

Cyanide Leach Test Results

CONFIDENTIAL

Test ID: CN1

CAVM-50269-001

Alex H

August 8, 2012

Sample ID: M.C -1"

Purpose:

To evaluate the leaching kinetics of Au in a coarse ore bottle roll test

Procedure:

The specified crush size sample was pulped to 50% solids with water and placed in the vessel. The pH was brought to 10.5 with lime and 1.0 g/L of NaCN was added. The vessel was agitated on the rolls intermittently (1 minute per hour) at 22 rpm. NaCN, pH and DO were monitored during the test. Intermittent solution samples were removed for Au determined. After the termination of the test, the pulp was filtered and the residue washed well with fresh water. The final leach solution and the residue (by size fraction) were assayed for Au.

Feed: 5,000 g of Master Comp -1"

Solution Volume: 5,000 mls

Pulp Density: 50 % solids

Sol'n Composition: 1.0 g/L maintained

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

Grind: "As is"

Reagent Addition (kg/t of cyanide feed)

NaCN: 1.39

CaO: 3.27

Reagent Consumption (kg/t of cyanide feed)

NaCN: 0.41

CaO: 3.21

Time hours	Added, Grams				Residual		Consumed		pH	D.O ₂
	Actual		Equivalent		Grams		Grams			
	NaCN	Ca(OH) ₂	NaCN	CaO	NaCN	CaO	NaCN	CaO		
To add 1.0 g/L	5.06		5.00						8.5	
0 - 4	5.06	1.34	5.00	0.99	3.12		1.89		11.2	9.0
4 - 8	1.91	3.60	1.89	2.66	5.30		-0.30		11.3	8.4
8 - 24	0.00	7.27	0.00	5.38	5.98		-0.67		11.9	8.3
24 - 48	0.00	3.52	0.00	2.61	5.55		0.42		11.6	8.3
48 - 72	0.00	0.43	0.00	0.32	5.39		0.16		10.8	8.7
72 - 96	0.00	0.95	0.00	0.70	5.29		0.10		10.9	8.6
96 - 120	0.00	0.59	0.00	0.44	5.26		0.03		10.6	8.1
120 - 144	0.00	1.84	0.00	1.36	5.13		0.13		11.1	8.0
144 - 168	0.00	2.10	0.00	1.55	5.05		0.08		11.3	8
168 - 192	0.00	0.20	0.00	0.15	4.85	0.31	0.19	15.85	11.0	8
Total	6.97	21.83	6.89	16.16	4.85	0.31	2.04	15.85		

Cyanidation Results:

Product	Amount g, mL	Assays, mg/L Au	% Distribution Au
4 h Pregnant Solution	5,074	2.42	58.1
8 h Pregnant Solution	5,027	3.04	72.9
24 h Pregnant Solution	5,023	3.32	80.3
48 h Pregnant Solution	5,043	3.45	84.5
72 h Pregnant Solution	5,067	3.58	88.8
96h Pregnant Solution	5,058	3.49	87.3
120 h Pregnant Solution	5,073	3.30	83.8
144 h Pregnant Solution	5,016	3.45	87.3
168 h Pregnant Solution	5,027	3.32	85.2
192 h Pregnant Solution	5,118	3.25	85.7
Final Residue	4,943	0.61	14.3
Head (calc.)	4,943	4.27	100.0

Direct Head Assay, g/t
Screen Metallurgy Assay, g/t

SGS Vancouver Metallurgy

CONFIDENTIAL

Test ID: CN2

CAVM-50269-001

Alex H

August 8, 2012

Sample ID: M.C -3/4"

Purpose:

To evaluate the leaching kinetics of Au in a coarse ore bottle roll test

Procedure:

The specified crush size sample was pulped to 50% solids with water and placed in the vessel. The pH was brought to 10.5 with lime and 1.0 g/L of NaCN was added. The vessel was agitated on the rolls intermittently (1 minute per hour) at 22 rpm. NaCN, pH and DO were monitored during the test. Intermittent solution samples were removed for Au determined. After the termination of the test, the pulp was filtered and the residue washed well with fresh water. The final leach solution and the residue (by size fraction) were assayed for Au.

Feed: 5,000 g of Master Comp -3/4"

Solution Volume: 5,000 mls

Pulp Density: 50 % solids

Sol'n Composition: 1.0 g/L maintained

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

Grind: "As is"

Reagent Addition (kg/t of cyanide feed)

NaCN: 1.46

CaO: 3.11

Reagent Consumption (kg/t of cyanide feed)

NaCN: 0.50

CaO: 3.08

Time hours	Added, Grams				Residual Grams		Consumed Grams		pH	D.O ₂
	Actual NaCN	Ca(OH) ₂	Equivalent NaCN	CaO	NaCN	CaO	NaCN	CaO		
To add 1.0 g/L	5.06		5.00						8.5	
0 - 4	5.06	1.80	5.00	1.33	3.11		1.89		11.8	9.0
4 - 8	1.91	3.16	1.89	2.34	5.41		-0.41		11.4	8.5
8 - 24	0.00	6.97	0.00	5.16	5.82		-0.41		11.9	8.4
24 - 48	0.00	4.14	0.00	3.06	5.59		0.23		11.7	8.2
48 - 72	0.00	0.00	0.00	0.00	5.25		0.35		10.7	8.7
72 - 96	0.00	1.40	0.00	1.04	5.04		0.21		11.0	8.3
96 - 120	0.00	1.42	0.00	1.05	4.83		0.21		10.9	7.9
120 - 144	0.18	0.00	0.18	0.00	4.87		0.14		10.7	8.0
144 - 168	0.14	1.43	0.14	1.06	4.92		0.09		11.1	8.2
168 - 192	0.00	0.45	0.00	0.33	4.75	0.15	0.17	15.22	10.9	7.9
Total	7.29	20.78	7.21	15.37	4.75	0.15	2.46	15.22		

Cyanidation Results:

Product	Amount g, mL	Assays, mg/L Au	% Distribution Au
4 h Pregnant Solution	5,073	2.27	64.2
8 h Pregnant Solution	5,037	2.87	81.2
24 h Pregnant Solution	4,951	3.07	86.2
48 h Pregnant Solution	4,975	3.20	91.0
72 h Pregnant Solution	4,974	2.97	85.5
96h Pregnant Solution	5,066	2.92	86.5
120 h Pregnant Solution	5,071	2.88	86.2
144 h Pregnant Solution	5,038	2.89	86.8
168 h Pregnant Solution	4,950	2.83	84.5
192 h Pregnant Solution	5,135	2.75	85.9
Final Residue	4,943	0.51	14.1
Head (calc.)	4,943	3.63	100.0

Direct Head Assay, g/t
Screen Metallurgy Assay, g/t

SGS Vancouver Metallurgy

CONFIDENTIAL

Test ID: CN3

CAVM-50269-001

Alex H

August 8, 2012

Sample ID: M.C -1/2"

Purpose: To evaluate the leaching kinetics of Au in a coarse ore bottle roll test

Procedure: The specified crush size sample was pulped to 50% solids with water and placed in the vessel. The pH was brought to 10.5 with lime and 1.0 g/L of NaCN was added. The vessel was agitated on the rolls intermittently (1 minute per hour) at 22 rpm. NaCN, pH and DO were monitored during the test. Intermittent solution samples were removed for Au determined. After the termination of the test, the pulp was filtered and the residue washed well with fresh water. The final leach solution and the residue (by size fraction) were assayed for Au.

Feed: 5,000 g of Master Comp -1/2"

Solution Volume: 5,000 mls

Pulp Density: 50 % solids

Sol'n Composition: 1.0 g/L maintained

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

Grind: "As is"

Reagent Addition (kg/t of cyanide feed)

NaCN: 1.44 CaO: 3.15

Reagent Consumption (kg/t of cyanide feed)

NaCN: 0.47 CaO: 3.12

Time hours	Added, Grams				Residual		Consumed		pH	D.O ₂
	Actual		Equivalent		Grams		Grams			
	NaCN	Ca(OH) ₂	NaCN	CaO	NaCN	CaO	NaCN	CaO		
To add 1.0 g/L	5.06		5.00						8.4	
0 - 4	5.06	1.60	5.00	1.18	3.25		1.75		11.8	8.8
4 - 8	1.77	4.01	1.75	2.96	5.30		-0.29		11.5	8.6
8 - 24	0.00	6.89	0.00	5.10	5.64		-0.35		11.9	8.5
24 - 48	0.00	2.61	0.00	1.93	5.24		0.41		11.6	8.4
48 - 72	0.00	0.86	0.00	0.64	5.03		0.21		10.9	8.6
72 - 96	0.00	1.00	0.00	0.74	4.90		0.13		11.0	8.2
96 - 120	0.11	0.90	0.11	0.67	4.85		0.15		10.8	8.0
120 - 144	0.15	1.27	0.15	0.94	4.96		0.04		10.9	7.9
144 - 168	0.00	1.13	0.00	0.84	4.89		0.06		11.1	8.3
168 - 192	0.11	0.79	0.11	0.58	4.80	0.16	0.20	15.42	10.9	8.1

Total	7.20	21.06	7.12	15.58	4.80	0.16	2.32	15.42
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Cyanidation Results:

Product	Amount g, mL	Assays, mg/L	% Distribution
		Au	Au
4 h Pregnant Solution	5,031	2.08	55.5
8 h Pregnant Solution	4,975	2.93	77.8
24 h Pregnant Solution	4,954	3.18	84.9
48 h Pregnant Solution	5,048	3.21	88.1
72 h Pregnant Solution	5,003	3.33	91.4
96h Pregnant Solution	5,086	3.29	92.6
120 h Pregnant Solution	5,043	3.17	89.5
144 h Pregnant Solution	5,053	3.18	90.8
168 h Pregnant Solution	5,011	3.04	87.2
192 h Pregnant Solution	5,267	2.87	87.4
Final Residue	4,947	0.48	12.6
Head (calc.)	4,947	3.81	100.0

Direct Head Assay, g/t
Screen Metallurgy Assay, g/t

SGS Vancouver Metallurgy

CONFIDENTIAL

Test ID: CN4

CAVM-50269-001

Alex H

August 8, 2012

Sample ID: M.C -1/4"

Purpose: To evaluate the leaching kinetics of Au in a coarse ore bottle roll test

Procedure: The specified crush size sample was pulped to 50% solids with water and placed in the vessel. The pH was brought to 10.5 with lime and 1.0 g/L of NaCN was added. The vessel was agitated on the rolls intermittently (1 minute per hour) at 22 rpm. NaCN, pH and DO were monitored during the test. Intermittent solution samples were removed for Au determined. After the termination of the test, the pulp was filtered and the residue washed well with fresh water. The final leach solution and the residue (by size fraction) were assayed for Au.

Feed: 5,000 g of Master Comp -1/4"

Solution Volume: 5,000 mls

Pulp Density: 50 % solids

Sol'n Composition: 1.0 g/L maintained

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

Grind: "As is"

Reagent Addition (kg/t of cyanide feed)

NaCN: 1.50 CaO: 3.40

Reagent Consumption (kg/t of cyanide feed)

NaCN: 0.55 CaO: 3.40

Time hours	Added, Grams				Residual		Consumed		pH	D.O ₂
	Actual		Equivalent		Grams		Grams			
	NaCN	Ca(OH) ₂	NaCN	CaO	NaCN	CaO	NaCN	CaO		
To add 1.0 g/L	5.06		5.00						9.0	
0 - 4	5.06	1.68	5.00	1.24	2.90		2.11		11.5	9.2
4 - 8	2.13	5.47	2.11	4.05	5.83		-0.83		11.7	8.6
8 - 24	0.00	6.45	0.00	4.77	5.75		0.08		11.9	8.5
24 - 48	0.00	2.32	0.00	1.71	5.32		0.42		11.6	8.4
48 - 72	0.00	0.62	0.00	0.46	5.24		0.08		11.0	8.6
72 - 96	0.00	1.59	0.00	1.18	5.08		0.17		11.1	8.3
96 - 120	0.00	0.92	0.00	0.68	4.81		0.27		11.0	8.1
120 - 144	0.20	1.19	0.20	0.88	4.91		0.10		11.1	8.2
144 - 168	0.10	1.99	0.10	1.47	4.93		0.08		11.3	8.4
168 - 192	0.00	0.53	0.00	0.39	4.70	0.00	0.23	16.84	10.9	8.1

Total	7.49	22.76	7.41	16.84	4.70	0.00	2.70	16.84
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Cyanidation Results:

Product	Amount g, mL	Assays, mg/L	% Distribution
		Au	Au
4 h Pregnant Solution	5,015	2.31	56.3
8 h Pregnant Solution	5,008	2.98	73.1
24 h Pregnant Solution	4,936	3.24	79.0
48 h Pregnant Solution	4,969	3.37	83.5
72 h Pregnant Solution	5,234	3.35	88.1
96h Pregnant Solution	5,139	3.38	88.1
120 h Pregnant Solution	5,062	3.38	87.7
144 h Pregnant Solution	5,069	3.28	86.2
168 h Pregnant Solution	5,021	3.36	88.2
192 h Pregnant Solution	5,177	3.19	87.2
Final Residue	4,955	0.53	12.8
Head (calc.)	4,955	4.15	100.0

Direct Head Assay, g/t
Screen Metallurgy Assay, g/t

SGS Vancouver Metallurgy

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