

DOUG BARTLETT

An Investigation of
THE RECOVERY OF GOLD
from samples
submitted by
GIANT YELLOWKNIFE MINES LTD.

Progress Report No. 1

POLISHING
PON

Project No. L.R. 3515

NOTE:

This report refers to the samples as received.

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LAKEFIELD RESEARCH
A DIVISION OF FALCONBRIDGE LIMITED

August 24, 1988

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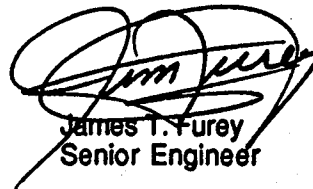
INTRODUCTION

During a visit to Lakefield Research on April 29, 1988, Mr. S. McAlpine, Acting Manager, Giant Yellowknife Mines Ltd., authorized a program of metallurgical testwork. The testwork involved carbon-in-leach tests at various densities to recover gold from a series of tailing composites. The results were sent to Mr. S. E. El-Afy (Giant) as they became available.

LAKEFIELD RESEARCH



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SUMMARY

1. Head Analysis

A representative sample was removed from each of the six composites. These samples were assayed for gold with the results being tabulated below along with the calculated head assay from the testwork.

Sample	Direct Assay Au, g/t	Calc. Assay g/t	$\frac{\text{Calc.}}{\text{Direct}}$
88-1,2,3	3.01	3.27	1.09
88-4,5	2.61	2.70	1.03
88-6,7	3.23	4.08	1.26
88-8,12	3.03	3.36	1.11
88-9,10	2.85	2.93	1.03
88-1-12	2.97	3.34	1.12
Avg Assay	2.95	3.28	1.11
Extraction (Tail 1.89)	35.9	42.3	1.18

2. Cyanidation Testwork

Carbon-in-Leach (CIL) cyanidation tests were conducted in groups of three. Mechanical agitators with impellor blades of 5 cm diameter, curved, stainless steel air sparger, was located under each agitator to allow proper dispersion of the controlled air flow being injected into the pulp. For the 50% solids tests, 1000 mL tall form beakers were used to provide adequate pulp depth.

All tests were conducted at a NaCN concentration of 1.0 g/L with regular oxygen measurements and tachometer readings taken. The pH range was 10.5 to 11.0. Carbon (GRC 22) was added to maintained a concentration of 15 g/L based on solution volume.

2.1 Carbon-in-Leach

The eleven individual groups of samples were combined into five composites with a sixth composite representing all eleven samples.

From the first 5 composites, 500 g charges were pulped to 30, 40 and 50 percent solids. Lime, cyanide and carbon were added and a CIL test carried out for 48 hours. Carbon changes were made at 24 and 36 hours with the 48 hour carbon being recovered at the end of the test. All products were recovered and assayed for gold. From the sixth composite (Comp. 1-12) a 54 h CIL test at 40 percent solids was completed. This test was used to indicated the response of the blended tailings composites.

Results from all tests completed have been summarized in Table No. 1.

Table No.1 : Summary of Carbon in Leach Results

Test No.	Comp. No.	Leach Density % Sol.	Grind % -400 Mesh	Reagent Con s. ,kg/t				Res. Au g/t	Diss. O ₂ mg/L	% Recovery			Calc. Head Au, g/t	Agitator Speed rpm
				Total	Add'n	Actual	Cons.			24	36	48		
				NaCN	CaO	NaCN	CaO			hour	hour	hour		
1	1-2-3	30		6.74	1.12	5.91	0.37	1.98	7.6	32.9	36.6	39	3.25	500
2	1-2-3	40	91.7	4.83	0.99	3.89	0.64	2.1	7.4	36.2	37.9	39.4	3.48	550
3	1-2-3	50		2.52	3.16	1.6	2.93	1.86	6.5	35.8	37.7	39.2	3.07	600
10	4-5	30		7.79	0.55	6.32	0.27	1.73	7.4	30.6	34.8	37.9	2.81	550
11	4-5	40	82.9	5.2	0.56	4.43	0.08	1.72	7.6	29.7	32.7	35.2	2.67	550
12	4-5	50		3.59	0.69	3.21	0.28	1.65	6.9	31.2	34.3	36.9	2.63	600
4	6-7	30		6.64	0.74	4.95	0.43	1.97	8.1	36.7	40.0	43.6	3.51	500
5	6-7	40	89.4	4.76	1.32	3.91	0.77	2.04	7.6	52.8	54.2	55.6	4.93	550
6	6-7	50		3.67	0.63	3.04	0.31	1.92	6.5	27.5	47.6	49.3	3.80	600
7	8-12	30		6.87	0.75	4.78	0.14	1.94	7.8	33.1	35.7	42.5	3.40	500
8	8-12	40	78.1	4.26	0.76	3.09	0.38	2.01	7.6	33.3	39.3	41.3	3.44	550
9	8-12	50		3.74	0.76	3.29	0.35	1.96	6.9	36	37.9	39.3	3.24	600
13	9-10	30		6.8	0.88	5.53	0.23	1.77	6.7	30.6	34.3	36.9	2.82	550
14	9-10	40	76.8	5.3	0.78	4.56	0.14	1.87	7.1	31.7	34.3	36.7	2.97	550
15	4-5	50		3.65	1.09	3.12	0.64	1.85	6.4	33.4	35.9	38.3	3.01	600
16	11 to 12	40	85.4	8.87	1.08	7.24	0.4	1.82	7.5	41.5	42.4	44	3.34	550

*Test No. -54 h recovery to CIL was 45.3

Avg

1.89

Comp	Avg Grade	Avg Ext ^N	g / 100 tons Recoverable.
1-2-3	0.095	35.0	3.32
4-5	0.079	30.5	2.41
6-7	0.119	39.0	4.64
8, 12	0.098	37.0	3.63
9, 10	0.084	31.1	2.61
Total 1-12	0.097	34.2	3.32

Summary

Gold extraction for all composites at 48 hours was over 35 percent. The effect of density on gold extraction was inconclusive but in general the best results were achieved at 40 to 50% solids. Cyanide consumptions were irregular and high, 1.5-7.5 kg/t.

Figures 1-6 display graphically the CIL recovery versus leach time data.

Test No. 16, CIL on Comp 1-12 conducted at 40% solids, displayed a CIL recovery of 44.0% for 48 hours and 45.3% for 54 hours leaching. Figure No. 6 displays graphically the CIL recovery data.

FIGURE NO. 1 COMPOSITE No. 1-2-3

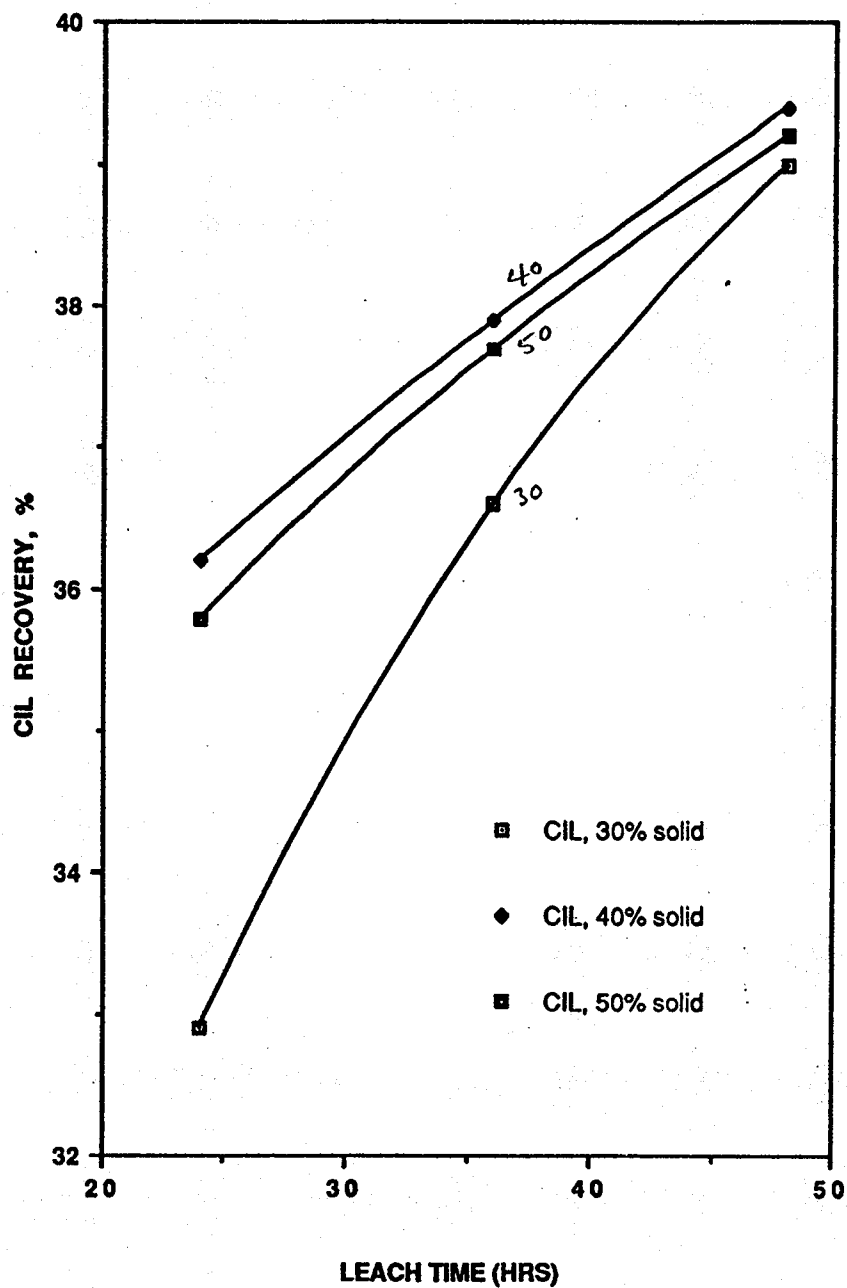


FIGURE NO. 2 COMPOSITE No. 4-5

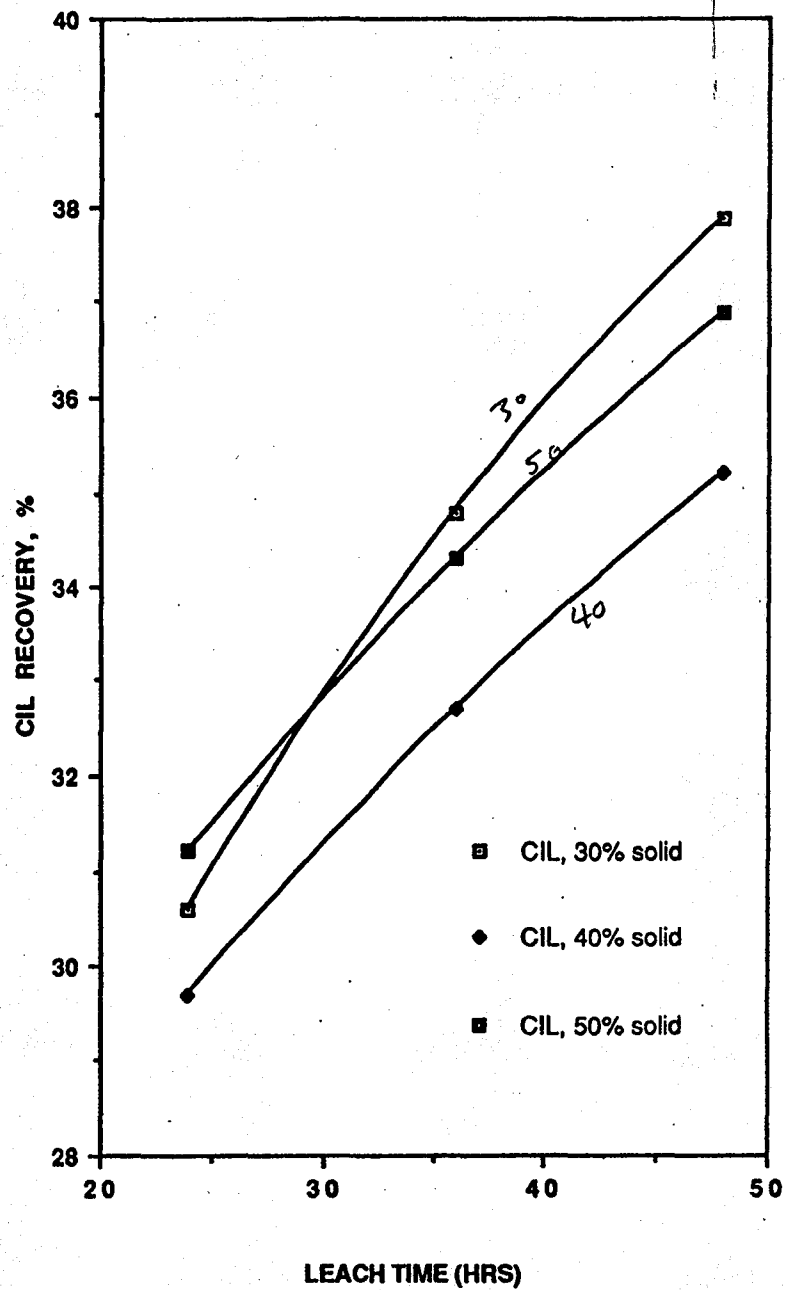


FIGURE NO. 3 COMPOSITE No. 6-7

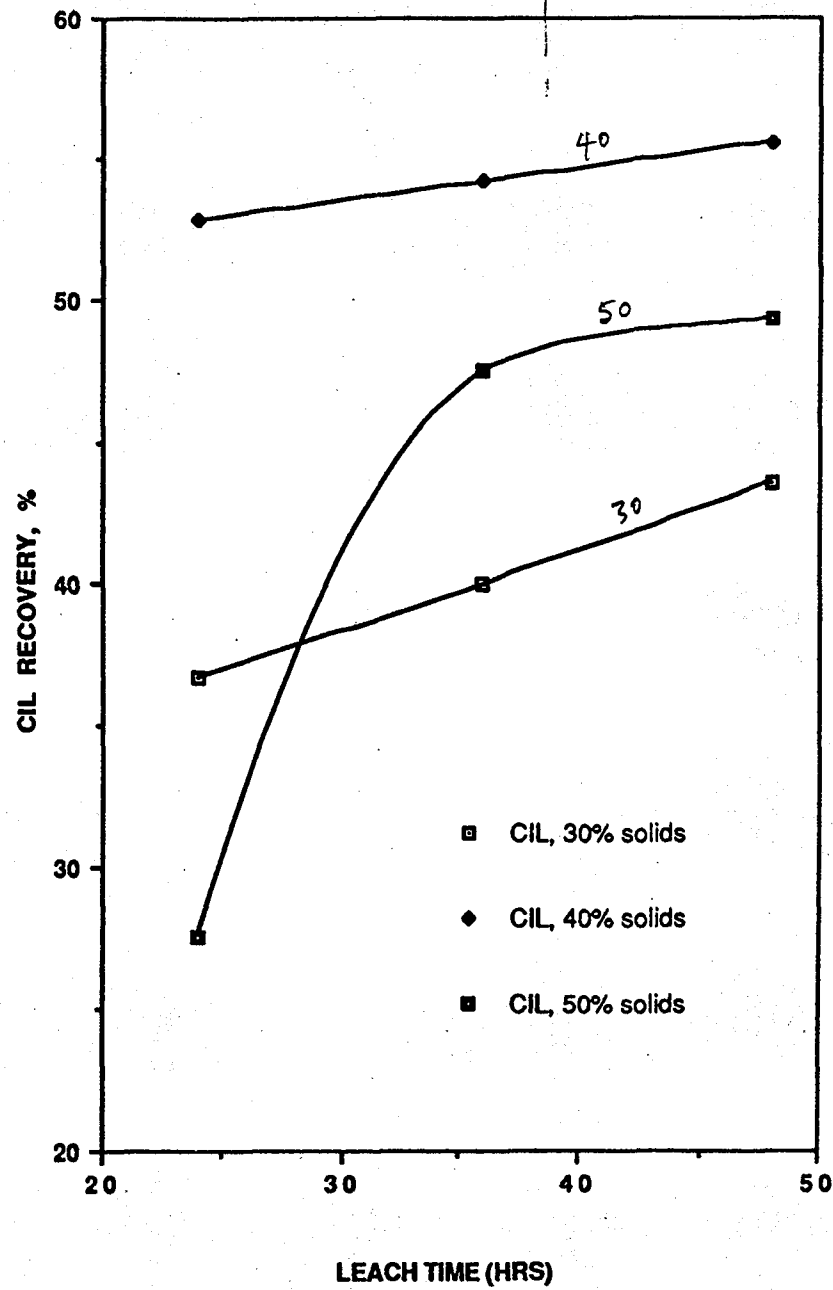


FIGURE NO. 4 COMPOSITE No. 8-12

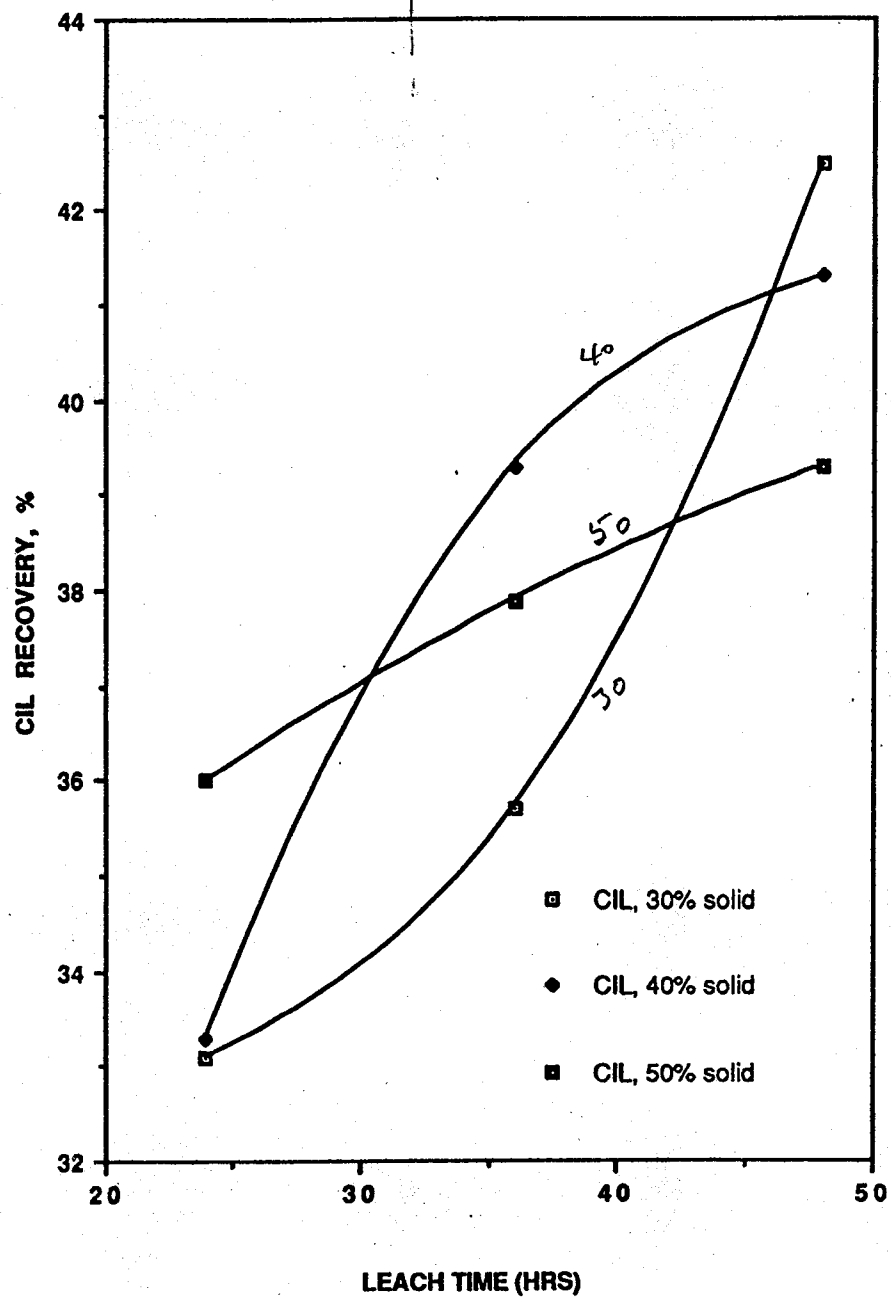


FIGURE NO. 5 COMPOSITE No. 9-10

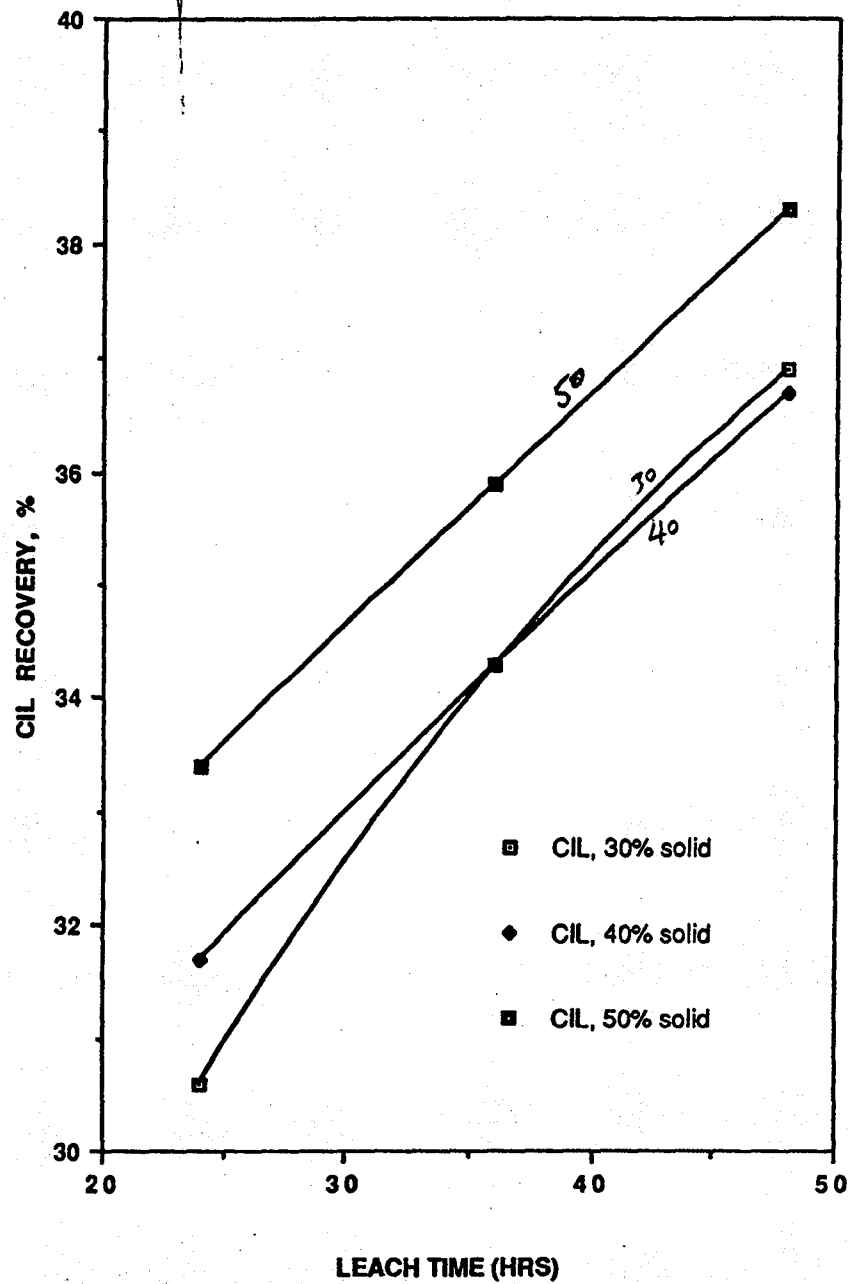
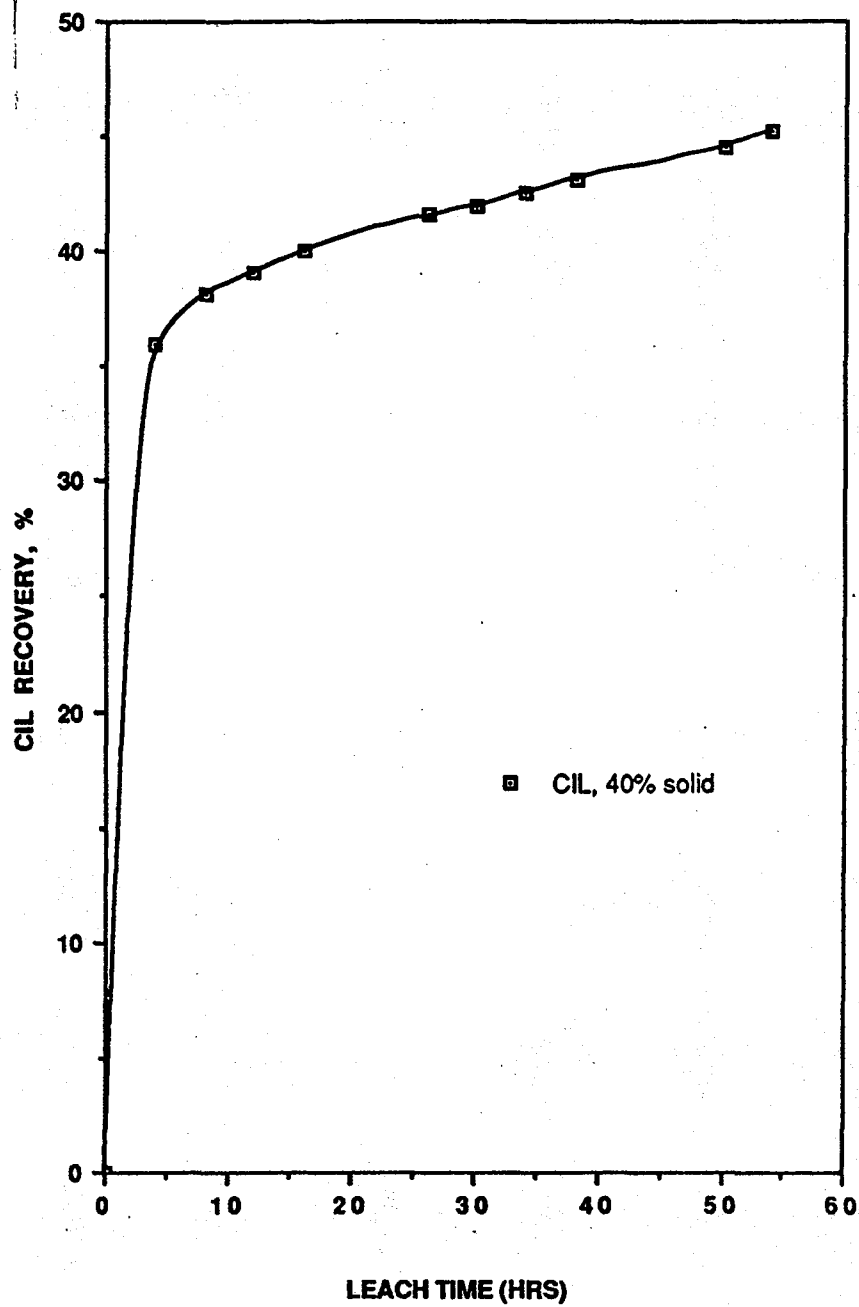


FIGURE NO. 6 COMPOSITE No. 1-12 (inclusive)



CONCLUSIONS AND RECOMMENDATIONS

The tailings responded quite well to single stage CIL leaching for gold. Recoveries of over 35% can be expected. Cyanide consumption, however, was quite high, and further investigation into preaeration, and lower NaCN concentrations should be completed using mechanical agitation.

A confirmatory bottle rolls comparison test on the 1-12 composites should be conducted to compare both gold extraction and cyanide consumption to those achieved with mechanical mixing. This would assist in the proper estimation of plant cyanide consumption.

INVENTORY

1 BOX OF ASSAY AND BUCKING ROOM REJECTS

1 BOX OF CHARGES, COMPOSITE REJECTS AND INDIVIDUAL SAMPLE REJECTS

SAMPLE PREPARATION

On May 5, 1988, test hole samples were received at Lakefield Research and given our reference number LR8829600.

Each drill hole sample consisted of several other subsamples, see Tables A-K for weights and description, which were weighed and composited into a final wet weight. The data below illustrates the composite make-up.

Drill Hole No.	Range of Composite	Range of Composite Not Present	Wet Weight g
88-1	6" - 28'	-	3452
88-2	2' - 34'	-	3477
88-3	5" - 36'	-	5070
88-4	8" - 40'	24' - 26'	3474
88-5	1' - 31'	6' - 18'	3113
88-6	2' - 28'	16' - 18'	2791
88-7	14" - 42'	-	5351
88-8	2' - 40'	28'-32', 34'-38'	4459
88-9	2' - 42'	30' - 32'	4783
88-10	1' - 28'	22' - 24'	3099
88-12	8" - 34'	-	4201

Each drill hole sample was combined and thoroughly mixed. Wood chips and trash was screened off on a 30 mesh screen. Six composites were made of the 11 drill samples. The following data illustrate the composite makeup.

Composite Make-up **New Product Dry Weight (4000 g)**

1.	88-1	1333
	88-2	1333
	88-3	1333
2.	88-4	2000
	88-5	2000
3.	88-6	2000
	88-7	2000
4.	88-8	2000
	88-12	2000
5.	88-9	2000
	88-10	2000
6.	88-1 to 88-12 inclusive	91 g each } 1000 g

A head sample plus 5 charges were cut from the wet cakes. A head sample was prepared for the Au fire assay and a screen analysis.

SAMPLE DATA ON AS RECEIVED SAMPLES

Table No. A

COMPOSITE NO.	SAMPLE NO.	DEPTH	WET WEIGHT (g)
88-1	S1	0'-2'	172.11
	S2	2'-4'	240.46
	S3	4'-6'	233.62
	S4	6'-8'	152.17
	S5	8'-10'	384.69
	S6	10'-12'	226.18
	S7	12'-14'	286.06
	S8	14'-16'	218.59
	S9	16'-18'	366.47
	S10	18'-20'	244.25
	S11	20'-22'	256.01
	S12	22'-24'	166.55
	S13	24'-26'	225.7
	S14	26'-28'	83.05
	S15	28'-30'	275.72

Table No. B

COMPOSITE NO.	SAMPLE NO.	DEPTH	WET WEIGHT (g)
88-2	S1	2'-4'	169.93
	S2	4'-6'	272.84
	S3	6'-8'	238.72
	S4	8'-10'	141.23
	S5	10'-12'	232.49
	S6	12'-14'	235.39
	S7	14'-16'	253.8
	S8	16'-18'	186.32
	S9	18'-20'	174.84
	S10	20'-22'	196.69
	S11	22'-24'	292.63
	S12	24'-26'	210.01
	S13	26'-28'	244.06
	S14	28'-30'	222.55
	S15	30'-32'	223.55
	S16	32'-34'	176.58

Table No. C

COMPOSITE NO.	SAMPLE NO.	DEPTH	WET WEIGHT (g)
88-3	S1	5'-2'	392.4
	S2	2'-4'	272.14
	S3	4'-6'	249.37
	S4	6'-8'	237.09
	S5	8'-10'	369.7
	S6	10'-12'	288.26
	S7	12'-14'	251.65
	S8	14'-16'	319.86
	S9	16'-18'	254.09
	S10	18'-20'	264.71
	S11	20'-22'	185.49
	S12	22'-24'	241.32
	S13	24'-26'	487.8
	S14	26'-28'	297.6
	S15	28'-30'	209.42
	S16	30'-32'	391.4
	S17	32'-34'	112.69

Table No. D

COMPOSITE NO.	SAMPLE NO.	DEPTH	WET WEIGHT (g)
88-4	S1	8'-20"	168.33
	S2	20'-58"	351.23
	S3	58'-88"	424.1
	S4	88'-11'-8"	236.96
	S5	108'-13'	352.26
	S6	14'-16'	66.48
	S7	16'-18'	274.48
	S8	18'-20'	202.95
	S9	21'-24'	230.8
	S10	-	-
	S11	26'-28'	168.93
	S12	28'-30'	133.48
	S13	30'-32'	208.1
	S14	32'-34'	196.62
	S15	34'-36'	125.08
	S16	36'-38'	214.25
	S17	38'-40'	120.08

SAMPLE DATA ON AS RECEIVED SAMPLES

Table No. E

COMPOSITE NO.	SAMPLE NO.	DEPTH	WET WEIGHT (g)
88-5	GRAB	1'-2'	62.67
	S1	2'-4'	299.86
	S2	4'-6'	215.89
	S3	-	-
	S4	8'-10'	116.35
	S5	10'-12'	218.68
	S6	12'-14'	196.55
	S7	14'-16'	321.9
	S8	16'-18'	134.27
	S9	18'-20'	189.16
	S10	20'-22'	317.25
	S11	22'-24'	270.91
	S12	24'-26'	179.64
	S13	26'-28'	246.29
	S14	28'-30'	257.77
	S15	29'-31'	86.25

Table No. F

COMPOSITE NO.	SAMPLE NO.	DEPTH	WET WEIGHT (g)
88-6	S1	1'-2'	65.5
	S2	2'-4'	119.8
	S3	4'-6'	233.78
	S4	6'-8'	276.95
	S5	8'-10'	283.24
	S6	10'-12'	318.88
	S7	12'-14'	261.82
	S8	14'-16'	293.69
	S9	16'-18'	305.24
	S10	18'-20'	300.54
	S11	20'-22'	234.54
	S12	-	-
	S13	24'-26'	245.08
	S14	26'-28'	159.93

Table No. G

COMPOSITE NO.	SAMPLE NO.	DEPTH	WET WEIGHT (g)
88-7	S1	14'-2'	113.46
	S2	2'-4'	148.78
	S3	4'-6'	195.56
	S4	6'-8'	362.21
	S5	8'-10'	209.89
	S6	10'-12'	256.89
	S7	12'-14'	299.65
	S8	14'-16'	296.7
	S9	16'-18'	248.12
	S10	18'-20'	213.97
	S11	20'-22'	327.68
	S12	22'-24'	290.3
	S13	24'-26'	269.26
	S14	24'-28'	233.2
	S15	28'-30'	243.31
	S16	30'-32'	191.5
	S17	32'-34'	275.71
	S18	34'-36'	318.08
	S19	36'-38'	252.23
	S20	38'-40'	276.6
	S21	40'-42'	194.81

Table No. H

COMPOSITE NO.	SAMPLE NO.	DEPTH	WET WEIGHT (g)
88-8	S1	2'-4'	83.76
	S2	4'-6'	222.48
	S3	6'-8'	309.28
	S4	8'-10'	214.28
	S5	10'-12'	242.19
	S6	12'-14'	290.72
	S7	14'-16'	247.7
	S8	16'-18'	316.44
	S9	18'-20'	155.8
	S10	20'-22'	268.8
	S11	22'-24'	299.35
	S12	24'-26'	432.1
	S13	26'-28'	370.87
	S14	-	-
	S15	-	-
	S16	32'-34'	135.27
	S16	36'-38'	227.63
	S17	-	-
	S18	-	-
	S19	38'-40'	541.8

SAMPLE DATA ON AS RECEIVED SAMPLES

Table No. I

COMPOSITE NO.	SAMPLE NO.	DEPTH	WET WEIGHT (g)
88-9	S1	2'-4'	149.47
	S2	4'-6'	294
	S3	6'-8'	339.35
	S4	8'-10'	264
	S5	10'-12'	366.1
	S6	12'-14'	340.1
	S7	14'-16'	283.07
	S8	16'-18'	321.07
	S9	18'-20'	344.75
	S10	20'-22'	181.53
	S11	22'-24'	264.39
	S12	24'-26'	161.94
	S13	26'-28'	322.92
	S14	28'-30'	257.17
	S15	-	-
	S16	32'-34'	200.99
	S17	34'-36'	72.69
	S18	36'-38'	251.31
	S19	38'-40'	160.332
	S20	40'-42'	213.37

Table No. J

COMPOSITE NO.	SAMPLE NO.	DEPTH	WET WEIGHT (g)
88-10	S1	1'-2'	65.5
	S2	2'-4'	119.9
	S3	4'-6'	233.79
	S4	6'-8'	276.95
	S5	8'-10'	283.24
	S6	10'-12'	318.88
	S7	12'-14'	261.82
	S8	14'-16'	293.69
	S9	16'-18'	305.24
	S10	18'-20'	300.54
	S11	20'-22'	234.54
	S12	-	-
	S13	24'-26'	245.08
	S14	26'-28'	159.93

Table No. K

COMPOSITE NO.	SAMPLE NO.	DEPTH	WET WEIGHT (g)
88-12	S1	0'-2'	203.13
	S2	2'-4'	263.45
	S3	4'-6'	222.75
	S4	6'-8'	405.6
	S5	8'-10'	144.79
	S6	10'-12'	321.29
	S7	12'-14'	174.6
	S8	14'-16'	316
	S9	16'-18'	219.8
	S10	18'-20'	270.3
	S11	20'-22'	182.92
	S12	22'-24'	304.01
	S13	24'-26'	189.7
	S14	26'-28'	267.4
	S15	28'-30'	211.61
	S16	30'-32'	174.07
	S17	32'-34'	330.8

DETAILS OF TESTSTest No. 1CYANIDATION

Purpose: To conduct a CIL cyanidation on a sample of Giant Yellowknife Composite (1,2,3)

Procedure: A 500 g charge was pulped with tap water as outlined below. Lime and cyanide were added as required. Carbon was added to give a 15 g/L concentrate on a solution basis. A carbon exchange was completed at 24, 36 and 48 hours. The carbon used was GRC 22. Dissolved oxygen and pH were monitored regularly. Upon completion, the carbon was removed and slurry filtered. The cake was washed three times with water.

Feed: 500 g Giant Yellowknife 88-1, 88-2, 88-3

Solution Volume: 1167 mL Pulp Density 30 % solids

Solution Composition: 1.0 g/L NaCN

pH Range: 10.5 - 11 with Ca(OH)₂

Carbon: 17.5 carbon GRC 22

Reagent Balance:

Time Hours	Added, grams				Residual		Consumed		pH	Diss. O ₂ mg/L
	Actual NaCN	Ca(OH) ₂	Equivalent NaCN	CaO	Grams NaCN	Grams CaO	NaCN	CaO		
0-1	1.23	0.55	1.17	0.42	0.93		0.24		10.5-10.2	6.0
1-4	0.25	0.08	0.24	0.04	1.11		0.06		10.7-10.4	6.6
4-12	0.06	0.05	0.06	0.04	0.76		0.41		10.6-10.5	7.9
12-24	0.43		0.41		0.53		0.64		10.5-10.5	6.8
24-31	0.67		0.64		0.82		0.35		10.5-10.5	9.4
31-36	0.37	0.05	0.35	0.04	0.80		0.37		10.5-10.3	8.4
36-48	0.39		0.37		0.40	0.36	0.77		10.5-10.6	8.4
Total	3.40	0.70	3.24	0.54	0.40	0.36	2.84	0.18	10.5	7.6

Reagent Consumption (kg/t of cyanide feed) NaCN: 5.91 kg/t CaO: 0.37 kg/t

Metallurgical Results

Product	Amount	Assays g/t,mg/L Au	% Distribution Au
1. 24 h CIL Recovery	19.3 g	26.7	32.9
2. 36 h CIL Recovery	24.6 g	2.30	36.6
3. 48 h CIL Recovery	19.1 g	2.00	39.0
4. 48 h CIL Barren	1800.0 mL	0.002	0.3
5. 48 h CIL Residue	480.0	1.98	60.7
Head (Calc.)	480.8 g	3.25	100.0

Calculated Grades and Recoveries

Products 4 + 5			61.0
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Screen Analysis

Mesh Size (Tyler)	% Retained		% Passing Cumulative
	Individual	Cumulative	
+ 100	0	0	0
150	0.6	0.6	99.4
200	1.6	2.2	97.8
270	2.4	4.6	95.4
400	3.7	8.3	91.7
- 400	91.7	100.0	-
Total	100.0	-	-

Test No. 2**CYANIDATION**

Purpose: As for Test No. 1
Procedure: Same as for Test No. 1
Feed: 500 g Giant Yellowknife 88-1, 88-2, 88-3
Solution Volume: 750 mL Pulp Density 40 % solids
Solution Composition: 1.0 g/L NaCN
pH Range: 10.5 - 11 with $\text{Ca}(\text{OH})_2$
Carbon: 11.25 carbon GRC 22
Note: 500 rpm to 550 rpm
Reagent Balance:

Time Hours	Added, grams				Residual		Consumed		pH	Diss. O ₂ mg/L
	Actual NaCN	Ca(OH) ₂	Equivalent NaCN	CaO	Grams NaCN	Grams CaO	NaCN	CaO		
0-1	0.79	0.66	0.75	0.50	0.60		0.15		11.3-10.8	6.5
1-4	0.16		0.15		0.64		0.11		10.8-10.8	5.0
4-12	0.12		0.11		0.53		0.22		10.8-10.6	8.3
12-24	0.23		0.22		0.30		0.45		10.6-10.3	6.4
24-31	0.47		0.45		0.45		0.30		10.5-10.5	9.1
31-36	0.32		0.30		0.35		0.45		10.5-10.5	8.4
36-48	0.47		0.45		0.47	0.18	0.28		10.5-10.7	8.1
Total	2.56	0.66	2.43	0.50	0.47	0.18	1.96	0.32		7.4

Reagent Consumption (kg/t of cyanide feed) NaCN: 3.89 kg/t CaO: 0.64 kg/t

Metallurgical Results

Product	Amount	Assays g/t,mg/L Au	% Distribution Au
1. 24 h CIL Recovery	12.4 g	51.0	36.2
2. 36 h CIL Recovery	12.41 g	2.50	37.9
3. 48 h CIL Recovery	111.6 g	2.30	39.4
4. 48 h CIL Barren	1690.0 mL	0.002	0.2
5. 48 h CIL Residue	503.3 g	2.10	60.4
Head (Calc.)	503.3 g	3.48	100.0

Calculated Grades and Recoveries

Products 4 + 5			60.6
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Test No. 3**CYANIDATION**

Purpose: As for Test No. 1
Procedure: Same as for Test No. 1
Feed: 500 g Giant Yellowknife 88-1, 88-2, 88-3
Solution Volume: 500 mL Pulp Density 50 % solids
Solution Composition: 1.0 g/L NaCN
pH Range: 10.5 - 11 with Ca(OH)₂
Carbon: 7.5 g carbon GRC 22
Note: 2 blades on agitation, speed 500 rpm to 600 rpm
Reagent Balance:

Time Hours	Added, grams				Residual		Consumed		pH	Diss. O ₂ mg/L
	Actual NaCN	Ca(OH) ₂	Equivalent NaCN	CaO	Grams NaCN	Grams CaO	NaCN	CaO		
0-1	0.53	2.00	0.50	1.52	0.33		0.27		11.8-11.5	6.4
1-4	0.28		0.27		0.50		0.00		11.5-11.5	3.0
4-12	0.00		0.000		0.38		0.12		11.5-11.2	6.0
12-24	0.13		0.12		0.43		0.07		11.2-11.0	5.8
24-31	0.07		0.07		0.38		0.12		11.0-10.8	8.2
31-36	0.13		0.12		0.37		0.13		10.8-10.8	7.8
36-48	0.14		0.13		0.44	0.11	0.06		10.8-10.9	8.1
Total	1.28	2.00	1.21	1.52	0.44	0.11	0.77	1.41		6.5

Reagent Consumption (kg/t of cyanide feed) NaCN: 1.60 kg/t CaO: 2.93 kg/t

Metallurgical Results

Product	Amount	Assays g/t,mg/L Au	% Distribution Au
1. 24 h CIL Recovery	9.1 g	58.0	35.8
2. 36 h CIL Recovery	7.5 g	3.70	37.7
3. 48 h CIL Recovery	7.8 g	2.80	39.2
4. 48 h CIL Barren	1460 mL	0.002	0.2
5. 48 h CIL Residue	480.8 g	1.86	60.6
Head (Calc.)	480.8 g	3.07	100.0

Calculated Grades and Recoveries

Products 4 + 5			60.8
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Test No. 4**CYANIDATION**

Purpose: To conduct a CIL extraction on a sample of Giant Yellowknife Composite (88-6, 99-7)

Procedure: Same as for Test No. 1

Feed: 500 g Giant Yellowknife 88-6, 88-7

Solution Volume: 1167 mL Pulp Density 30 % solids

Solution Composition: 1.0 g/L NaCN

pH Range: 10.5 - 11 with $\text{Ca}(\text{OH})_2$

Carbon: 17.5 g carbon GRC 22

Reagent Balance:

Time Hours	Added, grams				Residual		Consumed		pH	Diss. O ₂ mg/L
	Actual NaCN	Ca(OH) ₂	Equivalent NaCN	CaO	Grams NaCN	Grams CaO	NaCN	CaO		
0-1	1.23	0.32	1.17	0.24	0.99		0.18		10.8-10.3	7.6
1-4	0.19	0.10	0.18	0.08	0.99		0.18		10.8-10.5	6.8
4-12	0.19		0.18		0.58		0.59		10.5-10.6	8.5
12--24	0.62		0.59		0.82		0.35		10.6-10.3	7.7
24-30	0.37	0.05	0.35	0.04	0.76		0.41		10.5-10.6	7.5
30-36	0.43		0.41		0.82		0.35		10.6-10.7	8.5
36-48	0.37		0.35		0.82	0.15	0.35		10.7-10.6	8.1
Total	3.40	0.47	3.23	0.36	0.82	0.15	2.41	0.21		7.8

Reagent Consumption (kg/t of cyanide feed) NaCN: 4.95 kg/t CaO: 0.43 kg/t

Metallurgical Results

Product	Amount	Assays g/t,mg/L Au	% Distribution Au
1. 24 h CIL Recovery	19.3 g	32.5	36.7
2. 36 h CIL Recovery	22.0 g	2.50	40.0
3. 48 h CIL Recovery	17.8 g	3.50	43.6
4. 48 h CIL Barren	2040.0 mL	0.002	0.2
5. 48 h CIL Residue	486.8 g	1.97	56.2
Head (Calc.)	486.8 g	3.51	100.0

Calculated Grades and Recoveries

Products 4 + 5			56.4
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Screen Analysis - Composite 6, 7

Mesh Size (Tyler)	% Retained		% Passing Cumulative
	Individual	Cumulative	
+ 100	0.1	0.1	99.9
150	0.8	0.9	99.1
200	2.2	3.1	96.9
270	2.5	5.6	94.4
400	5.0	10.6	89.4
- 400	89.4	100.0	-
Total	100.0	-	-

Test No. 5**CYANIDATION**

Purpose: Same as Test No.4
Procedure: Same as Test No. 1
Feed: 500 g Giant Yellowknife 88-6, 88-7
Solution Volume: 750 mL Pulp Density 40 % solids
Solution Composition: 1.0 gpL NaCN
pH Range: 10.5 - 11 with Ca(OH)₂
Carbon: 11.25 g carbon GRC 22
Reagent Balance:

Time Hours	Added, grams				Residual		Consumed		pH	Diss. O ₂ mg/L
	Actual NaCN	Ca(OH) ₂	Equivalent NaCN	CaO	Grams NaCN	Grams CaO	NaCN	CaO		
0-1	0.79	0.80	0.75	0.61	0.56		0.19		11.1-10.6	7.6
1-4	0.20		0.19		0.60		0.15		10.6-10.6	7.0
4-12	0.16		0.15		0.53		0.22		10.6-10.6	8.2
12-24	0.23		0.22		0.23		0.52		10.6-10.3	7.1
24-30	0.55	0.05	0.52	0.01	0.49		0.26		10.5-10.7	7.3
30-36	0.27		.26		0.49		0.26		10.7-10.7	8.2
36-48	0.27		0.26		0.42	0.27	0.33		10.7-10.6	8.1
Total	2.47	0.82	2.35	0.65	0.42	0.27	1.93	0.38		7.6

Reagent Consumption (kg/t of cyanide feed) NaCN: 3.91 kg/t CaO: 0.77 kg/t

Metallurgical Results

Product	Amount	Assays g/t,mg/L Au	% Distribution Au
1. 24 h CIL Recovery	16.7 g	76.9	52.8
2. 36 h CIL Recovery	11.5 g	3.00	54.2
3. 48 h CIL Recovery	11.4 g	3.00	55.6
4. 48 h CIL Barren	1630.0 mL	0.002	0.1
5. 48 h CIL Residue	494.0 g	2.04	44.3
Head (Calc.)	494.0 g	4.93	100.0

Calculated Grades and Recoveries

Products 4 + 5			44.4
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Test No. 6**CYANIDATION****Purpose:** Same as Test No. 4**Procedure:** Same as Test No. 1**Feed:** 500 g Giant Yellowknife 88-6, 88-7**Solution Volume:** 500 mL **Pulp Density** 50 % solids**Solution Composition:** 1.0 g/L NaCN**pH Range:** 10.5 - 11 with Ca(OH)_2 **Carbon:** 7.5 g carbon GRC 22**Reagent Balance:****Note:** 2 blades on agitator; speed 600 rpm

Time Hours	Added, grams				Residual		Consumed		pH	Diss. O ₂ mg/L
	Actual NaCN	Ca(OH) ₂	Equivalent NaCN	CaO	Grams NaCN	Grams CaO	NaCN	CaO		
0-1	0.53	0.40	0.50	0.30	0.25		0.25		11.1-11.5	2.6
1-4	0.26		0.25		0.40		0.10		11.5-11.1	5.8
4-12	0.11		0.10		0.10		0.40		11.1-10.9	7.1
12-24	0.42		0.40		0.33		0.27		10.9-10.6	6.4
24-30	0.28		0.27		0.48		0.02		10.6-10.8	6.9
30-36	0.02		0.02		0.28		0.22		10.8-10.8	8.1
36-48	0.23		0.22		0.30	0.15	0.20		10.8-10.7	8.4
Total	1.85	0.40	1.76	0.30	0.30	0.15	1.46	0.15		6.5

Reagent Consumption (kg/t of cyanide feed) **NaCN:** 3.04 kg/t **CaO:** 0.31 kg/t

Metallurgical Results

Product	Amount	Assays g/t,mg/L Au	% Distribution Au
1. 24 h CIL Recovery	7.7 g	65.0	27.5
2. 36 h CIL Recovery	7.8 g	47.0	47.6
3. 48 h CIL Recovery	7.4 g	4.00	49.3
4. 48 h CIL Barren	1360.0 mL	0.003	0.2
5. 48 h CIL Residue	497.7 g	1.92	50.5
Head (Calc.)	479.7 g	3.80	100.0

Calculated Grades and Recoveries

Products 4 + 5			50.7
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Test No. 7**CYANIDATION**

Purpose: To conduct a CIL cyanidation on a sample of Giant Yellowknife Composite (88-8, 88-12)

Procedure: Same as Test No. 1

Feed: 500 g Giant Yellowknife 88-8, 88-12

Solution Volume: 1167 mL **Pulp Density** 30 % solids

Solution Composition: 1.0 gpL NaCN

pH Range: 10.5 - 11 with $\text{Ca}(\text{OH})_2$

Carbon: 17.5 g carbon GRC 22

Reagent Balance:

Time Hours	Added, grams				Residual		Consumed		pH	Diss. O ₂ mg/L
	Actual NaCN	Ca(OH) ₂	Equivalent NaCN	CaO	Grams NaCN	Grams CaO	NaCN	CaO		
0-1	1.23	0.48	1.17	0.37	0.89		0.28		10.8-10.5	6.5
1-4	0.30		0.28		1.11		0.06		10.5-10.6	7.5
4-12	0.06		0.06		0.87		0.30		10.6-10.8	7.9
12-24	0.32		0.30		0.53		0.64		10.8-10.5	8.3
24-31	0.67		0.64		0.70		0.47		10.5-10.5	8.3
31-36	0.49		0.47		0.70		0.47		10.5-10.7	7.5
36-48	0.49		0.47		1.03	0.30	0.14		10.7-10.7	8.7
Total	3.56	0.48	3.39	0.37	1.03	0.30	2.36	0.07		7.8

Reagent Consumption (kg/t of cyanide feed) **NaCN:** 4.78 kg/t **CaO:** 0.14 kg/t

Metallurgical Results

Product	Amount	Assays g/t,mg/L Au	% Distribution Au O'all
1. 24 h CIL Recovery	18.3 g	30.3	33.1
2. 36 h CIL Recovery	22.4 g	2.00	35.7
3. 48 h CIL Recovery	17.4 g	6.50	42.5
4. 48 h CIL Barren	2030.0 mL	0.004	0.5
5. 48 h CIL Residue	493.8 g	1.94	57.0
Head (Calc.)	493.8 g	3.40	100.0

Calculated Grades and Recoveries

48 h CIL (4 - 5)			57.5
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Screen Analysis - Composite 8-12

Mesh Size (Tyler)	% Retained		% Passing Cumulative
	Individual	Cumulative	
+ 100	0.1	0.1	99.9
150	2.3	2.4	97.6
200	6.3	8.7	91.3
270	6.9	15.6	84.4
400	6.3	21.9	78.1
- 400	78.1	100.0	-
Total	100.0	-	-

Test No. 8**CYANIDATION**

Purpose: Same as Test No. 7
Procedure: Same as Test No. 1
Feed: 500 g Giant Yellowknife 88-8, 88-12
Solution Volume: 750 mL Pulp Density 40 % solids
Solution Composition: 1.0 g/L NaCN
pH Range: 10.5 - 11 with Ca(OH)₂
Carbon: 11.25 g carbon GRC 22
Reagent Balance:

Time Hours	Added, grams				Residual		Consumed		pH	Diss. O ₂ mg/L
	Actual NaCN	Ca(OH) ₂	Equivalent NaCN	CaO	Grams NaCN	Grams CaO	NaCN	CaO		
0-1	0.79	0.50	0.75	0.38	0.64		0.11		11.0-10.6	6.2
1-4	0.12		0.11		0.60		0.15		10.6-10.7	7.3
4-12	0.16		0.15		0.53		0.22		10.7-10.9	7.7
12-24	0.23		0.22		0.38		0.37		10.9-10.6	8.2
24-31	0.39		0.37		0.53		0.22		10.6-10.6	8.1
31-36	0.23		0.22		0.45		0.30		10.6-10.8	7.3
36-48	0.32		0.30		0.58	0.19	0.17		10.8-10.7	8.7
Total	2.24	0.50	2.12	0.38	0.58	0.19	1.54	0.19		7.6

Reagent Consumption (kg/t of cyanide feed) NaCN: 3.09 kg/t CaO: 0.38 kg/t

Metallurgical Results

Product	Amount		Assays g/t,mg/L Au	% Distribution Au O'all
1. 24 h CIL Recovery	13.1	g	43.6	33.4
2. 36 h CIL Recovery	12.7	g	7.96	39.3
3. 48 h CIL Recovery	12.1	g	2.80	41.2
4. 48 h CIL Barren	1610.0	mL	0.003	0.3
5. 48 h CIL Residue	498.0	g	2.01	58.5
Head (Calc.)	498.0	g	3.44 O'all	100.0

Calculated Grades and Recoveries

48 h CIL (4 - 5)			58.8
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Test No. 9**CYANIDATION**

Purpose: Same as Test No. 7

Procedure: Same as Test No. 1

Feed: 500 g Giant Yellowknife 88-8, 88-12

Solution Volume: 500 mL Pulp Density 50 % solids

Solution Composition: 1.0 gpL NaCN

pH Range: 10.5 - 11 with Ca(OH)₂

Carbon: 7.5 g carbon GRC 22

Reagent Balance:

Note: 2 blades on agitator; speed 600 rpm

Time Hours	Added, grams				Residual		Consumed		pH	Diss. O ₂ mg/L
	Actual NaCN	Ca(OH) ₂	Equivalent NaCN	CaO	Grams NaCN	Grams CaO	NaCN	CaO		
0-1	0.53	0.32	0.50	0.24	0.25		0.25		10.5-10.2	4.1
1-4	0.26	0.12	0.25	0.09	0.45		0.05		10.8-10.5	6.5
4-12	0.05		0.05		0.25		0.25		10.5-10.6	6.9
12-24	0.26		0.25		0.23		0.27		10.6-10.4	8.2
24-31	0.28	0.05	0.27	0.04	0.30		0.20		10.6-10.5	8.1
31-36	0.21		0.20		0.20		0.30		10.5-10.5	6.4
36-48	0.32		0.30		0.22	0.20	0.28		10.5-10.5	8.2
Total	1.91	0.49	1.82	0.37	0.22	0.20	1.60	0.17		6.9

Reagent Consumption (kg/t of cyanide feed) NaCN: 3.29 kg/t CaO: 0.35 kg/t

Metallurgical Results

Product	Amount	Assays g/t,mg/L Au	% Distribution Au
1. 24 h CIL Recovery	8.6 g	66.0	36.0
2. 36 h CIL Recovery	8.4 g	3.40	37.9
3. 48 h CIL Recovery	7.4 g	3.10	39.3
4. 48 h CIL Barren	1400 mL	0.003	0.3
5. 48 h CIL Residue	486.3 g	1.96	60.4
Head (Calc.)	486.3 g	3.24 O'all	100.0

Calculated Grades and Recoveries

48 h CIL (4 - 5)			60.7
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Test No. 10**CYANIDATION**

Purpose: To conduct a CIL cyanidation on a sample of Giant Yellowknife Composite (88-4, 88-5)

Procedure: Same as Test No. 1

Feed: 500 g Giant Yellowknife 88-4, 88-5

Solution Volume: 1167 mL Pulp Density 30 % solids

Solution Composition: 1.0 g/L NaCN

pH Range: 10.5 - 11 with $\text{Ca}(\text{OH})_2$

Carbon: 17.5 g carbon GRC 22

Reagent Balance:

Time Hours	Added, grams				Residual		Consumed		pH	Diss. O ₂ mg/L
	Actual NaCN	Actual $\text{Ca}(\text{OH})_2$	Equivalent NaCN	Equivalent CaO	Grams NaCN	Grams CaO	NaCN	CaO		
0-1	1.23	0.26	1.17	0.20	0.88		0.29		10.6-10.2	6.30
1-4	0.31	0.09	0.29	0.07	1.05		0.12		10.7-10.7	7.70
4-12	0.13		0.12		0.70		0.47		10.7-10.7	7.9
12-24	0.49		0.47		0.41		0.76		10.7-10.5	8.1
24-30	0.80		0.76		0.70		0.47		10.5-10.7	7.5
30-36	0.49		0.47		0.64		0.53		10.7-10.7	6.7
36-48	0.56		0.53		0.72	0.22	0.45		10.7-10.9	7.6
Total	4.01	0.35	3.81	0.27	0.72	0.22	3.09	0.05		

Reagent Consumption (kg/t of cyanide feed) NaCN: 6.32 kg/t CaO: 0.10 kg/t

Metallurgical Results

Product	Amount	Assays g/t,mg/L Au	% Distribution Au
1. 24 h CIL Recovery	19.6 g	21.5	30.6
2. 36 h CIL Recovery	19.7 g	2.90	34.8
3. 48 h CIL Recovery	17.8 g	2.40	37.9
4. 48 h CIL Barren	2010.0 mL	0.003	0.4
5. 48 h CIL Residue	489.3 g	1.73	61.7
Head (Calc.)	489.3 g	2.81	100.0

Calculated Grades and Recoveries

Products 4 + 5			62.1
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Screen Analysis - Composite 4. 5

Mesh Size (Tyler)	% Retained		% Passing Cumulative
	Individual	Cumulative	
+ 65	0.1	0.1	99.9
100	0.1	0.2	99.8
150	2.2	2.4	97.6
200	4.5	6.9	93.1
270	5.0	11.9	88.1
400	5.2	17.1	82.9
- 400	82.9	100.0	-
Total	100.0	-	-

Test No. 11**CYANIDATION**

Purpose: Same as Test No. 10
Procedure: Same as Test No. 1
Feed: 500 g Giant Yellowknife 88-4, 88-5
Solution Volume: 750 mL Pulp Density 40 % solids
Solution Composition: 1.0 g/L NaCN
pH Range: 10.5 - 11 with $\text{Ca}(\text{OH})_2$
Carbon: 11.25 g carbon GRC 22
Reagent Balance:

Time Hours	Added, grams				Residual		Consumed		pH	Diss. O ₂ mg/L
	Actual NaCN	Ca(OH) ₂	Equivalent NaCN	CaO	Grams NaCN	Grams CaO	NaCN	CaO		
0-1	0.79	0.32	0.75	0.24	0.45		0.30		11.0-10.5	6.67
1-4	0.32	0.05	0.30	0.04	0.53		0.22		10.5-10.7	7.63
4-12	0.23		0.22		0.56		0.19		10.7-10.8	7.8
12-24	0.20		0.19		0.23		0.52		10.8-10.6	8.0
24-30	0.55		0.52		0.45		0.30		10.6-10.7	7.6
30-36	0.32		0.30		0.45		0.30		10.7-10.7	7.4
36-48	0.32		0.36		0.38	0.24	0.37		10.7-10.7	8.0
Total	2.73	0.37	2.58	0.28	0.38	0.24	2.20	0.04		7.6

Reagent Consumption (kg/t of cyanide feed) NaCN: 4.43 kg/t CaO: 0.08 kg/t

Metallurgical Results

Product	Amount	Assays g/t,mg/L Au	% Distribution Au
1. 24 h CIL Recovery	13.2 g	29.8	29.7
2. 36 h CIL Recovery	11.2 g	3.60	32.7
3. 48 h CIL Recovery	11.5 g	2.90	35.2
4. 48 h CIL Barren	1730.0 mL	0.002	0.3
5. 48 h CIL Residue	496.1 g	1.72	64.5
Head (Calc.)	496.1 g	2.67	100.0

Calculated Grades and Recoveries

Products (4+5)			64.8
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Test No. 12**CYANIDATION**

Purpose: Same as Test No. 10
Procedure: Same as Test No. 1. Note: beaker used was a regular 1000 mL size
Feed: 500 g Giant Yellowknife 88-4, 88-5
Solution Volume: 500 mL **Pulp Density:** 50 % solids
Solution Composition: 1.0 g/L NaCN
pH Range: 10.5 - 11 with Ca(OH)₂
Carbon: 7.5 g carbon GRC 22
Reagent Balance:
Note: speed 600 rpm

Time Hours	Added, grams				Residual		Consumed		pH	Diss. O ₂ mg/L
	Actual NaCN	Ca(OH) ₂	Equivalent NaCN	CaO	Grams NaCN	Grams CaO	NaCN	CaO		
0-1	0.53	0.31	0.50	0.24	0.20		0.30		11.2-10.3	4.10
1-4	0.32	0.08	0.30	0.06	0.35		0.15		10.8-10.7	7.30
4-12	0.16		0.15		0.40		0.10		10.7-10.8	7.8
12-24	0.11		0.10		0.13		0.37		10.8-10.4	7.9
24-30	0.39	0.05	0.37	0.04	0.28		0.22		10.6-10.7	7.3
30-36	0.23		0.22		0.38		0.12		10.7-10.6	6.8
36-48	0.13		0.12		0.18	0.20	0.32		10.6-10.6	7.2
Total	1.87	0.44	1.76	0.34	0.18	0.20	1.58	0.14		6.9

Reagent Consumption (kg/t of cyanide feed) NaCN: 3.21 kg/t CaO: 0.28 kg/t

Metallurgical Results

Product	Amount	Assays g/t,mg/L Au	% Distribution Au
1. 24 h CIL Recovery	8.4 g	49.1	31.8
2. 36 h CIL Recovery	7.7 g	4.20	34.3
3. 48 h CIL Recovery	7.4 g	4.60	36.9
4. 48 h CIL Barren	1400 mL	0.003	0.3
5. 48 h CIL Residue	492.6 g	1.65	62.8
Head (Calc.)	492.6 g	2.63	100.0

Calculated Grades and Recoveries

Products (4+5)			63.1
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Test No. 13**CYANIDATION**

Purpose: To conduct a CIL cyanidation on a sample of Giant Yellowknife Composite (88-9, 88-10)

Procedure: Same as Test No. 1

Feed: 500 g Giant Yellowknife 88-9, 88-10

Solution Volume: 1167 mL Pulp Density 30 % solids

Solution Composition: 1.0 g/L NaCN

pH Range: 10.5 - 11 with $\text{Ca}(\text{OH})_2$

Carbon: 17.5 g carbon GRC 22

Reagent Balance:

Time Hours	Added, grams				Residual		Consumed		pH	Diss. O ₂ mg/L
	Actual NaCN	Ca(OH) ₂	Equivalent NaCN	CaO	Grams NaCN	Grams CaO	NaCN	CaO		
0-1	1.23	0.50	1.17	0.38	0.93		0.24		10.6-10.4	7.1
1-4	0.25	0.05	0.24	0.04	0.99		0.18		10.6-10.5	7.0
4-12	0.19		0.18		0.76		0.41		10.5-10.5	6.7
12-24	0.43		0.41		0.47		0.70		10.5-10.6	6.8
24-31	0.74		0.70		0.88		0.29		10.6-10.5	6.7
31-36	0.31		0.29		0.93		0.24		10.5-10.5	5.9
36-48	0.25		0.24		0.60	0.31	0.57		10.5-10.6	7.0
Total	3.40	0.55	3.23	0.42	0.60	0.31	2.63	0.11		6.7

Reagent Consumption (kg/t of cyanide feed) NaCN: 5.53 kg/t CaO: 0.23 kg/t

Metallurgical Results

Product	Amount	Assays g/t,mg/L Au	% Distribution Au
1. 24 h CIL Recovery	20.3 g	20.2	30.6
2. 36 h CIL Recovery	21.4 g	2.30	34.3
3. 48 h CIL Recovery	17.6 g	2.00	36.9
4. 48 h CIL Barren	1870.0 mL	0.002	0.3
5. 48 h CIL Residue	475.2 g	1.77	62.8
Head (Calc.)	475.2 g	2.82	100.0

Calculated Grades and Recoveries

Products 4 + 5			63.1
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Screen Analysis - Composite 9, 10

Mesh Size (Tyler)	% Retained		% Passing Cumulative
	Individual	Cumulative	
+ 100	0.1	0.1	99.9
150	1.6	1.7	98.3
200	3.1	4.8	95.2
270	3.7	8.5	91.5
400	4.7	13.2	86.8
- 400	86.8	100.0	-
Total	100.0	-	-

Test No. 14**CYANIDATION**

Purpose: Same as Test No. 13
Procedure: Same as Test No. 1
Feed: 500 g Giant Yellowknife 88-9, 88-10
Solution Volume: 750 mL Pulp Density 40 % solids
Solution Composition: 1.0 g/L NaCN
pH Range: 10.5 - 11 with Ca(OH)₂
Carbon: 11.25 g carbon GRC 22
Reagent Balance:

Time Hours	Added, grams				Residual		Consumed		pH	Diss. O ₂ mg/L
	Actual NaCN	Ca(OH) ₂	Equivalent NaCN	CaO	Grams NaCN	Grams CaO	NaCN	CaO		
0-1	0.79	0.45	0.75	0.34	0.53		0.22		10.6-10.4	7.3
1-4	0.23	0.05	0.22	0.04	0.56		0.19		10.6-10.5	7.3
4-12	0.20		0.19		0.45		0.30		10.5-10.5	7.0
12-24	0.32		0.30		0.19		0.56		10.5-10.5	7.1
24-31	0.59		0.56		0.49		0.26		10.5-10.5	6.5
31-36	0.27		0.26		0.45		0.30		10.5-10.5	6.5
36-48	0.32		0.30		0.36	0.31	0.39		10.5-10.6	7.2
Total	2.72	0.50	2.58	0.38	0.36	0.31	2.22	0.07		7.1

Reagent Consumption (kg/t of cyanide feed) NaCN: 4.56 kg/t CaO: 0.14 kg/t

Metallurgical Results

Product	Amount	Assays g/t,mg/L Au	% Distribution Au
1. 24 h CIL Recovery	13.4 g	34.1	31.7
2. 36 h CIL Recovery	12.7 g	3.10	34.3
3. 48 h CIL Recovery	11.2 g	3.00	36.7
4. 48 h CIL Barren	1640.0 mL	0.002	0.2
5. 48 h CIL Residue	487.0 g	1.87	63.1
Head (Calc.)	487.0 g	2.97	100.0

Calculated Grades and Recoveries

Products (4+5)			63.3
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Test No. 15**CYANIDATION**

Purpose: To conduct a CIL cyanidation on a sample of Giant Yellowknife Composite

Procedure: Same as Test No. 1. Note: beaker used was a regular 1000 mL size

Feed: 500 g Giant Yellowknife 88-4, 88-5

Solution Volume: 500 mL Pulp Density 50 % solids

Solution Composition: 1.0 gpL NaCN

pH Range: 10.5 - 11 with Ca(OH)₂

Carbon: 7.5 g carbon GRC 22

Reagent Balance:

Note: speed 600 rpm

Time Hours	Added, grams				Residual		Consumed		pH	Diss. O ₂ mg/L
	Actual NaCN	Ca(OH) ₂	Equivalent NaCN	CaO	Grams NaCN	Grams CaO	NaCN	CaO		
0-1	0.53	0.46	0.50	0.35	0.25		0.25		10.5-10.2	6.4
1-4	0.26	0.08	0.25	0.06	0.40		0.10		10.6-10.4	6.3
4-12	0.11	0.05	0.10	0.04	0.30		0.20		10.6-10.5	6.3
12-24	0.21		0.20		0.15		0.35		10.5-10.4	6.8
24-31	0.37	0.05	0.35	0.04	0.35		0.15		10.6-10.5	6.1
31-36	0.16	0.05	0.15	0.04	0.28		0.22		10.5-10.5	6.1
36-48	0.23		0.22		0.26	0.22	0.24		10.5-10.5	6.9
Total	1.87	0.69	1.77	0.53	0.26	0.22	1.51	0.31		6.4

Reagent Consumption (kg/t of cyanide feed) NaCN: 3.12 kg/t CaO: 0.64 kg/t

Metallurgical Results

Product	Amount	Assays g/t,mg/L Au	% Distribution Au
1. 24 h CIL Recovery	7.9 g	61.7	33.4
2. 36 h CIL Recovery	7.5 g	4.90	35.9
3. 48 h CIL Recovery	7.6 g	4.60	38.3
4. 48 h CIL Barren	1630.0 mL	0.002	0.2
5. 48 h CIL Residue	484.8 g	1.85	61.5
Head (Calc.)	484.8 g	3.01	100.0

Calculated Grades and Recoveries

Products (4+5)			61.7
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Test No. 16**CYANIDATION**

Purpose: To conduct a CIL cyanidation on a sample of Giant Yellowknife Composite (88-1 to 88-12)

Procedure: A 500 g charge was pulped with fresh water as outlined below. Lime and cyanide were added as required. Carbon was added to give a 15 g/L concentrate on a solution basis. A carbon exchange was completed as often as possible (approximately every 4 hours). The carbon used was GRC 22. Dissolved oxygen and pH were monitored regularly. Upon completion, the carbon was removed and slurry filtered. The cake was washed three times with water.

Feed: 500 g Giant Yellowknife 88-1, 88-2, 88-3

Solution Volume: 1167 mL Pulp Density 30 % solids

Solution Composition: 1.0 g/L NaCN

pH Range: 10.5 - 11 with Ca(OH)₂

Carbon: 11.25 carbon GRC 22

Reagent Balance:

Time Hours	Added, grams				Residual		Consumed		pH	Diss. O ₂ mg/L
	Actual NaCN	Ca(OH) ₂	Equivalent NaCN	CaO	Grams NaCN	Grams CaO	NaCN	CaO		
0-1	0.79	0.49	0.75	0.37	0.56		0.19		10.5-10.4	6.5
1-4	0.20	0.05	0.19	0.04	0.38		0.37		10.7-10.6	6.9
4-8	0.39		0.37		0.65		0.10		10.6-10.2	7.4
8-12	0.11	0.05	0.10	0.04	0.38		0.37		10.5-10.3	7.4
12-16	0.39	0.05	0.37	0.04	0.38		0.37		10.6-10.6	7.7
16-26	0.39		0.37		0.15		0.60		10.6-10.5	7.3
26-30	0.63		0.60		0.56		0.19		10.5-10.5	6.8
30-34	0.59		0.56		0.85		0.27		10.5-10.6	7.6
34-38	0.00		0.00		0.49		0.36		10.6-10.5	7.3
38-50	0.27		0.26		0.30		0.45		10.5-10.5	9.0
50-54	0.47		0.45		0.74	0.31	0.01	0.18	10.5-10.5	8.2
Total	4.23	0.64	4.02	0.49	0.74	0.31	3.28	0.18	10.5	7.5

Reagent Consumption (kg/t of cyanide feed) NaCN: 7.24 kg/t CaO: 0.40 kg/t

Metallurgical Results

Product	Amount		Assays g/t,mg/L Au	% Distribution Au
1. 4 h CIL Recovery	11.3	g	48.3	36.0
2. 8 h CIL Recovery	12.6	g	2.50	38.2
3. 12 h CIL Recovery	11.5	g	1.30	39.1
4. 16 h CIL Recovery	11.7	g	1.10	40.0
5. 26 h CIL Recovery	12.7	g	1.90	41.6
6. 30 h CIL Recovery	12.4	g	0.50	42.0
7. 34 h CIL Recovery	12.8	g	0.80	42.6
8. 38 h CIL Recovery	12.8	g	0.60	43.2
9. 50 h CIL Recovery	12.2	g	1.80	44.6
10. 54 h CIL Recovery	11.0	g	0.90	45.3
11. 54 h CIL Barren	2060.0	mL	0.002	0.3
12. 54 h CIL Residue	453.3	g	1.82	54.4
Head (Calc.)	453.3	g	3.54	100.0

Calculated Grades and Recoveries

Products (11 + 12)			54.7
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Screen Analysis - 1-12 Comb.

Mesh Size (Tyler)	% Retained		% Passing Cumulative
	Individual	Cumulative	
+ 100	0.1	0.1	99.9
150	1.5	1.6	98.4
200	3.6	5.2	94.8
270	4.4	9.6	90.4
400	5.0	14.6	85.4
- 400	85.4	100.0	-
Total	100.0	-	-

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