

**An Investigation into  
GOLD RECOVERY FROM THE  
AMULSAR PROJECT SAMPLES**

prepared for

**GEOTEAM CJSC – LYDIAN INTERNATIONAL**

Project 11956-001 – Final Report  
September 30, 2008

**NOTE:**

This report refers to the samples as received.

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## *Executive Summary*

A scoping level test program was undertaken, at the request of GEOTEAM CJSC, a subsidiary of Lyidian International Ltd., on a composite of samples representing one drill hole (DDA-004) of the Amulsar project in Armenia. The deposit is an epithermal gold deposit and to date only oxide ore has been drilled. The purpose of the program was to evaluate the response of the sample to basic metallurgical processes.

The metallurgical program consisted of a qualitative mineralogical evaluation of the composited sample, Bond ball mill work index determination, gravity concentration, cyanide leaching of the gravity tailings and the whole ore and an evaluation of the ore's amenability to heap leaching.

The average direct gold head grade was determined, by duplicate screened metallics assays, to be 1.07 g/t.

The Bond ball mill work index was 7.2 kWh/t.

The results of the testwork are summarized below.

Grind Size, P <sub>80</sub>	1/2"	1/4"	~150 µm	~100 µm	~75 µm
<b>Heap Leach Simulation, (15 days)</b>					
Gold Recovery, %	94.7	96.0			
Residue Assay, Au, g/t	0.06	0.04			
<b>Gravity Separation</b>			8.5		
Gold Recovery, %					
<b>Gravity Separation + Cyanidation (48 h)</b>					
Gold Recovery, %			94.7	95.5	94.5
Residue Assay, Au, g/t			0.06	0.05	0.06
<b>Whole Ore Cyanidation (48 h)</b>					
Gold Recovery, %			97.3	94.7	96.5
Residue Assay, Au, g/t			0.03	0.06	0.04

The results suggested that the ore is amenable to heap leaching and conventional whole ore cyanidation. The recovery of gold was in the range of 96-97%, leaving a residue assay of 0.03-0.06 g/t gold.


The reagent consumptions were very low, below 0.1 kg/t NaCN and 0.3 kg/t lime.

Additional confirmatory heap leach testwork is recommended.

## ***Introduction***

This report presents the results from testwork completed for GEOTEAM CJSC, a subsidiary of Lyidian International Ltd., on a composite sample of one drill hole from their Amulsar project in Armenia. A brief gold scoping metallurgical testwork program was completed. The testwork evaluated the response of the sample to gravity separation and cyanidation processes.

The program was initiated by Mr. Jason Wilkinson, Exploration Manager for Lyidian International Ltd. Results were forwarded to Mr. Wilkinson and Mr. Hayk Aloyan (GEOTEAM CJSC) as they became available over the course of the program.



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## *Testwork Summary*

### 1. Sample Receipt, Preparation and Characterisation

#### 1.1. Sample Receipt

A total of 146 samples of half core from drill hole (DDA-004) were received at SGS Lakefield site in June, 2008 and given our receipt number 0217-JUN08. A complete list of the samples received, including individual sample numbers, depths and weights, is appended.

#### 1.2. Sample Preparation

The individual core samples were inventoried and weighed. Each sample was crushed to -1/2 inch and then split in half. One half was stored and the other half of the -1/2 inch samples were blended together. A 6 kg sample was riffled out. From this 6 kg portion, three 1-kg test charges were cut out at -1/2". The remainder of the 6 kg was crushed to pass 1/4" and test charges riffled out.

The balance of the -1/2" material was crushed to pass 6 mesh and 10 kg was riffled out for a Bond Work Index determination. The remaining 6 mesh material was then crushed to pass 10 mesh and rotary split into two 10 kg charges and 1 kg test charges. Two of the 1 kg charges were submitted for duplicate screened metallics analysis for gold at ±150 mesh. The minus 150 mesh fraction was assayed for gold in duplicate. The results indicated that the calculated head grade for the samples submitted for assay was 1.06-1.08 g/t Au. Only 1.5-1.9% of the gold reported into the plus 150 mesh fraction, indicating the gravity recoverable gold component in this ore is fairly low. A 100-200 gram sample of the -10 mesh material was submitted for S, S<sup>-</sup> and a multi-element semi-quantitative ICP scan. The results of these assays are summarized below in Tables 1 and 2.

**Table 1. Screened Metallics Analysis for Gold, Comp 1**

Composite	Calculated Head Grade Au, g/t	+150 mesh Fraction		-150 mesh Fraction				% Au Distribution	
		% Mass	Au, g/t	% Mass	Au, g/t	Au, g/t	Au, avg.	+150 Mesh	-150 Mesh
Comp 1 cut A	1.06	2.61	0.78	99.7	1.05	1.09	1.07	1.9	98.1
Comp 1 cut B	1.08	2.08	0.80	99.8	1.05	1.13	1.09	1.5	98.5

**Table 2. Head Analyses of Composite 1**

Element	Comp 1
S %	0.08
S= %	0.05
<b>ICP Scan</b>	
Ag g/t	2
Al g/t	3700
As g/t	88
Ba g/t	110
Be g/t	<0.1
Bi g/t	68
Ca g/t	390
Cd g/t	<2
Co g/t	<4
Cr g/t	22
Cu g/t	98
Fe g/t	37000
K g/t	620
Li g/t	<5
Mg g/t	330
Mn g/t	9.6
Mo g/t	11
Na g/t	160
Ni g/t	<20
P g/t	94
Pb g/t	120
Sb g/t	120
Se g/t	<30
Sn g/t	<25
Sr g/t	66
Ti g/t	8400
Tl g/t	<30
U g/t	<20
V g/t	8
Y g/t	0.8
Zn g/t	80

The head analysis indicated that the ore contained 0.05% sulphide and fairly low base metal concentration.

### **1.3. Mineralogical Evaluation**

A 1-kg sample of Composite 1 was submitted for qualitative mineralogical evaluation. The standard “rapid mineral scan” examination was applied, which includes general mineral assemblage with manual grain counting. An X-ray diffraction analysis was included for the

identification of the major minerals. The rapid mineral scan evaluates the bulk petrography and general mineral types, abundances and grain size ranges.

The rapid mineral scan indicated that the Composite 1 sample consisted of the following crystalline mineral assemblage phases:

- Major - quartz
- Minor - hematite  
goethite  
potassium-feldspar  
rutile
- Trace - chlorite  
mica  
alunite

The complete details of the rapid mineral scan are appended.

## 2. Metallurgical Test Program

The metallurgical test program included:

- Bond ball mill grindability
- Gravity concentration of gold
- Study of the ore's amenability to cyanide leaching
- Study of the ore's amenability to heap leaching

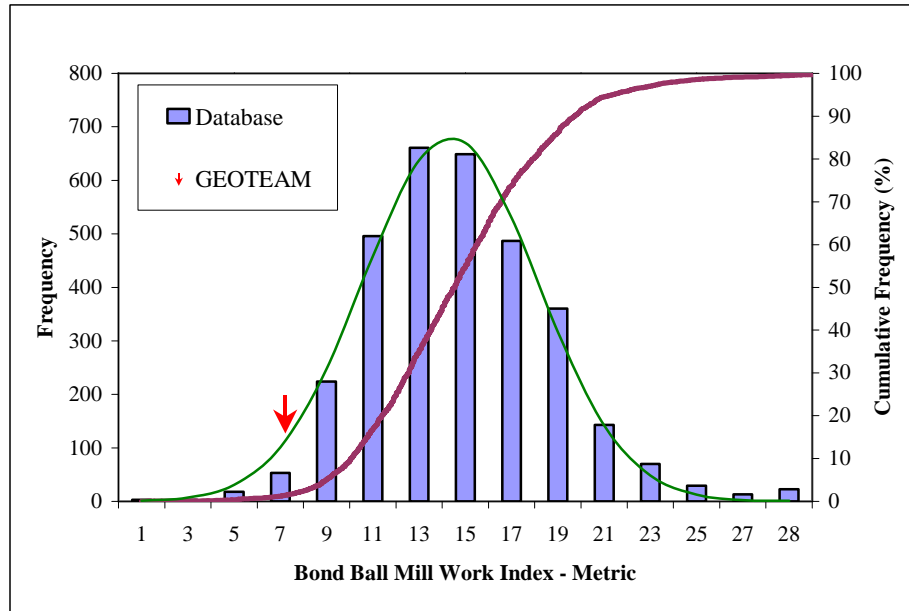
These tests are discussed individually in the following sections.

### 2.1. Bond Ball Mill Grindability Testwork

The Bond ball mill grindability test was performed at a grind of 100 mesh (150 microns) on Composite 1. The results are summarised in Table 3 and compared with the A.R. MacPherson Grinding Specialist database in Figure 1. The results indicated that the Bond work index for the Composite 1 sample was 7.2 kWh/t (metric).

**Table 3. Bond Ball Mill Grindability Test Summary**

Sample Name	Mesh of Grind	F <sub>80</sub> (µm)	P <sub>80</sub> (µm)	Gram per Revolution	Work Index (kWh/t) (metric)	Hardness Percentile
Comp 1	100	1999	102	3.54	7.2	1.0



**Figure 1. Bond Ball Mill Database**

At the time of this testwork, there were 3232 Bond ball mill work indices in the A.R. MacPherson database. The frequency versus work index is the number of samples in the database that have that particular work index. For example, there are approximately 500 samples out of the 3232 samples that have a work index of 11. The cumulative frequency curve represents the cumulative number of samples out of the total number of samples as a percentage. The hardness percentile is essentially the percent cumulative frequency. For example, a cumulative frequency of 50% means that 50% of the samples tested had that work index or lower and 50% had a higher work index. For sample Comp 1, 1% of the samples tested had a work index of 7.2 or lower and 99% had a higher work index. This would indicate that this sample has a very low degree of hardness. The complete test details are appended.

## 2.2. Gravity Separation Testwork

The potential for gold recovery by gravity was briefly evaluated for the sample, Comp 1, at a grind size of 147  $\mu\text{m}$ . The gravity separation tests were completed using the standard scoping level program charge of 12 kg. A Knelson MD-3 concentrator was used as the primary gravity gold recovery unit. The Knelson concentrate was recovered and further upgraded by treatment

on a Mozley mineral separator. Approximately 4 grams (0.034 wt %) of final Mozley concentrate was recovered. The Mozley concentrate was assayed to extinction for gold by standard fire assay methods.

The Knelson and Mozley tails were combined, blended and sampled in duplicate for gold assay. The results are given in Table 4.

**Table 4. Summary of Gravity Test**

Sample	Gravity Test No.	Feed Size K <sub>80</sub> ~µm	Gravity Conc		Gravity Recovery Au %	Head	
			Wt. %	Assays Au g/t		Calc Au g/t	Direct Au g/t
Comp 1	G1	147	0.034	258	8.5	1.03	1.07

Gold recovery by gravity separation was 8.5% at a particle size of 147 µm. The gravity concentrate contained 258 g/t Au. These results indicated that the gravity separation step should not be included in the process flowsheet.

### 2.3. Cyanidation Testwork

Cyanide leach tests were completed on the composite at three primary grind sizes, 153, 110 and 85 µm. One kilogram charges were ground in a laboratory ball mill to the desired particle size and subjected to cyanidation testing applying the following standard conditions:

Pulp Density	=	40% solids (w/w)
Pulp pH	=	10.5 – 11 (maintained with lime)
Cyanide Concentration	=	0.5 g/L NaCN (maintained)
Retention Time	=	48 hours (sub-samples at ~8 and 24 hours).

Results from the direct composite cyanidation leach tests are presented in Table 5.

**Table 5. Direct Composite Cyanidation Results**

Test No.	Feed Size K <sub>80</sub> , ~µm	Leach				Gold				
		NaCN		CaO		Final Resi. g/t	CN Feed Calc. g/t	Recovery(%)		
		Added kg/t	Cons. kg/t	Added kg/t	Cons. kg/t					8h
CN1	153	0.51	0.03	0.33	0.32	0.030	1.12	93	95	97.3
CN2	110	0.50	0.02	0.31	0.30	0.060	1.14	89	94	94.7
CN3	85	0.52	0.02	0.28	0.28	0.040	1.14	88	95	96.5

All three tests had very fast leaching kinetics with 88-93% of the gold leaching within the first 8 hours.

A series of cyanidation tests was also completed on the gravity tailing from Test G1 (refer to section 2.2). Three grind sizes were evaluated; 129, 95 and 72  $\mu\text{m}$ . The test conditions applied were the same as in the direct composite cyanidation test series. Results from these tests are summarized in Table 6. The overall gold recovered by gravity separation followed by cyanidation of the tailing is included in the recovery values shown in the Table 6.

**Table 6. Gravity Tailing Cyanidation Results**

Test No.	Feed Size K <sub>80</sub> ~ $\mu\text{m}$	Leach				Gold					
		NaCN		CaO		Final Resi. g/t	CN Feed Calc. g/t	Recovery(%)			O'all Grav+CN
Added kg/t	Cons. kg/t	Added kg/t	Cons. kg/t	8h	24h			48-h			
CN4	129	0.53	0.02	0.32	0.30	0.060	1.03	92	91	94.2	94.7
CN5	95	0.55	0.06	0.31	0.30	0.050	1.01	91	94	95.1	95.5
CN6	72	0.51	0.03	0.33	0.31	0.060	0.99	92	95	94.0	94.5

\*Gravity tailings from test G1

The leach kinetics were very fast, 91 – 92% of the gold leached within the first 8 hours.

Overall gold recovery by direct composite cyanidation (Table 5) ranged from 95-97% and indicated that grind size had very little effect on the gold recovery. There was no synergistic impact noted in overall gold recovery by gravity separation + tailing cyanidation (Table 6). Combining the processes essentially resulted in the same overall gold recovery, 94-95%.

The final residue grades for all tests ranged from 0.030 to 0.060 g/t gold.

Cyanide consumption was very low, averaging approximately 0.03 kg NaCN per tonne of leach feed.

#### **2.4. Heap Leach Amenability Testwork**

In order to evaluate the amenability of the ore to heap leaching, a series of coarse ore bottle roll tests was completed at two feed sizes, minus ½ inch and minus ¼ inch. Typically, in these tests the bottles are rolled intermittently (1 minute every hour) in order to maximize solution contact with the ore while minimizing ore attrition.

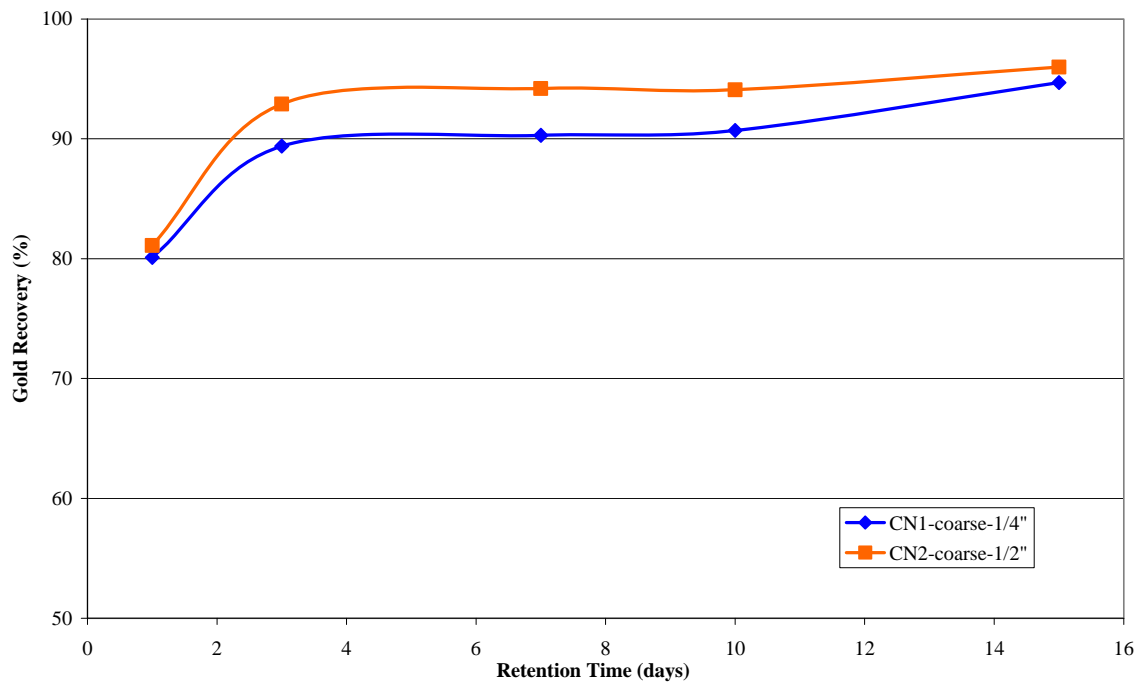
The conditions applied were as follows;

Pulp Density	=	50% solids (w/w)
Pulp pH	=	10.5 – 11 (maintained with lime)
Cyanide Concentration	=	0.5 g/L NaCN (maintained)
Retention Time	=	15 days (sub-samples at 1, 3, 7, 10 days)

The pregnant solution was sub-sampled and assayed for gold content after 1, 3, 7, 10 and 15 days, in order to monitor the rate of gold extraction. The final leach residues were crushed to pass 10 mesh and sampled/assayed for gold. The results from these tests are given in Table 7 and plotted in Figure 4. The gold recovery from the coarse ore was 95-96% and the final residue gold grade was 0.040-0.060 g/t.

**Table 7. Coarse Ore Cyanidation Results**

Feed Size	Leach				Gold							
	NaCN		CaO		Final Resi. g/t	CN Feed Calc. g/t	Recovery (%)					
	Added kg/t	Cons. kg/t	Added kg/t	Cons. kg/t			1 day	3 days	7 days	10 days	15 days	
1/4"	0.75	0.25	1.32	1.32	0.06	1.14	80.1	89.4	90.3	90.7	94.7	
1/2"	0.7	0.23	1.36	1.37	0.04	1.00	81.1	92.9	94.2	94.1	96.0	



**Figure 4. Gold Recovery (%) vs. Retention Time (days)**

## Conclusions and Recommendations

The following general comments, observations and recommendations may be made with respect to the metallurgical test program:

- **Head Analysis:** The duplicate screened metallica analysis for gold results, presented in Table 1, indicate that there was very little concentration of gold in the +150 mesh (+100 µm) screen fraction. The grades of the +150 mesh and -150 mesh material were essentially the same, implying that there was not a significant coarse gold component in the sample.
- **Gravity Separation:** The gravity recoverable gold for this sample was only 8.5% (refer to Table 4), indicating that a gravity separation circuit will not be required. However, further testing should be performed in order to confirm this.
- **Cyanide Leaching:** The similarity between the whole ore cyanidation results and the gravity separation + tailing cyanidation results (refer to Tables 5 and 6), further illustrated that the free gold is quite fine and amenable to direct (whole ore) extraction by cyanide.
- **Heap Leach Simulation:** The results from the heap leach simulation tests (refer to Table 7) indicate that this sample is highly amenable to the heap leaching process. The relative costs (capital and operating) of this type of operation are generally very attractive. Additional testwork will be required to verify and optimize the heap leach process operating parameters. Column simulated heap leaching tests should be performed on a more representative sample of the overall ore body.

It is recommended that these basic metallurgical processes be tested on samples representing the entire ore body, Composite 1 was representative of only one drill hole, to confirm the results achieved in this program.

Note that the statements and recommendations made in this report are based entirely on the behaviour of the ore sample (representing only one drill hole in the ore body) tested in this program.

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## ***Appendix 1 – Sample Information***

11956-001 GEOTEAM - Lydian International - Amulsar

June 27th, 2008

GEOTEAM				SGS Weight		Comments	Au_ppm
From (m)	To (m)	Total (m)	Sample No.	Weight	Total		
0.00	1.00	1.00	ADD0074	0.70		Sack 1	0.849
1.00	2.00	1.00	ADD0075	1.10		Sack 1	0.334
2.00	3.00	1.00	ADD0076	0.40		Sack 1	0.860
3.00	4.00	1.00	ADD0077	1.00		Sack 1	7.160
4.00	6.00	2.00	ADD0078	0.65		Sack 1	11.100
6.00	7.80	1.80	ADD0079	1.10		Sack 1	10.800
7.80	9.00	1.20	ADD0081	2.00		Sack 1	1.170
9.00	9.80	0.80	ADD0082	1.30		Sack 1	31.200
9.80	11.00	1.20	ADD0083	3.00		Sack 1	0.734
11.00	12.00	1.00	ADD0084	3.35		Sack 1	0.385
12.00	13.00	1.00	ADD0085	3.50		Sack 2	0.211
13.00	14.00	1.00	ADD0086	3.10		Sack 2	0.469
14.00	15.00	1.00	ADD0087	2.70		Sack 2	2.230
15.00	16.10	1.10	ADD0088	3.90		Sack 2	3.440
16.10	17.65	1.55	ADD0089	4.30		Sack 2	3.090
17.65	18.00	0.35	ADD0090	1.10		Sack 2	0.447
18.00	19.00	1.00	ADD0091	3.15		Sack 2	0.513
19.00	19.50	0.50	ADD0092	2.00		Sack 3	1.470
19.50	20.00	0.50	ADD0093	1.70		Sack 3	1.650
20.00	21.00	1.00	ADD0094	2.60		Sack 3	1.420
21.00	22.35	1.35	ADD0095	3.55		Sack 3	17.300
22.35	23.00	0.65	ADD0096	2.45		Sack 3	1.970
23.00	23.90	0.90	ADD0097	2.90		Sack 3	3.620
23.90	25.00	1.10	ADD0099	3.00		Sack 3	6.490
25.00	26.00	1.00	ADD0101	2.80		Sack 3	10.800
26.00	27.00	1.00	ADD0102	1.90		Sack 4	5.490
27.00	28.00	1.00	ADD0103	2.95		Sack 4	0.836
28.00	29.00	1.00	ADD0104	2.85		Sack 4	1.050
29.00	30.00	1.00	ADD0105	2.25		Sack 4	0.519
30.00	31.00	1.00	ADD0106	2.60		Sack 4	0.308
31.00	32.00	1.00	ADD0107	2.40		Sack 4	0.374
32.00	33.00	1.00	ADD0108	1.90		Sack 4	1.880
33.00	34.00	1.00	ADD0109	2.40		Sack 4	0.575
34.00	35.00	1.00	ADD0110	1.70		Sack 5	0.377
35.00	36.00	1.00	ADD0111	2.45		Sack 5	0.591
36.00	37.00	1.00	ADD0112	3.10		Sack 5	0.206
37.00	38.00	1.00	ADD0113	2.60		Sack 5	0.512
38.00	39.00	1.00	ADD0114	2.75		Sack 5	0.759
39.00	40.00	1.00	ADD0115	2.90		Sack 5	0.211
40.00	41.00	1.00	ADD0116	1.85		Sack 5	0.058
41.00	42.00	1.00	ADD0118	3.80		Sack 5	0.106
42.00	43.00	1.00	ADD0119	2.70		Sack 5	0.321

11956-001 GEOTEAM - Lydian International - Amulsar

June 27th, 2008

From (m)	To (m)	Total (m)	GEOTEAM		SGS Weight		Comments	Au_ppm
			Sample No.	Weight	Total	To Composite		
43.00	44.00	1.00	ADD0121	3.00			Sack 6	0.097
44.00	45.00	1.00	ADD0122	2.40			Sack 6	0.193
45.00	46.00	1.00	ADD0123	3.00			Sack 6	0.148
46.00	47.00	1.00	ADD0124	2.90			Sack 6	0.072
47.00	48.00	1.00	ADD0125	2.45			Sack 6	0.118
48.00	49.00	1.00	ADD0126	3.05			Sack 6	0.321
49.00	50.00	1.00	ADD0127	2.55			Sack 6	0.207
50.00	51.00	1.00	ADD0128	2.85			Sack 6	0.095
51.00	52.00	1.00	ADD0129	2.55			Sack 7	0.034
52.00	53.00	1.00	ADD0130	3.10			Sack 7	0.200
53.00	54.00	1.00	ADD0132	3.25			Sack 7	0.163
54.00	55.00	1.00	ADD0133	2.70			Sack 7	0.027
55.00	56.00	1.00	ADD0134	3.10			Sack 7	0.033
56.00	57.00	1.00	ADD0135	2.20			Sack 7	0.024
57.00	58.00	1.00	ADD0136	2.40			Sack 7	0.029
58.00	59.00	1.00	ADD0137	2.90			Sack 7	0.027
59.00	60.00	1.00	ADD0138	2.70			Sack 8	0.006
60.00	61.00	1.00	ADD0139	2.20			Sack 8	0.009
61.00	62.00	1.00	ADD0141	2.15			Sack 8	0.054
62.00	63.00	1.00	ADD0142	2.40			Sack 8	0.047
63.00	64.00	1.00	ADD0143	2.10			Sack 8	0.034
64.00	65.00	1.00	ADD0144	2.60			Sack 8	0.047
65.00	66.00	1.00	ADD0145	1.90			Sack 8	0.049
66.00	67.00	1.00	ADD0146	3.00			Sack 8	0.022
67.00	68.00	1.00	ADD0147	2.40			Sack 9	0.042
68.00	69.00	1.00	ADD0148	2.90			Sack 9	0.023
69.00	70.00	1.00	ADD0149	2.95			Sack 9	0.041
70.00	71.00	1.00	ADD0151	1.70			Sack 9	0.063
71.00	72.00	1.00	ADD0152	3.20			Sack 9	0.325
72.00	73.00	1.00	ADD0153	2.80			Sack 9	0.968
73.00	74.00	1.00	ADD0154	2.50			Sack 9	0.640
74.00	75.00	1.00	ADD0155	2.10			Sack 9	0.734
75.00	76.00	1.00	ADD0156	2.80			Sack 10	0.401
76.00	77.00	1.00	ADD0157	2.60			Sack 10	0.174
77.00	78.00	1.00	ADD0158	2.70			Sack 10	0.272
78.00	79.00	1.00	ADD0159	2.80			Sack 10	0.141
79.00	80.00	1.00	ADD0161	2.55			Sack 10	0.041
80.00	81.00	1.00	ADD0162	2.00			Sack 10	0.027
81.00	82.00	1.00	ADD0163	2.20			Sack 10	0.031
82.00	83.00	1.00	ADD0164	3.25			Sack 10	0.010
83.00	84.00	1.00	ADD0165	3.20			Sack 11	0.013
84.00	85.00	1.00	ADD0166	2.70			Sack 11	0.061
85.00	86.00	1.00	ADD0167	2.95			Sack 11	0.025
86.00	87.00	1.00	ADD0168	2.85			Sack 11	0.005
87.00	88.00	1.00	ADD0169	1.70			Sack 11	0.019
88.00	89.00	1.00	ADD0170	1.30			Sack 11	0.056

11956-001 GEOTEAM - Lydian International - Amulsar

June 27th, 2008

GEOTEAM				SGS Weight			Comments	Au_ppm
From (m)	To (m)	Total (m)	Sample No.	Weight	Total	To Composite		
89.00	90.00	1.00	ADD0172	2.30			Sack 11	0.112
90.00	91.00	1.00	ADD0173	2.40			Sack 11	0.207
91.00	92.00	1.00	ADD0174	2.60			Sack 11	0.039
92.00	92.40	0.40	ADD0175	1.50			Sack 11	0.009
92.40	93.00	0.60	ADD0176	0.80			Sack 12	0.007
93.00	94.00	1.00	ADD0177	3.40			Sack 12	0.027
94.00	95.00	1.00	ADD0178	3.15			Sack 12	0.006
95.00	96.00	1.00	ADD0179	1.80			Sack 12	0.453
96.00	97.00	1.00	ADD0181	3.50			Sack 12	0.770
97.00	98.00	1.00	ADD0182	2.60			Sack 12	0.107
98.00	99.00	1.00	ADD0183	2.20			Sack 12	0.137
99.00	100.00	1.00	ADD0184	3.00			Sack 12	0.408
100.00	101.00	1.00	ADD0185	2.50			Sack 13	0.175
101.00	102.00	1.00	ADD0186	2.75			Sack 13	0.196
102.00	103.00	1.00	ADD0187	2.90			Sack 13	0.247
103.00	104.00	1.00	ADD0188	1.70			Sack 13	0.030
104.00	105.00	1.00	ADD0190	2.40			Sack 13	0.131
105.00	106.00	1.00	ADD0191	2.60			Sack 13	0.394
106.00	107.20	1.20	ADD0193	2.15			Sack 13	0.166
107.20	108.00	0.80	ADD0194	2.45			Sack 13	0.143
108.00	109.00	1.00	ADD0195	2.10			Sack 13	0.135
109.00	110.00	1.00	ADD0196	2.10			Sack 14	0.346
110.00	110.70	0.70	ADD0197	1.20			Sack 14	0.699
110.70	111.00	0.30	ADD0198	0.60			Sack 14	6.410
111.00	112.00	1.00	ADD0199	0.45			Sack 14	2.770
112.00	113.00	1.00	ADD0201	0.50			Sack 14	2.090
113.00	114.00	1.00	ADD0202	0.65			Sack 14	2.070
114.00	115.00	1.00	ADD0203	1.85			Sack 14	0.624
115.00	116.00	1.00	ADD0204	2.00			Sack 14	0.142
116.00	117.00	1.00	ADD0205	2.00			Sack 14	0.144
117.00	118.00	1.00	ADD0206	1.40			Sack 14	0.249
118.00	119.00	1.00	ADD0207	1.70			Sack 14	0.288
119.00	120.00	1.00	ADD0208	1.30			Sack 14	0.329
120.00	121.20	1.20	ADD0209	2.30			Sack 15	0.697
121.20	122.40	1.20	ADD0210	1.80			Sack 15	3.920
122.40	123.00	0.60	ADD0211	1.20			Sack 15	0.806
123.00	124.00	1.00	ADD0212	2.15			Sack 15	1.350
124.00	125.00	1.00	ADD0213	1.40			Sack 15	0.517
125.00	126.00	1.00	ADD0214	1.40			Sack 15	0.442
126.00	127.00	1.00	ADD0215	1.70			Sack 15	0.661
127.00	128.00	1.00	ADD0216	1.50			Sack 15	0.086
128.00	129.00	1.00	ADD0217	1.30			Sack 15	0.077
129.00	130.00	1.00	ADD0218	0.90			Sack 15	0.039

11956-001 GEOTEAM - Lydian International - Amulsar

June 27th, 2008

GEOTEAM					SGS Weight		Comments	Au_ppm
From (m)	To (m)	Total (m)	Sample No.	Weight	Total	To Composite		
130.00	131.00	1.00	ADD0219	0.95			Sack 16	0.026
131.00	132.00	1.00	ADD0221	0.90			Sack 16	0.438
132.00	133.00	1.00	ADD0222	1.10			Sack 16	0.219
133.00	134.00	1.00	ADD0223	1.10			Sack 16	0.100
134.00	135.00	1.00	ADD0224	1.10			Sack 16	0.055
135.00	136.00	1.00	ADD0225	1.00			Sack 16	0.053
136.00	137.00	1.00	ADD0227	0.70			Sack 16	0.025
137.00	138.00	1.00	ADD0228	0.80			Sack 16	0.023
138.00	139.00	1.00	ADD0229	1.20			Sack 16	0.107
139.00	140.00	1.00	ADD0230	0.90			Sack 16	0.034
140.00	141.00	1.00	ADD0231	0.65			Sack 16	0.033
141.00	142.00	1.00	ADD0232	1.20			Sack 16	0.053
142.00	143.00	1.00	ADD0233	1.00			Sack 16	0.019
143.00	144.00	1.00	ADD0235	0.70			Sack 16	-0.005
144.00	145.00	1.00	ADD0236	1.20			Sack 16	0.042
<b>0.00</b>	<b>145.00</b>	<b>145.00</b>	<b>146 samples</b>	<b>316.75</b>				

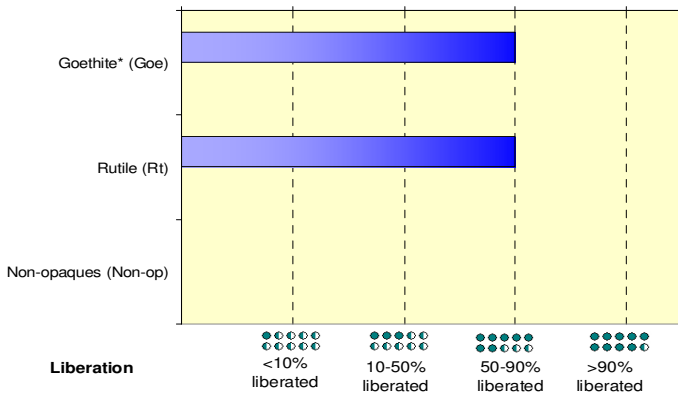
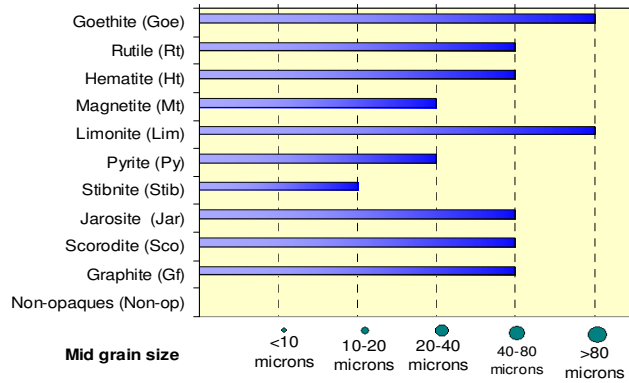
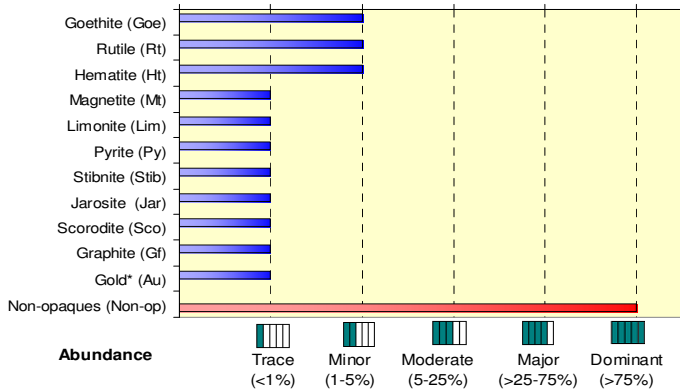
## **Appendix 2 – Mineralogy**

# RAPID MINERAL SCAN DATA REPORT

Sample: Comp 1  
Date: 24-Jul-08  
Mineralogist: AC  
Size Range: 80% passing 150 µm

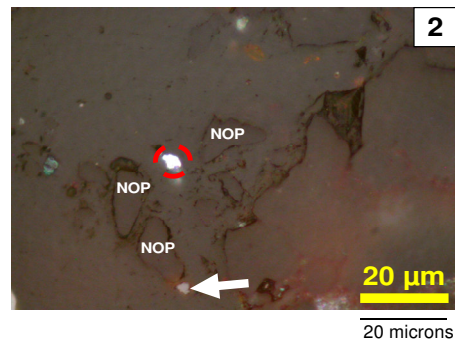
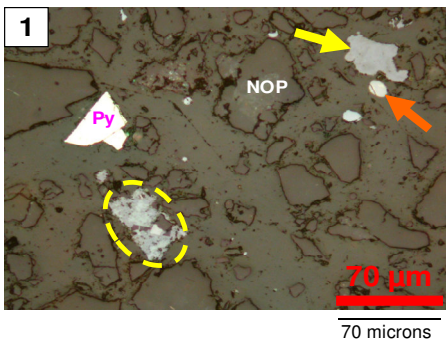
Project number: CALR-11956-001  
Client: Geo Team  
Property: Amulsar Project  
LIMS: MI5017-JUL08

## Petrographic and XRD examination:



Mineral	Association
Goethite (Goe)	<b>Goe</b> >Lim>Ht>Jar>Sco>Stib>Rt
Rutile (Rt)	<b>Rt</b> >Goe>Lim>Ht>Py
Hematite (Ht)	<b>Ht</b> >Goe>Lim>Mt>Rt>Py
Magnetite (Mt)	<b>Mt</b> >Ht>Rt
Limonite (Lim)	Goe> <b>Lim</b> >Jar>Sco>Stib>Rt>Ht
Pyrite (Py)	<b>Py</b> >Goe>Lim>Rt
Stibnite (Stib)	Goe> <b>Stib</b> >Jar>Sco
Jarosite (Jar)	Goe>Lim> <b>Jar</b> >Stib>Sco
Scorodite (Sco)	Goe>Lim> <b>Sco</b> >Jar
Graphite (Gf)	<b>Gf</b> >Goe>Lim>Py

\*as liberated and locked particles



**Notes:** Photomicrographs of the polished section showing general appearance of different phases under reflected light:  
**Plate 1** showing liberated pyrite, rutile and goethite (Py, orange and yellow arrow respectively), also showing composite goethite-scorodite-jarosite (broken yellow circle) and non-opaques (NOP), X200  
**Plate 2** showing liberated gold (broken red circle), also showing magnetite (white arrow) and non-opaques (NOP), X500

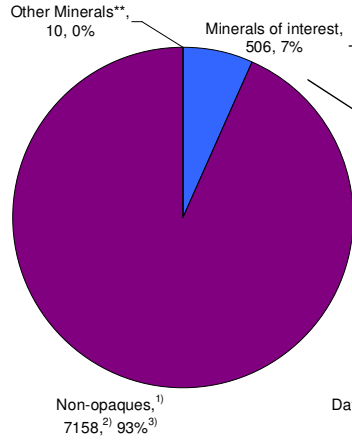
# RAPID MINERAL SCAN DATA REPORT

Sample: Comp 1  
Date: 24-Jul-08  
Mineralogist: AC  
Size Range: 80% passing 150 µm

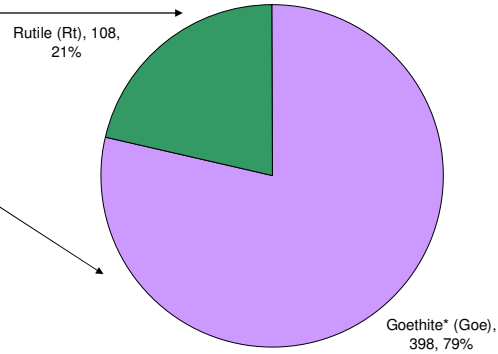
Project number: CALR-11956-001  
Client: Geo Team  
Property: Amulsar Project  
LIMS: MI5017-JUL08

**Pointcounting of principal minerals:**  
Manual

**Total Mineral Abundance:**

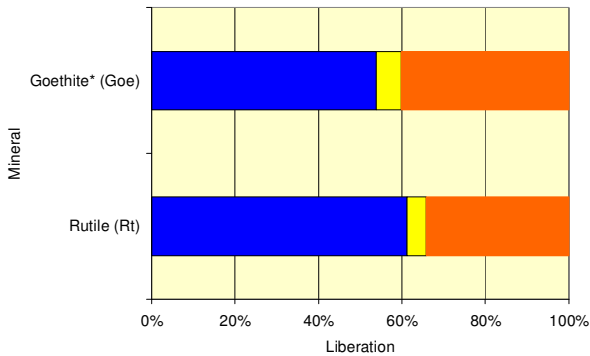


**Specific Mineral Abundance:**



Data labels denote:  
1) mineral  
2) no of grains  
3) abundance +/-10%

**Liberation of Specific Minerals:**



Mineral	No of analyses	liberated	attached	locked
Goethite* (Goe)	398	54%	6%	40%
Rutile (Rt)	108	61%	5%	34%
Total	506			

\*including Ht, Lim, Mt, Jar and Sco  
\*\*including Py, Stib and Gf

**Disclaimer:**

The reader should be aware that this semi-qualitative study is designed to provide merely a broad picture of the mineralogy of the studied sample. Any numerical approximations should be treated as approximations only. Like any such study, its accuracy is subject to the representativity of the sample selected, and limited by the particle statistics inherent in such a study.

Aparup Chattopadhyay  
Senior Mineralogist & Project Manager

Roch Marion  
Group Manager

Helen Dry  
Report Prep Specialist

# RAPID MINERAL SCAN DATA REPORT

Sample: Comp 1  
Date: 24-Jul-08  
Mineralogist: AC  
Size Range: 80% passing 150 µm

Project number: CALR-11956-001  
Client: Geo Team  
Property: Amulsar Project  
LIMS: MI5017-JUL08

### Summary of Qualitative X-ray Diffraction Results:

Sample	Crystalline Mineral Assemblage (relative proportions based on peak height)			
	Major	Moderate	Minor	Trace
Comp 1	quartz		hematite, goethite, potassium-feldspar, rutile	*chlorite, *mica, *alunite

\*Tentative identification due to low concentrations, diffraction line overlap or poor crystallinity

Instrument: Siemens D5000 diffractometer  
Scan Conditions: Co radiation, graphite monochromator, 40 kV, 30 mA, Step: 0.02 o, Step time:1s  
Interpretations: JCPDS / ICDD powder diffraction files. Siemens Search / Match software.  
Detection Limit: 0.5-2%. Strongly dependent on crystallinity.

Interpretations do not reflect the presence of non-crystalline / amorphous compounds. Mineral proportions are based on relative peak heights and may be strongly influenced by crystallinity, structural group or preferred orientations. Interpretations and relative proportions should be accompanied by supporting petrographic and geochemical data (WRA, ICP-OES).

Mineral	Composition
Quartz	SiO <sub>2</sub>
Alunite	(K,Na)Al <sub>6</sub> (SO <sub>4</sub> ) <sub>4</sub> (OH) <sub>12</sub>
Hematite	Fe <sub>2</sub> O <sub>3</sub>
Goethite	αFeO·OH
Potassium-Feldspar	KAlSi <sub>3</sub> O <sub>8</sub>
Rutile	TiO <sub>2</sub>
Chlorite	(Fe,(Mg,Mn) <sub>5</sub> ,Al)(Si <sub>3</sub> Al)O <sub>10</sub> (OH) <sub>8</sub>
Mica	K(Mg,Fe)Al <sub>2</sub> Si <sub>3</sub> AlO <sub>10</sub> (OH) <sub>2</sub>

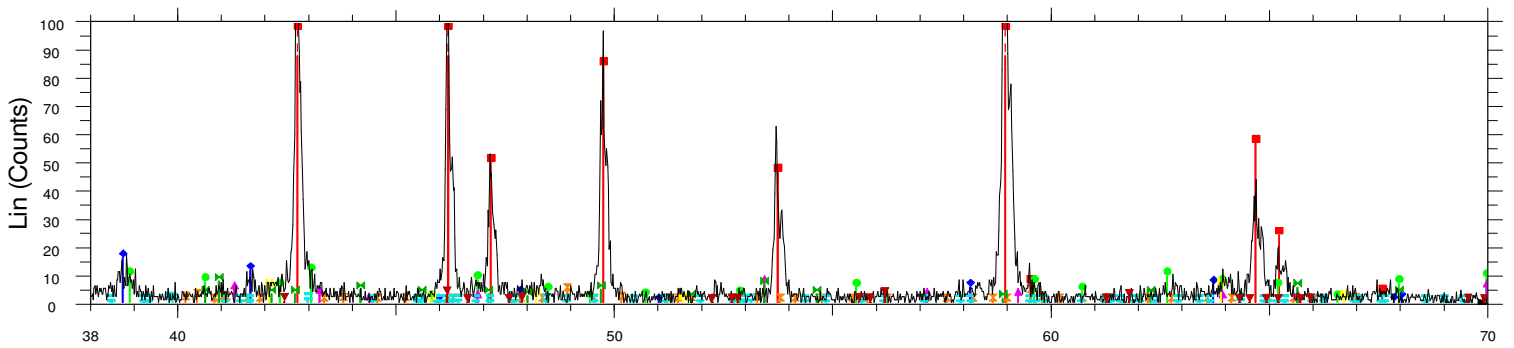
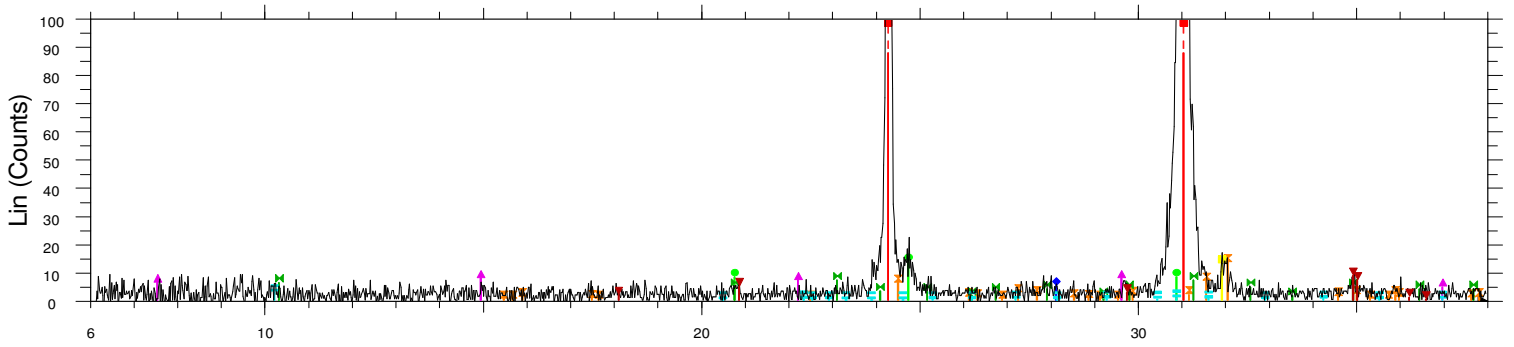
**Note:**

N/A

Bernie C. Yeung, B. Sc.  
Junior Mineralogist

Aparup Chattopadhyay, Ph.D., P.Geo.  
Senior Mineralogist

# Comp 1



2-Theta - Scale

- ▲ Comp 1 - File: JUL5017-1.raw - Type: 2Th/Th locked - Start: 6.000 ° - End: 70.000 °
 ■ 01-076-0318 (C) - Rutile, syn - TiO<sub>2</sub>
- 01-079-1910 (C) - Quartz - SiO<sub>2</sub>
▼ 01-072-1630 (C) - Alunite - K(Al<sub>3</sub>(SO<sub>4</sub>)<sub>2</sub>(OH)<sub>6</sub>)
- ◆ 01-087-1166 (C) - Hematite - Fe<sub>2</sub>O<sub>3</sub>
- 00-003-0249 (D) - Goethite, syn - alpha-Fe+3O(OH)
- ⊠ 00-019-0932 (I) - Microcline, intermediate - KAlSi<sub>3</sub>O<sub>8</sub>
- ▲ 00-002-0111 (D) - Clinocllore - (Mg,Fe+2)5Al(Si3Al)O10(OH)8
- ⊠ 00-002-1019 (D) - Muscovite - (H,K)AlSiO<sub>4</sub>
- 01-083-1366 (C) - Biotite - K<sub>2</sub>(Fe<sub>2.786</sub>Mg<sub>2.321</sub>Ti<sub>0.550</sub>)(Al<sub>2.413</sub>Si<sub>5.587</sub>O<sub>20</sub>)(OH)<sub>4</sub>

## **Appendix 3 – Test Details**

SGS Minerals Services

Standard Bond Ball Mill Grindability Test

Project No.: 11956-001 Product: Minus 6 Mesh Date: JULY 10 2008

Sample.: COMP 1

Purpose: To determine the ball mill grindability of the sample in terms of a Bond work index number.

Procedure: The equipment and procedure duplicate the Bond method for determining ball mill work indices.

Test Conditions: Mesh of grind: 100 mesh  
 Test feed weight (700 mL): 1175 grams  
 Equivalent to : 1679 kg/m<sup>3</sup> at Minus 6 mesh  
 Weight % of the undersize material in the ball mill feed: 25.4 %  
 Weight of undersize product for 250% circulating load: 336 grams

Results: Average for Last Three Stages = 3.54g, 256% Circulation load

CALCULATION OF A BOND WORK INDEX

$$BWI = \frac{44.5}{P1^{0.23} \times Grp^{0.82} \times \left\{ \frac{10}{\sqrt{P}} - \frac{10}{\sqrt{F}} \right\}}$$

P1 = 100% passing size of the product 150 microns  
 Grp = Grams per revolution 3.54 grams  
 P80 = 80% passing size of product 102 microns  
 F80 = 80% passing size of the feed 1999 microns

BWI = 6.5 (imperial)

BWI = 7.2 (metric)

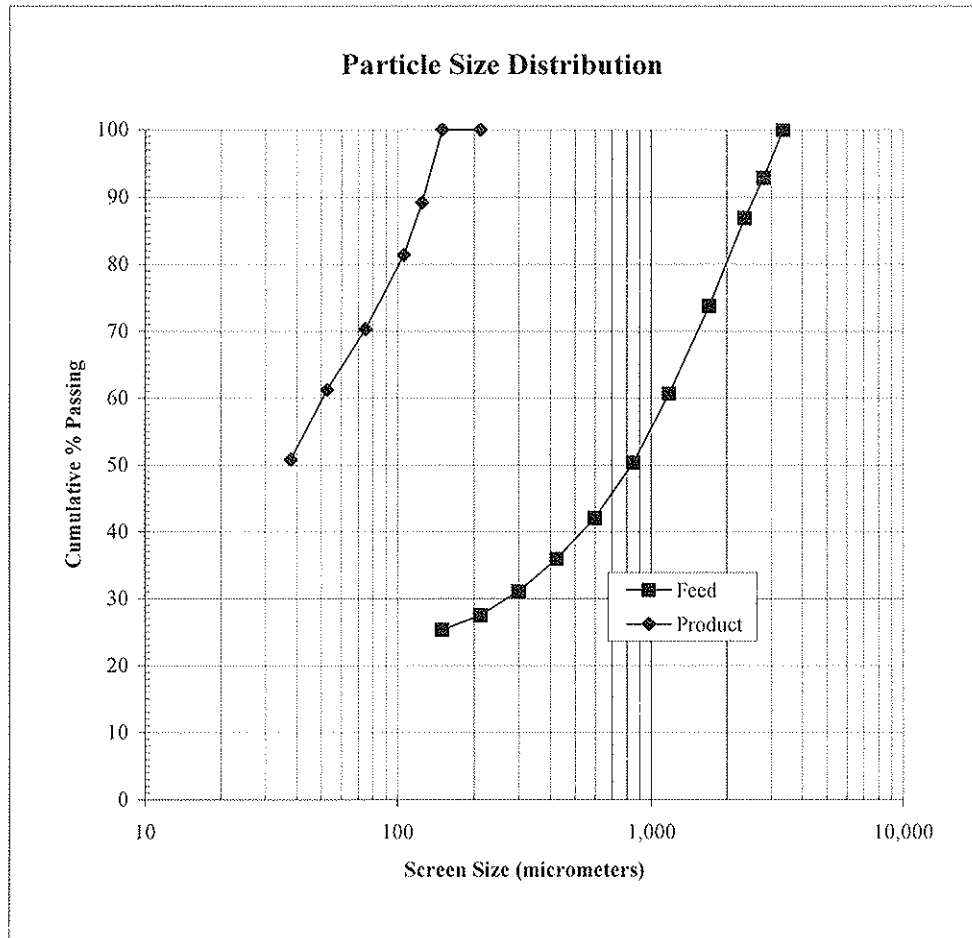
Stage No.	Revs	New Feed (grams)	Undersize		U'Size	Undersize Product	
			In Feed (grams)	To Be Ground (grams)	In Product (grams)	Total (grams)	Per Mill Rev (grams)
1	100	1,175	298	38	605	307	3.07
2	59	605	153	182	386	233	3.94
3	60	386	98	238	309	211	3.52
4	73	309	78	257	359	281	3.84
5	64	359	91	245	316	225	3.52
6	73	316	80	256	341	261	3.57
7	70	341	86	249	333	247	3.52

Average for Last Three Stages = 330g.

3.54g.

Feed K80						
Mesh	Size	Weight grams	% Retained		% Passing Cumulative	
	µm		Individual	Cumulative		
6	3,360	0.0	0.0	0.0	100.0	
7	2,800	58.1	7.1	7.1	92.9	
8	2,360	49.2	6.0	13.1	86.9	
10	1,700	106.9	13.1	26.2	73.8	
14	1,180	107.1	13.1	39.3	60.7	
20	850	84.6	10.3	49.7	50.3	
28	600	67.8	8.3	57.9	42.1	
35	425	50.1	6.1	64.1	35.9	
48	300	39.5	4.8	68.9	31.1	
65	212	29.5	3.6	72.5	27.5	
100	150	17.4	2.1	74.6	25.4	
Pan	-150	207.3	25.4	100.0	0.0	
<b>Total</b>	-	<b>817.5</b>	<b>100.0</b>	-	-	
<b>K80</b>	<b>1,999</b>					

Product K80						
Mesh	Size	Weight grams	% Retained		% Passing Cumulative	
	µm		Individual	Cumulative		
65	212	0.0	0.0	0.0	100.0	
100	150	0.0	0.0	0.0	100.0	
115	125	16.4	10.8	10.8	89.2	
150	106	11.9	7.8	18.6	81.4	
200	75	16.8	11.1	29.7	70.3	
270	53	13.8	9.1	38.8	61.3	
400	38	15.9	10.5	49.2	50.8	
Pan	-38	77.2	50.8	100.0	0.0	
<b>Total</b>	-	<b>152.0</b>	<b>100.0</b>	-	-	
<b>K80</b>	<b>102</b>					



Test: G1

Project No.: 11956-001

GT

22-Jul-08

**Purpose:** To determine the response of the ore to gravity separation.

**Procedure:** A 12kg sample of -10 mesh Comp 1 was ground in the lab rod mill for 7.5 minutes per two kilograms. The mill discharge was passed through the Knelson concentrator, collecting a Knelson concentrate and a Knelson tail. The Knelson concentrate was further upgraded on the Mozley table collecting a Mozley concentrate and tailings. The Mozley tailings and Knelson tailings were combined and forwarded to cyanidation.

**Feed** 12 kg -10 mesh Comp 1

**Grind:** 7.5 minutes @65% solids in a lab rod mill per 2kg.  
K<sub>80</sub> = 147 μm

**Metallurgical Results:**

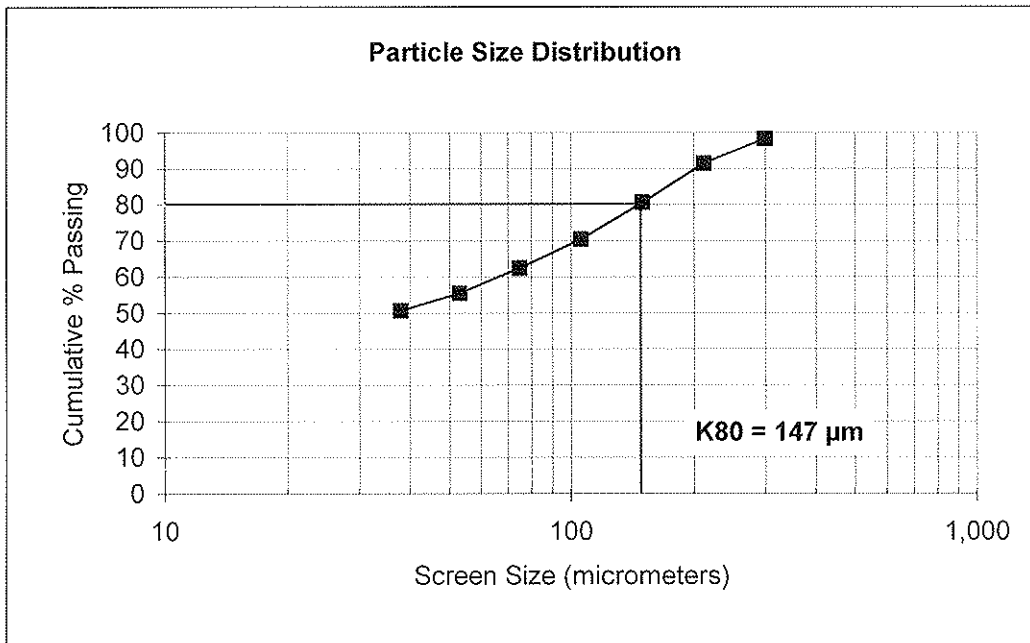
Product	Weight		Assays, g/t	% Distribution
	g	%	Au	Au
Mozley Concentrate	4.080	0.034	258	8.5
Knelson Tail	11995.9	99.97	0.94 *	91.5
Head (calc.)	12000.0	100.0	<b>1.03</b>	100.0
Head (direct)			1.07	

**SGS Minerals Services  
Size Distribution Analysis**

Project No.  
**11956-001**

Sample: **Knelson Tail**                      Test No.: **Comp 1**

Mesh	Size	Weight grams	% Retained		% Passing Cumulative
	µm		Individual	Cumulative	
48	300	3.2	1.7	1.7	98.3
65	212	13.0	6.8	8.5	91.5
100	150	20.6	10.8	19.4	80.6
150	106	19.3	10.2	29.5	70.5
200	75	15.2	8.0	37.5	62.5
270	53	13.3	7.0	44.5	55.5
400	38	9.1	4.8	49.3	50.7
Pan	-38	96.3	50.7	100.0	0.0
<b>Total</b>	-	<b>190.0</b>	100.0	-	-
<b>K80</b>	<b>147</b>				



Test No. CN 1

Project No. 11956-001

Operator: GT

Date: July 22nd, 2008

**Purpose:** Evaluation of the effect of grind size on gold extraction in Comp 1 whole ore.

**Procedure:** The sample was ground in a laboratory ball mill to the desired particle size. The mill discharge was pulped to 40% solids in a 2.5 L glass bottle. The pulp was brought to pH 10.5-11 with lime. 0.5g/L of cyanide was added. The bottle was placed on rolls for 48 hours. NaCN and pH levels were monitored over the duration of the test. Intermittent solution samples were removed at 8h and 24h for Au assay. Final PLS and residue were assayed for gold. Residue assayed in duplicate and submitted for size analysis.

**Feed:** 1,000 g Comp 1

**Solution Volume:** 1,500 mL

**Pulp Density:** 40 % solids

**Sol'n Composition:** 0.5 g/L NaCN maintained

**pH Range:** 10.5 - 11 maintained with lime as required.

**Grind:** 7.5 min / 2 kg @ 65% solids in 2 kg Rod Mill P<sub>80</sub> = 153 µm

Reagent Addition (kg/t of cyanide feed) NaCN: 0.51 CaO: 0.33

Reagent Consumption (kg/t of cyanide feed) NaCN: 0.03 CaO: 0.32

Time hours	Added, Grams				Residual		Consumed		pH
	Actual		Equivalent		Grams		Grams		
	NaCN	Ca(OH) <sub>2</sub>	NaCN	CaO	NaCN	CaO	NaCN	CaO	
To add 1.0 g/L	0.79		0.75						8.2
<b>Cyanidation:</b>									
0-2	0.79	0.62	0.75	0.46	0.75		0.00		11.3-11.0
2-8	0.00	0.00	0.00	0.00	0.75		0.00		11.0-11.0
8-24	0.00	0.00	0.00	0.00	0.71		0.05		11.0-10.7
24-32	0.05	0.05	0.04	0.04	0.75		0.00		11.0-10.8
32-48	0.00	0.03	0.00	0.02	0.75	0.02	0.00	0.50	11.0-10.8
<b>Total</b>	<b>0.84</b>	<b>0.70</b>	<b>0.80</b>	<b>0.52</b>	<b>0.75</b>	<b>0.02</b>	<b>0.05</b>	<b>0.50</b>	

**Cyanidation Results:**

Product	Amount g, mL	Assays, mg/L, g/t		% Distribution
		Au		
8 h Pregnant Solution	1,528	0.65		92.9
24 h Pregnant Solution	1,543	0.65		94.7
48 h Pregnant Solution	1,547	0.66		97.3
Final Residue	954.0	0.03		2.7
Head (calc.)	954.0	1.12		100.0

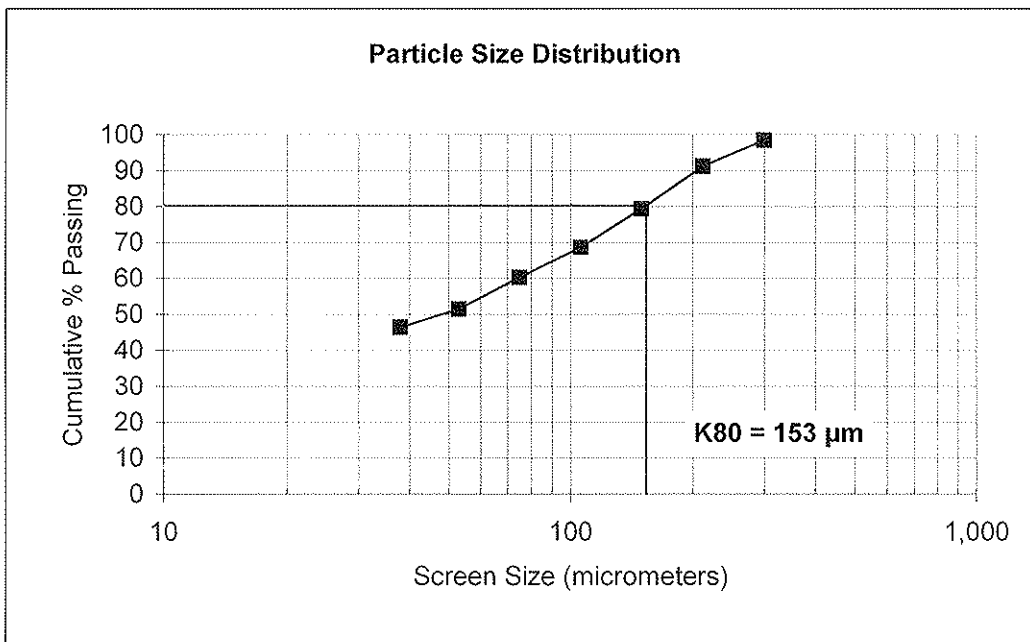
**SGS Minerals Services  
Size Distribution Analysis**

Project No.  
**11956-001**

Sample: **Res**

Test No.: **CN1**

Mesh	Size	Weight grams	% Retained		% Passing Cumulative
	µm		Individual	Cumulative	
48	300	2.4	1.5	1.5	98.5
65	212	11.6	7.3	8.8	91.2
100	150	18.9	11.8	20.6	79.4
150	106	17.1	10.7	31.3	68.7
200	75	13.5	8.4	39.7	60.3
270	53	14.1	8.8	48.6	51.4
400	38	8.0	5.0	53.6	46.4
Pan	-38	74.2	46.4	100.0	0.0
<b>Total</b>	-	<b>159.8</b>	100.0	-	-
<b>K80</b>	<b>153</b>				



Test No. CN 2

Project No. 11956-001

Operator: GT

Date: July 22nd, 2008

**Purpose:** Evaluation of the effect of grind size on gold extraction in Comp 1 whole ore.

**Procedure:** The sample was ground in a laboratory ball mill to the desired particle size. The mill discharge was pulped to 40% solids in a 2.5 L glass bottle. The pulp was brought to pH 10.5-11 with lime. 0.5g/L of cyanide was added. The bottle was placed on rolls for 48 hours. NaCN and pH levels were monitored over the duration of the test. Intermittent solution samples were removed at 8h and 24h for Au assay. Final PLS and residue were assayed for gold. Residue assayed in duplicate and submitted for size analysis.

**Feed:** 1,000 g Comp 1

**Solution Volume:** 1,500 mL

**Pulp Density:** 40 % solids

**Sol'n Composition:** 0.5 g/L NaCN maintained

**pH Range:** 10.5 - 11 maintained with lime as required.

**Grind:** 9 min / 2 kg @ 65% solids in 2 kg Rod Mill P<sub>80</sub> = 110 µm

Reagent Addition (kg/t of cyanide feed) NaCN: 0.50 CaO: 0.31

Reagent Consumption (kg/t of cyanide feed) NaCN: 0.02 CaO: 0.30

Time hours	Added, Grams				Residual		Consumed		pH
	Actual		Equivalent		Grams		Grams		
	NaCN	Ca(OH) <sub>2</sub>	NaCN	CaO	NaCN	CaO	NaCN	CaO	
To add 1.0 g/l	0.79		0.75						8.3
<b>Cyanidation:</b>									
0-2	0.79	0.42	0.75	0.31	0.75		0.00		11.0-10.6
2-8	0.00	0.09	0.00	0.07	0.75		0.00		11.0-10.7
8-24	0.00	0.05	0.00	0.04	0.75		0.00		11.0-10.7
24-32	0.00	0.05	0.00	0.04	0.75		0.00		11.0-10.8
32-48	0.00	0.03	0.00	0.02	0.72	0.02	0.03	0.46	11.0-10.8
<b>Total</b>	0.79	0.64	0.75	0.48	0.72	0.02	0.03	0.46	

**Cyanidation Results:**

Product	Amount g, mL	Assays, mg/L, g/t		% Distribution	
		Au		Au	
8 h Pregnant Solution	1,502	0.66		89.3	
24 h Pregnant Solution	1,514	0.68		93.7	
48 h Pregnant Solution	1,516	0.68		94.7	
Final Residue	975.2	0.06		5.3	
Head (calc.)	975.2	1.14		100.0	

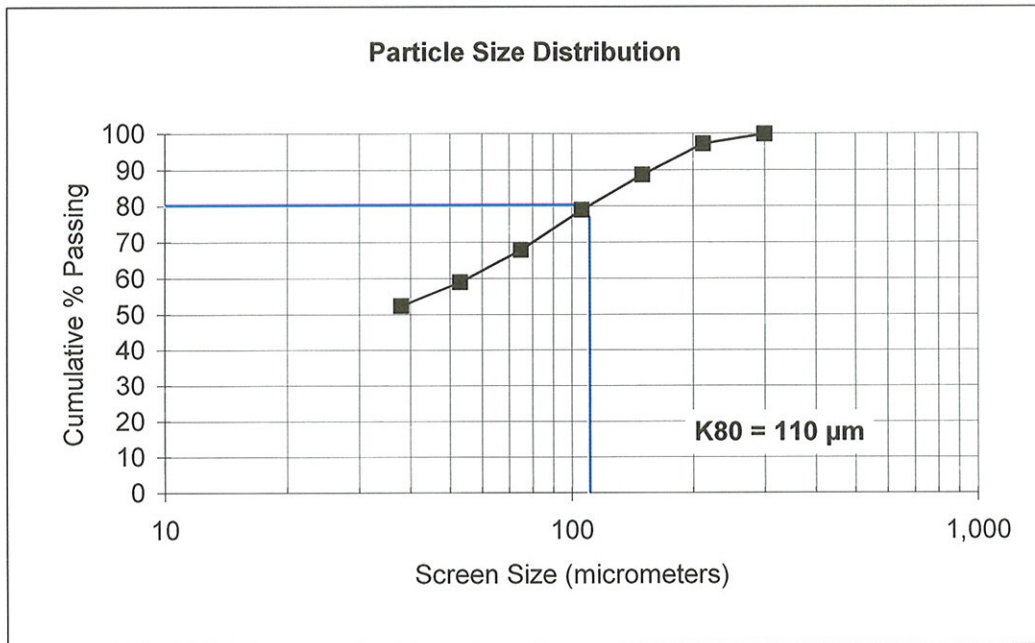
**SGS Minerals Services  
Size Distribution Analysis**

Project No.  
**11956-001**

Sample: **Residue**

Test No.: **CN2**

Mesh	Size	Weight grams	% Retained		% Passing Cumulative
	µm		Individual	Cumulative	
48	300	0.3	0.2	0.2	99.8
65	212	4.3	2.7	2.9	97.1
100	150	13.5	8.5	11.3	88.7
150	106	15.4	9.6	21.0	79.0
200	75	17.8	11.2	32.1	67.9
270	53	14.3	9.0	41.1	58.9
400	38	10.4	6.5	47.6	52.4
Pan	-38	83.6	52.4	100.0	0.0
<b>Total</b>	-	<b>159.6</b>	100.0	-	-
<b>K80</b>	<b>110</b>				



Test No. CN 3

Project No. 11956-001

Operator: GT

Date: July 22nd, 2008

**Purpose:** Evaluation of the effect of grind size on gold extraction in Comp 1 whole ore.

**Procedure:** The sample was ground in a laboratory ball mill to the desired particle size. The mill discharge was pulped to 40% solids in a 2.5 L glass bottle. The pulp was brought to pH 10.5-11 with lime. 0.5g/L of cyanide was added. The bottle was placed on rolls for 48 hours. NaCN and pH levels were monitored over the duration of the test. Intermittent solution samples were removed at 8h and 24h for Au assay. Final PLS and residue were assayed for gold. Residue assayed in duplicate and submitted for size analysis.

**Feed:** 1,000 g Comp 1

**Solution Volume:** 1,500 mL

**Pulp Density:** 40 % solids

**Sol'n Composition:** 0.5 g/L NaCN maintained

**pH Range:** 10.5 - 11 maintained with lime as required.

**Grind:** 11.5 min / 2 kg @ 65% solids in 2 kg Rod Mill P<sub>80</sub> = 85 µm

Reagent Addition (kg/t of cyanide feed)	NaCN: 0.52	CaO: 0.28
Reagent Consumption (kg/t of cyanide feed)	NaCN: 0.02	CaO: 0.28

Time hours	Added, Grams				Residual		Consumed		pH
	Actual		Equivalent		Grams		Grams		
	NaCN	Ca(OH) <sub>2</sub>	NaCN	CaO	NaCN	CaO	NaCN	CaO	
To add 1.0 g/L	0.79		0.75						8.3
<b>Cyanidation:</b>									
0-2	0.79	0.44	0.75	0.33	0.72		0.03		11.0-10.6
2-8	0.03	0.10	0.03		0.75		0.00		11.0-10.8
8-24	0.00	0.04	0.00	0.03	0.75		0.00		10.9-10.7
24-32	0.00	0.05	0.00	0.04	0.75		0.00		11.0-10.8
32-48	0.00	0.04	0.00	0.03	0.74	0.01	0.01	0.41	11.0-10.8
<b>Total</b>	<b>0.82</b>	<b>0.67</b>	<b>0.78</b>	<b>0.42</b>	<b>0.74</b>	<b>0.01</b>	<b>0.03</b>	<b>0.41</b>	

**Cyanidation Results:**

Product	Amount g, mL	Assays, mg/L, g/t		% Distribution
		Au		
8 h Pregnant Solution	1,467	0.69		87.9
24 h Pregnant Solution	1,489	0.73		95.3
48 h Pregnant Solution	1,492	0.73		96.5
Final Residue	1,013.6	0.04		3.5
Head (calc.)	1,013.6	1.14		100.0

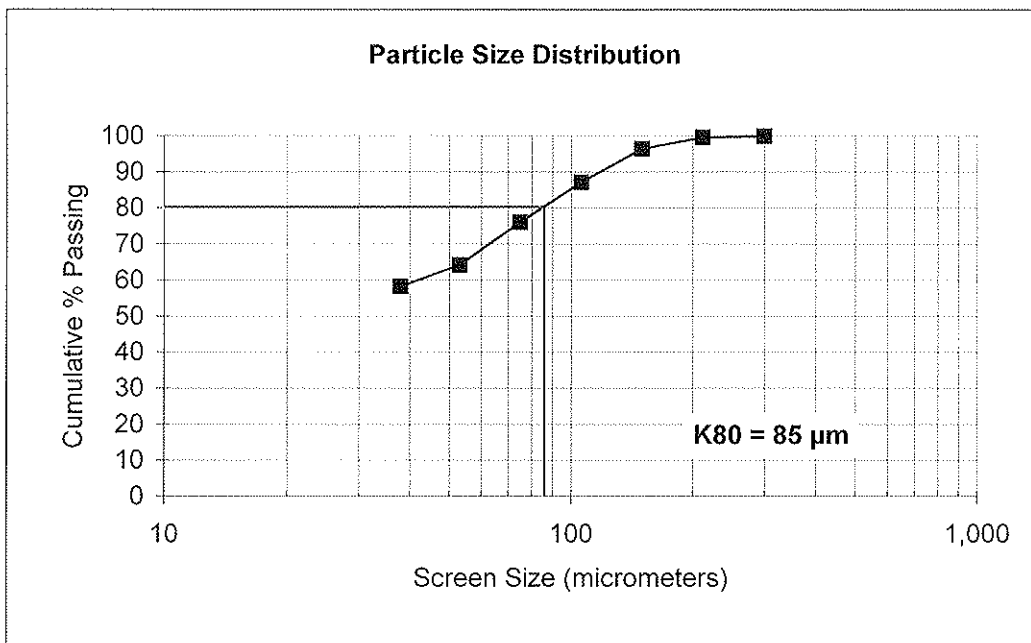
**SGS Minerals Services  
Size Distribution Analysis**

Project No.  
**11956-001**

Sample: **Res**

Test No.: **CN3**

Mesh	Size	Weight grams	% Retained		% Passing Cumulative
	µm		Individual	Cumulative	
48	300	0.1	0.1	0.1	99.9
65	212	0.6	0.3	0.4	99.6
100	150	5.6	3.3	3.7	96.3
150	106	15.8	9.2	12.9	87.1
200	75	19.0	11.1	23.9	76.1
270	53	20.3	11.8	35.7	64.3
400	38	10.2	5.9	41.7	58.3
Pan	-38	100.2	58.3	100.0	0.0
<b>Total</b>	-	<b>171.8</b>	100.0	-	-
<b>K80</b>	<b>85</b>				



Test No. CN 4

Project No. 11956-001

Operator: GT

Date: July 23rd, 2008

**Purpose:** Evaluation of the effect of grind size on gold extraction in Comp 1 whole ore.

**Procedure:** The feed was pulped to 40% solids in a 2.5L glass bottle. The pulp was brought to pH 10.5-11 with lime. 0.5g/L of cyanide was added. The bottle was placed on rolls for 48 hours. NaCN and pH levels were monitored over the duration of the test. Intermittent solution samples were removed at 8h and 24h for Au assay. Final PLS and residue were assayed for gold. Residue assayed in duplicate and submitted for size analysis.

**Feed:** 960 g Comp 1 Gravity Tailings

**Solution Volume:** 1,440 mL

**Pulp Density:** 40 % solids

**Sol'n Composition:** 0.5 g/L NaCN maintained

**pH Range:** 10.5 - 11 maintained with lime as required.

**Grind:** 7.5 min / 2 kg @ 65% solids in 2 kg Rod Mill **P<sub>80</sub> = 129 µm**

Reagent Addition (kg/t of cyanide feed)	NaCN: 0.53	CaO: 0.32
Reagent Consumption (kg/t of cyanide feed)	NaCN: 0.02	CaO: 0.30

Time hours	Added, Grams				Residual		Consumed		pH
	Actual		Equivalent		Grams		Grams		
	NaCN	Ca(OH) <sub>2</sub>	NaCN	CaO	NaCN	CaO	NaCN	CaO	
To add 1.0 g/L	0.76		0.72						8.2
Cyanidation:									
0-2	0.76	0.39	0.72	0.29	0.69		0.03		11.1-10.7
2-8	0.06	0.05	0.06	0.04	0.75		0.00		10.9-10.7
8-24	0.00	0.08	0.00	0.06	0.75		0.00		11.0-10.7
24-32	0.00	0.07	0.00	0.05	0.75		0.00		11.0-10.8
32-48	0.00	0.04	0.00	0.03	0.75	0.02	0.00	0.45	11.0-10.6
<b>Total</b>	<b>0.82</b>	<b>0.63</b>	<b>0.78</b>	<b>0.47</b>	<b>0.75</b>	<b>0.02</b>	<b>0.03</b>	<b>0.45</b>	

**Cyanidation Results:**

Product	Amount g, mL	Assays, mg/L, g/t		% Distribution
		Au		
8 h Pregnant Solution	1,474	0.59		91.9
24 h Pregnant Solution	1,476	0.58		91.4
48 h Pregnant Solution	1,480	0.59		94.2
Final Residue	920.2	0.06		5.8
Head (calc.)	920.2	1.03		100.0

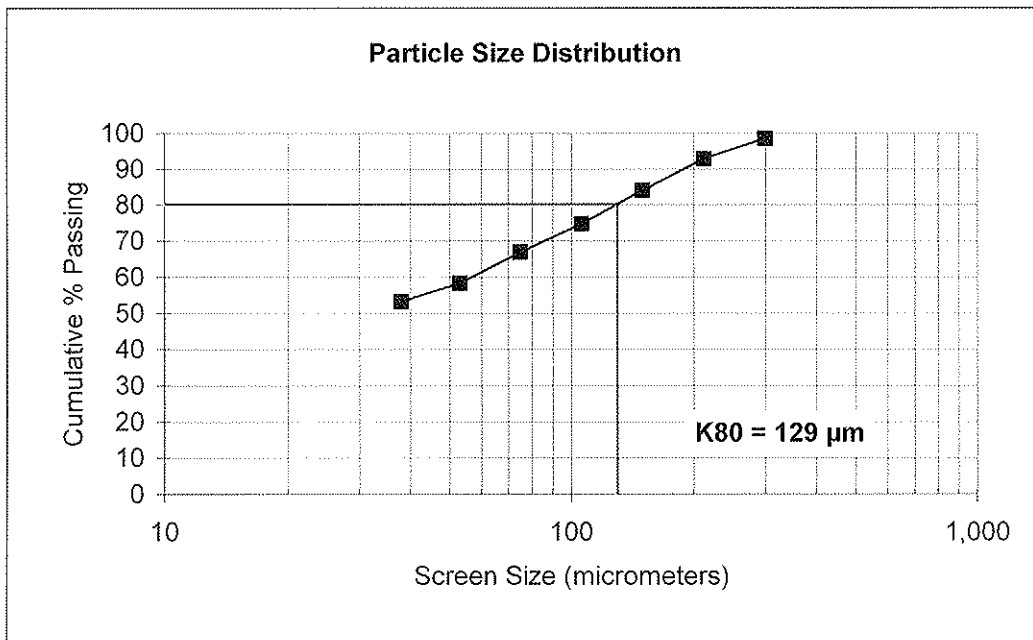
**SGS Minerals Services  
Size Distribution Analysis**

Project No.  
**11956-001**

Sample: **Res**

Test No.: **CN4**

Mesh	Size	Weight grams	% Retained		% Passing Cumulative
	µm		Individual	Cumulative	
48	300	2.1	1.5	1.5	98.5
65	212	8.2	5.7	7.1	92.9
100	150	12.6	8.7	15.9	84.1
150	106	13.5	9.3	25.2	74.8
200	75	11.4	7.9	33.1	66.9
270	53	12.5	8.6	41.7	58.3
400	38	7.3	5.1	46.8	53.2
Pan	-38	76.9	53.2	100.0	0.0
<b>Total</b>	-	<b>144.5</b>	100.0	-	-
<b>K80</b>	<b>129</b>				



Test No. CN 5

Project No. I1956-001

Operator: GT

Date: July 23rd, 2008

**Purpose:** Evaluation of the effect of grind size on gold extraction in Comp 1 whole ore.

**Procedure:** The feed was pulped to 40% solids in a 2.5L glass bottle. The pulp was brought to pH 10.5-11 with lime. 0.5g/L of cyanide was added. The bottle was placed on rolls for 48 hours. NaCN and pH levels were monitored over the duration of the test. Intermittent solution samples were removed at 8h and 24h for Au assay. Final PLS and residue were assayed for gold. Residue assayed in duplicate and submitted for size analysis.

**Feed:** 1,000 g **Comp 1 Gravity Tailings**

**Solution Volume:** 1,500 mL

**Pulp Density:** 40 % solids

**Sol'n Composition:** 0.5 g/L NaCN maintained

**pH Range:** 10.5 - 11 maintained with lime as required.

**Grind:** 7.5 min / 2 kg + 3 min / 2 kg @ 65% solids in 2 kg Rod Mill **P<sub>80</sub> = 95 µm**

Reagent Addition (kg/t of cyanide feed) NaCN: 0.55 CaO: 0.31

Reagent Consumption (kg/t of cyanide feed) NaCN: 0.06 CaO: 0.30

Time hours	Added, Grams				Residual		Consumed		pH
	Actual		Equivalent		Grams		Grams		
	NaCN	Ca(OH) <sub>2</sub>	NaCN	CaO	NaCN	CaO	NaCN	CaO	
To add 1.0 g/l	0.79		0.75						8.3
<b>Cyanidation:</b>									
0-2	0.79	0.40	0.75	0.30	0.75		0.00		11.0-10.6
2-8	0.00	0.08	0.00	0.06	0.75		0.00		11.0-10.7
8-24	0.00	0.06	0.00	0.04	0.74		0.02		11.0-10.7
24-32	0.02	0.06	0.02	0.04	0.68		0.08		11.0-10.8
32-48	0.08	0.04	0.08	0.03	0.75	0.02	0.00	0.46	11.0-10.6
<b>Total</b>	<b>0.89</b>	<b>0.64</b>	<b>0.85</b>	<b>0.47</b>	<b>0.75</b>	<b>0.02</b>	<b>0.09</b>	<b>0.46</b>	

**Cyanidation Results:**

Product	Amount g, mL	Assays, mg/L, g/t Au	% Distribution Au
8 h Pregnant Solution	1,526	0.58	91.0
24 h Pregnant Solution	1,535	0.59	94.0
48 h Pregnant Solution	1,537	0.59	95.1
Final Residue	961.4	0.05	4.9
Head (calc.)	961.4	1.01	100.0

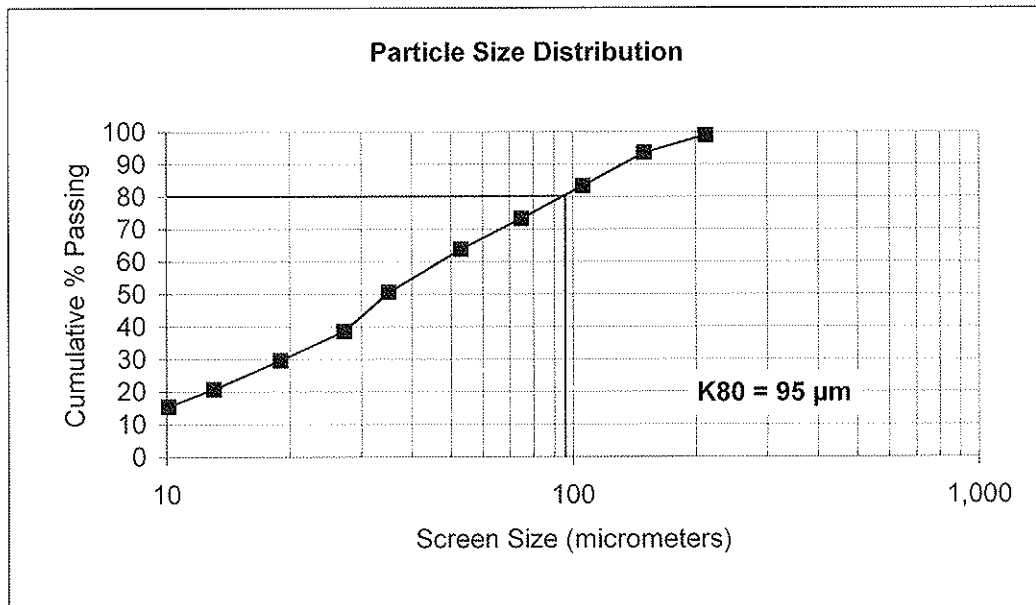
**SGS Minerals Services  
Size Distribution Analysis**

Project No.  
**11956-001**

Sample: **RESIDUE**

Test No.: **CN5**

Dry Solids S.G.=		2.71	Water Temperature =		25.00 C°
Mesh	Size µm	Weight grams	% Retained		% Passing Cumulative
			Individual	Cumulative	
65	212	0.5	1.1	1.1	98.9
100	150	2.7	5.5	6.5	93.5
150	106	5.1	10.2	16.7	83.3
200	75	5.0	10.0	26.7	73.3
270	53	4.7	9.5	36.2	63.8
	35	6.6	13.2	49.4	50.6
	27	6.0	12.0	61.4	38.6
	19	4.5	9.0	70.3	29.7
	13	4.5	8.9	79.2	20.8
	10	2.6	5.2	84.5	15.5
	-10	7.8	15.5	100.0	0.0
<b>Total</b>	-	<b>50.0</b>	100.0	-	-
<b>K80</b>	<b>95</b>				



Test No. CN 6

Project No. 11956-001

Operator: GT

Date: July 23rd, 2008

**Purpose:** Evaluation of the effect of grind size on gold extraction in Comp 1 whole ore.

**Procedure:** The feed was pulped to 40% solids in a 2.5L glass bottle. The pulp was brought to pH 10.5-11 with lime. 0.5g/L of cyanide was added. The bottle was placed on rolls for 48 hours. NaCN and pH levels were monitored over the duration of the test. Intermittent solution samples were removed at 8h and 24h for Au assay. Final PLS and residue were assayed for gold. Residue assayed in duplicate and submitted for size analysis.

**Feed:** 1,000 g **Comp 1 Gravity Tailings**

**Solution Volume** 1,500 mL

**Pulp Density:** 40 % solids

**Sol'n Compositio** 0.5 g/L NaCN maintained

**pH Range:** 10.5 - 11 maintained with lime as required.

**Grind:** 7.5 min / 2 kg + 5 min/ 2 kg @ 65% solids in 2 kg Rod Mill **P<sub>80</sub> = 72 µm**

Reagent Addition (kg/t of cyanide feed) NaCN: 0.51 CaO: 0.33

**Reagent Consumption (kg/t of cyanide feed)** NaCN: **0.03** CaO: **0.31**

Time hours	Added, Grams				Residual		Consumed		pH
	Actual		Equivalent		Grams		Grams		
	NaCN	Ca(OH) <sub>2</sub>	NaCN	CaO	NaCN	CaO	NaCN	CaO	
To add 1.0 g/l.	0.79		0.75						8.3
Cyanidation:									
0-2	0.79	0.62	0.75	0.46	0.75		0.00		11.3-11.1
2-8	0.00	0.00	0.00	0.00	0.75		0.00		11.1-11.0
8-24	0.00	0.00	0.00	0.00	0.71		0.05		11.0-10.8
24-32	0.05	0.03	0.05	0.02	0.75		0.00		10.9-10.8
32-48	0.00	0.04	0.00	0.03	0.74	0.02	0.01	0.49	11.0-10.7

Total	0.84	0.69	0.80	0.51	0.74	0.02	0.05	0.49
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**Cyanidation Results:**

Product	Amount g, mL	Assays, mg/L, g/t		% Distribution	
		Au		Au	
8 h Pregnant Solution	1,545	0.56		91.6	
24 h Pregnant Solution	1,550	0.57		94.5	
48 h Pregnant Solution	1,554	0.56		94.0	
Final Residue	949.3	0.06		6.0	
Head (calc.)	949.3	0.99		100.0	

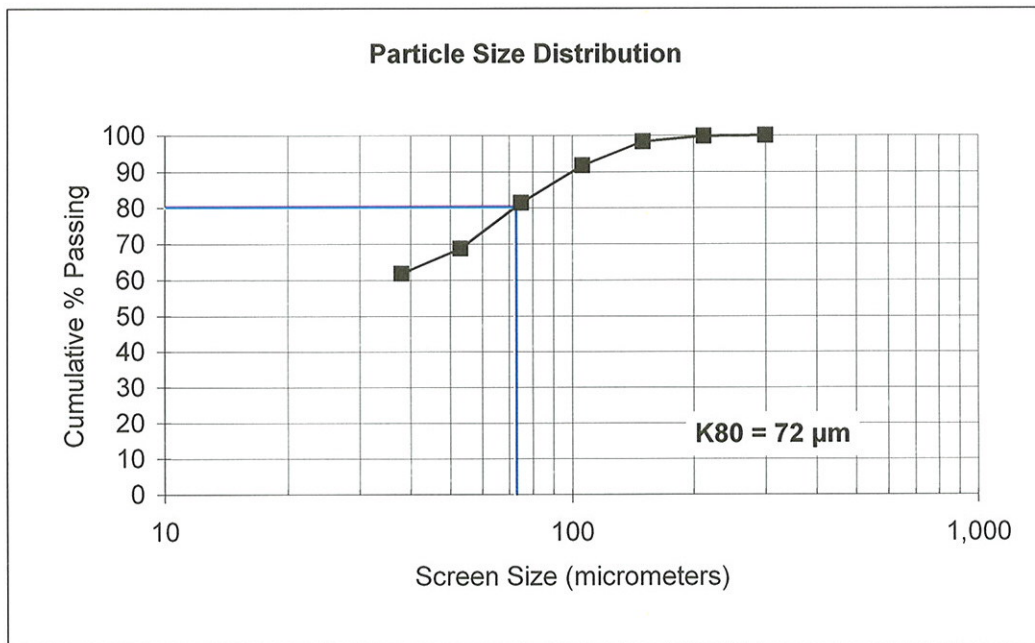
**SGS Minerals Services  
Size Distribution Analysis**

Project No.  
**11956-001**

Sample: **Res**

Test No.: **CN6**

Mesh	Size	Weight grams	% Retained		% Passing Cumulative
	µm		Individual	Cumulative	
48	300	0.1	0.0	0.0	100.0
65	212	0.3	0.2	0.2	99.8
100	150	3.0	1.5	1.7	98.3
150	106	13.1	6.6	8.3	91.7
200	75	20.6	10.3	18.6	81.4
270	53	25.3	12.7	31.2	68.8
400	38	13.8	6.9	38.1	61.9
Pan	-38	123.6	61.9	100.0	0.0
<b>Total</b>	-	<b>199.8</b>	100.0	-	-
<b>K80</b>	<b>72</b>				



Test No. CN 1

Project No. 11956-001

Operator: KH

Date: August, 2008

**Purpose:** To investigate the recovery of gold from the Composite 1 sample at -1/4".

**Procedure:** A 1 kg sample of the ore was pulped to the desired solids density in a bottle. The pH was adjusted to 10.5 - 11.0 with lime. NaCN was added. The pH and NaCN were maintained during the leach. Solution samples were taken for Au and Ag analyses. After leaching the pulp was filtered. The pregnant leach solution was collected and sent for Au and Ag assay. The residue was washed three times with water, dried and submitted for Au and Ag analysis. The wash was discarded.

**Feed:** 997 g of Composite 1 (1000 g of -1/4" ore).

**Solution Volume:** 997 mL

**Pulp Density:** 50 % solids **Sol'n Composition:** 0.5 g/L, NaCN

**pH Range:** 10.5 - 11.0 with Ca(OH)<sub>2</sub>

**Duration:** 15 days **Solution Samples:** 1, 3, 6, 10, 15 days

**Grind:** ...

**Reagent Consumption (kg/t of cyanide feed)**

**NaCN: 0.25 CaO: 1.32**

**Reagent Addition (kg/t of cyanide feed)**

**NaCN: 0.75 CaO: 1.32**

Time Days	Added, Grams				Residual Grams		Consumed Grams		pH	Bottle Weight g
	Actual		Equivalent		NaCN	CaO	NaCN	CaO		
	NaCN	Ca(OH) <sub>2</sub>	NaCN	CaO						
Grind									8.4	231
Cyanidation										
0-6h	0.53	0.42	0.50	0.32	0.50		0.00		11.3-10.6	2254
6h-1d	0.00	0.11	0.00	0.08	0.48		0.02		11.2-10.5	2250
1d-2d	0.02	0.09	0.02	0.07	0.48		0.02		11.1-10.4	2237
2d-3d	0.02	0.08	0.02	0.06	0.50		0.00		11.0-10.3	2237
3d-6d	0.00	0.12	0.00	0.09	0.42		0.08		11.1-10.1	2215
6d-7d	0.08	0.15	0.08	0.11	0.50		0.00		11.0-10.3	2204
7d-8d	0.00	0.12	0.00	0.09	0.47		0.03		11.1-10.4	2216
8d-9d	0.03	0.12	0.03	0.09	0.50		0.00		11.2-10.6	2220
9d-10d	0.00	0.10	0.00	0.08	0.50		0.00		11.2-10.5	2216
10d-13d	0.00	0.09	0.00	0.07	0.41		0.09		11.1-10.0	2200
13d-14d	0.09	0.16	0.09	0.12	0.50		0.00		11.1-10.4	2209
14d-15d	0.00	0.12	0.00	0.09	0.49	0.00	0.01	1.28	11.1-10.4	2202

Total	0.77	1.68	0.73	1.28	0.49	0.00	0.24	1.28		
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**Results:**

Product	Amount g, mL	Assay (mg/L, g/t)		Distribution (%)	
		Au	Ag	Au	Ag
1 d Pregnant Solution	1052	0.84	0.19	80.1	9.7
3-d Pregnant Solution	1039	0.93	0.20	89.4	10.4
6-d Pregnant Solution	1006	0.97	0.24	90.3	12.0
10-d Pregnant Solution	1018	0.94	0.23	90.7	11.9
15-d Pregnant Solution	1004	0.95	0.24	94.7	12.8
Final Residue	967.2	0.06	1.9	5.3	87.2
Head (calc.)	967.2	1.14	2.12	100.0	100.0

