

Giant
YELLOWKNIFE MINES LIMITED

MEMO TO: T.R. Raponi
CC: G.B. Halverson, S. El-Alfy, L. Dufour
FROM: M.E. Goodfellow
DATE: May 11, 1988
SUBJECT: Cyanidation Testwork on Top, Middle, and Bottom composite samples from the Polishing Pond

Summary:

Testwork was conducted to investigate the effect of depth on gold recovery. Testwork using the Lakefield cyanidation method was conducted by L. Dufour. The top composite sample (depth 0'-10') achieved the highest gold recovery at 49.60% Au with a calculated headgrade of 0.125 oz/ton. The middle composite sample (depth 10'-20') obtained a much lower gold recovery at 24.13% Au with a calculated headgrade of 0.151 oz/ton Au. The bottom composite sample (depth 20'-30') recovered 26.14% Au with a calculated headgrade of 0.119 oz/ton Au. For this test hole (#1) if the top twenty feet were mined, an average gold recovery of 36.87% could be obtained. The reagent consumption for each composite sample were very similar. All samples consumed 1.5 lb/ton CaO and the cyanide consumption averaged 3.05 lb/ton. Further testwork will be conducted on another test hole to verify the result of this testwork.

Purpose:

To investigate the effect of depth on gold cyanidation recovery.

Procedure:

Test Hole #1 was used for this testwork. The hole was divided into three ten foot sections; top, middle and bottom. Each section was composited and two - 200 g samples were taken for this cyanidation testwork. The 200 g samples were placed in a Winchester acid bottle and pulped with tap water to 33.0% solids.

Lime (CaO) and cyanide (NaCN) were added to raise the pH to 10.0 and give an initial free cyanide strength of 2.0 lb/ton. The sample was then placed on the rolls for one hour. A sample was withdrawn to check pH and NaCN levels. CaO and NaCN were added to restore pH to 10.0 and to give a free cyanide strength of 1.0 lb/ton. The sample was rolled for a further 23 hours. The sample was then filtered to separate the pregnant solution. The filter cake was washed three times with 250 mL tap water and a separate wash sample was obtained. Both solution samples were submitted for assay. pH and NaCN levels were checked. The cake was repulped to 33.0% solids with tap water. Lime (CaO) and cyanide (NaCN) were added to raise pH to 10.0 and give an initial free cyanide strength of 2.0 lb/ton. Samples were rolled for a final 24 hours for a total of 48 hours leaching. The samples were then filtered to separate the pregnant solutions. The filter cakes were washed three times with 250 mL tap water and a separate wash sample was obtained. Both solution samples and the solid residue were assayed for Au. The NaCN level and pH were also determined for each pregnant solution. The Winchester acid bottles were rolled uncapped for the entire 48 hour test.

Results:

Test and assay results are attached. A summary of the tests can be found in Table 1.

Conclusions:

1. The top composite sample of depth 0-10 ft. recovered 49.60% Au with a calculated headgrade of 0.125 oz/ton Au. Reagent consumptions were calculated at 3.22 lb/ton NaCN and 1.5 lb/ton CaO.
2. The middle composite sample of depth 10-20 ft. recovered 24.13% Au with a calculated headgrade of 0.151 oz/ton Au. Reagent consumptions were calculated at 3.00 lb/ton NaCN and 1.50 lb/ton CaO.
3. The bottom composite sample of depth 20-30 ft. recovered 26.14% Au with a calculated headgrade of 0.119 oz/ton Au. Reagent consumptions were calculated at 2.93 lb/ton NaCN and 1.5 lb/ton CaO.
4. The highest recovery was obtained from the top composite sample of depth 0-10 ft. If the top and middle composite samples are combined depth 0-20 ft, a calculated recovery of 36.87% Au is obtained.

5. Further testwork will be conducted on another Test Hole to confirm the results of this test. The test hole will be chosen from the middle of the polishing pond. A composite sample of the top 20 feet will be tested.

Discussion:

The test results indicate that the tailings located in the upper depths are more amenable to cyanidation than the lower levels. The top composite sample of 0 to 10 feet recovered 49.60% Au. The middle composite sample of 10 to 20 feet obtained the lowest recovery at 24.13% Au. The bottom composite at a depth of 20 to 30 feet obtained 26.14% Au. If the top 20 feet were composited, a calculated recovery of 36.87% Au is obtained. The calculated headgrades for each composite sample were higher than the assayed headgrade. The top sample calculated headgrade was 24% higher than the assayed headgrade. The middle and bottom were 9% and 14% higher, respectively.

Further testwork will be conducted to confirm the results of this testwork. Test Hole #1 used in this testwork is located close to B-3 pit. The next sample chosen will be located near the middle of the pond. Duplicate tests of a composite sample of the top 20 feet will be conducted.

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TABLE 1: SUMMARY OF TEST RESULTS

SAMPLE #	CALC HEAD (oz/ton)	AVE HEAD (oz/ton)	RESIDUE (oz/ton)	CALC Au RECOVERY(%)	REAGENT CONSUMPTION		DEPTH (feet)
					NaCN (lb/ton)	CaO (lb/ton)	
T1	0.124	0.101	0.062	50.12	3.10	1.50	0-10
T2	0.126	0.101	0.064	49.07	3.33	1.50	0-10
M1	0.150	0.138	0.114	24.17	3.05	1.50	10-20
M2	0.152	0.138	0.115	24.09	2.95	1.50	10-20
B1	0.121	0.104	0.088	27.53	3.00	1.50	20-30
B2	0.116	0.104	0.087	24.75	2.85	1.50	20-30
AVE	0.132	0.114	0.088	33.29	3.05	1.50	
TH1	0.114	0.103	0.078	30.05	2.43	3.75	
TH1A	0.113	0.103	0.077	32.06	2.40	5.00	
TH1B	0.114	0.103	0.078	28.04	2.45	2.50	

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CYANIDATION TESTS

Date of Test: May 3, 1988

Sample: TEST HOLE #1 TOP COMPOSITE (0'-10')

Sample Code #: T1

REF: CYANID.FRM

Initial					
Size = 200 g	Reagents	1 hr Roll	After 24 Hrs.	After 48 Hrs.	After Hrs.
pH = 8.7	CaO = 0.10 g	pH = 10.25	pH = 9.8	pH = 10.1	pH =
%-200=	NaCN = 2.0 lb/t	CN ⁻ = 0.55 lb/t	CN ⁻ = 0.75 lb/t	CN ⁻ = 0.60 lb/t	CN ⁻ = lb/t
H2O = 400 mL	Other =	Tit = 10 mL	Tit = ---- mL	Tit = ---- mL	Tit = ---- mL
Other=	pH to 10.6	Other =	Other =	Other =	Other =
		Added 0.45 lb/t NaCN.	Added 2.0 lb/t NaCN. Added 0.05 g CaO. pH to 11.0		

Sample Calculations:

	Units	Gold			Arsenic		
		Assay	Distribution	Recovery	Assay	Distribution	Recovery
24 Preg	359 mL	0.664 mg/L	0.238 mg	27.93 %	mg/L	mg	%
24 Wash	750 mL	0.106 mg/L	0.080 mg	9.39 %	mg/L	mg	%
48 Preg	500 mL	0.140 mg/L	0.070 mg	8.22 %	mg/L	mg	%
48 Wash	750 mL	0.051 mg/L	0.039 mg	4.58 %	mg/L	mg	%
Total	2,359 mL	0.181 mg/L	0.427 mg	50.12 %	mg/L	mg	%
Residue	200 g	2.124 g/t	0.425 mg	49.88 %	%	mg	%
Calc Head	200 g	4.259 g/t	0.852 mg	100.00 %	%	mg	%
Assay Head	200 g	3.459 g/t	0.692 mg		%	mg	

Note: Preg (mL) = Preg + Tit

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CYANIDATION TESTS

Date of Test: May 3, 1988

Sample: TEST HOLE #1 TOP COMPOSITE (0'-10')

Sample Code #: T2

REF: CYANID.FRM

Initial					
Size = 200 g	Reagents	1 hr Roll	After 24 Hrs.	After 48 Hrs.	After Hrs.
pH = 8.45	CaO = 0.10 g	pH = 10.15	pH = 9.5	pH = 9.85	pH =
%-200=	NaCN = 2.0 lb/t	CN ⁻ = 0.55 lb/t	CN ⁻ = 0.55 lb/t	CN ⁻ = 0.60 lb/t	CN ⁻ = lb/t
H2O = 400 mL	Other =	Tit = 10 mL	Tit = ---- mL	Tit = ---- mL	Tit = ---- mL
Other=	pH to 10.2	Other =	Other =	Other =	Other =
		Added 0.45 lb/t NaCN.	Added 2.0 lb/t NaCN. Added 0.05 g CaO. pH to 11.0		

Sample Calculations:

	Units	Gold			Arsenic		
		Assay	Distribution	Recovery	Assay	Distribution	Recovery
24 Preg	385 mL	0.617 mg/L	0.237 mg	27.56 %	mg/L	mg	%
24 Wash	750 mL	0.185 mg/L	0.139 mg	16.16 %	mg/L	mg	%
48 Preg	475 mL	0.065 mg/L	0.031 mg	3.61 %	mg/L	mg	%
48 Wash	750 mL	0.021 mg/L	0.015 mg	1.74 %	mg/L	mg	%
Total	2,360 mL	0.179 mg/L	0.422 mg	49.07 %	mg/L	mg	%
Residue	200 g	2.192 g/t	0.438 mg	50.93 %	%	mg	%
Calc Head	200 g	4.302 g/t	0.860 mg	100.00 %	%	mg	%
Assay Head	200 g	3.459 g/t	0.692 mg		%	mg	

Note: Preg (mL) = Preg + Tit

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CYANIDATION TESTS

Date of Test: May 3, 1988

Sample: TEST HOLE #1 MIDDLE COMPOSITE (10'-20')

Sample Code #: M1

REF: CYANID.FRM

Initial					
Size = 200 g	Reagents	1 hr Roll	After 24 Hrs.	After 48 Hrs.	After Hrs.
pH = 8.2	CaO = 0.10 g	pH = 10.3	pH = 9.7	pH = 9.95	pH =
%-200=	NaCN = 2.0 lb/t	CN ⁻ = 0.75 lb/t	CN ⁻ = 0.70 lb/t	CN ⁻ = 0.50 lb/t	CN ⁻ = lb/t
H2O = 400 mL	Other =	Tit = 10 mL	Tit = ---- mL	Tit = ---- mL	Tit = ---- mL
Other=	pH to 10.5	Other =	Other =	Other =	Other =
		Added 0.25 lb/t NaCN.	Added 2.0 lb/t NaCN. Added 0.05 g CaO. pH to 11.0		

Sample Calculations:

	Units	Gold			Arsenic		
		Assay	Distribution	Recovery	Assay	Distribution	Recovery
24 Preg	361 mL	0.425 mg/L	0.153 mg	14.85 %	mg/L	mg	%
24 Wash	750 mL	0.082 mg/L	0.062 mg	6.02 %	mg/L	mg	%
48 Preg	455 mL	0.041 mg/L	0.019 mg	1.84 %	mg/L	mg	%
48 Wash	750 mL	0.021 mg/L	0.015 mg	1.46 %	mg/L	mg	%
Total	2,316 mL	0.108 mg/L	0.249 mg	24.17 %	mg/L	mg	%
Residue	200 g	3.905 g/t	0.781 mg	75.83 %	%	mg	%
Calc Head	200 g	5.150 g/t	1.030 mg	100.00 %	%	mg	%
Assay Head	200 g	4.727 g/t	0.945 mg		%	mg	

Note: Preg (mL) = Preg + Tit

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CYANIDATION TESTS

Date of Test: May 3, 1988

Sample: TEST HOLE #1 MIDDLE COMPOSITE (10'-20')

Sample Code #: M2

REF: CYANID.FRM

Initial					
Size = 200 g	Reagents	1 hr Roll	After 24 Hrs.	After 48 Hrs.	After Hrs.
pH = 8.4	CaO = 0.10 g	pH = 10.4	pH = 9.7	pH = 9.9	pH =
%-200=	NaCN = 2.0 lb/t	CN ⁻ = 0.75 lb/t	CN ⁻ = 0.75 lb/t	CN ⁻ = 0.55 lb/t	CN ⁻ = lb/t
H2O = 400 mL	Other =	Tit = 10 mL	Tit = ---- mL	Tit = ---- mL	Tit = ---- mL
Other =	pH to 10.6	Other =	Other =	Other =	Other =
		Added 0.25 lb/t NaCN.	Added 2.0 lb/t NaCN. Added 0.05 g CaO. pH to 10.9		

Sample Calculations:

	Units	Gold			Arsenic		
		Assay	Distribution	Recovery	Assay	Distribution	Recovery
24 Preg	359 mL	0.438 mg/L	0.157 mg	15.13 %	mg/L	mg	%
24 Wash	750 mL	0.062 mg/L	0.046 mg	4.43 %	mg/L	mg	%
48 Preg	455 mL	0.075 mg/L	0.034 mg	3.28 %	mg/L	mg	%
48 Wash	750 mL	0.017 mg/L	0.013 mg	1.25 %	mg/L	mg	%
Total	2,314 mL	0.108 mg/L	0.250 mg	24.09 %	mg/L	mg	%
Residue	200 g	3.939 g/t	0.788 mg	75.91 %	%	mg	%
Calc Head	200 g	5.189 g/t	1.038 mg	100.00 %	%	mg	%
Assay Head	200 g	4.727 g/t	0.945 mg		%	mg	

Note: Preg (mL) = Preg ÷ Tit

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CYANIDATION TESTS

Date of Test: May 3, 1988

Sample: TEST HOLE #1 BOTTOM COMPOSITE (20'-30')

Sample Code #: B1

REF: CYANID.FRM

Initial					
Size = 200 g	Reagents	1 hr Roll	After 24 Hrs.	After 48 Hrs.	After Hrs.
pH = 8.4	CaO = 0.10 g	pH = 10.35	pH = 9.5	pH = 9.8	pH =
%-200=	NaCN = 2.0 lb/t	CN ⁻ = 0.7 lb/t	CN ⁻ = 0.80 lb/t	CN ⁻ = 0.50 lb/t	CN ⁻ = lb/t
H2O = 400 mL	Other =	Tit = 10 mL	Tit = ---- mL	Tit = ---- mL	Tit = ---- mL
Other=	pH to 10.4	Other =	Other =	Other =	Other =
		Added 0.30 lb/t NaCN.	Added 2.0 lb/t NaCN. Added 0.05 g CaO. pH to 10.5		

Sample Calculations:

	Units	Gold			Arsenic		
		Assay	Distribution	Recovery	Assay	Distribution	Recovery
24 Preg	380 mL	0.356 mg/L	0.135 mg	16.23 %	mg/L	mg	%
24 Wash	750 mL	0.062 mg/L	0.046 mg	5.53 %	mg/L	mg	%
48 Preg	480 mL	0.072 mg/L	0.035 mg	4.21 %	mg/L	mg	%
48 Wash	750 mL	0.017 mg/L	0.013 mg	1.56 %	mg/L	mg	%
Total	2,360 mL	0.097 mg/L	0.229 mg	27.53 %	mg/L	mg	%
Residue	200 g	3.014 g/t	0.603 mg	72.48 %	%	mg	%
Calc Head	200 g	4.159 g/t	0.832 mg	100.00 %	%	mg	%
Assay Head	200 g	3.562 g/t	0.712 mg		%	mg	

Note: Preg (mL) = Preg + Tit

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CYANIDATION TESTS

Date of Test: May 3, 1988

Sample: TEST HOLE #1 BOTTOM COMPOSITE (20'-30')

Sample Code #: B2

REF: CYANID.FRM

Initial					
Size = 200 g	Reagents	1 hr Roll	After 24 Hrs.	After 48 Hrs.	After Hrs.
pH = 8.3	CaO = 0.10 g	pH = 10.3	pH = 9.6	pH = 9.6	pH =
%-200=	NaCN = 2.0 lb/t	CN ⁻ = 0.65 lb/t	CN ⁻ = 0.95 lb/t	CN ⁻ = 0.55 lb/t	CN ⁻ = lb/t
H2O = 400 mL	Other =	Tit = 10 mL	Tit = ---- mL	Tit = ---- mL	Tit = ---- mL
Other=	pH to 10.3	Other =	Other =	Other =	Other =
		Added 0.35 lb/t NaCN.	Added 2.0 lb/t NaCN. Added 0.05 g CaO. pH to 10.6		

Sample Calculations:

	Units	Gold			Arsenic		
		Assay	Distribution	Recovery	Assay	Distribution	Recovery
24 Preg	395 mL	0.281 mg/L	0.111 mg	14.01 %	mg/L	mg	%
24 Wash	750 mL	0.058 mg/L	0.044 mg	5.56 %	mg/L	mg	%
48 Preg	455 mL	0.062 mg/L	0.028 mg	3.54 %	mg/L	mg	%
48 Wash	750 mL	0.017 mg/L	0.013 mg	1.64 %	mg/L	mg	%
Total	2,350 mL	0.083 mg/L	0.196 mg	24.75 %	mg/L	mg	%
Residue	200 g	2.980 g/t	0.596 mg	75.25 %	%	mg	%
Calc Head	200 g	3.960 g/t	0.796 mg	100.00 %	%	mg	%
Assay Head	200 g	3.562 g/t	0.712 mg		%	mg	

Note: Preg (mL) = Preg + Tit

..... Assayer

