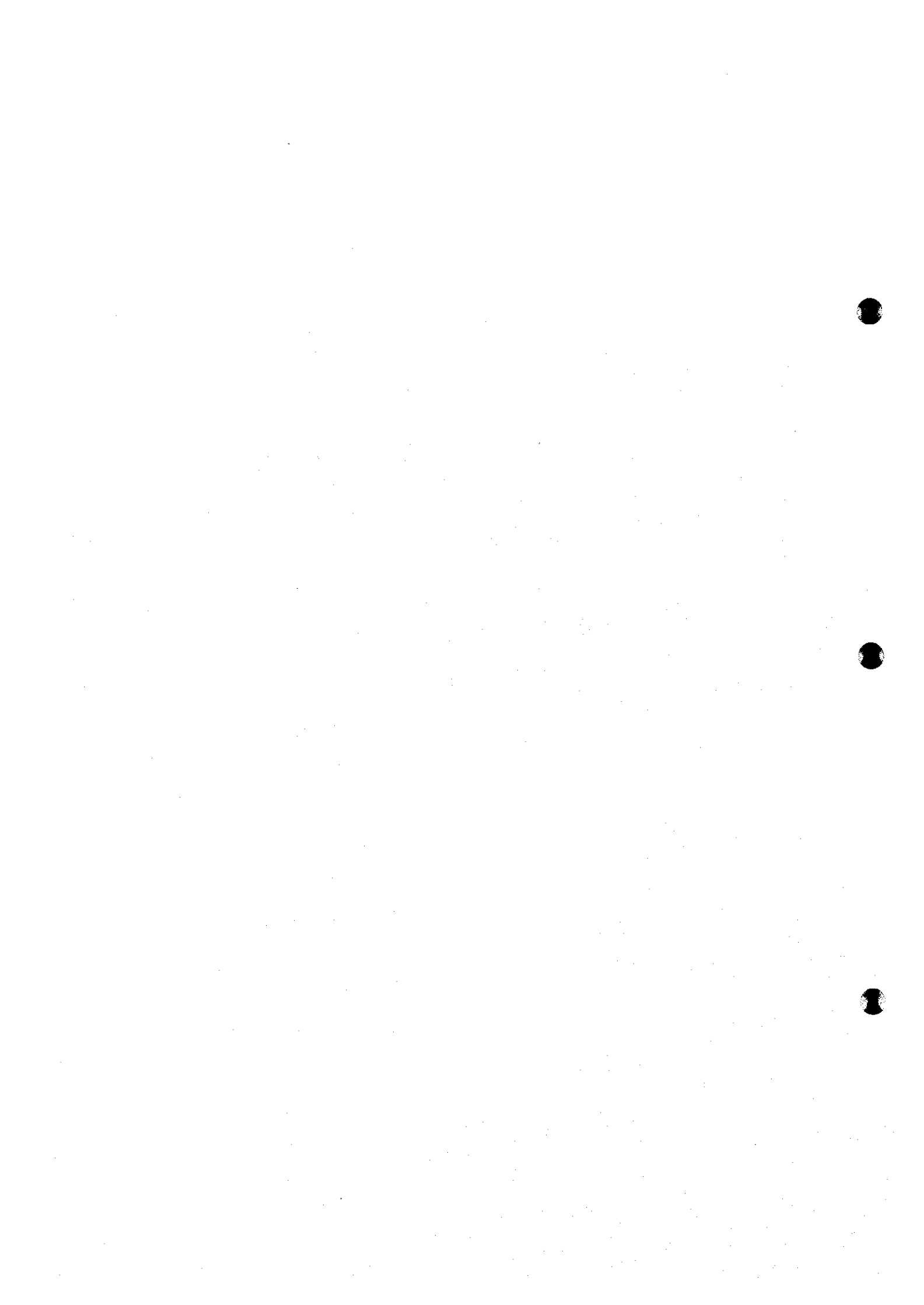


Appendix 8

Basic data of metallurgical tests



Appendix 8A

Head assays



HEAD ASSAYS

Element	Unit	Rakah S/W	Hayl as Safil S/W	Rakah MS	Bishara Breccia
Au 1	ppm	0.46	0.13	3.74	1.06
Au 2	ppm	0.43	0.19	3.81	---
Cu	%	1.15	0.915	1.82	1.45
Ag	ppm	<2	<2	9	3
Pb	%	<0.005	0.010	0.010	0.020
Zn	%	0.125	0.155	0.055	0.680
Fe	%	16.0	11.1	33.0	29.5
As	ppm	100	<50	1450	300
S	%	3.35	7.40	39.0	28.3
S ⁻	%	3.30	7.4	38.8	28.1
Bi	ppm	1.4	0.3	3.9	2.6
Cd	ppm	2.7	3.7	0.8	7.5
Co	ppm	75	84	175	230
Cs	ppm	<0.1	<0.1	<0.1	0.5
Ga	ppm	14	8.5	0.5	13
In	ppm	0.6	0.25	0.7	1.00
Mo	ppm	0.7	5	3.8	3.5
Ni	ppm	185	27	125	65
Rb	ppm	0.1	<0.1	0.2	7.0
Se	ppm	25	25	38.5	16.0
Te	ppm	0.8	1.2	18	1.5
Th	ppm	0.03	0.24	3.6	12.0
Tl	ppm	0.4	0.1	3.5	9.5
U	ppm	0.11	0.65	0.25	0.81
Y	ppm	4.5	3.3	0.3	7.0
Sb	ppm	<50	<4	67	<50



Appendix 8B

Ball mill work index



BOND BALL MILL WORK INDEX

Sample Tested		RAKAH STOCKWORK			
BOND BALL MILL WORK INDEX					
		19.1	kWh/tonne		
		17.3	kWh/short ton		
GRINDABILITY REPORT					
Weight of Feed in Mill, g		1208.1	Averages for last 2 grinding stages		
Volume of Feed in Mill, ml		700	Grindability, g/rev		0.97
			Circulating Load, %		252
Feed 80% passing, μm		2415			
Product 80% passing, μm		82	Product Screen Aperture, μm		106
GRINDING STAGE DATA					
Grinding Stage	Mill Revolutions	Gross Product Wt, g	Net Product, g	Grindability g/rev	Circulating Load, %
1	290	343.9	267.3	0.92	251
2	351	334.2	312.4	0.89	261
3	364	387.9	366.7	1.01	211
4	318	345.0	320.4	1.01	250
5	321	334.0	312.1	0.97	262
6	333	338.7	317.5	0.95	257
7	340	355.9	334.4	0.98	239
8	328	342.4	319.8	0.98	253
9	332	343.8	322.1	0.97	251
10					
FEED and PRODUCT SIZINGS					
Screen Aperture, mm	Cumulative Wt % Passing		Screen Aperture, mm	Cumulative Wt % Passing	
	Feed			Product	
2.800	91.3		0.090	84.4	
2.360	77.4		0.075	74.6	
2.000	65.0		0.063	66.5	
1.700	55.5		0.053	58.1	
1.400	46.0		0.045	53.6	
1.180	40.7		0.038	46.0	
0.850	29.7				
0.600	22.3				
0.300	13.3				
0.150	7.9				
0.125	6.9				
0.106	6.3				
Printed 22/02/01			Comments		
Job No. NI08FLOO					
Technician DS					
Test Date 21.11.00					
File ref BMW108B					
<i>Version 5</i>					

BOND BALL MILL WORK INDEX

Sample Tested		HAYL AS SAFIL STOCKWORK			
BOND BALL MILL WORK INDEX					
		16.2	kWh/tonne		
		14.7	kWh/short ton		
GRINDABILITY REPORT					
Weight of Feed in Mill, g	1339.8	Averages for last 2 grinding stages			
Volume of Feed in Mill, ml	700	Grindability, g/rev		1.23	
		Circulating Load, %		253	
Feed 80% passing, μm	2167				
Product 80% passing, μm	84	Product Screen Aperture, μm		106	
GRINDING STAGE DATA					
Grinding Stage	Mill Revolutions	Gross Product Wt, g	Net Product, g	Grindability g/rev	Circulating Load, %
1	250	432.9	280.6	1.12	209
2	297	403.2	354.0	1.19	232
3	283	329.5	283.7	1.00	307
4	345	432.7	395.2	1.15	210
5	291	414.2	365.0	1.25	223
6	268	377.7	330.6	1.23	255
7	275	382.0	339.1	1.23	251
8					
9					
10					
FEED and PRODUCT SIZINGS					
Screen Aperture, mm	Cumulative Wt % Passing		Screen Aperture, mm	Cumulative Wt % Passing	
	Feed		Product		
2.800	94.2		0.090	83.5	
2.360	84.5		0.075	72.1	
2.000	74.7		0.063	62.7	
1.700	66.8		0.053	53.2	
1.400	58.1		0.045	48.5	
1.180	52.7		0.038	40.1	
0.850	41.8				
0.600	33.7				
0.300	22.5				
0.150	14.3				
0.125	12.6				
0.106	11.4				
Printed	22/02/01		Comments		
Job No.	N108FLOO				
Technician	DS				
Test Date	21.11.00				
File ref	BMW108A				
Version 5					

BOND BALL MILL WORK INDEX

Sample Tested		RAKAH MASSIVE SULPHIDE			
BOND BALL MILL WORK INDEX					
		14.2	kWh/tonne		
		12.9	kWh/short ton		
GRINDABILITY REPORT					
Weight of Feed in Mill, g	1587.9	Averages for last 2 grinding stages			
Volume of Feed in Mill, ml	700	Grindability, g/rev		1.44	
		Circulating Load, %		253	
Feed 80% passing, μm	2214				
Product 80% passing, μm	85	Product Screen Aperture, μm		106	
GRINDING STAGE DATA					
Grinding Stage	Mill Revolutions	Gross Product Wt, g	Net Product, g	Grindability g/rev	Circulating Load, %
1	200	606.7	345.8	1.73	162
2	205	431.2	331.5	1.62	268
3	237	420.1	349.3	1.47	278
4	261	445.8	376.8	1.44	256
5	264	453.8	380.6	1.44	250
6					
7					
8					
9					
10					
FEED and PRODUCT SIZINGS					
Screen Aperture, mm	Cumulative Wt % Passing		Screen Aperture, mm	Cumulative Wt % Passing	
	Feed			Product	
2.800	93.9		0.090	83.3	
2.360	83.3		0.075	71.1	
2.000	73.5		0.063	61.5	
1.700	66.4		0.053	52.1	
1.400	59.1		0.045	47.3	
1.180	54.8		0.038	38.3	
0.850	45.8				
0.600	38.7				
0.300	28.1				
0.150	19.6				
0.125	17.6				
0.106	16.4				
Printed 28/11/00 Job No. N108FLOO Technician T.E Test Date 23/11/00 File ref BMW108C			Comments 		
Version 5					

BOND BALL MILL WORK INDEX

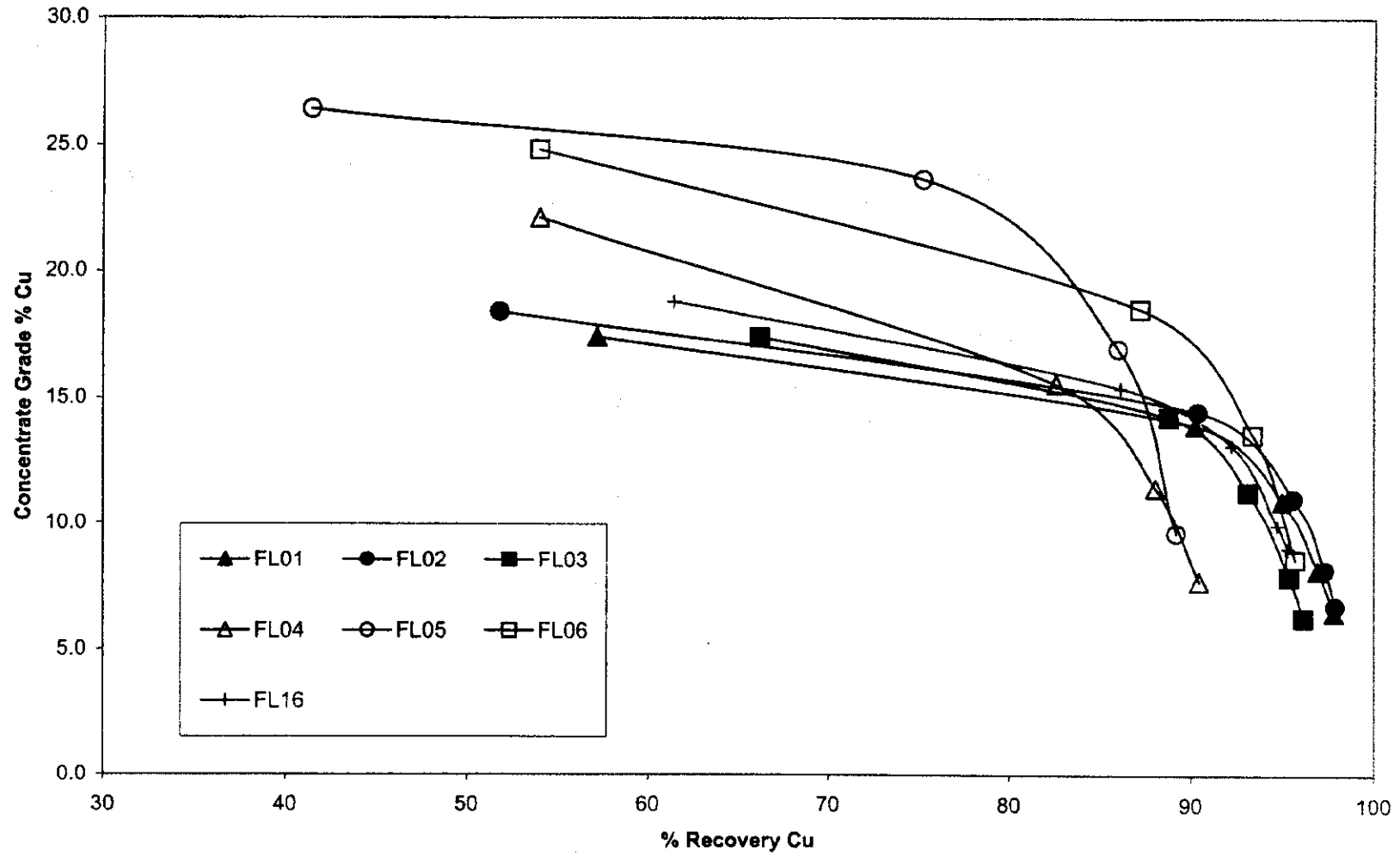
Sample Tested		BISHARA BRECCIA			
BOND BALL MILL WORK INDEX					
		15.5	kWh/tonne		
		14.1	kWh/short ton		
GRINDABILITY REPORT					
Weight of Feed in Mill, g	1481.1	Averages for last 2 grinding stages			
Volume of Feed in Mill, ml	700	Grindability, g/rev		1.23	
		Circulating Load, %		247	
Feed 80% passing, μm	2405				
Product 80% passing, μm	80	Product Screen Aperture, μm		106	
GRINDING STAGE DATA					
Grinding Stage	Mill Revolutions	Gross Product Wt, g	Net Product, g	Grindability g/rev	Circulating Load, %
1	250	387.9	250.0	1.00	282
2	387	447.9	411.8	1.06	231
3	359	457.3	415.6	1.16	224
4	329	441.1	398.5	1.21	236
5	316	430.0	388.9	1.23	244
6	312	422.9	382.9	1.23	250
7					
8					
9					
10					
FEED and PRODUCT SIZINGS					
Screen Aperture, mm	Cumulative Wt % Passing		Screen Aperture, mm	Cumulative Wt % Passing	
	Feed			Product	
2.800	90.5		0.090	86.5	
2.360	78.1		0.075	75.1	
2.000	68.4		0.063	67.2	
1.700	60.6		0.053	58.4	
1.400	51.3		0.045	53.7	
1.180	46.8		0.038	45.3	
0.850	35.8				
0.600	27.9				
0.300	17.7				
0.150	11.4				
0.125	10.1				
0.106	9.3				
Printed	30/11/00		Comments		
Job No.	N108FL00				
Technician	DS				
Test Date	27.11.00				
File ref	BMW108D				
Version 5					

Appendix 8C

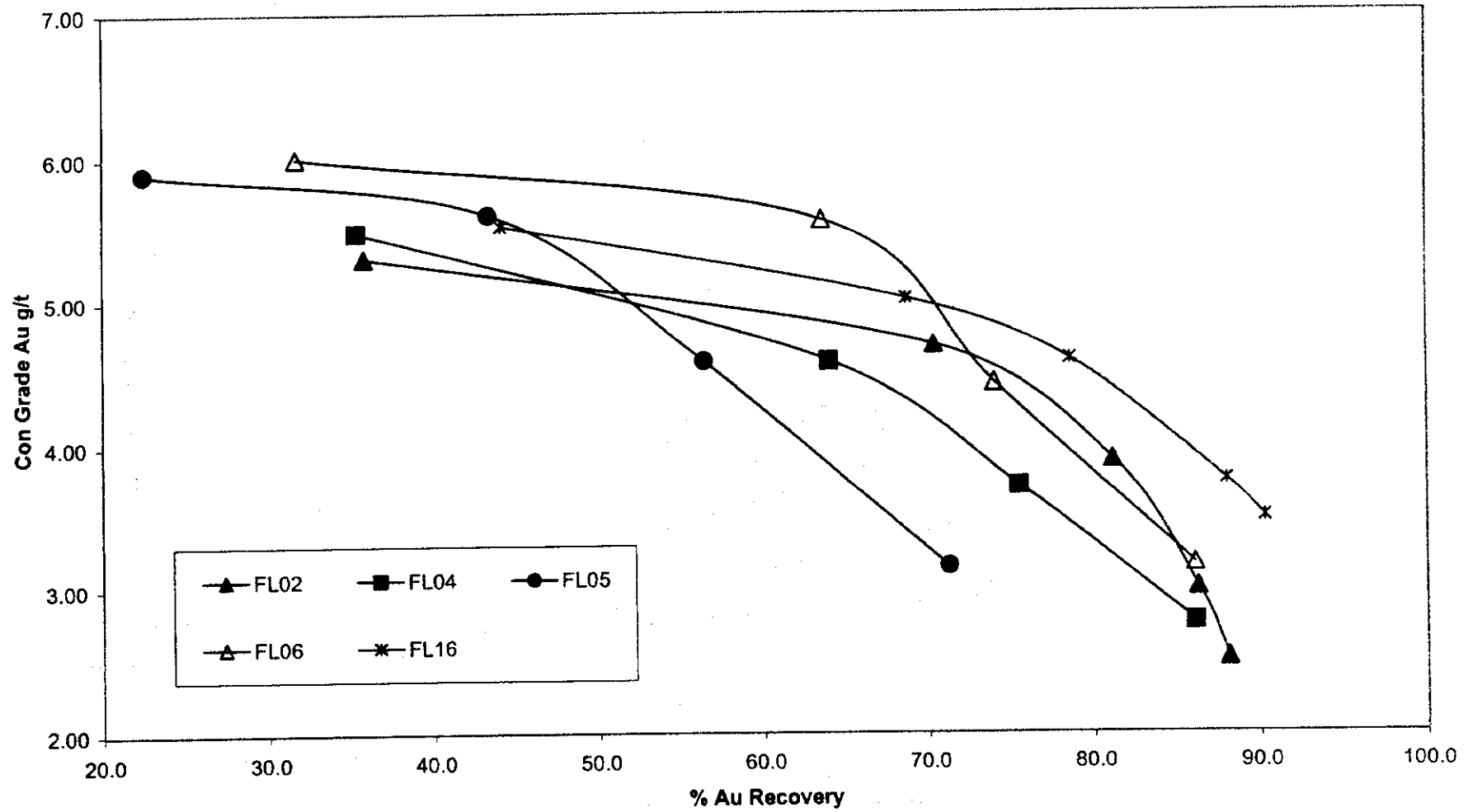
Batch flotation tests



Rakah Stockwork Cu Grade vs Recovery

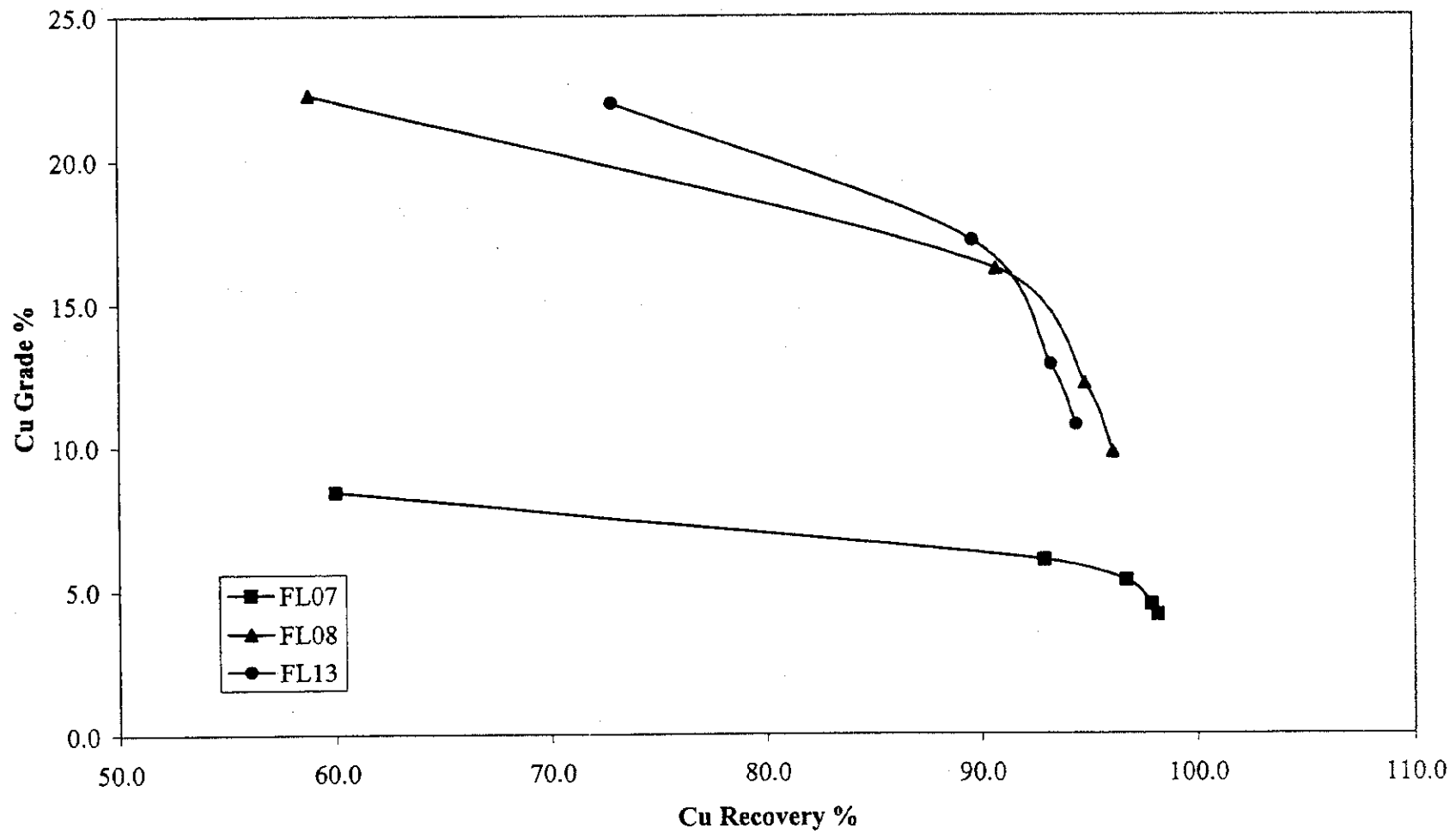


Rakah Stockwork Au Grade vs Recovery

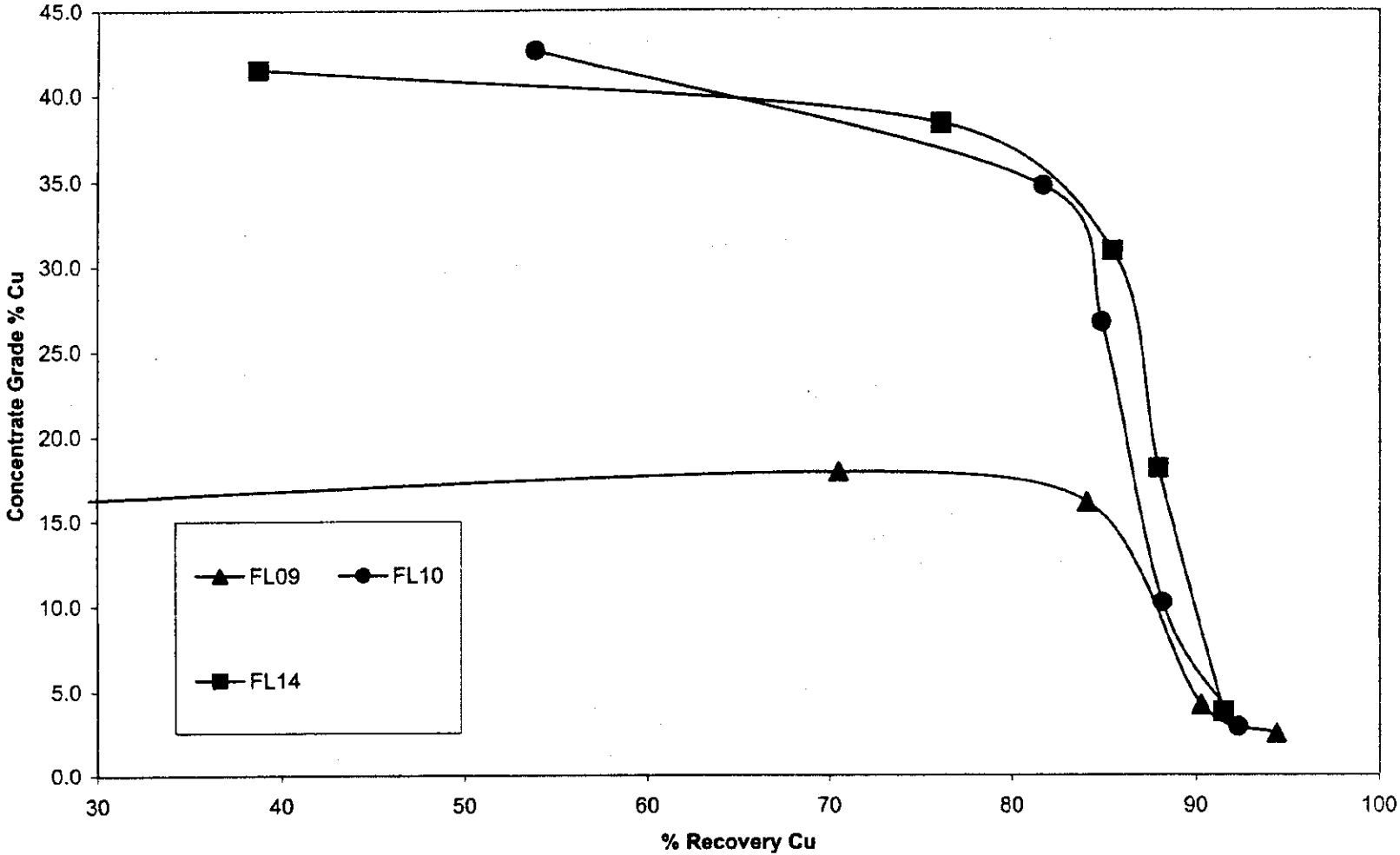


A-112

Hayl As Safil - Cu Grade vs Recovery

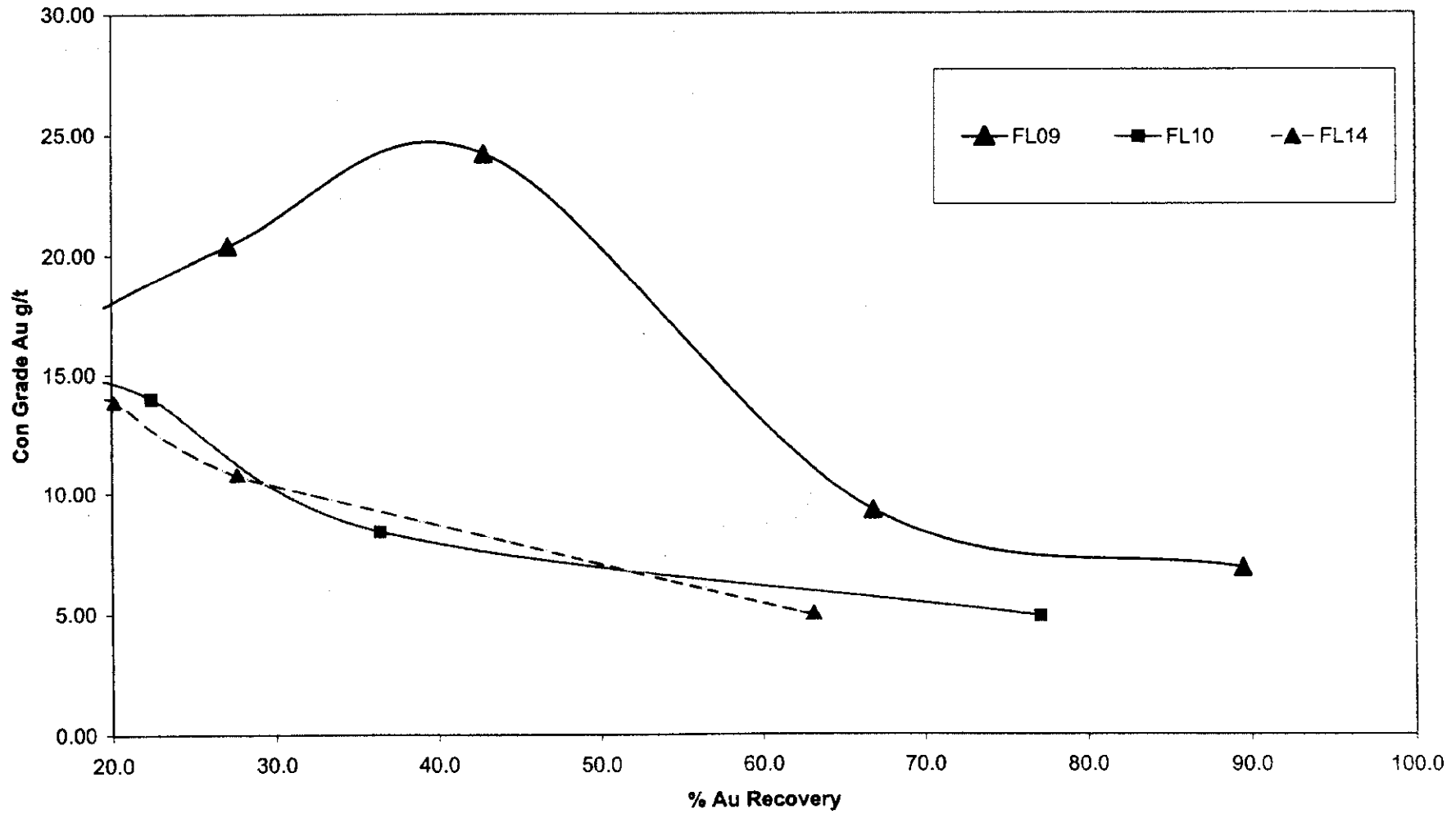


Rakah Massive Sulphide Cu Grade vs Recovery

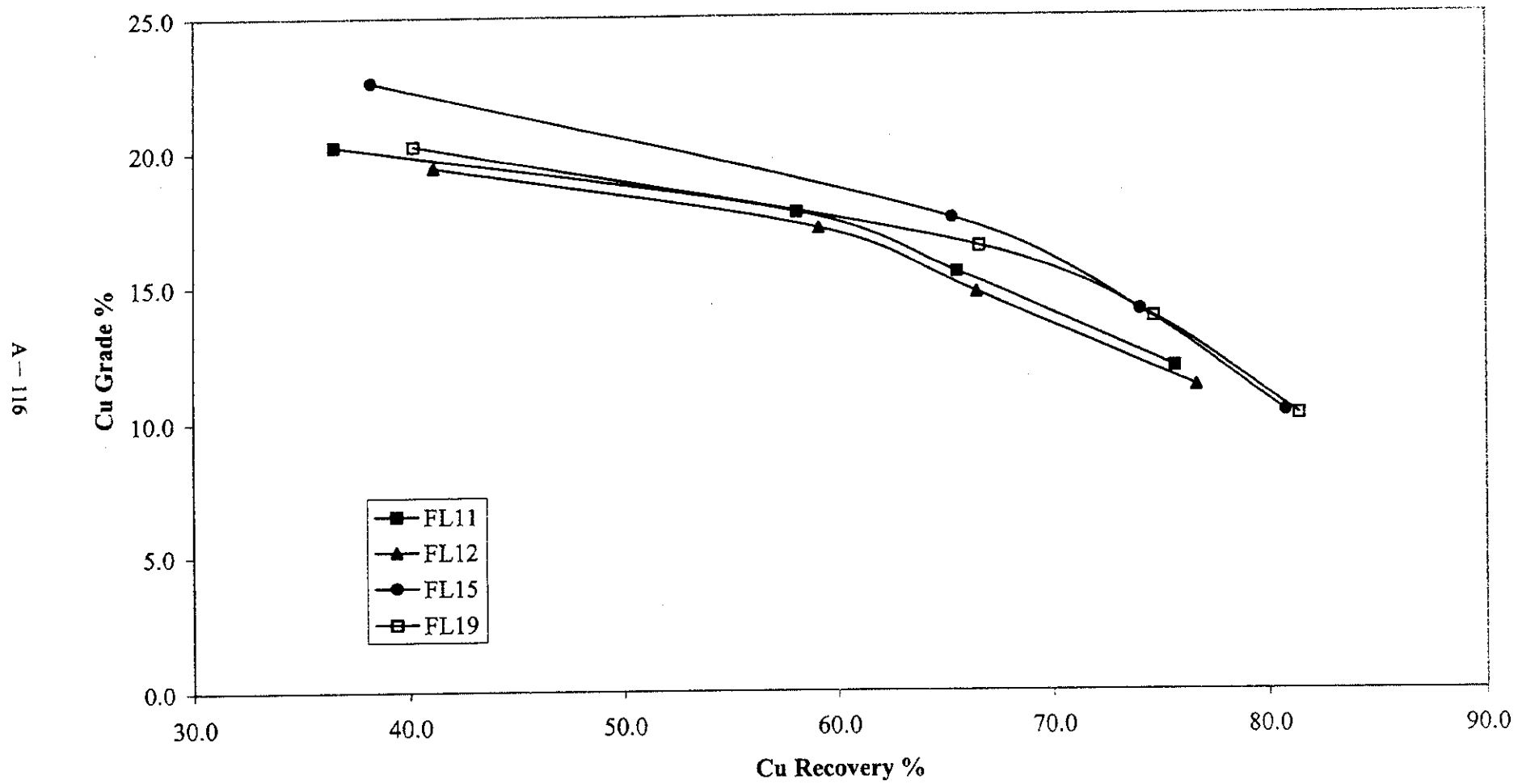


A-114

Rakah Massive Sulphide Au Grade vs Recovery

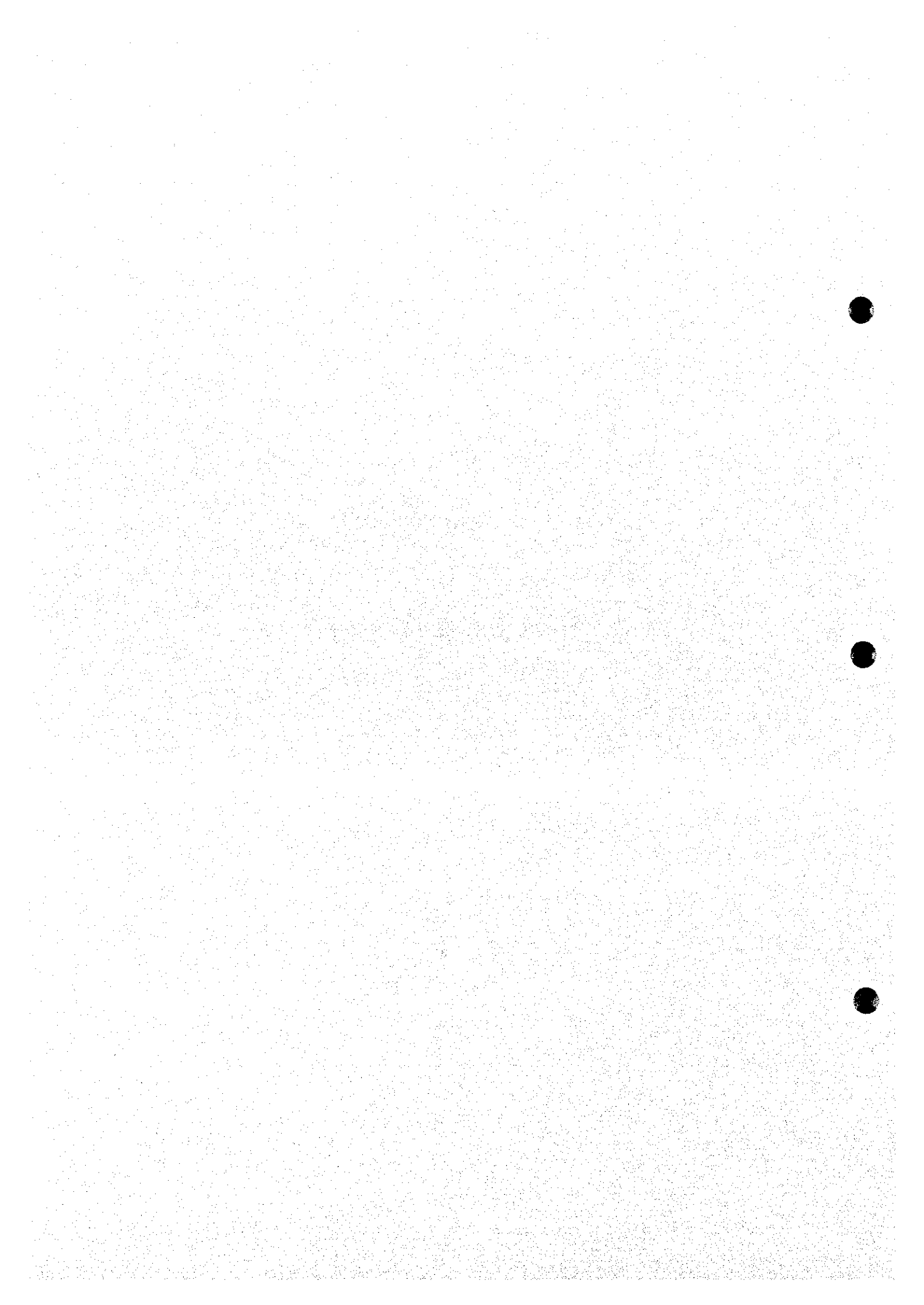


Bishara Breccia Cu Grade vs Recovery



Appendix 8D

Mineralogy of flotation products



SAMPLE NO:

Test FL:13 Cu Ro Con 1

POLISHED SECTION NO:

PS 59575

Mineral	Approx Wt %	Approx % Liberation	Main mineral(s) locked with
Chalcopyrite	60	90	Pyrite
Chalcocite	<1		
Covellite	<1		
Bornite	2	50	Pyrite
Pyrite/marcasite	14	30	
Sphalerite	1		Chalcopyrite, (bornite)
Silicates	23	20	Chalcopyrite, (bornite), (chalcocite)
	100		

Scale of common intergrowths

Chalcopyrite – pyrite/marcasite : 5-30µm

Chalcopyrite – silicates : 5-20µm

SAMPLE NO:

Test FL:13 Cu Ro Con 2

POLISHED SECTION NO:

PS 59575

Mineral	Approx Wt %	Approx % Liberation	Main mineral(s) locked with
Chalcopyrite	25	40	Pyrite, silicates
Chalcocite	<1		
Covellite	<1		
Bornite	1		Chalcopyrite, (pyrite)
Pyrite/marcasite	35	30	
Sphalerite	1		Chalcopyrite
Silicates	38	40	
	100		

Scale of common intergrowths

Chalcopyrite – pyrite/marcasite : 5-30µm

Chalcopyrite – silicates : 5-30µm

SAMPLE NO:

Test FL:15 Cu Ro Con 2

POLISHED SECTION NO:

PS 59577

Mineral	Approx Wt %	Approx % Liberation	Main mineral(s) locked with
Chalcopyrite	38	20	Pyrite, (sphalerite)
Chalcocite	<1		
Covellite	<1		
Bornite	<1		
Pyrite/marcasite	40	30	Chalcopyrite
Sphalerite	7	20	Chalcopyrite
Silicates	14	20	Chalcopyrite
	100		

Scale of common intergrowths

Chalcopyrite – pyrite/marcasite : 5-20µm

Chalcopyrite – silicates : 10-30µm

SAMPLE NO:

Test FL:22 Ro Con 1

POLISHED SECTION NO:

PS 59578

Mineral	Approx Wt %	Approx % Liberation	Main mineral(s) locked with
Chalcopyrite	58	50	Pyrite
Chalcocite	<1		
Covellite	<1		
Bornite		50	
Pyrite/marcasite	23	30	Chalcopyrite
Sphalerite	5		Chalcopyrite
Silicates	14	20	Chalcopyrite
	100		

Scale of common intergrowths

Chalcopyrite – pyrite/marcasite : 5-30µm

Chalcopyrite – silicates : 1-30µm

SAMPLE NO:

Test FL:22 Ro Zn Cl Con

POLISHED SECTION NO:

PS 59581

Mineral	Approx Wt %	Approx % Liberation	Main mineral(s) locked with
Chalcopyrite	31	30	Pyrite
Chalcocite	<1		
Covellite	<1		
Bornite			
Pyrite/marcasite	42	60	Chalcopyrite
Sphalerite	3		Chalcopyrite
Silicates	24	30	Chalcopyrite
	100		

Scale of common intergrowths

Chalcopyrite – pyrite/marcasite : 5-30 μ m

Chalcopyrite – silicates : 10-30 μ m

SAMPLE NO:

Test FL:22 Ro 3 Cl Tail

POLISHED SECTION NO:

PS 59582

Mineral	Approx Wt %	Approx % Liberation	Main mineral(s) locked with
Chalcopyrite	27	90	Pyrite
Chalcocite			
Covellite			
Bornite			
Pyrite/marcasite	30	90	Chalcopyrite
Sphalerite			
Silicates	43	>90	Pyrite
	100		

Scale of common intergrowths

Chalcopyrite – pyrite/marcasite : 5-30 μ m

Chalcopyrite – silicates : 5-30 μ m

Note: The particle size of this sample is mainly <30 μ m

SAMPLE NO:

Test FL:23 Ro Con 1

POLISHED SECTION NO:

PS 59579

Mineral	Approx Wt %	Approx % Liberation	Main mineral(s) locked with
Chalcopyrite	55	60	Pyrite, (sphalerite)
Chalcocite	<1		
Covellite	<1		
Bornite			
Pyrite/marcasite	33	40	Chalcopyrite
Sphalerite	7	20	Chalcopyrite
Silicates	6	20	Chalcopyrite, pyrite
	100		

Scale of common intergrowths

Chalcopyrite - pyrite/marcasite : 5-30µm

Chalcopyrite - silicates : 5-30µm

SAMPLE NO:

Test FL:23 Scav Con

POLISHED SECTION NO:

PS 59580

Mineral	Approx Wt %	Approx % Liberation	Main mineral(s) locked with
Chalcopyrite	9	<10	Pyrite
Chalcocite			
Covellite			
Bornite			
Pyrite/marcasite	59	30	Chalcopyrite
Sphalerite	5	10	Chalcopyrite
Silicates	26	10	Chalcopyrite
	100		

Scale of common intergrowths

Chalcopyrite - pyrite/marcasite :

Chalcopyrite - silicates :

Appendix 8E

Assays of flotation concentrates



ASSAYS OF FLOTATION CONCENTRATES

Element	Unit	Rakah S/W	Hayl as Safil S/W	Rakah M/S
		FL06 Ro Con 1	FL08 Ro Con 1	FL10 Ro Con 1
As	ppm	600	50	6600
Ba	ppm	<20	<20	<20
Ce	ppm	<100	<100	<100
Cd	ppm	<20	50	20
Co	ppm	110	<20	<20
La	ppm	<50	<50	<50
Mo	ppm	<50	50	50
Nb	ppm	<50	<50	<50
Sn	ppm	<50	<50	100
Sr	ppm	<20	<20	<20
Ta	ppm	<50	<50	<50
V	ppm	30	50	<20
Y	ppm	<10	<10	<10
Zr	ppm	<20	<20	<20
Al ₂ O ₃	%	1.83	2.25	0.02
CaO	%	0.3	0.31	0.10
Fe ₂ O ₃	%	41.7	35.9	19.2
K ₂ O	%	0.01	<0.01	<0.01
MgO	%	0.97	1.81	0.02
MnO	%	0.03	0.02	0.01
Na ₂ O	%	<0.01	<0.01	<0.01
P ₂ O ₅	%	<0.01	0.02	<0.01
SiO ₂	%	6.05	13.4	2.6
TiO ₂	%	0.08	0.12	0.02
Hg	ppm	0.7	0.2	11.0
F	%	0.02	0.01	0.01

1

2

3

Appendix 8F

Cyanidation of pyrite concentrates



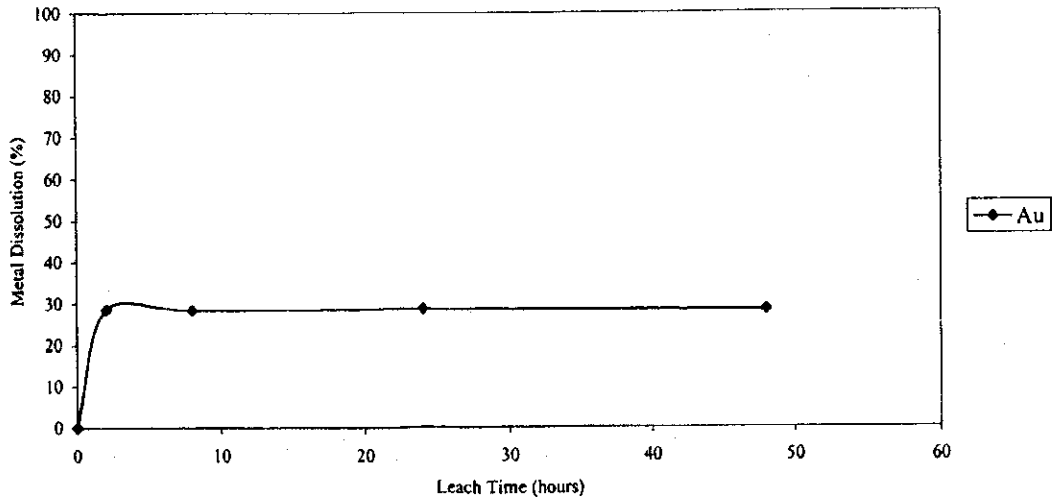
AGITATION CYANIDE LEACH TEST

Test No.		CY01					
Sample Tested		RAKAH MS, PYRITE CONCENTRATE					
Sample Weight (g)		312.7					
Target Parameters							
Grind Size (mm)		P80 70um					
NaCN Concentration (%)		0.150					
pH		11.0					
Leach Time (hours)			0	2	8	24	48
Solids Assays (ppm)		Calculated Head	Head				Final Residue
Au		3.37	3.53				2.42
Solution Assays (mg/L)							
Au				0.40	0.39	0.40	0.43
Metal Dissolution (%)							
Au				29	28	29	28
Leach Conditions							
Slurry Density (%w/w)			29	29	30	31	33
NaCN conc (pre-adjustment)				0.176	0.166	0.160	0.150
NaCN conc (post-adjustment)			0.287	0.201	0.215	0.225	
NaCN added (kg/t)			6.9	7.5	8.4	9.2	9.2
NaCN [1] consumed (kg/t)				2.68	3.38	4.49	5.85
CaO[2] added (kg/t)			0.78	0.78	0.78	0.78	0.78
pH (pre-adjustment)			3.6	10.9	11.1	11.2	11.2
pH (post-adjustment)			10.9	10.9	11.1	11.2	
Dissolved Oxygen (mg/L)			6.0	6.7	7.2	7.8	8.0
Printed 23/02/01			Comments Pyrite con from tests FL9, 10, 14 Ag assays; Leach feed 13ppm, leach residue 15ppm				
Job No. N108FL00							
Technician KT							
Test Date 7/2/01							
File ref CYN108RMS							
Version 5							

[1] Cumulative NaCN consumed (kg/t) = NaCN added - (NaCN in leach solution + NaCN removed in samples)

[2] Cumulative CaO addition relates to a pure reagent and allows for test additions of Lime with an activity/concentration of 57.0 %

Au



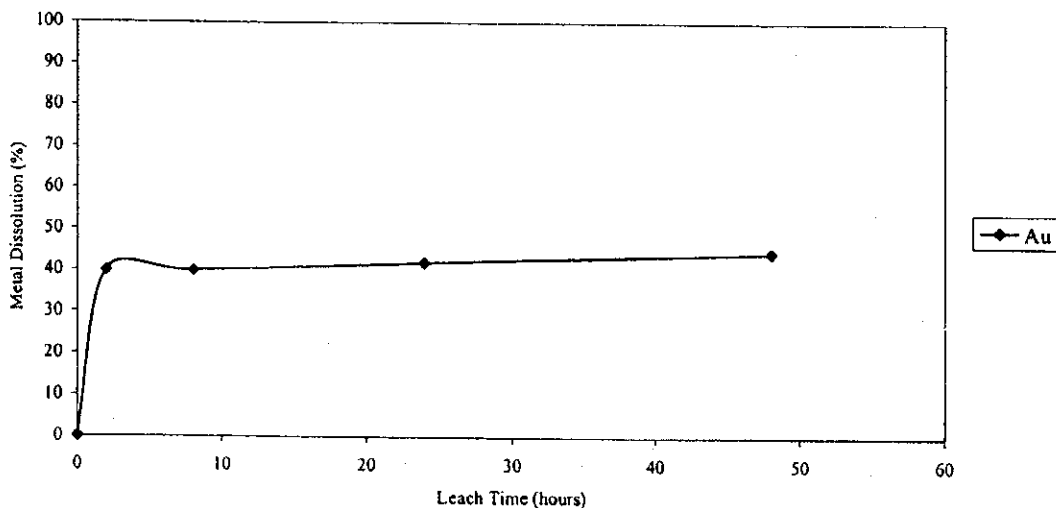
AGITATION CYANIDE LEACH TEST

Test No.		CY02					
Sample Tested		RAKAH MS, PYRITE CONCENTRATE, RE-GROUND					
Sample Weight (g)		302.9					
Target Parameters							
Grind Size (mm)		P80 34um					
NaCN Concentration (%)		0.150					
pH		11.0					
Leach Time (hours)			0	2	8	24	48
Solids Assays (ppm)		Calculated Head	Head				Final Residue
Au		3.61	3.53				1.93
Solution Assays (mg/L)				0.61	0.60	0.64	0.72
Metal Dissolution (%)				40	40	42	44
Au							
Leach Conditions							
Slurry Density (%w/w)			30	30	30	31	33
NaCN conc (pre-adjustment)				0.144	0.146	0.156	0.136
NaCN conc (post-adjustment)			0.295	0.203	0.229	0.220	
NaCN added (kg/t)			7.0	8.3	9.9	10.9	10.9
NaCN [1] consumed (kg/t)				3.56	4.77	6.25	7.82
CaO[2] added (kg/t)			1.90	1.90	1.90	1.90	1.90
pH (pre-adjustment)			3.0	10.7	11.0	11.1	11.1
pH (post-adjustment)			10.9	10.7	10.9	11.1	
Dissolved Oxygen (mg/L)			5.0	6.1	7.3	7.0	7.8
Printed 23/02/01		Comments Pyrite con from tests FL9, 10, 14 Concentrate re-ground to P80 34um Air injected to maintain DO level Ag assays; Leach feed 13ppm, leach residue 8ppm					
Job No. N108FL00							
Technician KT							
Test Date 7/2/01							
File ref CYN108RMS							
<i>Version 5</i>							

[1] Cumulative NaCN consumed (kg/t) : NaCN added - (NaCN in leach solution + NaCN removed in sample)

[2] Cumulative CaO addition relates to a pure reagent and allows for test additions of Lime with an activity/concentration of 57.0 %.

Au

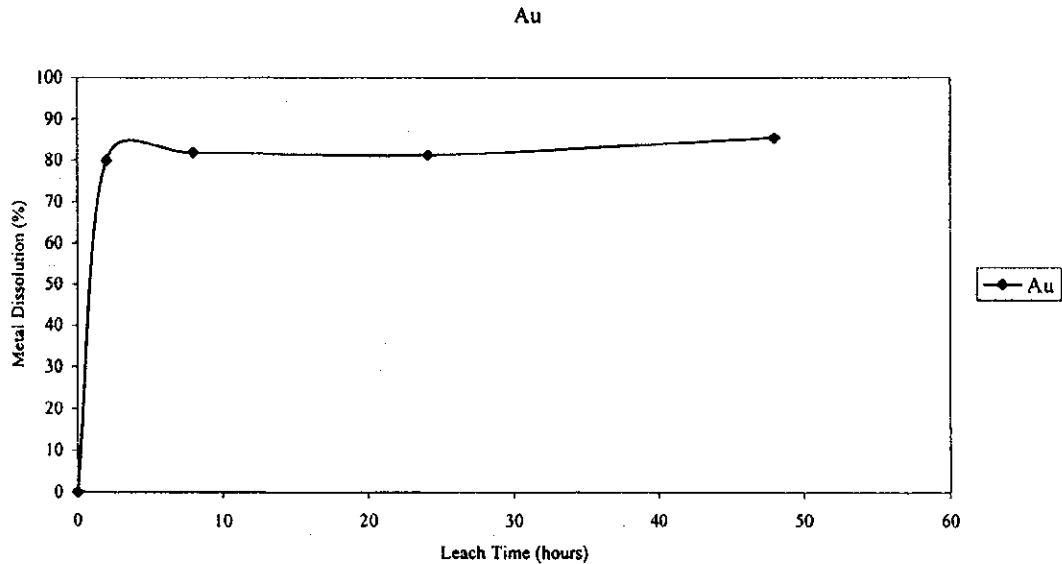


AGITATION CYANIDE LEACH TEST

Test No.		CY03					
Sample Tested		RAKAH MS, PYRITE CONCENTRATE, CALCINED					
Sample Weight (g)		208.3					
Target Parameters							
Grind Size (mm)		P80 70um					
NaCN Concentration (%)		0.150					
pH		11.0					
Leach Time (hours)			0	2	8	24	48
Solids Assays (ppm)		Calculated Head	Head				Final Residue
Au		8.12	5.30				1.18
Solution Assays (mg/L)							
Au				1.00	1.04	1.06	1.09
Metal Dissolution (%)							
Au				80	82	81	85
Leach Conditions							
Slurry Density (%w/w)			13	13	14	14	14
NaCN conc (pre-adjustment)				0.236	0.194	0.168	0.134
NaCN conc (post-adjustment)			0.301	0.244	0.214	0.197	
NaCN added (kg/t)			19.5	19.5	20.2	22.0	22.0
NaCN [1] consumed (kg/t)				4.23	7.07	9.63	13.22
CaO[2] added (kg/t)			0.39	0.39	0.39	0.39	0.39
pH (pre-adjustment)			5.8	10.9	11.0	11.2	11.3
pH (post-adjustment)			10.6	10.9	11.2	11.2	
Dissolved Oxygen (mg/L)			7.2	7.9	7.8	7.7	7.5
Printed 23/02/01			Comments Pyrite con from tests FL9, 10, 14 Concentrate blended with sand and calcined at 700°C Con weight 312.7g, calcine weight 208.3g Ag assays; Leach feed 19ppm, leach residue 20ppm				
Job No. N108FL00							
Technician KT							
Test Date 7/2/01							
File ref CYN108RMS							
Version 5							

[1] Cumulative NaCN consumed (kg/t) : NaCN added - (NaCN in leach solution + NaCN removed in samples)

[2] Cumulative CaO addition relates to a pure reagent and allows for test additions of Lime with an activity/concentration of 57.0 %.



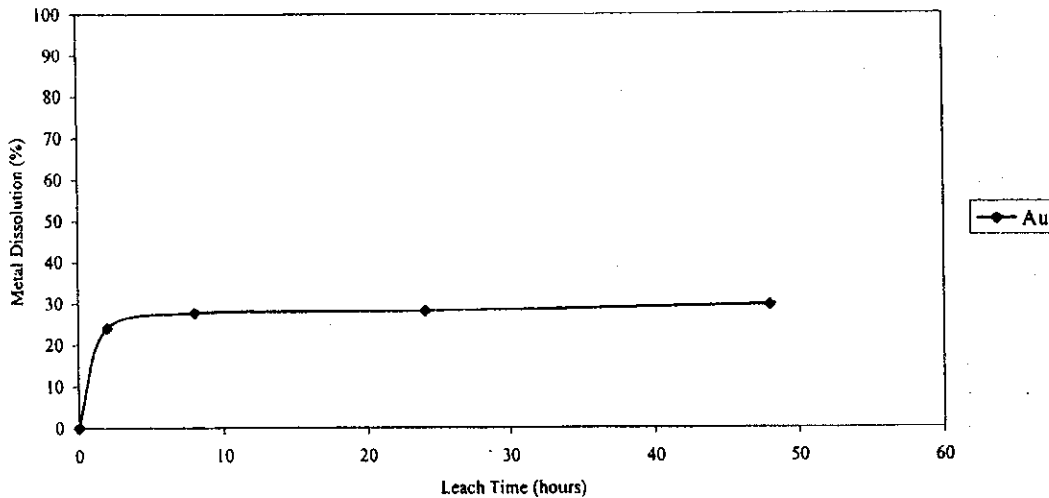
AGITATION CYANIDE LEACH TEST

Test No.	CY05					
Sample Tested	BISHARA BRECCIA, PYRITE CONCENTRATE					
Sample Weight (g)	350.0					
Target Parameters						
Grind Size (mm)	P80 70um					
NaCN Concentration (%)	0.150					
pH	11.0					
Leach Time (hours)		0	2	8	24	48
Solids Assays (ppm)	Calculated Head	Head				Final Residue
Au	1.97	1.84				1.40
Solution Assays (mg/L)						
Au			0.21	0.23	0.24	0.25
Metal Dissolution (%)						
Au			24	28	28	30
Leach Conditions						
Slurry Density (%w/w)		30	31	30	32	32
NaCN conc (pre-adjustment)			0.084	0.116	0.090	0.146
NaCN conc (post-adjustment)		0.309	0.298	0.315	0.320	
NaCN added (kg/t)		6.9	11.9	16.1	20.9	20.9
NaCN [1] consumed (kg/t)			5.05	9.16	13.98	17.62
CaO[2] added (kg/t)		0.53	0.53	0.53	0.53	0.53
pH (pre-adjustment)		7.0	11.6	10.8	10.3	10.3
pH (post-adjustment)		11.3	11.6	10.8	10.6	
Dissolved Oxygen (mg/L)		2.6	7.8	7.8	8.2	8.3
Printed	23/02/01		Comments Pyrite con from bulk sample flotation Air injected to maintain DO level Ag assays; Leach feed 9ppm, leach residue 8ppm			
Job No.	N108FL00					
Technician	KT					
Test Date	14/2/01					
File ref	CYN108BB					
Version 5						

[1] Cumulative NaCN consumed (kg/t) : NaCN added - (NaCN in leach solution + NaCN removed in samples)

[2] Cumulative CaO addition relates to a pure reagent and allows for test additions of Lime with an activity/concentration of 57.0 %

Au



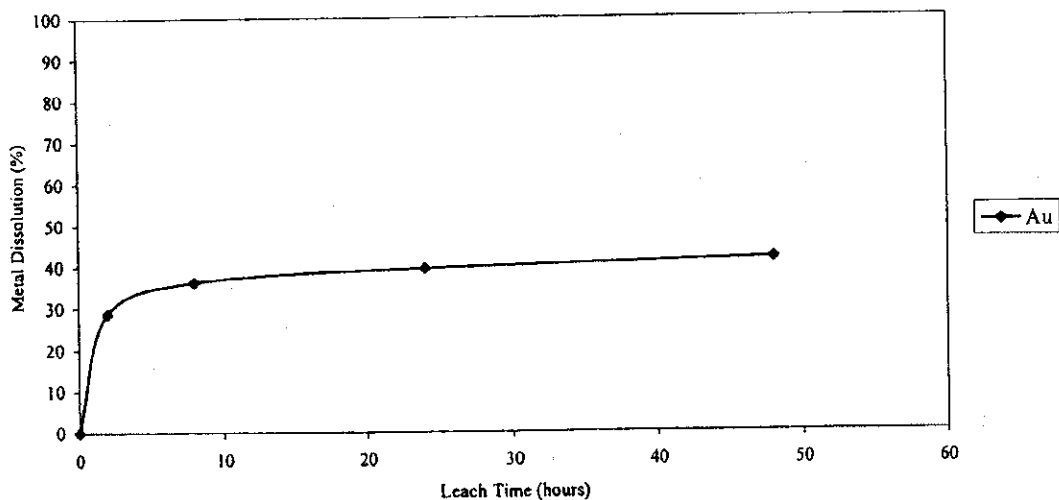
AGITATION CYANIDE LEACH TEST

Test No.		CY06				
Sample Tested		BISHARA BRECCIA, PYRITE CONCENTRATE, RE-GROUND				
Sample Weight (g)		350.0				
Target Parameters						
Grind Size (mm)		P80 18um				
NaCN Concentration (%)		0.150				
pH		11.0				
Leach Time (hours)		0	2	8	24	48
Solids Assays (ppm)	Calculated Head	Head				Final Residue
Au	1.91	1.84				1.13
Solution Assays (mg/L)			0.24	0.29	0.33	0.35
Au						
Metal Dissolution (%)			29	36	39	42
Au						
Leach Conditions						
Slurry Density (%w/w)		30	30	30	32	32
NaCN conc (pre-adjustment)			0.060	0.082	0.020	0.050
NaCN conc (post-adjustment)		0.305	0.297	0.321	0.330	
NaCN added (kg/t)		7.0	12.5	17.6	24.1	24.1
NaCN [1] consumed (kg/t)			5.59	10.55	17.03	22.90
CaO[2] added (kg/t)		0.49	0.49	0.49	0.49	0.49
pH (pre-adjustment)		7.4	12.3	10.9	10.3	9.8
pH (post-adjustment)		11.8	12.3	11.0	10.7	
Dissolved Oxygen (mg/L)		0.6	4.0	4.7	7.5	8.1
Printed 23/02/01		Comments Pyrite con from bulk sample flotation Concentrate re-ground to P80 18um Air injected to maintain DO level Ag assays; Leach feed 9ppm, leach residue 9ppm				
Job No. NI08FL00						
Technician KT						
Test Date 14/2/01						
File ref CYN108BB						
Version 5						

[1] Cumulative NaCN consumed (kg/t) : NaCN added - (NaCN in leach solution + NaCN removed in samples)

[2] Cumulative CaO addition relates to a pure reagent and allows for test additions of Lime with an activity/concentration of 57.0 %.

Au



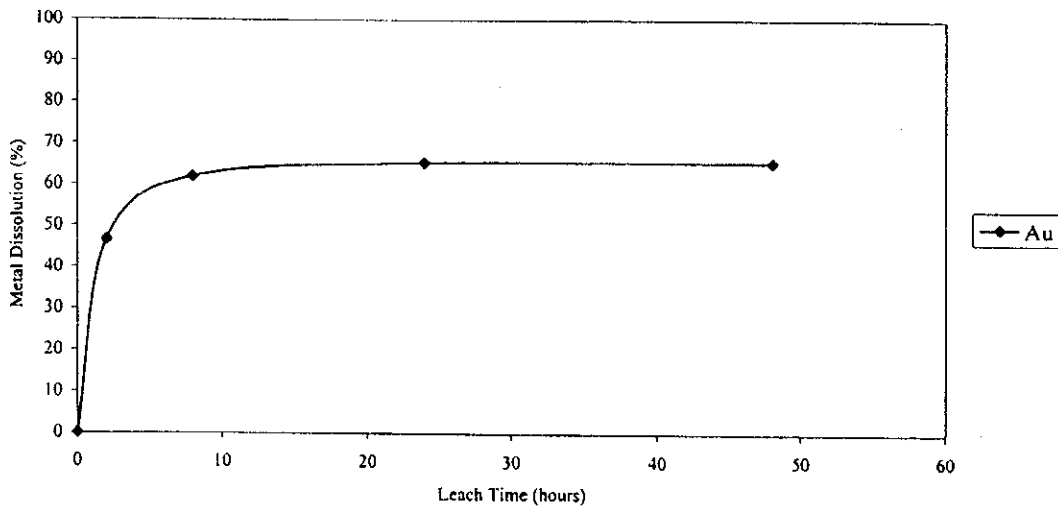
AGITATION CYANIDE LEACH TEST

Test No.		CY07				
Sample Tested		BISHARA BRECCIA, PYRITE CONCENTRATE, CALCINED				
Sample Weight (g)		275.0				
Target Parameters						
Grind Size (mm)		P80 70um				
NaCN Concentration (%)		0.150				
pH		11.0				
Leach Time (hours)		0	2	8	24	48
Solids Assays (ppm)		Calculated Head	Head			Final Residue
Au		2.16	2.26			0.75
Solution Assays (mg/L)						
Au			0.20	0.26	0.28	0.28
Metal Dissolution (%)						
Au			47	62	65	66
Leach Conditions						
Slurry Density (%w/w)		16	17	17	17	18
NaCN conc (pre-adjustment)			0.042	0.074	0.086	0.084
NaCN conc (post-adjustment)		0.304	0.300	0.309	0.308	
NaCN added (kg/t)		15.3	28.4	39.8	50.4	50.4
NaCN [1] consumed (kg/t)			13.16	24.60	35.44	46.13
CaO[2] added (kg/t)		11.02	11.02	15.85	15.85	15.85
pH (pre-adjustment)		6.3	11.0	9.5	9.8	9.8
pH (post-adjustment)		11.1	11.0	10.8	10.7	
Dissolved Oxygen (mg/L)		0.1	7.8	7.8	8.2	8.2
Printed 23/02/01		Comments Pyrite con from bulk sample flotation Concentrate blended with sand and calcined at 700°C Con weight 348g, calcine weight 284g Air injected to maintain DO level Ag assays; Leach feed 11ppm, leach residue 10ppm				
Job No. N108FL00						
Technician KT						
Test Date 14/2/01						
File ref CYN108BB						
<i>Version 5</i>						

[1] Cumulative NaCN consumed (kg/t) : NaCN added - (NaCN in leach solution + NaCN removed in samples)

[2] Cumulative CaO addition relates to a pure reagent and allows for test additions of Lime with an activity/concentration of 57.0 %.

Au



Appendix 8G

Cyanidation of pyrite tailings



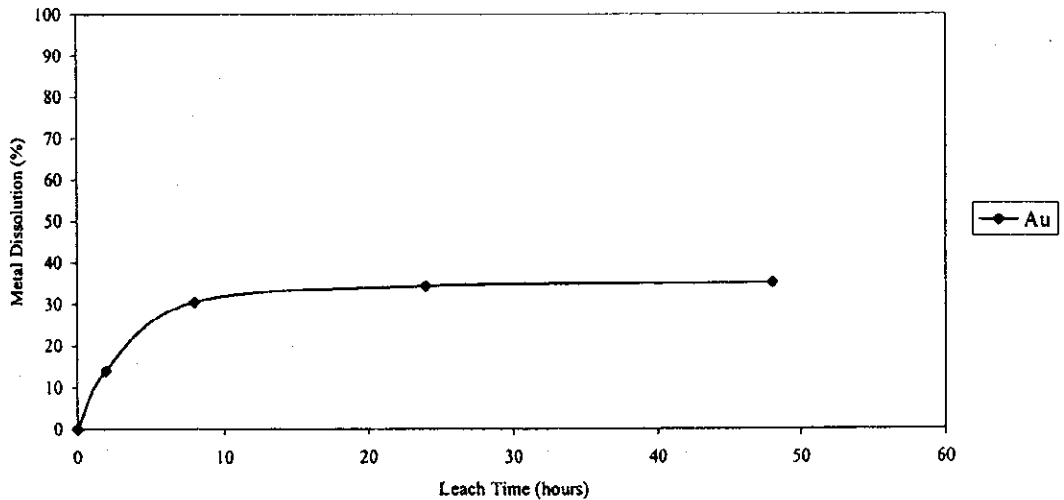
AGITATION CYANIDE LEACH TEST

Test No.		CY04				
Sample Tested		RAKAH MS, PYRITE TAILING				
Sample Weight (g)		500.5				
Target Parameters						
Grind Size (mm)		P80 70um				
NaCN Concentration (%)		0.050				
pH		11.0				
Leach Time (hours)		0	2	8	24	48
Solids Assays (ppm)	Calculated Head	Head				Final Residue
Au	1.66	1.93				1.09
Solution Assays (mg/L)						
Au			0.10	0.22	0.25	0.26
Metal Dissolution (%)						
Au			14	31	34	35
Leach Conditions						
Slurry Density (%w/w)		30	30	30	31	32
NaCN conc (pre-adjustment)			0.004	0.050	0.150	0.112
NaCN conc (post-adjustment)		0.097	0.110	0.255	0.156	
NaCN added (kg/t)		2.3	4.7	9.2	9.2	9.2
NaCN [1] consumed (kg/t)			2.16	3.53	5.84	6.70
CaO[2] added (kg/t)		0.52	0.65	0.92	0.92	0.92
pH (pre-adjustment)		7.7	10.3	10.3	11.0	10.9
pH (post-adjustment)		10.7	10.8	11.1	11.0	
Dissolved Oxygen (mg/L)		7.2	7.2	7.6	7.7	7.9
Printed	23/02/01	Comments Pyrite tail from tests FL9, 10, 14 Ag assays; Leach feed <2ppm, leach residue <2ppm				
Job No.	N108FL00					
Technician	KT					
Test Date	7/2/01					
File ref	CYN108RMS					
Version 5						

[1] Cumulative NaCN consumed (kg/t) : NaCN added - (NaCN in leach solution + NaCN removed in samples)

[2] Cumulative CaO addition relates to a pure reagent and allows for test additions of Lime with an activity/concentration of 57.9 %.

Au



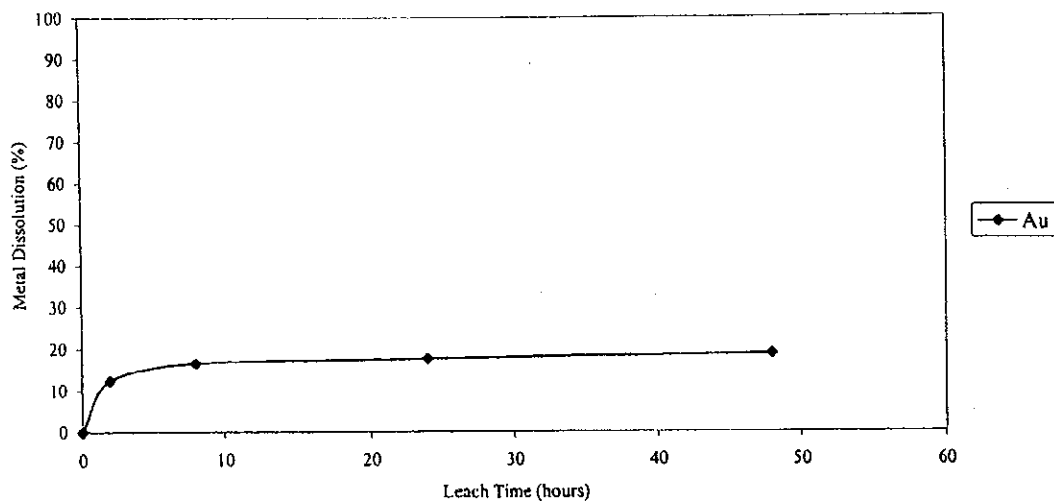
AGITATION CYANIDE LEACH TEST

Test No.		CY08					
Sample Tested		BISHARA BRECCIA, PYRITE TAILING					
Sample Weight (g)		1000.0					
Target Parameters							
Grind Size (mm)		P80 70um					
NaCN Concentration (%)		0.050					
pH		11.0					
Leach Time (hours)			0	2	8	24	48
Solids Assays (ppm)		Calculated Head	Head				Final Residue
Au		0.87	0.92				0.72
Solution Assays (mg/L)				0.07	0.09	0.10	0.11
Au							
Metal Dissolution (%)				12	16	18	19
Au							
Leach Conditions							
Slurry Density (%w/w)		40	39	39	40	41	
NaCN conc (pre-adjustment)			0.014	0.030	0.030	0.042	
NaCN conc (post-adjustment)		0.097	0.095	0.102	0.105		
NaCN added (kg/t)		1.5	2.8	3.8	4.9	4.9	
NaCN [1] consumed (kg/t)			1.27	2.30	3.37	4.26	
CaO[2] added (kg/t)		0.57	0.59	0.94	1.00	1.00	
pH (pre-adjustment)		6.6	10.3	9.4	10.3	10.2	
pH (post-adjustment)		10.6	10.4	10.8	10.7		
Dissolved Oxygen (mg/L)		2.0	7.6	7.0	7.1	8.1	
Printed 23/02/01		Comments Pyrite tail from bulk sample flotation Air injected to maintain DO level Ag assays; Leach feed 5ppm, leach residue 5ppm					
Job No. N108FL00							
Technician KT							
Test Date 14/2/01							
File ref CYN108BB							
Version 5							

[1] Cumulative NaCN consumed (kg/t) = NaCN added - (NaCN in leach solution + NaCN removed in samples)

[2] Cumulative CaO addition relates to a pure reagent and allows for test additions of Lime with an activity/concentration of 57.0 %.

Au



Appendix 8H

X-ray diffraction analyses of samples



X-RAY DIFFRACTION ANALYSES OF TEST SAMPLES

Mineral	Rakah Body Stockwork Ore	Hayl As Safil Stockwork Ore	Rakah Body Massive Ore	Bishara Body Breccia Ore
Quartz	D	D	A	A
Chlorite	SD	A		A
Plagioclase				Tr
Pyrite	Tr	Tr-A	D	D
Chalcopyrite	Tr-A	Tr	Tr	A
Marcasite			Tr	A
Pyrrhotite	Tr	Tr		
Siderite			Tr	
Hematite				Tr

Semiquantitative Abbreviations;

- D = Dominant. Used for the component apparently most abundant, regardless of its probable percentage level.
- CD = Co-dominant. Used for two (or more) predominating components, both or all of which are judged to be present, in roughly equal amounts.
- SD = Sub-dominant. The next most abundant component(s) providing its percentage level is judged above about 20.
- A = Accessory. Components judged to be present between the levels of roughly 5 and 20%.
- Tr = Trace. Components judged to be below about 5%.



Appendix 8I

Equipments used for metallurgical tests



LIST OF MAJOR EQUIPMENT

Crushing of 'as received' samples	Jaques 8 x 5 jaw crusher Laboratory rolls crusher
Sample splitting	Various rotary splitters and riffle splitters
Grind establishment	Batch stainless steel rod mill, 190mm diameter x 220mm, operating at 70rpm Charge 15 x 25mm diameter stainless steel rods, total weight 14.4kg
Ball mill work index	Standard Bond mill, 305mm x 305mm operating at 70rpm Ball charge 20.1kg, 38mm to 12.7mm diameter balls
Flotation tests, laboratory	Agitair flotation machine, LA500
Flotation tests, bulk samples	Agitair, 2 x #8 cells, 7.5L capacity each
Settling tests	600mL graduated cylinders fitted with rake stirrers
Filtration tests	Vacuum filter leaf, 110mm diameter, Neotex 6044 cloth
Cyanide leaching	2L beakers, mechanical agitation, air or oxygen injection optional



Appendix 9

Description of thin sections of surface and borehole samples



Description of thin sections of surface and borehole samples.

Ser. No.	Sample No.	Coordination		Geological Unit	Rock Name	Texture	Phenocrysts, crystals and fragments														Secondary Minerals														Remarks			
		N	E				Quartz	K-feldspar	Plagioclase	Amphibole	Clinopyroxene	Olivine	Calcite	Apatite	Magnetite	Cr-spinel	Opaque minerals	Glass	Quartz	Albite	Actinolite	Tremolite	Zeolite	Stibite	Dickite	Sericite	Chlorite	Epidote	Calcite	Laumontite	Smectite	Pargasite	Serpentine	Pumpellyite		Prehnite	Pyrite	Hematite
1	YN01	459800	2617750	Lasail	Basalt	Intersertal, amigdaloidal and porphyritic			⊙	○					⊙	⊙	⊙								Δ	Δ	*	*							⊙	⊙	Phenocryst Clinopyroxene	
2	YN02	459800	2618400	Dyke	Basalt	Hyalopilitic, amigdaloidal and porphyritic			⊙	○					⊙	⊙									Δ	○		*								Phenocryst Clinopyroxene		
3	YN03	460000	2617500	Lasail	Basalt	Subophitic			⊙	⊙					⊙	⊙	⊙								Δ	*	Δ									⊙	⊙	Phenocryst Clinopyroxene
4	YN04	460000	2618250	Lasail	Metalliferous sediment	Clastic and laminated	⊙																		Δ									⊙	⊙	Including radiolaria		
5	YN05	460200	2617250	Lasail	Basalt	Intersertal and amigdaloidal			⊙	⊙					⊙	⊙	○								Δ	*										⊙	⊙	Phenocryst Clinopyroxene
6	YN06	460400	2618950	Alley	Basalt	Subophitic and amigdaloidal			⊙	⊙						*									Δ	*	*		Δ							Δ		
7	YN07	460400	2618424	Sheeted dyke	Dolerite	Subophitic			⊙	○					⊙	Δ	⊙								⊙	Δ	○										*	
8	YN09	457400	2617300	Melange	Marble	Granular								⊙	⊙	*									*	⊙									*	Δ		
9	YN12	458200	2617200	Dyke	Rhyolite	Porphyritic	⊙	⊙	○						*		○								Δ	○									*	*	Phenocryst: K-feldspar	
10	YN14	458400	2617850	Cumulate sequence	Olivine gabbro	Granular and cumulate			⊙	⊙	○				*																					*		
11	YN16	458600	2617540	Cumulate sequence	Gabbro	Granular and cumulate			⊙	⊙								○							○	*			⊙						*	*		
12	YN18	458800	2618300	Cumulate sequence	Gabbro	Granular and cumulate			⊙	⊙					*			○							Δ				⊙							*	*	
13	YN20	459800	2618800	Cumulate sequence	Troctolite	Granular and cumulate			Δ	⊙	⊙				*										*			⊙										
14	YN22	Western Khushshan		Lasail	Basaltic andesite	Intersertal			⊙	○	Δ				⊙	⊙	⊙	Δ						*	*									Δ	Δ			
15	YN23	Eastern Khushshan		Geotimes	Basalt	Intersertal			⊙	⊙					⊙	*	⊙								○	*	*			Δ				*	*			
16	YN24	459700	2619000	Lasail	Basaltic andesite	Intersertal and amigdaloidal			○	Δ					⊙	⊙									○	*	Δ								*	*		
17	YN25	459800	2618700	Lasail	Basaltic andesite	Intersertal and amigdaloidal			⊙	○					⊙	⊙	Δ							Δ	Δ	○	Δ								*	*		
18	YN26	459000	2617500	Sheeted dyke	Dolerite	Ophitic and porphyritic			⊙	⊙					○		⊙	Δ							Δ	*	*		Δ	Δ						Δ	Δ	Phenocryst: Cpx & Pl
19	YN27	458940	2615827	Alley	Basaltic andesite	Intersertal, amigdaloidal and quench			○	Δ					⊙	⊙									Δ	*			*	Δ					*	*		
20	YN29	Southeastern Rakah Mine		Lasail	Basalt	Intersertal and porphyritic			⊙	⊙					⊙	○									Δ	Δ	*							Δ	Δ	Phenocryst: Clinopyroxene		
21	YN30	Eastern Rakah Mine		Alley	Basalt	Intersertal and quench			⊙	⊙					⊙	Δ	⊙								*	*	○								*	*		
22	YN31	Eastern Rakah Mine		Lasail	Basaltic andesite	Intersertal, amigdaloidal and porphyritic			⊙	○					⊙	○	⊙								○	*									*	*	Phenocryst: Clinopyroxene	

⊙: abundant, ○: common, Δ: a little, *: rare

Appendix 10

Results of X-ray diffraction analyses of surface and borehole samples



Results of X-ray diffraction analyses of surface and borehole samples.

Ser. No.	Sample No.	Coordination		Geological Unit	Description	Detected Minerals																Remarks	
		N	E			Quartz	Tridymite	Anorthite	Pargasite	Diopside	Enstatite	Calcite	Chlorite	Kaolinite	Dickite	Sericite	Laumontite	Stübitzite	Chrysotile	Hematite	Magnetite		Pyrite
1	YN01	459800	2617750	Laseil	Basalt	⊙		Δ		○		○											Sanidine?
2	YN02	459800	2618400	Dyke	Basalt	⊙		.		Δ		.											Sanidine?
3	YN03	460000	2617500	Laseil	Basalt	○		⊙					Δ										
4	YN04	460000	2618250	Laseil	Metalliferous sediment	⊙				Δ											Δ	Δ	jaspilite
5	YN05	460200	2617250	Laseil	Basalt	⊙		○		Δ			Δ										
6	YN06	460400	2618950	Alley	Basalt	Δ		⊙				Δ	.										
7	YN07	460400	2618424	Sheeted dyke	Dolerite	⊙		⊙				○	⊙										
8	YN09	457400	2617300	Umar Group	Marble	.						⊙	tr	tr									
9	YN14	458400	2617850	Cumulate	Olivine gabbro			⊙						tr									
10	YN16	458600	2617540	Cumulate	Gabbro			Δ	.	Δ			⊙										
11	YN18	458800	2618300	Cumulate	Gabbro			○	⊙														
12	YN20	459800	2618800	Cumulate	Troctolite					Δ		Δ	tr					⊙					unknown
13	YN22	Western Khushshan		Laseil	Basaltic andesite	⊙		⊙	.			.											
14	YN23	Eastern Khushshan		Geotimes	Basalt	○		⊙				.	.										
15	YN24	459700	2619000	Laseil	Basaltic andesite	⊙						.	.										
16	YN25	459800	2618700	Laseil	Basaltic andesite	⊙						.	○										
17	YN26	459000	2617500	Sheeted dyke	Dolerite			⊙	○				Δ										
18	YN27	458940	2615827	Alley	Basaltic andesite	⊙				⊙			.		Δ						Δ		
19	YN29	Southeastern Rakah Mine		Laseil	Basalt	○		⊙				Δ	○										
20	YN30	Eastern Rakah Mine		Alley	Basalt	Δ		⊙				.	.										
21	YN31	Eastern Rakah Mine		Laseil	Basaltic andesite	⊙		○				.	.										
22	2-30.40	459800	2618600	Laseil	Chlorite-altered rock	○							⊙										
23	2-145.30	459800	2618600	Laseil	Hyaloclastite	⊙						.	○										
24	2-183.60	459800	2618600	Laseil	Basaltic andesite	⊙		○				Δ	○										
25	3-20.40	459800	2618500	Laseil	Basalt	⊙				Δ		.	.										
26	3-174.90	459800	2618500	Laseil	Basaltic andesite	⊙							Δ										
27	4-17.45	459800	2618700	Laseil	Basalt	⊙						○	.									.	unknown
28	4-117.30	459800	2618700	Laseil	Silicified-chloritized rock	⊙						○	○									○	
29	5-17.80	459900	2618500	Laseil	Basaltic andesite								Δ			⊙							
30	5-64.50	459900	2618500	Laseil	Basalt	○		⊙					Δ										
31	5-155.75	459900	2618500	Laseil	Basaltic andesite	⊙		.				○	○									.	

⊙: abundant, ○: common, Δ: a little, .: rare, tr: trace

JICA