An Investigation of

THE RECOVERY OF GOLD FROM A SMP PORCUPINE TARGET SAMPLE

prepared for

HELIO RESOURCE CORP/BAFEX TANZANIA LTD.

Project 11940-003 – Final Report
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NOTE:
This report refers to the samples as received.

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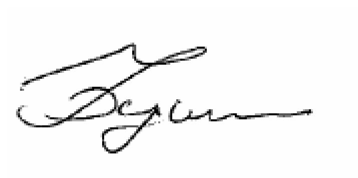
Introduction

This report presents the results from testwork on Helio Resource Corporation's (BAFEX Tanzania) Saza-Makongolosi Project, Porcupine target ore. The project is located in Tanzania. The purpose of the program was to evaluate the processing characteristics of the ore at a scoping level, and to develop a preliminary process flowsheet. The program, similar in scope to the previously completed test program on their Kenge ore, incorporated ore characterization tests (head analysis, mineralogy and comminution tests) as well as the evaluation of a number of processing options, including; gravity separation, flotation and cyanidation.

The test program was directed by Mr. Chris MacKenzie of Helio Resource Corp/BAFEX Tanzania Ltd. Test results were forwarded to Mr. MacKenzie as they became available.

James MacDonald
Project Manager



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Testwork Summary

1. Sample Receipt, Preparation and Characterisation

1.1. Sample Receipt and Preparation

A single composite sample representing Porcupine target sample from the Saza-Makongolosi Project (SMP) was received in two plastic crates at SGS Minerals Services (Lakefield) on April 9, 2009. The crates were assigned receipt number 0098-APR09.

The composite sample was processed as follows:

- The contents of the two crates were combined and labelled as SMP Comp 2.
- The sample was crushed to nominally pass one inch. One ~50-kg charge was riffled out and the remainder was stored at -1 inch.
- The ~50-kg charge was crushed to nominally pass 6 mesh (3.35 mm). One ~10-kg charge was riffled out for standard Bond ball mill work index (BWi) @ 100 mesh (150µm).
- The balance of the sample was crushed to nominally pass 10 mesh (1.7 mm).
- The minus 10 mesh sample was rotary split into 2-kg and 1-kg test charges.
- Two representative 1-kg samples were submitted for screened metallics analysis for gold at +/- 150 mesh. The plus 150 mesh fraction was assayed to extinction and duplicate riffled cuts from the minus 150 mesh fraction were also assayed to extinction.
- An additional 500-g representative sample was submitted for S, S= and ICP scan analysis.

The assay results are shown in Table 1.

1.2. Head Analysis

Screened metallics analysis results are shown in Table 1. Two ~1,000-g tests were completed on the sample. The minus 150 mesh Au, g/t "a" and "b" designations refer to the duplicate riffled (~25 to 30-g) cuts from the minus 150 mesh fraction.

Table 1. Head Analysis, Screened Metallics for Gold

Calculated Head Grade, Au, g/t		+150 Mesh		-150 Mesh			% Au Distribution	
Avg.	Indiv.	% Mass	Au, g/t	% Mass	Au, g/t a	Au, g/t b	+150 Mesh	-150 Mesh
2.35	**2.39**	2.51	10.8	97.5	2.11	2.23	11.4	88.6
	2.32	2.72	6.16	97.3	2.18	2.25	7.2	92.8

Additional head analyses are presented in Table 2.

Table 2. Additional Head Analysis

Element	Assay	Element	Assay
S %	0.50	Mg g/t	3,600
$S^{=}$ %	0.43	Mn g/t	220
Semi-quantitative ICP Scan		Mo g/t	9
Ag g/t	5	Na g/t	18,000
Al g/t	61,000	Ni g/t	< 20
As g/t	<30	P g/t	170
Ba g/t	820	Pb g/t	<30
Be g/t	1.6	Sb g/t	<10
Bi g/t	< 20	Se g/t	< 30
Ca g/t	9,800	Sn g/t	< 20
Cd g/t	<2	Sr g/t	87
Co g/t	<6	Ti g/t	1,800
Cr g/t	47	Tl g/t	< 30
Cu g/t	100	U g/t	< 20
Fe g/t	21,000	V g/t	17
K g/t	34,000	Y g/t	56
Li g/t	<10	Zn g/t	31.1

1.3. Comminution Testwork

Results from the standard Bond ball mill work index test completed on SMP Comp-2 are given in Table 3. The Saza-Makongolosi (Porcupine target) result is plotted against the SGS Grinding Specialists database in Figure 1.

Table 3. Bond Ball Mill Grindability Test Results

Feed (F_{80}), µm	Product (P_{80}), µm	Closing screen µm	BWi	
			Imperial	Metric
2,240	123	150	14.3	**15.7**

With a Bond ball mill work index of 15.7 (metric), the SMP Comp-2 ore falls at the 62nd percentile compared to the database. In terms of ball mill grindability, the material is considered to be moderately hard. Detailed results from this test are presented in the Details of Tests section of this report.

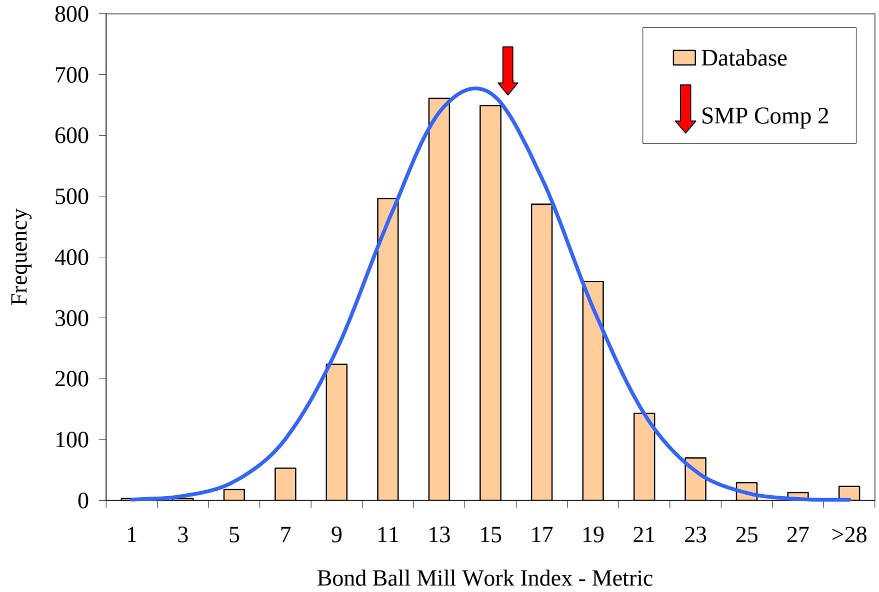

Figure 1. SMP Comp-1 Plotted with SGS Grinding Specialists Database

1.4. Mineralogical Evaluation

A representative portion of SMP Comp-2 was submitted for mineralogical evaluation. The standard "rapid mineral scan" examination package was applied. The -10 mesh sample was submitted for polished section preparation and XRD (X-ray diffraction) analysis. Polished sections were examined using an optical microscope for mineral speciation, grain counting and grain size estimation. Based on the XRD results and optical microscopic data, the abundance, size range, liberation and association of the major minerals were determined, with particular attention being paid to sulphide species. Photomicrographs were taken to illustrate the mineralogical composition, grain size and liberation data.

The investigation indicated that pyrite was the major sulphide present while minor amounts of chalcopyrite, covellite and chalcocite were also noted. The detailed results from the RMS evaluation are contained in Appendix A.

2. Metallurgical Test Program

- The metallurgical test program consisted of:
- Conventional (Lakefield type) gravity separation testing of the whole ore (SMP Comp-2) applying a Knelson MD-3 laboratory concentrator and Mozley C-800 Lab Separator,
- Flotation testing of both whole ore and gravity tailing,
- Conventional cyanidation of whole ore and gravity tailing, and
- Cyanide leaching of the flotation concentrate.

2.1. Gravity Separation Testwork

The potential for gold recovery by gravity separation was evaluated within a grind size range of 105 to 133 µm (P_{80}). The two gravity separation tests were completed using 10-kg of SMP Comp-2. A Knelson MD-3 concentrator was utilised as the primary gravity gold recovery unit. The Knelson concentrate was recovered and further upgraded by treatment on a Mozley mineral separator. Approximately 0.1% mass was targeted as the Mozley concentrate. The gravity concentrate was assayed to extinction for gold.

The Knelson and Mozley tailings were recombined, blended and divided into representative 1-kg (dry equivalent) charges for downstream flotation and cyanidation testwork. Gravity separation results are given in Table 4.

Table 4. Gravity Separation Test Results

Test No.	Feed Size P_{80}, µm	Tests on Grav. Tail.	Product	Mass %	Assays Au, g/t	% Distribution Au
G-1	133	F1-F3 CN4-CN6 and CIL1	Mozley Concentrate	0.090	426	16.8
			Combined Tailing	99.9	1.90	83.2
			Head (Calculated)	100.0	2.28	100.0
G-2	105	F8	Mozley Concentrate	0.159	312	22.0
			Combined Tailing	99.8	1.76	78.0
			Head (Calculated)	100.0	2.25	100.0
			Head (Direct)		**2.35**	

Note that Test G-2 was completed primarily for the purpose of generating flotation concentrate (in Test F-8) for subsequent cyanidation testwork. The finer feed size selected for that test (105 µm) was based on indications that flotation gold recovery was maximised at a slightly finer grind.

In both cases the combined gravity tailing was not assayed directly. The gold assays indicated for the tailings in Table 4 are the average calculated heads from the several tests subsequently completed on the combined gravity tailing product.

Gold recovery in both gravity separation tests was quite good ranging from ~17 to 22%. It is very likely that the SMP ore process will include a gravity recovery circuit of some sort.

2.2. Flotation Testwork

Flotation testwork was conducted on the gravity separation tailing generated in Tests G-1 and G-2 and on the SMP Comp-2 whole ore.

Three rougher kinetics tests were conducted on the gravity separation tailing generated in Test G-1 in order to evaluate the effect of primary grind size on flotation response. A standard set of bulk sulphide collectors, consisting of xanthate (PAX) and a dithiophosphate (Cytec 208) was applied. The conditions indicated in Table 5 were applied in all flotation tests completed within the scope of this program.

Table 5. Flotation Test Conditions

Stage	Reagents added, g/t			Time, minutes			pH
					Froth		
	PAX	R208	MIBC	Cond.	Ind.	Cum.	
Grind							
Rougher 1	15	10	12.5	2	3	3	8.0
Rougher 2	15	10	10	1	4	7	
Rougher 3	10	5	5	1	4	11	
Rougher 4	10	5	5	1	4	15	
Rougher 5	10	5	5	1	4	19	
Rougher 6	10	5	5	1	4	23	8.0
Total	**70**	**40**	**42.5**	**7**	**23**		

Stage	Rougher
Flotation Cell	2000 g D-1
Speed: r.p.m.	1800

The gravity tailing flotation results are given in Table 6.

Three flotation tests were completed on whole ore at similar grind sizes as tested in the gravity tailing flotation testwork. Whole Ore test results are contained in Table 7. The flotation results from both sets of tests are graphically compared in Figure 2.

The response to flotation in both test series was excellent. Overall gold recoveries (gravity + flotation) ranged from 91.6% at P_{80} = 133 µm (F-1) to ~93% at P_{80} = 111 µm. Finer grinding did not significantly improve gold recovery.

In the whole ore flotation tests, gold recovery ranged from ~92.3 % at P_{80} = 193 in Test F-5 to ~92.8% at P_{80} = 144 µm in Test F-6. Finer grinding, to P_{80} = 61 µm, appears to have resulted in a slight improvement in gold recovery (to 94.8% in Test F-7). In light of the very high calculated gold head grade in that test however, and the similarity in final tailing grades comparing Tests F-6 and F-7, there may in fact be no significant increase in gold recovery with finer grinding.

In the whole ore test, F-4, completed at a rather coarse 256 µm P_{80}, somewhat less satisfactory results were achieved. It is likely that the metallurgically optimum grind size is finer than 133 µm (P_{80}).

Table 6. Gravity Tailing Flotation Results

Feed =	Flot Test No.	Feed Size, P_{80}, µm	Product (cumulative)	Mass %	Assays, g/t, %		% Distribution		
					Au	$S^=$	Au Flot	Au Grav + Flot	$S^=$
Gravity Tailing (Test G-1)	F-1	133	*Gravity Concentrate*	*0.090*				*16.9*	
			Rougher Conc. 3 min.	2.21	61.8	23.0	74.6	78.9	90.6
			Rougher Conc. 7 min.	4.78	32.9	10.8	85.6	88.0	91.5
			Rougher Conc. 11 min.	6.24	25.7	8.26	87.5	89.6	91.7
			Rougher Conc. 15 min.	7.35	22.1	7.02	88.5	90.4	91.8
			Rougher Conc. 19 min.	8.32	19.7	6.21	89.2	91.0	91.8
			Rougher Conc. 23 min.	9.34	17.7	5.54	89.9	**91.6**	91.9
			Rougher Tail.	90.7	0.21	< 0.05	10.1		8.06
			Head (calc.)	100.0	1.84	0.56	100.0		100.0
	F-2	111	*Gravity Concentrate*	*0.090*				*16.9*	
			Rougher Conc. 3 min.	2.31	64.6	20.7	80.3	83.6	89.5
			Rougher Conc. 7 min.	4.91	33.2	9.93	87.8	89.9	91.1
			Rougher Conc. 11 min.	6.64	25.1	7.35	89.5	91.3	91.3
			Rougher Conc. 15 min.	7.93	21.2	6.16	90.4	92.0	91.4
			Rougher Conc. 19 min.	9.28	18.2	5.27	91.0	92.5	91.5
			Rougher Conc. 23 min.	10.3	16.4	4.74	91.3	**92.8**	91.6
			Rougher Tail.	89.7	0.18	< 0.05	8.69		8.39
			Head (calc.)	100.0	1.86	0.53	100.0		100.0
	F-3	89	*Gravity Concentrate*	*0.090*				*16.9*	
			Rougher Conc. 3 min.	2.99	52.6	15.6	83.4	86.2	89.3
			Rougher Conc. 7 min.	5.80	28.8	8.18	88.8	90.7	91.0
			Rougher Conc. 11 min.	8.09	21.0	5.88	90.2	91.9	91.2
			Rougher Conc. 15 min.	9.94	17.2	4.79	91.0	92.5	91.4
			Rougher Conc. 19 min.	11.5	15.0	4.16	91.5	92.9	91.5
			Rougher Conc. 23 min.	12.9	13.4	3.71	91.9	**93.3**	91.6
			Rougher Tail.	87.1	0.18	< 0.05	8.10		8.35
			Head (calc.)	100.0	1.88	0.52	100.0		100.0
Gravity Tailing (Test G-2)	F-8	105	*Gravity Concentrate*	*0.159*				*22.4*	
			Rougher Conc. 36 min.	11.3	14.0	4.05	91.5	**93.4**	91.2
			Rougher Tail.	88.7	0.17	< 0.05	8.49		8.85
			Head (calc.)	100.0	1.72	0.50	100.0		

Sulphide recovery was very consistent in all tests. Gold recovery, while obviously tied very closely to sulphide recovery, did vary somewhat with mass pull. The data illustrated in Figure 2 appear to reveal a clear trend indicating that mass pull played a more significant role in gold recovery than grind size.

Table 7. Whole Ore Flotation Results

Flot Test No.	Feed Size, P_{80}, µm	Product (cumulative)		Mass %	Assays, g/t, %		% Distribution	
					Au	$S^=$	Au	$S^=$
F-4	256	Rougher Conc.	3 min.	2.55	77.0	19.6	80.5	89.8
		Rougher Conc.	7 min.	5.11	41.7	10.0	87.2	91.4
		Rougher Conc.	11 min.	6.69	32.4	7.63	88.7	91.6
		Rougher Conc.	15 min.	8.02	27.2	6.38	89.5	91.7
		Rougher Conc.	19 min.	9.34	23.5	5.48	90.0	91.9
		Rougher Conc.	23 min.	10.4	21.2	4.91	**90.5**	92.0
		Rougher Tail.		89.6	0.26	< 0.05	9.54	8.04
		Head (calc.)		100.0	2.44	0.56	100.0	100.0
F-5	193	Rougher Conc.	3 min.	2.45	80.7	20.7	83.7	90.1
		Rougher Conc.	7 min.	5.42	38.8	9.49	89.2	91.5
		Rougher Conc.	11 min.	7.35	29.1	7.01	90.7	91.8
		Rougher Conc.	15 min.	8.85	24.3	5.83	91.4	91.9
		Rougher Conc.	19 min.	10.1	21.5	5.13	91.8	92.0
		Rougher Conc.	23 min.	11.6	18.8	4.47	**92.3**	92.1
		Rougher Tail.		88.4	0.21	< 0.05	7.69	7.87
		Head (calc.)		100.0	2.36	0.56	100.0	100.0
F-6	144	Rougher Conc.	3 min.	2.69	67.3	18.3	80.1	89.0
		Rougher Conc.	7 min.	5.32	37.6	9.50	88.4	91.3
		Rougher Conc.	11 min.	7.22	28.3	7.02	90.3	91.6
		Rougher Conc.	15 min.	8.92	23.2	5.69	91.5	91.8
		Rougher Conc.	19 min.	10.6	19.7	4.80	92.5	91.9
		Rougher Conc.	23 min.	12.1	17.4	4.22	**92.8**	92.1
		Rougher Tail.		87.9	0.19	< 0.05	7.20	7.95
		Head (calc.)		100.0	2.26	0.55	100.0	100.0
F-7	61	Rougher Conc.	3 min.	3.11	72.3	15.8	86.4	89.9
		Rougher Conc.	7 min.	7.64	31.4	6.56	91.9	91.6
		Rougher Conc.	11 min.	10.53	23.1	4.77	93.3	91.8
		Rougher Conc.	15 min.	12.76	19.2	3.95	93.9	92.0
		Rougher Conc.	19 min.	15.7	15.7	3.22	94.5	92.3
		Rougher Conc.	23 min.	17.2	14.3	2.94	**94.8**	92.4
		Rougher Tail.		82.8	0.17	< 0.05	5.24	7.56
		Head (calc.)		100.0	2.61	0.55	100.0	100.0

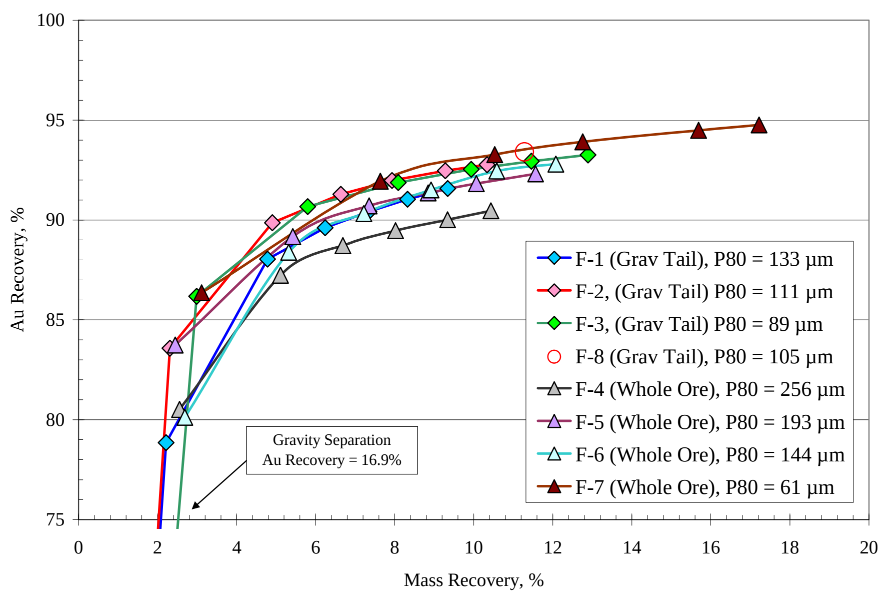

Figure 2. Flotation Results, Gravity Separation Tailing versus Whole Ore

While the general similarity of the two sets of flotation data (Gravity Tailing versus Whole Ore) may seem to imply that whole ore flotation could be pursued, the high proportion of gravity recoverable gold already identified in the SMP Comp-2 ore clearly indicate that it would be prudent to include gravity separation in the flowsheet designed to process this material.

2.3. Cyanidation Testwork

2.3.1. Gravity Tailing and Whole Ore Testwork

Tests were completed on gravity tailing and whole ore samples to evaluate the effect of grind size. The grind size range evaluated was from ~150 µm to ~75 µm (P_{80}'s). The standard bottle roll test conditions applied were:

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

Pulps were preconditioned for 1 hour with injected air (at leach pH) to ensure that dissolved oxygen levels were in the 6-8 mg/L O_2 range.

Applying the same conditions as indicated above, a single carbon-in-leach (CIL) test was completed on a gravity tailing sample. The test was completed at the grind size indicated as optimal in the initial grind series tests. All whole ore and gravity tailing cyanidation test results are presented in Table 8.

Table 8. Gravity Tailing and Whole Ore Cyanidation Results

Feed	Test No.	Feed Size P_{80}, µm	Reag. Consumption kg/t of CN Feed		% Au Extraction/Recovery				Residue Au, g/t	Head (Calc) Au, g/t	
			NaCN	CaO	5 h	24 h	48 h	O'all Grav + CN		CN	O'all Grav + CN
Whole Ore	CN-1	406	0.11	0.28	52.0	67.7	***70.3***	--	0.69	2.31	
	CN-2	294	0.19	0.25	52.9	66.6	***73.6***	--	0.62	2.33	
	CN-3	129	0.61	0.25	42.0	81.1	***86.3***	--	0.40	2.91	
	CN-7	75	0.39	0.28	65.9	88.4	***88.9***	--	0.26	2.29	
Test G1 Gravity Tailing	CN-4	174	0.07	0.21	61.2	73.3	78.4	***82.0***	0.42	1.94	2.28
	CN-5	108	0.26	0.24	62.7	79.9	84.9	***87.5***	0.30	1.99	
	CN-6	79	0.62	0.20	55.2	80.3	86.9	***89.1***	0.26	1.99	
	CIL-1	71	0.19	0.12	--	--	87.0	***89.2***	0.23	1.77	

Generally speaking, overall gold recoveries were slightly higher in the tests completed on the gravity tailing than in the tests completed on the whole ore. There appeared to be a positive correlation between finer grinding and increased gold extraction (and improved extraction kinetics) in both test series.

There was no additional gold recovery/extraction realised in the single CIL test completed on the gravity tailing (compare Tests CN-6 to CIL-1). This indicates that there is no potential preg robbing.

Cyanide consumptions ranged from 0.11 to 0.62-kg/t in the direct cyanidation tests and 0.19-kg/t in the single CIL test. This sample (Porcupine target) appears to consume more cyanide compared with previous testwork completed on SMP Comp 1. Further testwork is required to clarify this relationship.

2.3.2. Flotation Concentrate Cyanidation

Two tests were completed on the flotation concentrate generated in Test G-2/F-8 for the purpose of evaluating the impact of regrinding on gold extraction. One test was completed on the flotation concentrate "as-is" and the second, reground to 12 µm (P_{80}).

Test conditions applied in both cases were as follows:

Pulp Density	=	20% solids (w/w)
pH	=	10.5 -11 (maintained with lime)
Cyanide Concentration	=	20 g/L NaCN (maintained)
Dissolved Oxygen	=	~20 mg/L (maintained with periodic additions of hydrogen peroxide)
Retention Time	=	24h, with pregnant solution sub-samples submitted for Au analysis at 2, 6 and 24 hours.

At the termination of the tests the pulps were filtered and washed well with fresh water. Filter cakes were submitted for duplicate gold assays and size analysis. Results from these tests are summarised in Table 9.

Table 9. Intensive Cyanidation Testwork, Test F-8 Rougher Concentrate

Test No.	Feed Size P_{80}, µm	Reag. Consumption kg/t of CN Feed		% Au Extraction/Recovery				Residue Au, g/t	Head (calc) Au, g/t
		NaCN	CaO	2 h	6 h	24 h	O'all Grav+ Flot		
CN-8	21	44.85	0.06	80	76	**86.2**	***83.6***	1.97	14.3
CN-9	12	25.7	0.67	--	99	**97.8**	***91.9***	0.32	14.3

O'all Au Rec'ry,% = Grav Rec'ry (%) + (100 - Grav Rec'ry (%)) x Ro Flot. Rec'ry (%) x Flot Conc CN Extrac (%)

Based on the leach test unit extractions, there was a definite advantage to regrinding the flotation concentrate prior to cyanidation. Cyanide consumption, while very high, are fairly typical of this sort of process. If future testwork is undertaken along the same lines (i.e., flotation concentrate cyanidation), we would recommend that significantly lower cyanide levels be tested and that the flowsheet in general, reflect a more conventional concentrate leach approach.

2.4. Overall Metallurgical Results

The metallurgical response of the SMP Comp-2 (Porcupine target) material was quite positive on all fronts evaluated within the scope of this program. The overall (optimum) circuit responses of the ore to the various flowsheets evaluated in the program are compared in Figure 3.

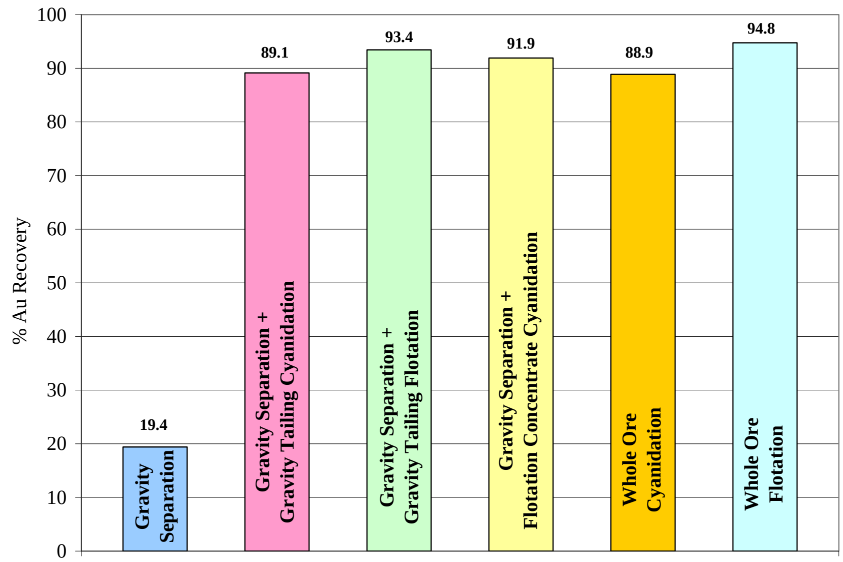

Figure 3. Comparison of Overall Flowsheet Gold Recoveries

Considering this quite successful round of tests completed on the SMP Comp-2 material, further metallurgical testwork is clearly warranted. We recommend that the next steps toward a robust metallurgical process flowsheet should focus on the gravity separation + gravity tailing flotation + flotation concentrate cyanidation flowsheet. Specific flowsheet parameters that require further investigation are:

- Optimum (or maximum) flotation feed size. The testwork to date indicates that it is likely in the ~75 to ~100 µm range.
- Flotation flowsheet configuration. Given the rather high mass pulls observed in this program (in the ~10 to ~ 17% range) it may be worthwhile investigating a simple flotation cleaner circuit. A brief evaluation of the requirement (or effects) of rougher concentrate regrinding prior to cleaning should be encompassed in the study.
- Conventional flotation concentrate cyanidation protocols should be investigated.

3. Preliminary Environmental Testwork

Samples of final tailing products were subjected to a preliminary environmental evaluation. A sample of Test CN-6 final tailing solids was submitted for acid-base accounting (ABA) and net acid generation

(NAG) tests. Final leach solution from the same test was submitted for broad spectrum (ICP) scan analysis. The purpose of these tests was to expose potentially significant environmental issues at an early stage of the Saza-Makongolosi project. Tests results are presented in Tables 10 (ABA), 11 (NAG) and 12 (solution analysis).

Table 10. Acid-Base Accounting Test Results

Parameter		Test CN-6 Final Tailing Solids
Paste pH	units	8.94
Final pH	units	1.62
NP	t $CaCO_3$/1000t	29.0
AP	t $CaCO_3$/1000 t	12.6
Net NP	t $CaCO_3$/1000 t	16.4
NP/AP	**ratio**	**2.3**
S	%	0.53
$S^=$	%	0.40
SO_4	%	0.13
$C_{(T)}$	%	0.45
CO_3	%	1.50

Table 11. Net Acid Generation Test Results

Parameter		Test CN-6 Final Tailing Solids
Sample	weight (g)	1.51
H_2O_2	mL	150
Final pH	units	7.4
NaOH	Normality	0.1
NaOH to pH = 4.5	mL	0.0
NaOH to pH = 7.0	mL	0.0
NAG (kg H_2SO_4/tonne)	@ **pH = 4.5**	**0.0**
	@ **pH = 7.0**	**0.0**

Generally speaking, samples with NP/AP ratios >3 are considered to be non-acid generating. Samples with NP/AP ratios between 1 and 3 may be acid generating while samples with ratios of <1 are very likely to be acid generating.

Based on the data presented in Tables 10 and 11, it seems unlikely that SMP Comp-1 final tailing solids will generate acid.

Table 12. Final Tailing Solution Analysis

Parameter		Assays Test CN-6 Final Solution	Parameter		Assays Test CN-6 Final Solution
Ag	mg/L	2.4	Mo	mg/L	0.1
Al	mg/L	0.6	Na	mg/L	370
As	mg/L	< 0.3	Ni	mg/L	0.6
Ba	mg/L	0.1	P	mg/L	< 5
Be	mg/L	< 0.002	Pb	mg/L	< 0.01
Bi	mg/L	< 0.02	Sb	mg/L	< 0.02
Ca	mg/L	12	Se	mg/L	< 0.3
Cd	mg/L	< 0.005	Sn	mg/L	< 0.05
Co	mg/L	0.03	Sr	mg/L	0.07
Cr	mg/L	< 0.1	Ti	mg/L	< 0.02
Cu	mg/L	4.8	Tl	mg/L	< 0.01
Fe	mg/L	85	U	mg/L	< 0.01
K	mg/L	13	V	mg/L	< 0.2
Li	mg/L	< 0.2	W	mg/L	< 0.01
Mg	mg/L	0.07	Y	mg/L	< 0.005
Mn	mg/L	< 0.04	Zn	mg/L	0.6

Conclusions and Recommendations

The testwork completed on the SMP Comp-2 (Porcupine target) ore indicated the following:

Ore Characterisation

- The ore's head grade was 2.35 g/t Au with 0.43% $S^{=}$.
- At 15.7 (metric), the Bond ball mill work index is considered to be moderately hard in terms of grindability.

Metallurgical Testing

- A simple, low mass yield, gravity circuit (Knelson) would likely yield gold recoveries in the 20% range. Full GRG testing would be required to gain an understanding of gold liberation relative to grind size.
- Flotation, at grind sizes ranging from ~193 µm to ~60 µm, gave good gold recovery in the seven tests conducted (on gravity tailing and whole ore). Gold recovery by gravity separation + rougher flotation ranged from ~92.3% to ~94.8%. Further development of the flotation option, including optimising primary grind size, an analysis of rougher concentrate cleaning and the impact of regrinding on cleaner circuit grade and recovery, is clearly warranted.
- The cyanidation of gravity separation tailing yielded a good response with approximately 89.1% of the gold being recovered in the gravity + cyanidation flowsheet at ~79 µm. Additional testwork will be required to elaborate on the effect of grind size on cyanidation gold extraction.
- A comparison of direct cyanidation and carbon-in-leach cyanidation indicated no preg robbing activity.
- The cyanidation of whole ore yielded a good response as well, with 88.9% of the gold being recovered (extracted) at P_{80} = 75 µm. Given the relatively high proportion of gravity recoverable gold in this material, we advise that gravity separation should be included in the flowsheet designed for treatment of the SMP Comp-1 ore.
- An intensive cyanidation test completed on flotation concentrate yielded a unit gold extraction of 97.8% when the flotation concentrate was reground to 12 µm (P_{80}). Gravity + flotation concentrate cyanidation = 91.9% gold extraction. We recommend further testwork to evaluate a more conventional concentrate cyanidation approach.

Environmental

- Testwork completed in this phase of the program indicates very low potential for acid mine drainage.

Details of Tests

Appendix A

Rapid Mineral Scan Report