	0.02	23.7	81.8
							actual silver assay <0.01 mg/l				

TAIL ASSAYS

residue	g/t Au	0.19, 0.35
	resample	0.26, 0.33
	g/t Ag	1

GRAVITY GOLD RECOVERY

2-3 flakes of gold were observed up to ~200µm

GOLD BALANCE

amount	material	assay	mg Au	dist. %
		g/t Au		
	amalgam		0.380	24.7
	carbon	56	0.848	55.1
	liquor	0.02	0.030	2.0
	residue	0.28	0.280	18.2
	total	1.54	1.539	100.0

SILVER BALANCE

amount	material	assay	mg Ag	dist. %
		g/t Ag		
	carbon	20	0.30	23.1
	liquor	0.01	0.01	0.6
	residue	1	1.00	76.3
	total	1.3	1.31	100.0

EXTRACTION SUMMARY %

	Au	Ag
calculated	81.8	23.7
head & taisl calculation	88.8	16.7

REAGENT CONSUMPTION

kg/t NaCN	0.65
kg/t hyd. lime	0.69

HEAD ASSAY

	Au	Ag
assay	2.51	1.2
calculated	1.54	1.3

REPORT M1499 KAY TANDA SULPHIDE ORE

IDENTIFICATION		GRIND		LEACH	
Project	M1499	**grams**	1001	**grams**	1001
Sample	Sulphide composite	**mls water**	819	**mls water**	1502
objective	gravity/CIL leach test	**water type**	tap	**% solids**	40
	Leach duration test	**% solids**	55		
	20hrs, P80 75µm	**minutes**	18.5		
test number	KS9	**80 % Passing**	**75** µm		

Time hours	carbon grams	NaCN grams	hyd.lime grams	pH	diss. O2 mg/l	% NaCN	liquor mls	mg/l Ag	mg/l Au	ext'n % Ag	ext'n % Au
				7.7							
0	15.0	1.50	0.51	10.6	8.0	0.100				0.0	20.6
2			0.10	10.2	7.2						
4			0.05	10.3	7.0						
8											
20	15.21			10.2	9.3	0.062	1508	0.005	0.02	24.6	87.4
							actual silver assay <0.01 mg/l				

TAIL ASSAYS

residue	g/t Au	0.17, 0.19
	resample	0.17, 0.19
	g/t Ag	1

GRAVITY GOLD RECOVERY

1 flake of gold was observed ~100µm

GOLD BALANCE

amount	material	assay g/t Au	mg Au	dist. %
	amalgam		0.296	20.6
	carbon	61	0.928	64.7
	liquor	0.02	0.030	2.1
	residue	0.18	0.180	12.6
	total	1.43	1.434	100.0

SILVER BALANCE

amount	material	assay g/t Ag	mg Ag	dist. %
	carbon	21	0.32	24.0
	liquor	0.01	0.01	0.6
	residue	1	1.00	75.4
	total	1.3	1.328	100.0

EXTRACTION SUMMARY %

	Au	Ag
calculated	87.4	24.6
head & taisl calculation	92.8	16.7

REAGENT CONSUMPTION

kg/t NaCN	0.56
kg/t hyd. lime	0.66

HEAD ASSAY

	Au	Ag
assay	2.51	1.2
calculated	1.43	1.3

REPORT M1499 KAY TANDA SULPHIDE ORE

IDENTIFICATION		GRIND		LEACH	
Project	M1499	**grams**	1001	**grams**	1001
Sample	Sulphide composite	**mls water**	819	**mls water**	1502
objective	gravity/CIL leach test	**water type**	tap	**% solids**	40
	NaCN test (0.08%)	**% solids**	55		
	20hrs, P80 75µm	**minutes**	18.5		
test number	KS11	**80 % Passing**	**75** µm		

Time hours	carbon grams	NaCN grams	hyd.lime grams	pH	diss. O2 mg/l	% NaCN	liquor mls	mg/l Ag	mg/l Au	ext'n % Ag	ext'n % Au
				7.5							
0	15.0	1.20	0.67	10.5	7.8	0.080				0.0	20.3
2			0.10	10.1	7.3	0.054					
4			0.05	10.2	7.0	0.048					
8											
20	15.15			10.1	9.1	0.046	1478	0.01	<0.01	48.8	84.8

TAIL ASSAYS

residue	g/t Au	0.21, 0.24
	resample	0.18, 0.20
	g/t Ag	<1 (1 used)

GRAVITY GOLD RECOVERY

no gold observed

GOLD BALANCE

amount	material	assay	mg Au	dist. %
		g/t Au		
	amalgam		0.276	20.3
	carbon	58	0.879	64.5
	liquor	<0.01		
	residue	0.208	0.208	15.2
	total	1.36	1.362	100.0

SILVER BALANCE

amount	material	assay	mg Ag	dist. %
		g/t Ag		
	carbon	62	0.94	48.0
	liquor	0.01	0.01	0.8
	residue	1.0	1.00	51.2
	total	1.95	1.955	100.0

EXTRACTION SUMMARY %

	Au	Ag
calculated	84.8	48.8
head & taisl calculation	91.7	16.7

REAGENT CONSUMPTION

kg/t NaCN	0.52
kg/t hyd. lime	0.82

HEAD ASSAY

	Au	Ag
assay	2.51	1.2
calculated	1.36	2.0

REPORT M1499 KAY TANDA SULPHIDE ORE

IDENTIFICATION		GRIND		LEACH	
Project	M1499	**grams**	1001	**grams**	1001
Sample	Sulphide composite	**mls water**	819	**mls water**	1502
objective	gravity/CIL leach test	**water type**	tap	**% solids**	40
	NaCN test (0.06%)	**% solids**	55		
	20hrs, P80 75µm	**minutes**	18.5		
test number	KS12	**80 % Passing**	**75** µm		

Time hours	carbon grams	NaCN grams	hyd.lime grams	pH	diss. O2 mg/l	% NaCN	liquor mls	mg/l Ag	mg/l Au	ext'n % Ag	ext'n % Au
				7.9							
0	15.0	0.90	0.77	10.6	7.8	0.060				0.0	9.6
2				10.2	7.2	0.044					
4			0.10	10.1	7.1	0.038					
8											
20	15.04			10	9.0	0.020	1484	0.11	<0.01	33.7	85.7

TAIL ASSAYS

residue	g/t Au	0.18, 0.17
	resample	0.18, 0.17
	g/t Ag	<1 (1 used)

GRAVITY GOLD RECOVERY

no gold observed

GOLD BALANCE

amount	material	assay	mg Au	dist. %
		g/t Au		
	amalgam		0.117	9.6
	carbon	62	0.932	76.1
	liquor	<0.01		
	residue	0.175	0.175	14.3
	total	1.22	1.225	100.0

SILVER BALANCE

amount	material	assay	mg Ag	dist. %
		g/t Ag		
	carbon	23	0.35	22.9
	liquor	0.11	0.16	10.8
	residue	1.0	1.00	66.3
	total	1.51	1.510	100.0

EXTRACTION SUMMARY %

	Au	Ag
calculated	85.7	33.7
head & taisl calculation	93.0	16.7

REAGENT CONSUMPTION

kg/t NaCN	0.60
kg/t hyd. lime	0.87

HEAD ASSAY

	Au	Ag
assay	2.51	1.2
calculated	1.22	1.5

APPENDIX 5

Comminution tests

BOND BALL MILL CLOSED CIRCUIT GRINDABILITY

SAMPLE	**Sulphide Composite**
SUBMITTED BY	**Kay Tanda**
REPORT No	**M1499**
DATE	**November 12, 2007**
TEST APERTURE (µm)	**106** ⇦⇦⇦⇦ (must have aperture here to calc bbwi)

PERIOD	REVS OF Mill	WT OF 700 mls (g)	WT OF NEW FEED (g)	WT OF O/SIZE (g)	WT OF U/SIZE (g)	NET WT OF U/SIZE (g)	NET WT OF U/SIZE PER REV (g)	CIRC'TING LOAD (%)	WT OF FRESH FEED ADDED TO NEXT CYCLE (g)	WT OF U/SIZE IN FEED TO NEXT CYCLE (g)
1	100	1328.1	1328.1	977.6	350.5	161.0	1.610	278.9	350.5	50.0
2	205	1328.1	350.5	987.3	340.8	290.8	1.418	289.7	340.8	48.6
3	233	1328.1	340.8	926.6	401.5	352.9	1.514	230.8	401.5	57.3
4	213	1328.1	401.5	948.9	379.2	321.9	1.511	250.2	379.2	54.1
5	215	1328.1	379.2	949.8	378.3	324.2	1.508	251.1	378.3	54.0

% PRODUCT IN THE FEED	14.3	%
IDEAL POTENTIAL PRODUCT	379.5	(g)
BULK DENSITY	1.897	(t/m3)
AVG % CIR. LOAD	250.7	%
AVG PRODUCT	1.510	(g/rev)
80% PASSING FEED SIZE	2494	(µm)
80% PASSING PROD'T SIZE	78	(µm)

BOND BALL MILL WORK INDEX (Kilowatt hours/dry tonne) : 12.9

BOND BALL MILL GRINDABILITY TEST FEED AND PRODUCTS SIZINGS

FEED TO PERIOD No. 1

Size (mm)	Weight (g)	Retained (%)	Passing (%)
2800	36.4	9.2	90.8
2360	61.5	15.5	75.3
1700	74.9	18.9	56.4
1180	50.3	12.7	43.6
600	51.4	13.0	30.7
300	34.6	8.7	21.9
150	22.4	5.7	16.3
106	7.9	2.0	14.3
-106	56.5	14.3	
TOTAL	395.9	100.0	

F 80 (µm) : 2494

EQUILIBRIUM PRODUCT

Size (mm)	Weight (g)	Retained (%)	Passing (%)
90	17.6	11.2	88.8
75	18.1	11.5	77.3
63	10.3	6.5	70.8
53	13.1	8.3	62.5
45	7.1	4.5	58.0
38	8.9	5.7	52.3
-38	82.4	52.3	
TOTAL	157.5	100.0	

P 80 (µm) : 78

BOND ROD MILL CLOSED CIRCUIT GRINDABILITY

SAMPLE	**Sulphide Composite**
SUBMITTED BY	**Kay Tanda**
REPORT No	**M1499**
DATE	**November 23, 2007**
TEST APERTURE (µm)	**1180** ⇦⇦⇦⇦ (must have aperture here to calc rbwi)

PERIOD	REVS OF Mill	WT OF 1250 mls (g)	WT OF NEW FEED (g)	WT OF O/SIZE (g)	WT OF U/SIZE (g)	NET WT OF U/SIZE (g)	NET WT OF U/SIZE PER REV (g)	CIRC'TING LOAD (%)	WT OF FRESH FEED ADDED TO NEXT CYCLE (g)	WT OF U/SIZE IN FEED TO NEXT CYCLE (g)
1	100	2311.2	2311.2	1291.7	1019.5	627.9	6.279	126.7	1019.5	172.8
2	157	2311.2	1019.5	1156.4	1154.8	982.0	6.255	100.1	1154.8	195.7
3	153	2311.2	1154.8	1143.6	1167.6	971.9	6.352	97.9	1167.6	197.9
4	151	2311.2	1167.6	1127.8	1183.4	985.5	6.527	95.3	1183.4	200.5
5	146	2311.2	1183.4	1165.0	1146.2	945.7	6.477	101.6	1146.2	194.2

% PRODUCT IN THE FEED	16.9	%
IDEAL POTENTIAL PRODUCT	1155.6	(g)
BULK DENSITY	1.849	(t/m3)
AVG % CIR LOAD	98.5	%
AVG PRODUCT	6.502	(g/rev)
80% PASSING FEED SIZE	10100	(µm)
80% PASSING PROD'T SIZE	853	(µm)

BOND ROD MILL WORK INDEX (Kilowatt hours/dry tonne) : 17.2

BOND ROD MILL GRINDABILITY TEST FEED AND PRODUCTS SIZINGS

FEED TO PERIOD No. 1

Size (µm)	Weight (g)	Retained (%)	Passing (%)
11200	119.4	10.4	89.6
9500	169.6	14.8	74.8
8000	175.4	15.3	59.6
6700	89.5	7.8	51.8
5600	98.6	8.6	43.2
3350	153.6	13.4	29.8
2360	64.5	5.6	24.2
1400	67.2	5.9	18.3
1180	16.0	1.4	16.9
-1180	194.6	16.9	
TOTAL	1148.4	100.0	

F 80 (µm) 10100

EQUILIBRIUM PRODUCT

Size (µm)	Weight (g)	Retained (%)	Passing (%)
1000	43.0	11.8	88.2
850	30.6	8.4	79.8
600	54.0	14.8	64.9
425	41.2	11.3	53.6
300	30.5	8.4	45.2
-300	164.4	45.2	
TOTAL	363.7	100.0	

P 80 (µm) : 853

BOND ABRASION INDEX DETERMINATION

SAMPLE IDENTITY :	Sulphide
CLIENT :	Kay Tanda
PROJECT NUMBER :	M1499
DATE :	12-Nov-07

SIZING ANALYSIS : ABRASION INDEX PRODUCT

Operation	Size (mm)	Weight (g)	Weight (%)	Weight % Passing
Screening	12.7	78.4	4.9	95.1
	9.5	301.9	18.8	76.3
	8.0	176.0	11.0	65.3
	4.0	303.5	18.9	46.4
	2.0	130.3	8.1	38.3
	1.0	92.6	5.8	32.5
	-1.0	521.1	32.5	
Total		1603.8	100.0	

PADDLE WEIGHT BEFORE TEST (g) : 83.7723

PADDLE WEIGHT AFTER TEST (g) : 83.7435

BOND ABRASION INDEX (Ai) : 0.0288