

Chapter 11 Conclusions and Recommendations

11-1 Conclusions

This study is a preliminary F/S on mineral exploration and development in Yanqul Area, for its general evaluation in order to lead the project into mining activities. Accordingly, the main objectives of the study are: 1) to increase gold recovery and grade of copper refinement, 2) to increase minable ore reserves through exploration activities, and 3) to estimate minimum investment costs and operation costs.

Exploration and development plan of the mine can be summarized as follows:

11-1-1 Exploration results

The application of an exploration methodology that was established in Batinah Coast area during the geological, geophysical and drilling explorations was also applied in and around the known mineralized zone in Yanqul area.

- (1) Geophysical survey to find new ore bodies within Geotimes and Lasail units in Samail volcanics yielded very promising IP anomalies in Qurom Al-Akhab area. Drilling results within these anomalies revealed that dominant mineralization zone extends about 300m in East-West and about 150m in North-South direction. However, a total copper grade is generally low, and gold mineralization is found quite local. Ore reserve here was roughly determined in 200 million tons with an average grade of 0.71% of Cu and 0.1g/t of Ag.
- (2) Based on this survey, it was concluded that the development of a new deposit of this size would give quite pessimistic results if developed in the future in this area. On the other hand, in the southwestern part of the open pit in Rakah and in the north of the existing gossan in Hail Al Safil area, a small scale with conspicuous IP anomalies were detected in places where the drilling exploration have confirmed stock work mineralization. A slight increase of ore reserves can be expected here.
- (3) The IP Geophysical method in this survey area detected several new mineralized zones including the known ore deposits. The application of the TEM method indicated the shape of the massive sulfide ore body. However, the massive sulfide in this area represents only a small-scale mineralization, and most deposits are in the form of stock work types, which are also found a good target by IP method.

11-1-2 Mining Plan

After compiling existing data, high quality data were collected for each item.

- (1) In making ore reserve calculations and taking into consideration the nugget effect, a top cutting method for each deposit were adopted both for copper and gold.

Geological ore reserves at a 0.5%Cu cut off grade are as follows:

Reserves (t)	Cu (%)	Au (g/t)	Contained Cu (t)	Contained Au (t)
15,767,000	1.13	0.62	178,738	9,851

- (2) In designing the pit, prior to the detailed designing, pit optimization was made by using the geological model used for ore reserve calculations. For this case and to maintain realistic mine operations, copper price at US ¢ 120/lb and gold price of US\$ 400/oz were assumed.

- (3) Minal ore reserve from the designed pit with a cut-off grade of 0.5% of Cu is as follows:

Reserves (t)	Cu (%)	Au (g/t)	Contained Cu (t)	Contained Au (t)
8,175,000	1.23	0.68	100,441	5,571

- (4) As a result of metallurgical tests, conventional methods are to be applied for crashing and grinding process, and crashing with a primary ball mill is adopted in order to minimize total construction costs. Estimated metallurgical test results based mainly on a locked cycle test are Cu: 20.0%, Au: 5.13 g/t, and recovery rate resulted in Cu: 85.7% and Au: 39.6%.

- (5) Owing to poor precipitations, water resource in this area is very precious so that contamination of ground water should strictly be avoided. Therefore, a filter Press is to be installed to the refinery plant, and dry-type trailing dam is designed which is able to process from 10 to 20% of the dehydrated drainage.

- (6) Investment costs with a crude ore production rate of 3,000 tons/day totaled US\$29,658,500, in which US\$2,157,500 is an additional investment after start of operation. This amount is mainly for expansion civil work on the trailing dam to be made after four years of operation. The total operation cost resulted in US\$89,864,200 but 30% of this costs goes to mining operation costs because the operation is to be done by subcontracts.

- (7) Investment costs with a crude ore production rate of 2,000 t/d totaled US\$2,278,500, which is little less than 3,000 t/d case, but operation cost of US\$102,068,200 exceeds much from the reduced investment, and therefore the case of 3,000 t/d is clearly economical.

- (8) As a result of financial and economic evaluation, for the case that all required capital is covered by equity and with a copper price of US100 ¢ /lb, the financial IRR to the plan of the project results in 5.92%. Economical evaluation on this results in IRR of 12.47% in case that all required capital is covered by equity and copper price of US100 ¢ /lb.

- (9) It is concluded that under present copper price level (US70 ¢ /lb as of February 2002), mining development of sulfide ore in Yanqul district is negative, but the possibility of development still remains if copper price increases over 100 ¢ /lb.

- (10) If gold production is added at Bishara, IRR could be increased about 1%, and in case of copper price of 100 ¢ /lb, IRR would be 19.22%, and even in case of copper price of 90 ¢ /lb, it would be 8.83%. Furthermore, it is estimated that IRR could be raised up to 10% depending on smelting cost,

even under a copper price of 90 ¢ /lb.

11-2 Recommendations

Cyprus type massive sulfide exploration scheme that was established in Batinah Coast can also be successfully adapted to exploration in Yanqul area. Therefore, this exploration methodology can be adapted to other type of mineralization in Oman for more efficient exploration.

Under this economical situation, it would be difficult for a private company to enter into sulfide mineral development in Yanqul, but it depends on copper price to be increased up to US 100 ¢ /lb.

If the area is developed by a governmental firm, even US 90 ¢ /lb would be feasible. Figures III-11-1 and III-11-2 indicate copper and gold price change in the past 17 years which suggest that above-mentioned price is yet realistic.

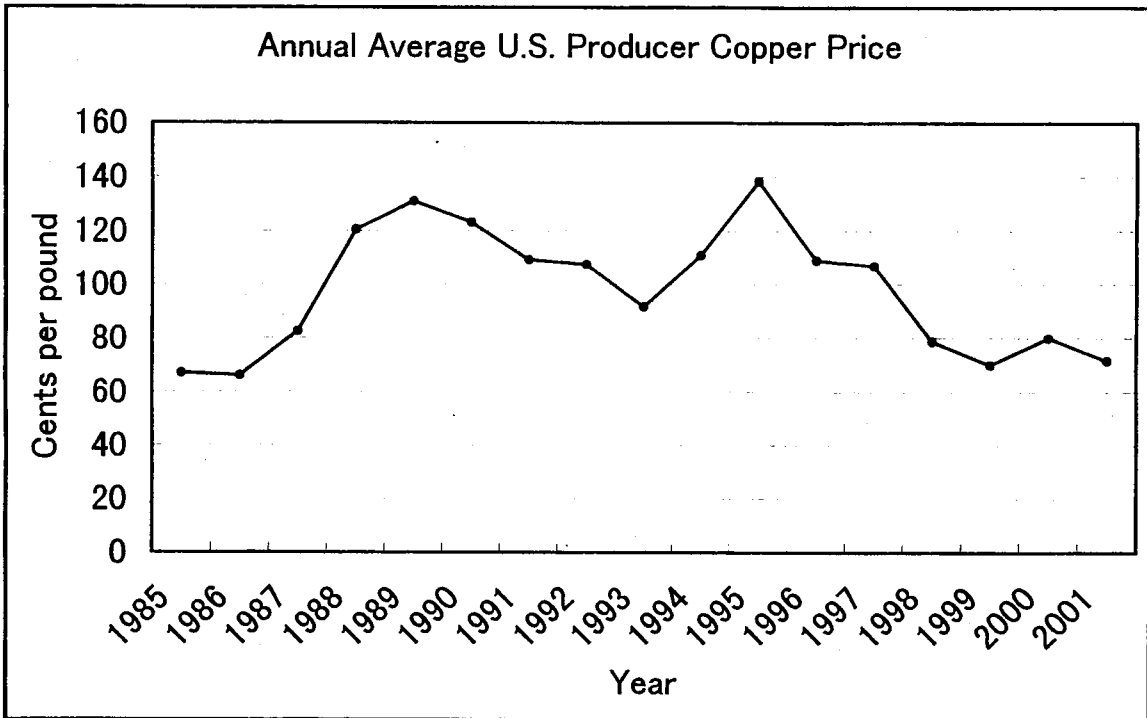


Fig. III-11-1 Historical copper price chart

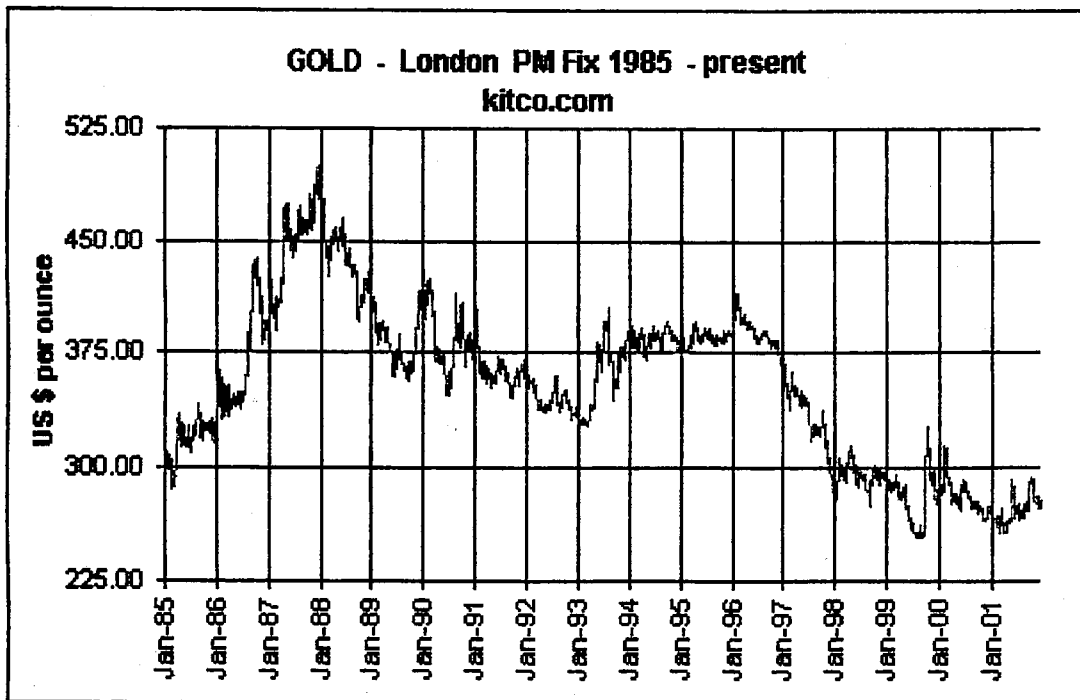


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Appendix

Appendix 1

Basic data of metallurgical tests

Appendix 1A

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 1B

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 Screen Aperture, μm		106	
Product 80% passing, μm	82				
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 Job No. N108FLOO Technician DS Test Date 21.11.00 File ref BMW108B			Comments		
<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					
<i>Version 5</i>					

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		Comments		
Job No.	N108FLOO				
Technician	T.E				
Test Date	23/11/00				
File ref	BMW108C				
Version 5					

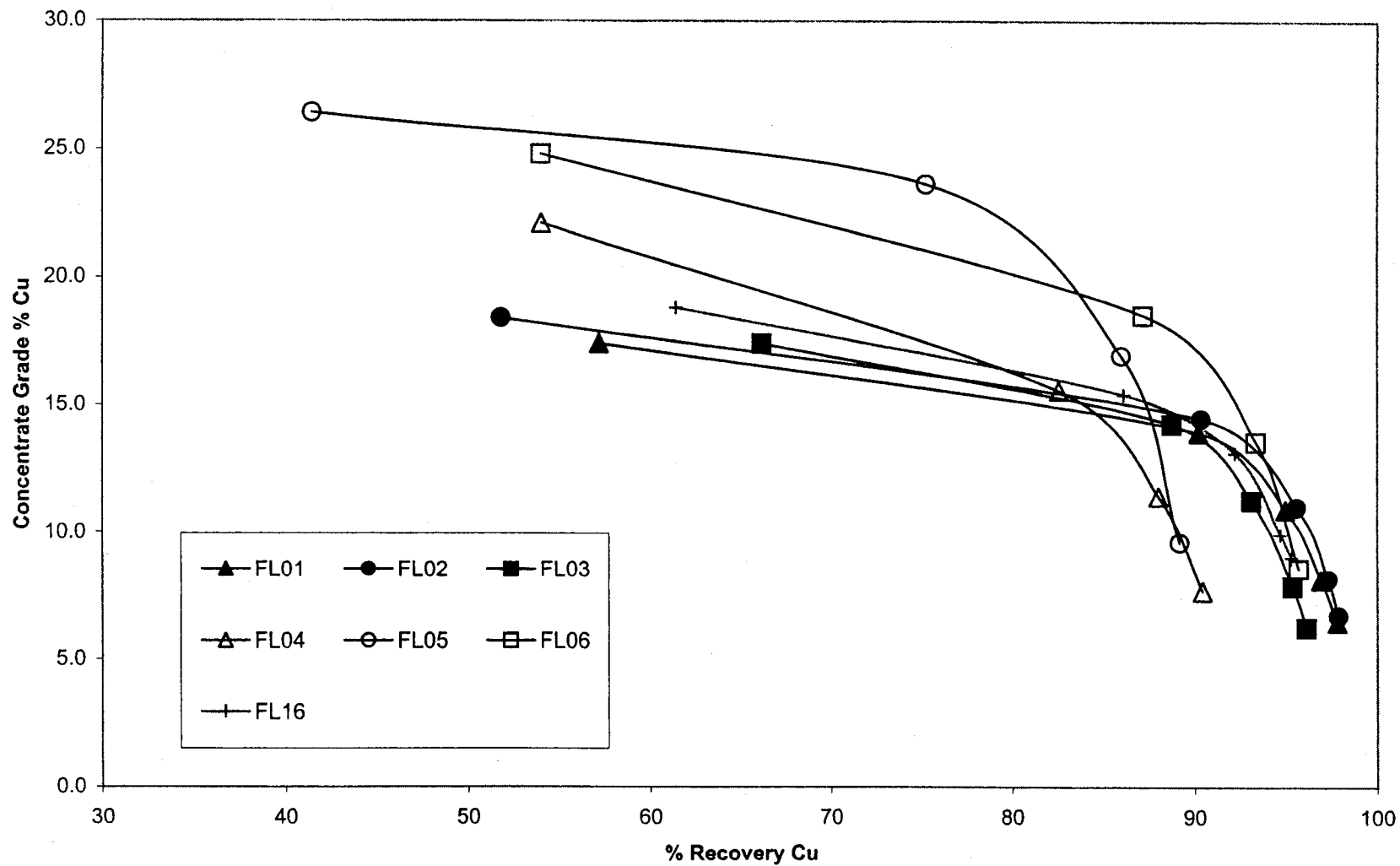
BOND BALL MILL WORK INDEX

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 Job No. N108FL00 Technician DS Test Date 27.11.00 File ref BMW108D			Comments		
Version 5					

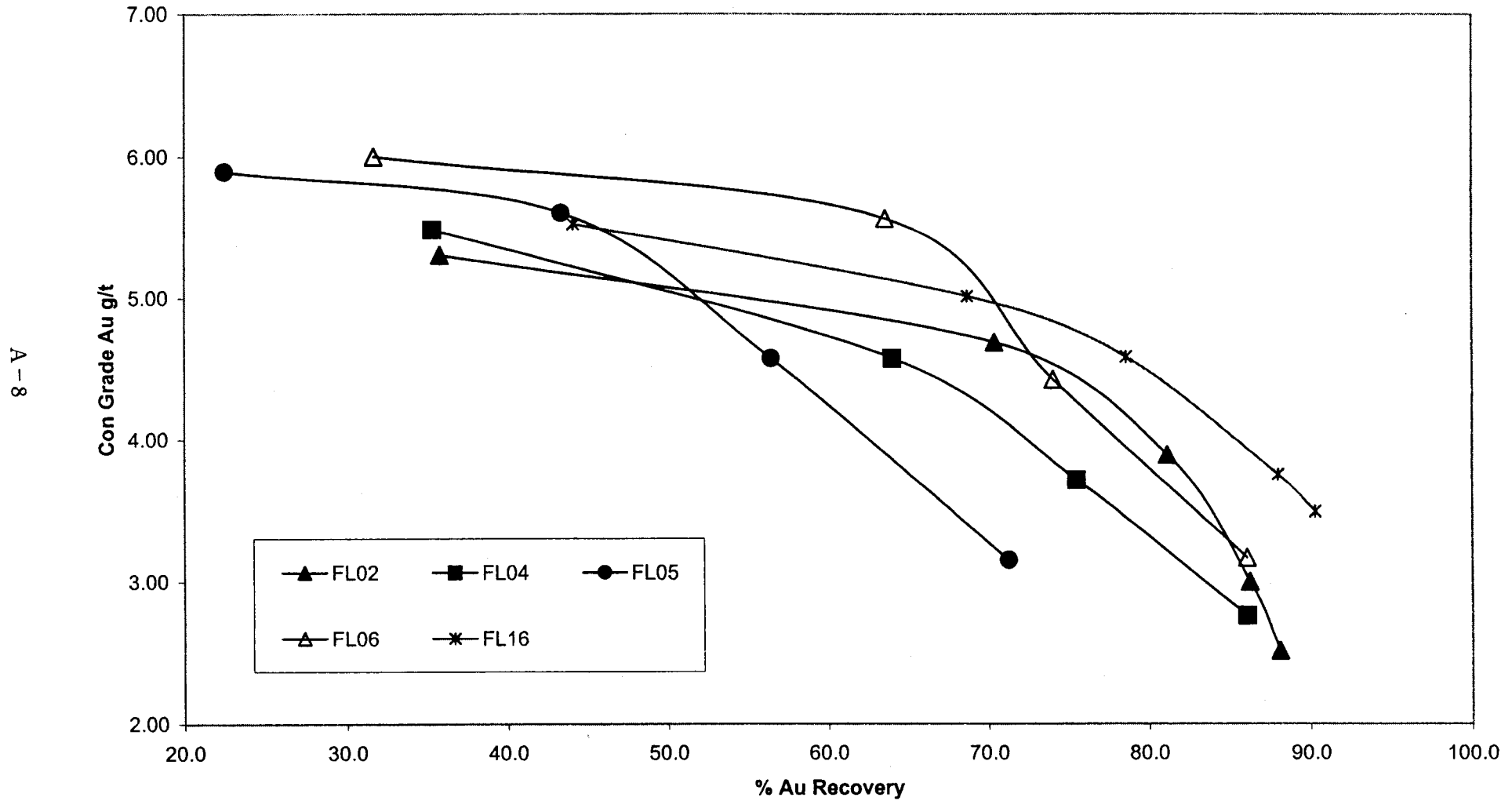
Appendix 1C

Batch flotation tests

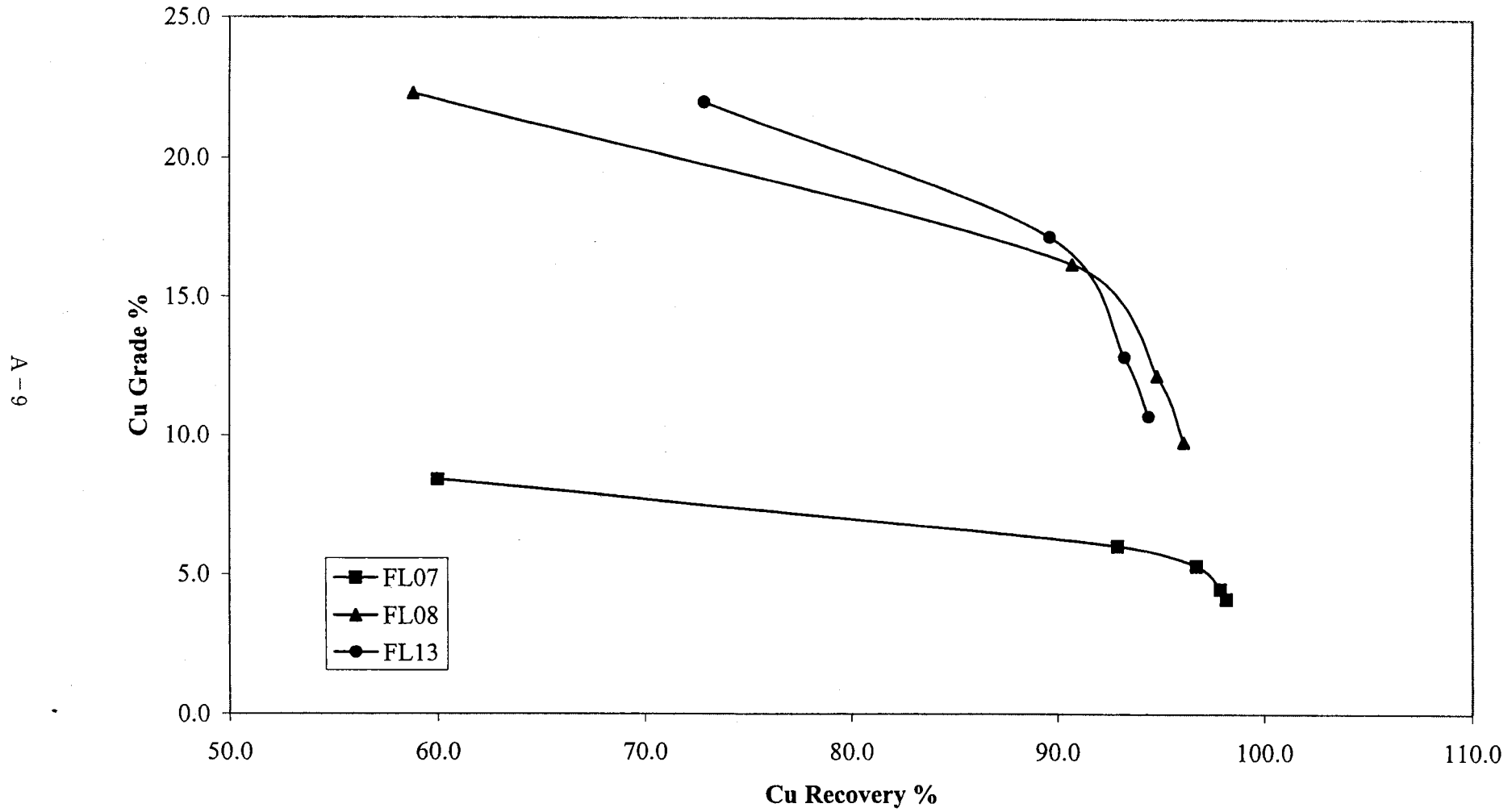
Rakah Stockwork Cu Grade vs Recovery



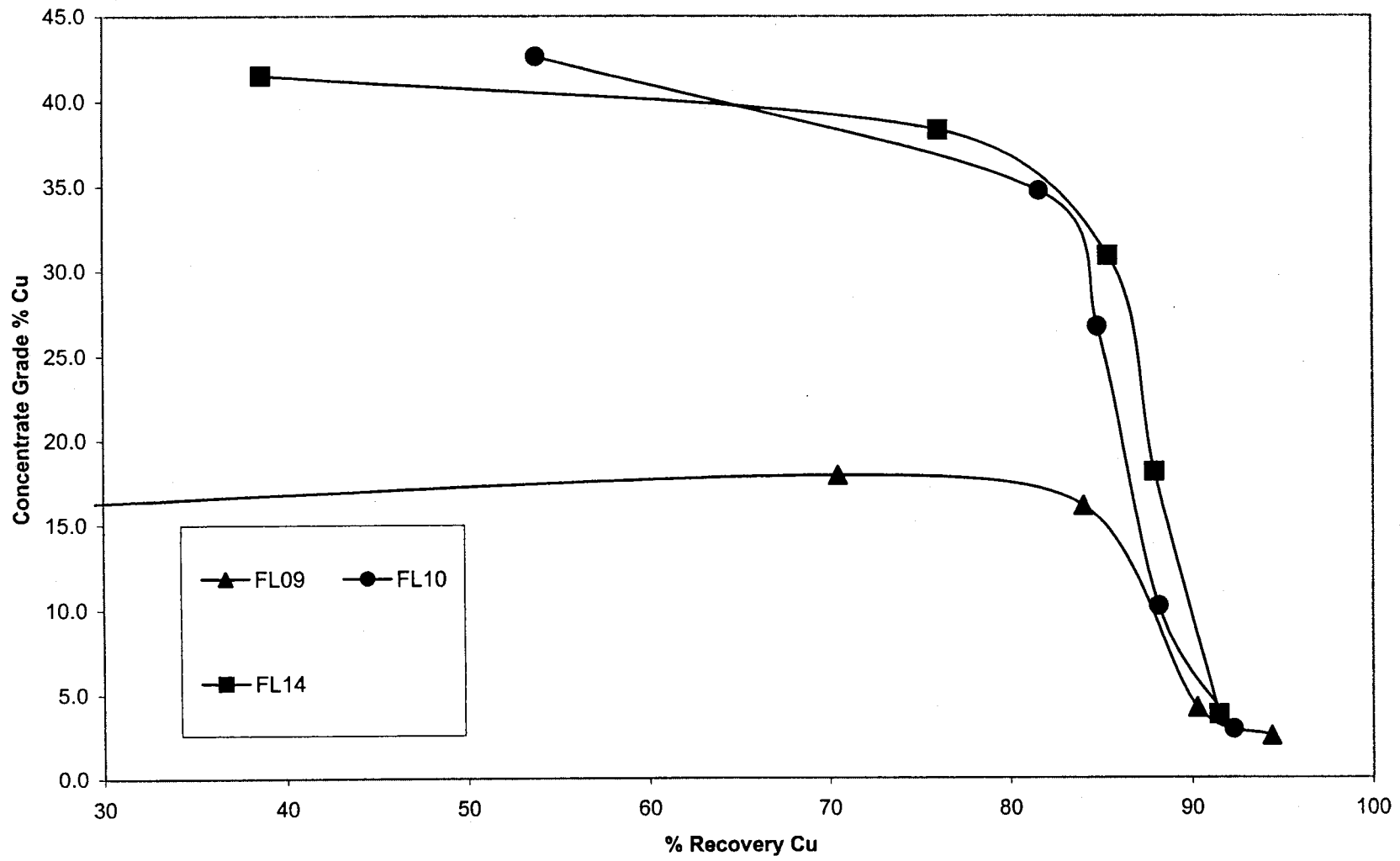
Rakah Stockwork Au Grade vs Recovery



Hayl As Safil - Cu Grade vs Recovery

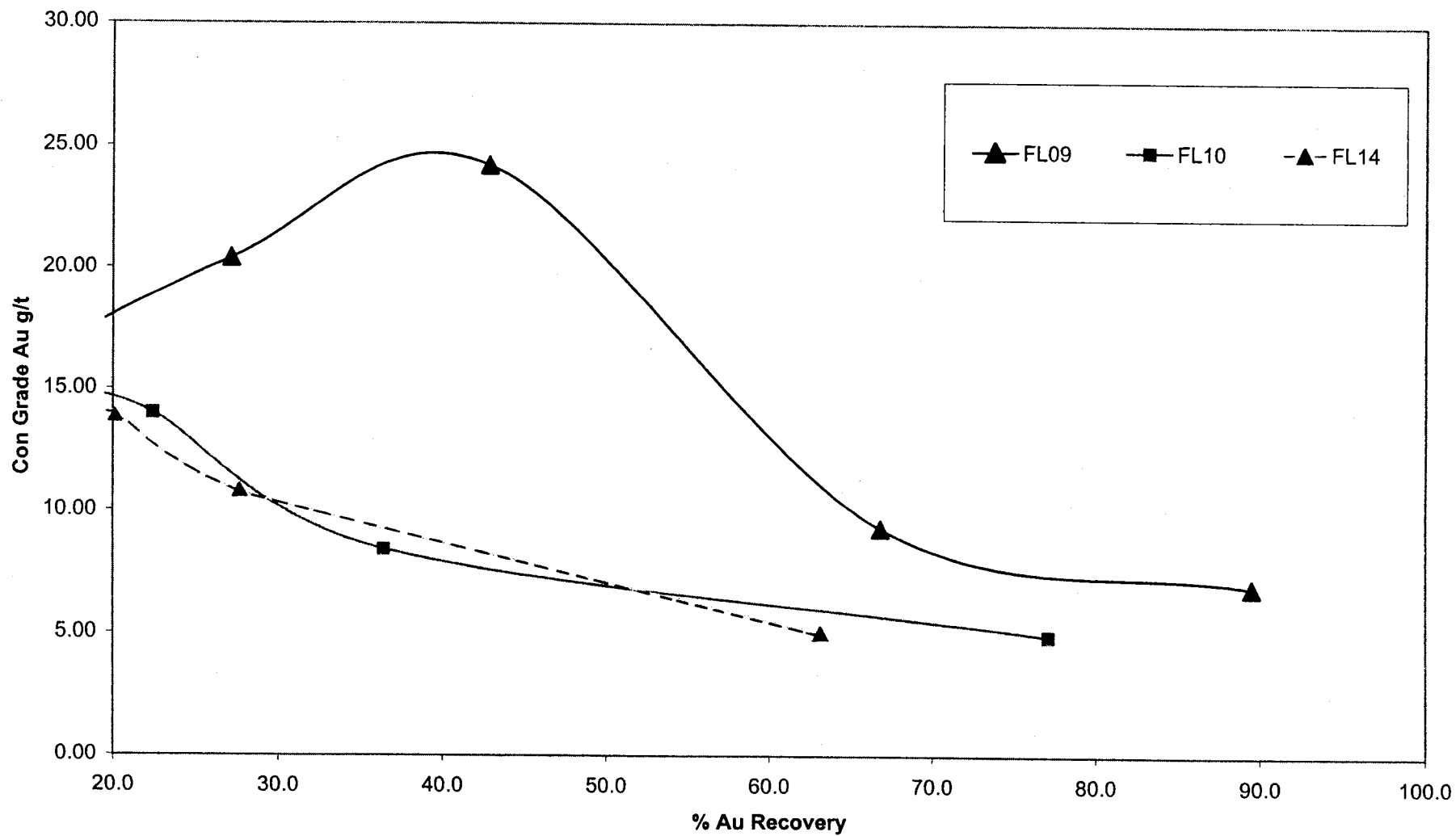


Rakah Massive Sulphide Cu Grade vs Recovery



A-10

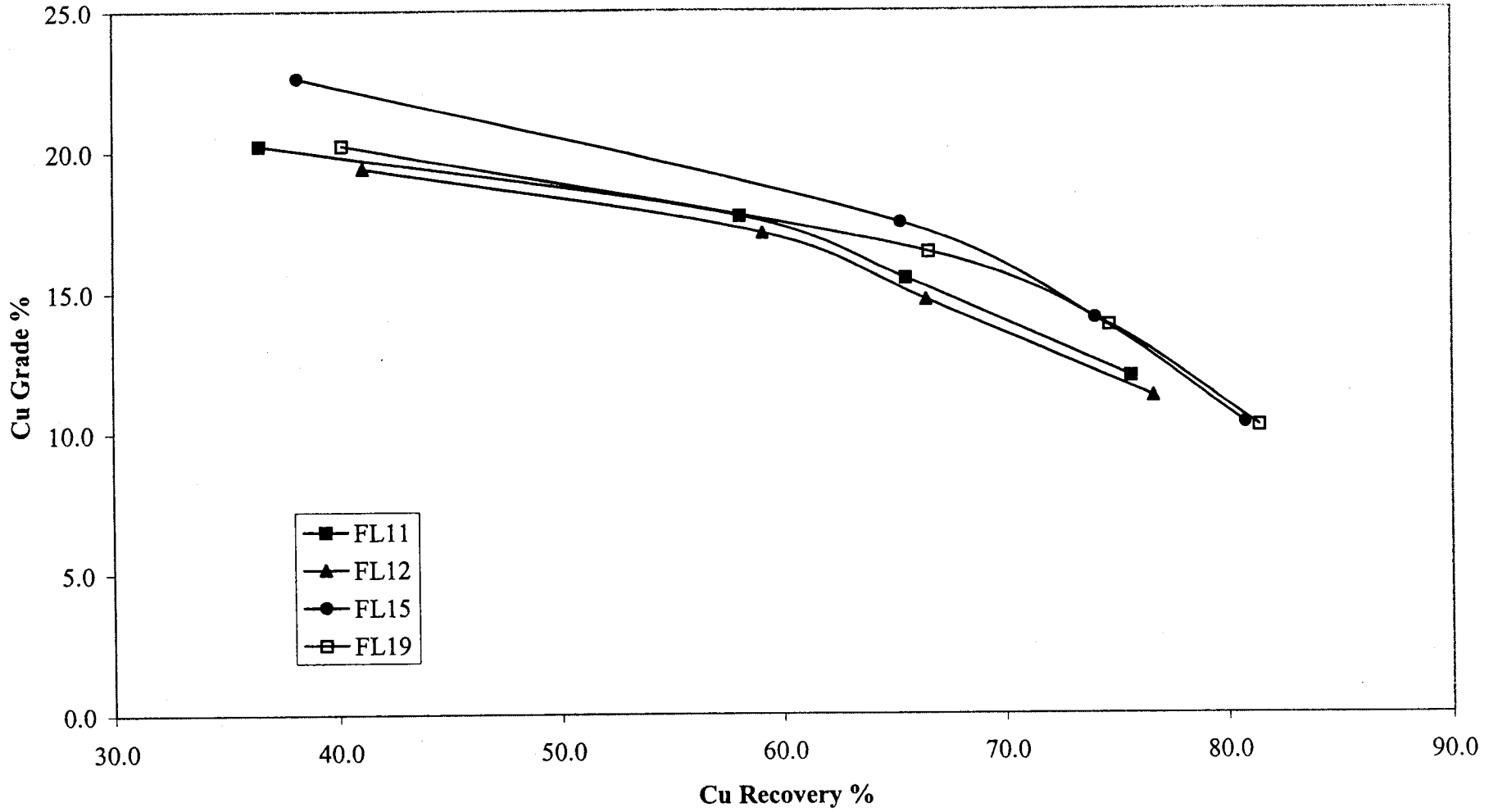
Rakah Massive Sulphide Au Grade vs Recovery



A-11

Bishara Breccia Cu Grade vs Recovery

A - 12



Appendix 1D

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	Chalcopyrite, (bornite)
Sphalerite	1		
Silicates	23	20	Chalcopyrite, (bornite), (chalcocite)
	100		

Scale of common intergrowths

Chalcopyrite – pyrite/marcasite : 5-30 μ m

Chalcopyrite – silicates : 5-20 μ m

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		
Pyrite/marcasite	35	30	Chalcopyrite, (pyrite)
Sphalerite	1		
Silicates	38	40	Chalcopyrite
	100		

Scale of common intergrowths

Chalcopyrite – pyrite/marcasite : 5-30 μ m

Chalcopyrite – silicates : 5-30 μ m

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 1E

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
Ma 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

Appendix 1F

Cyanidation of pyrite concentrates

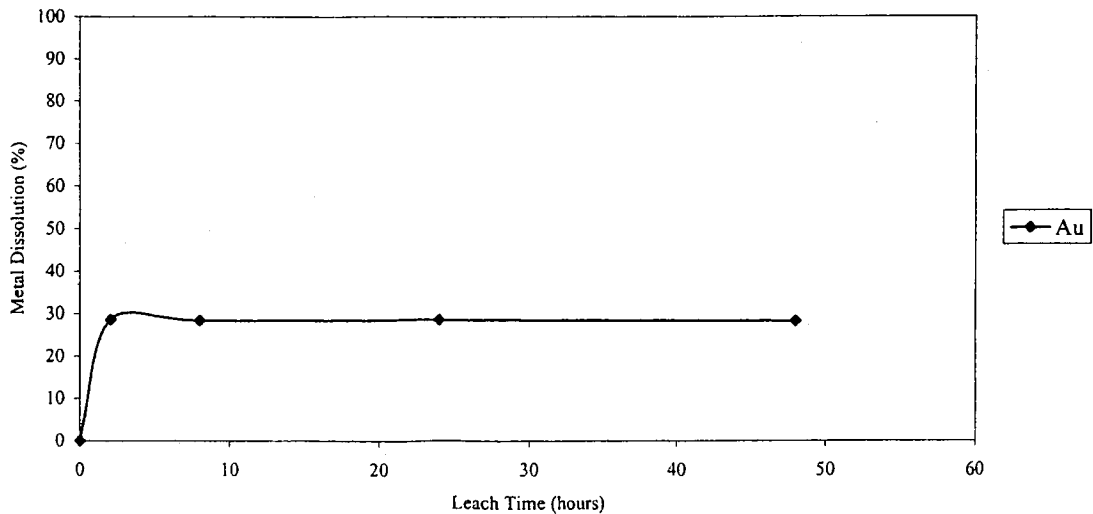
AGITATION CYANIDE LEACH TEST

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

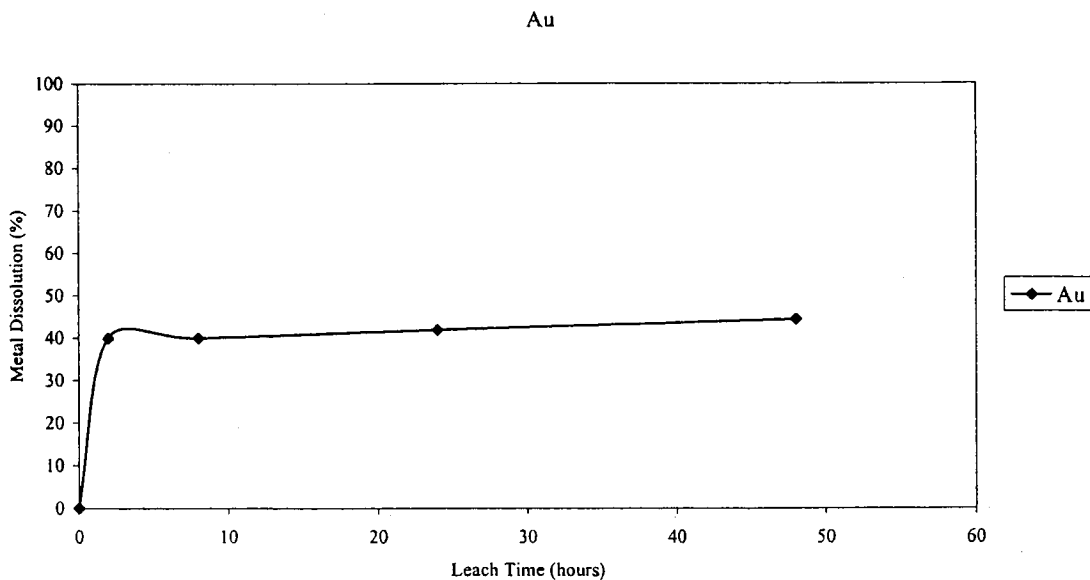


AGITATION CYANIDE LEACH TEST

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)							
Au				0.61	0.60	0.64	0.72
Metal Dissolution (%)							
Au				40	40	42	44
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							
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 %.

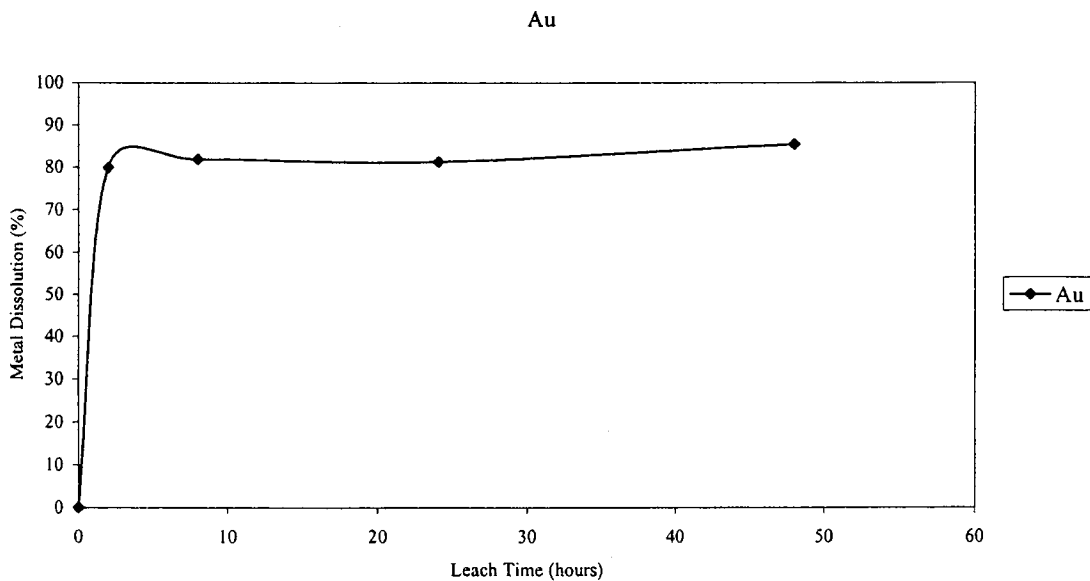


AGITATION CYANIDE LEACH TEST

Test No.	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	20.2	22.0	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					
<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 %.

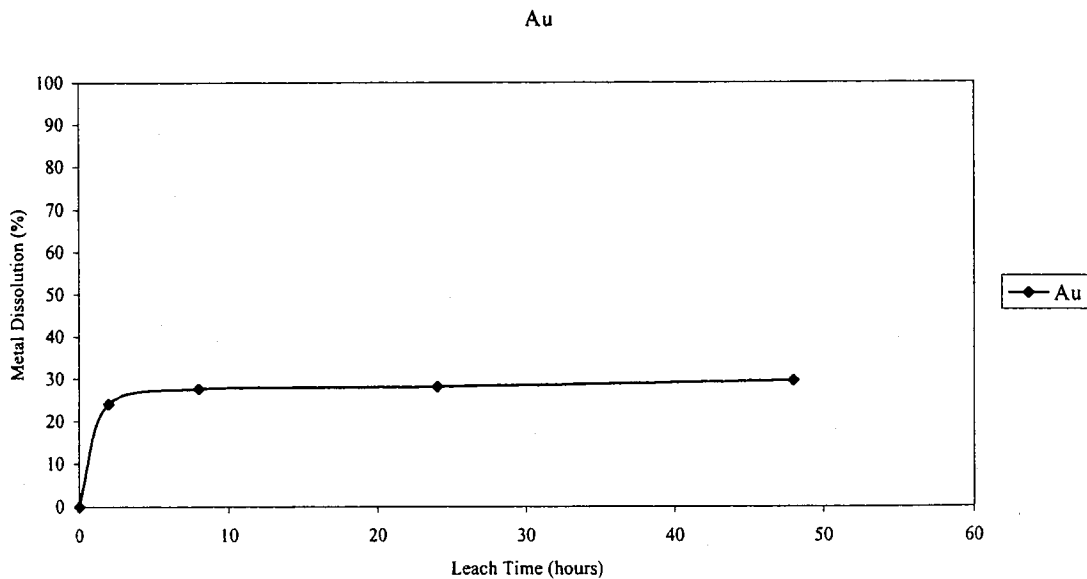


AGITATION CYANIDE LEACH TEST

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 %.

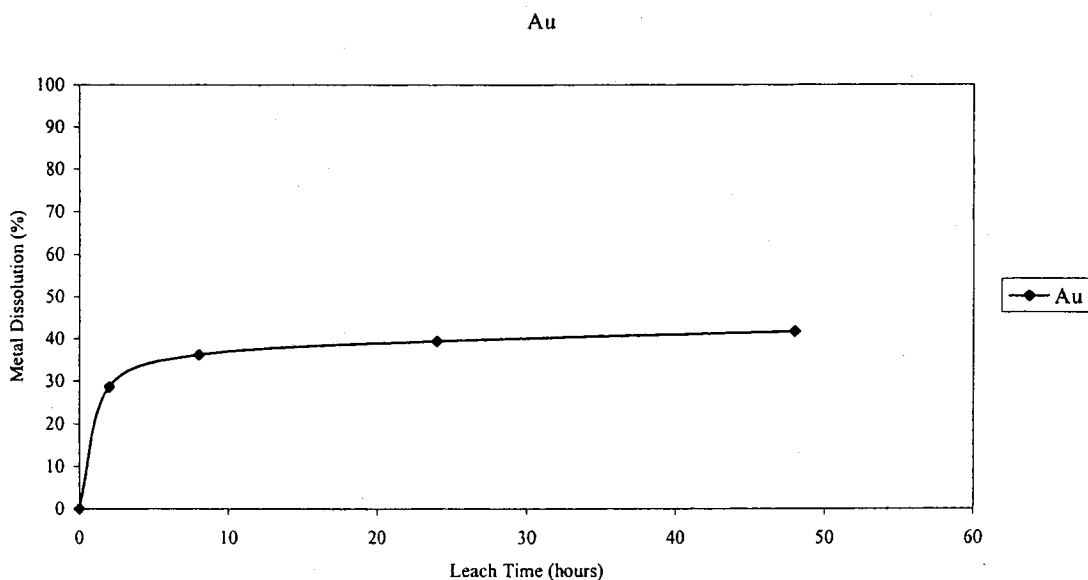


AGITATION CYANIDE LEACH TEST

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)						
Au			0.24	0.29	0.33	0.35
Metal Dissolution (%)						
Au			29	36	39	42
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.	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 %

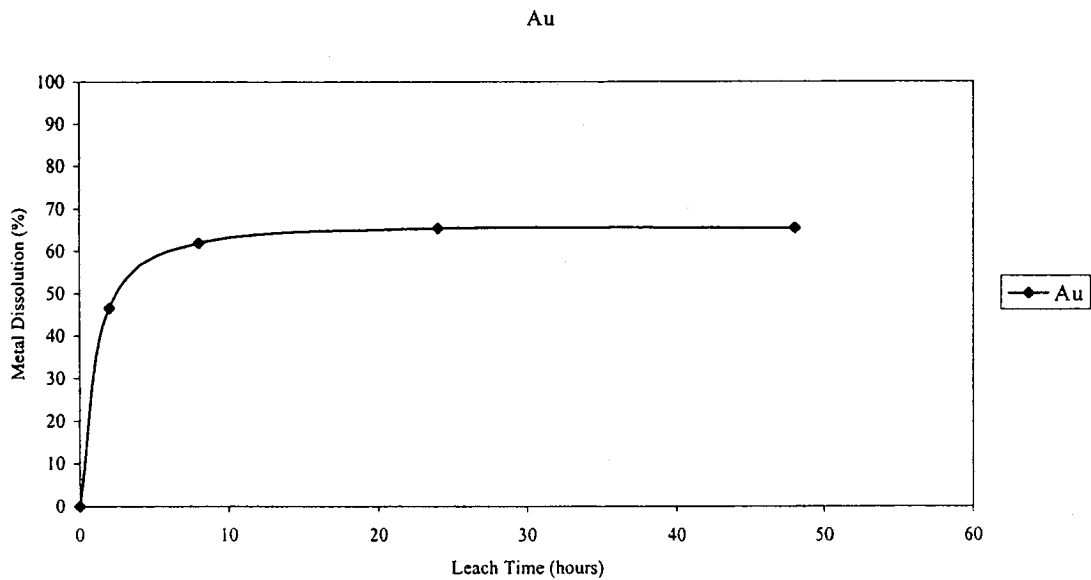


AGITATION CYANIDE LEACH TEST

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						
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 %.



Appendix 1G

Cyanidation of pyrite tailings

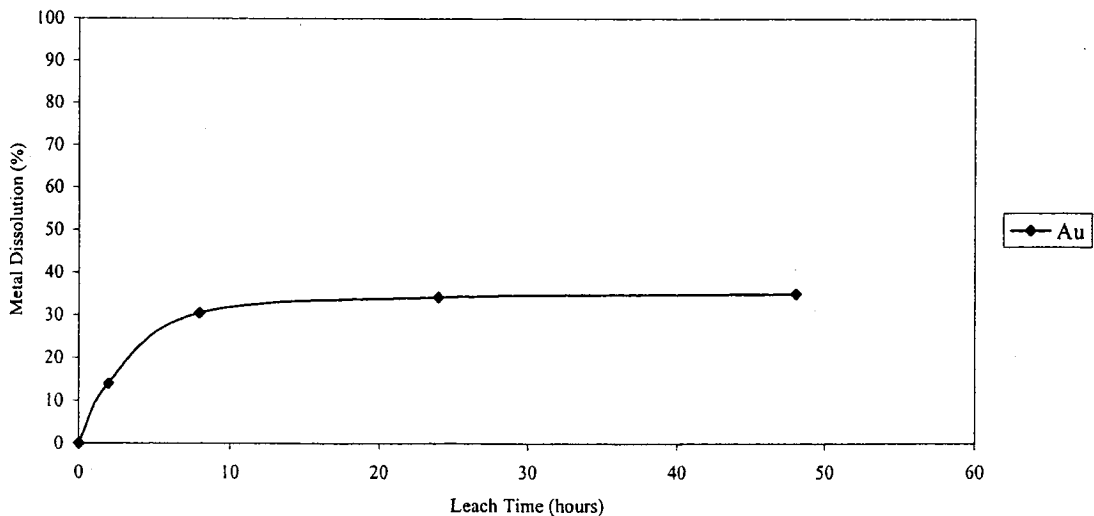
AGITATION CYANIDE LEACH TEST

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 Job No. N108FL00 Technician KT Test Date 7/2/01 File ref CYN108RMS			Comments Pyrite tail from tests FL9, 10, 14 Ag assays; Leach feed <2ppm, leach residue <2ppm				
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



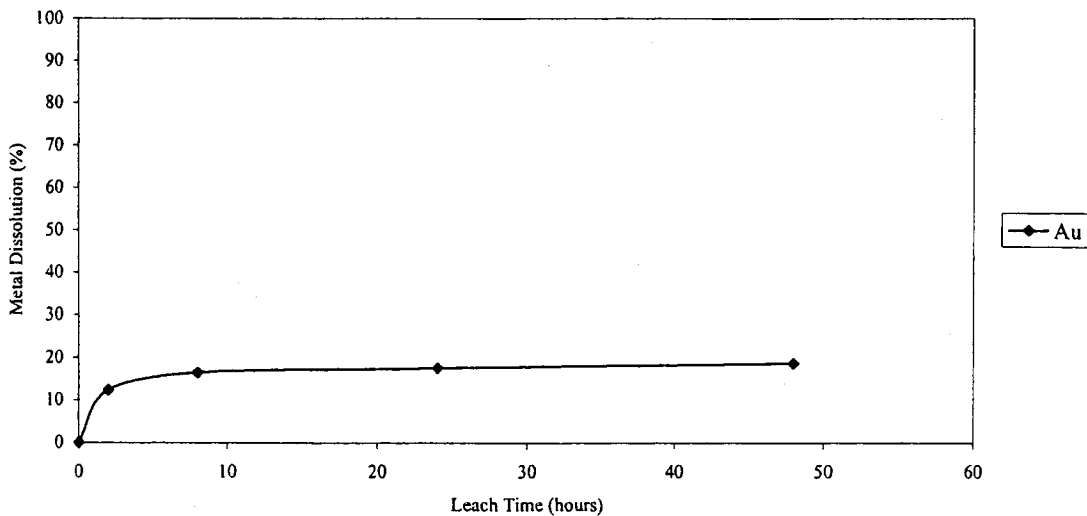
AGITATION CYANIDE LEACH TEST

Test No.		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)							
Au				0.07	0.09	0.10	0.11
Metal Dissolution (%)							
Au				12	16	18	19
Leach Conditions							
Slurry Density (%w/w)		40	39	39	40	41	
NaCN conc (pre-adjustment)			0.014	0.030	0.030	0.030	0.042
NaCN conc (post-adjustment)		0.097	0.095	0.102	0.105	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	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							
<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 1H

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

Semi-quantitative 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 1I

Equipments used for metallurgical tests

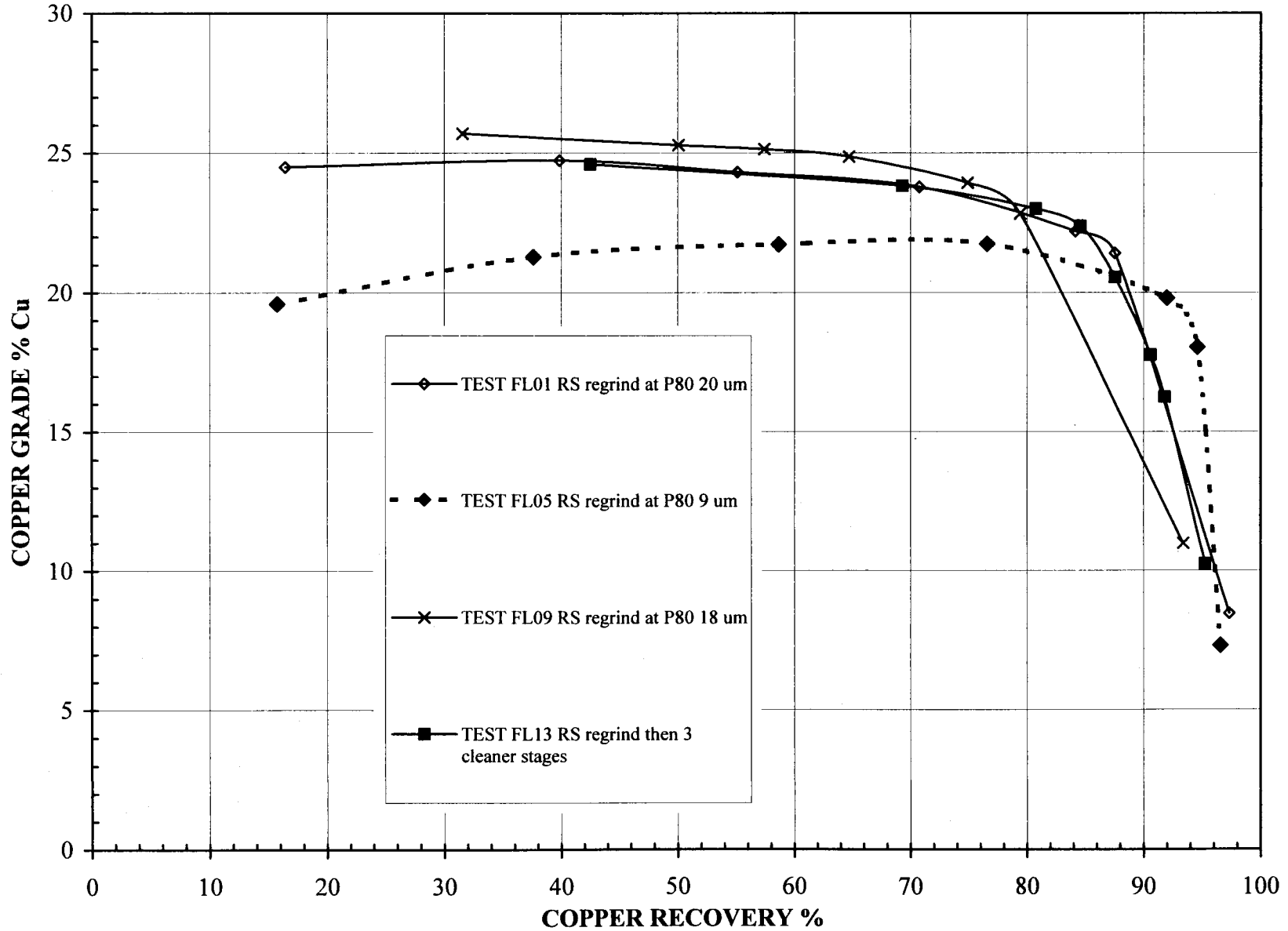
LIST OF MAJOR EQUIPMENT

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 1J

Effect of regrind

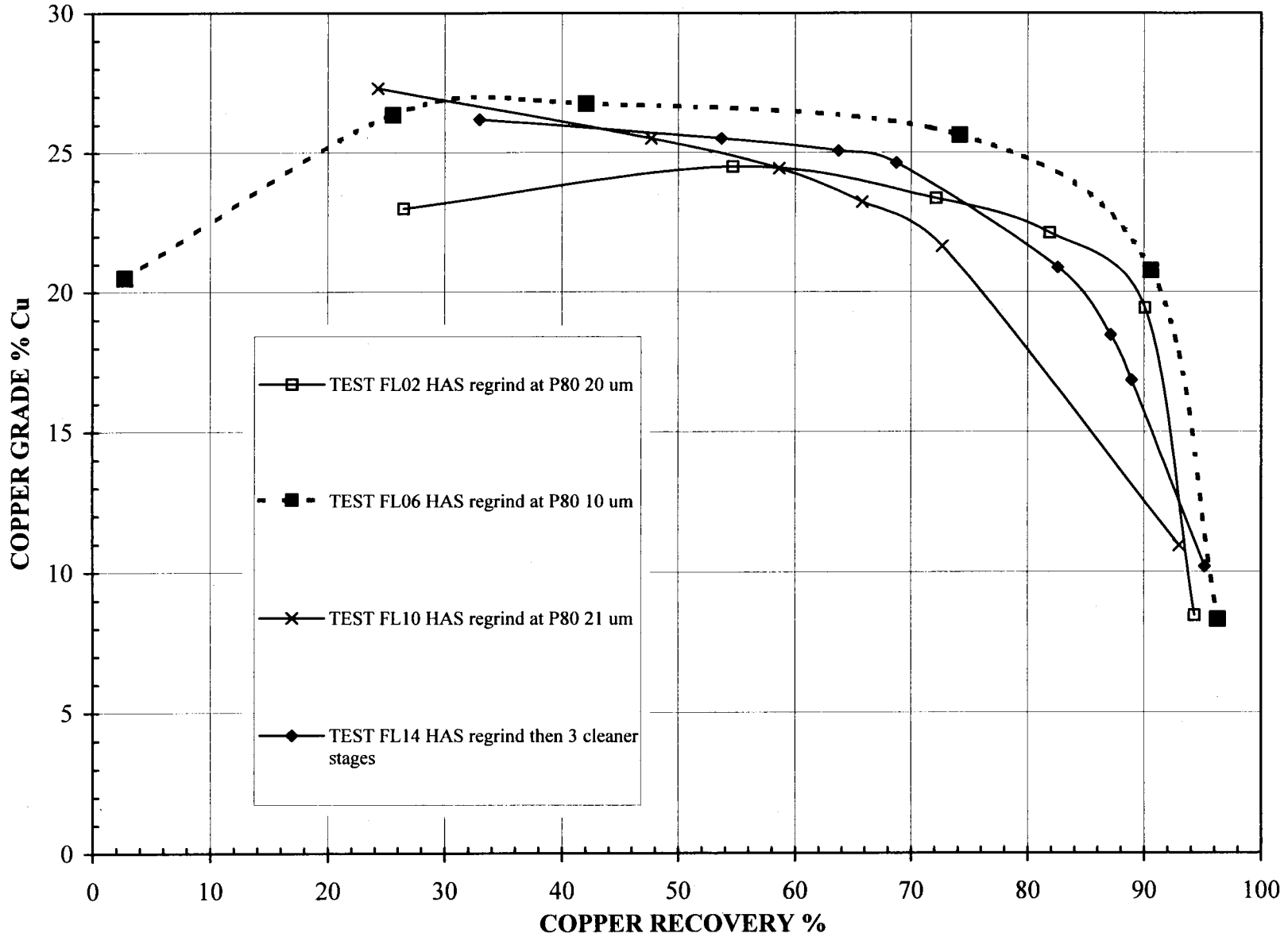
RS ORE
COPPER METALLURGY in CLEANER TESTS - RAKAH PROJECT
EFFECT of REGRIND SIZE on CLEANING TOTAL RO/SCAV CONS



HAS ORE

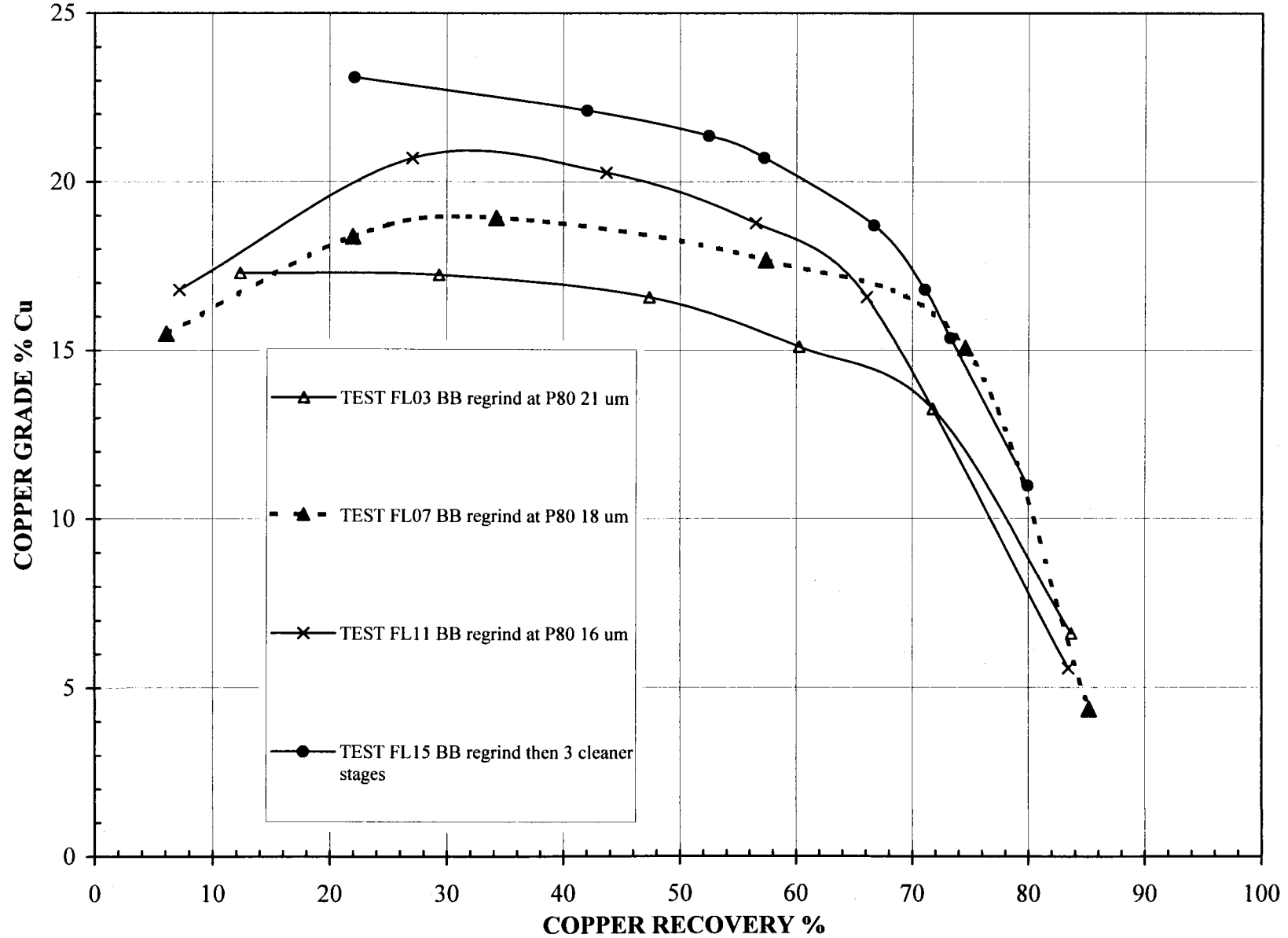
COPPER METALLURGY in CLEANER TESTS - RAKAH PROJECT

EFFECT of REGRIND SIZE on CLEANING TOTAL RO/SCAV CONS

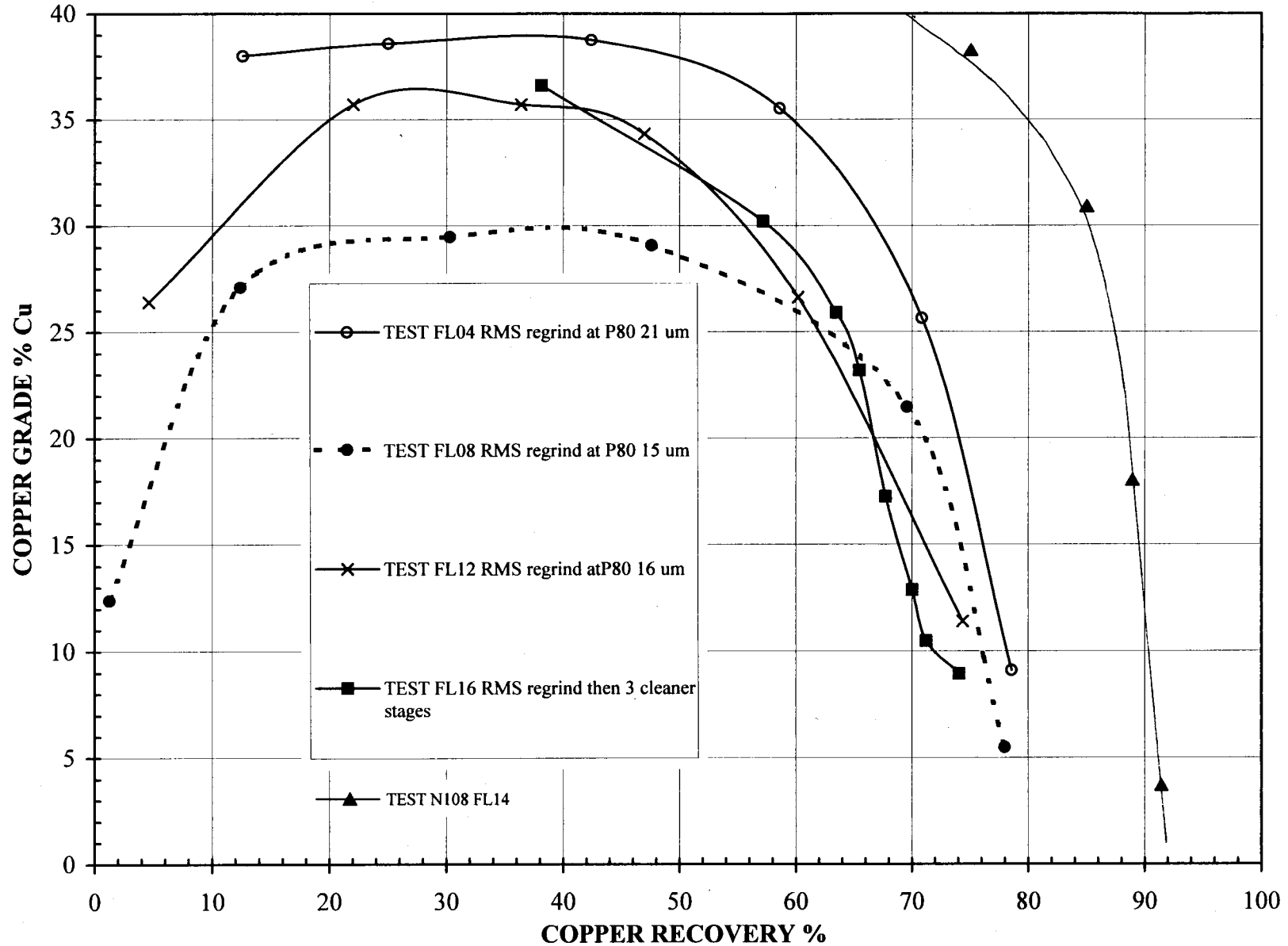


BB ORE

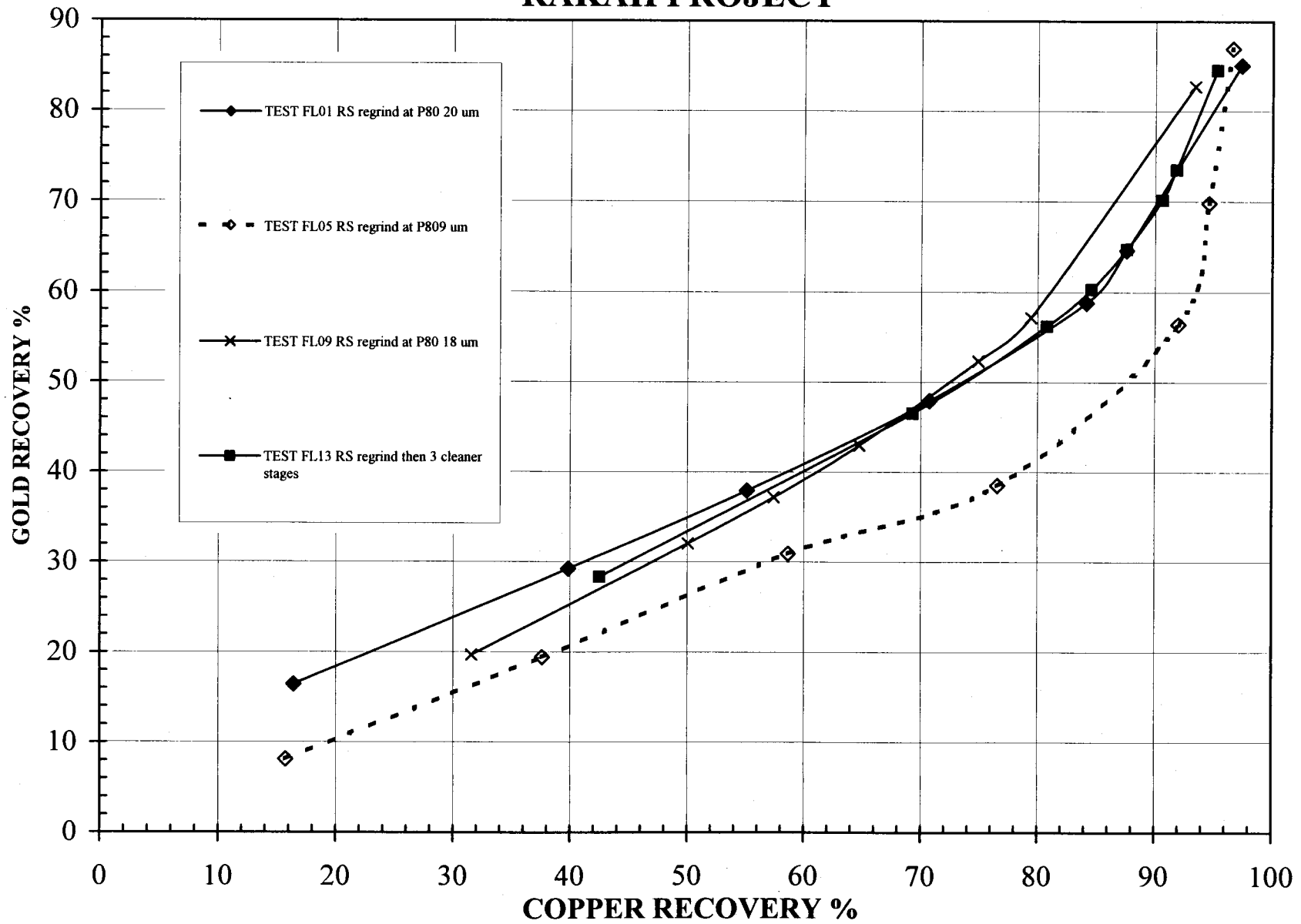
COPPER METALLURGY in CLEANER TESTS - RAKAH PROJECT EFFECT of REGRIND SIZE on CLEANING TOTAL RO/SCAV CONS



RMS ORE
COPPER METALLURGY in CLEANER TESTS - RAKAH PROJECT
EFFECT of REGRIND SIZE on CLEANING TOTAL RO/SCAV CONS



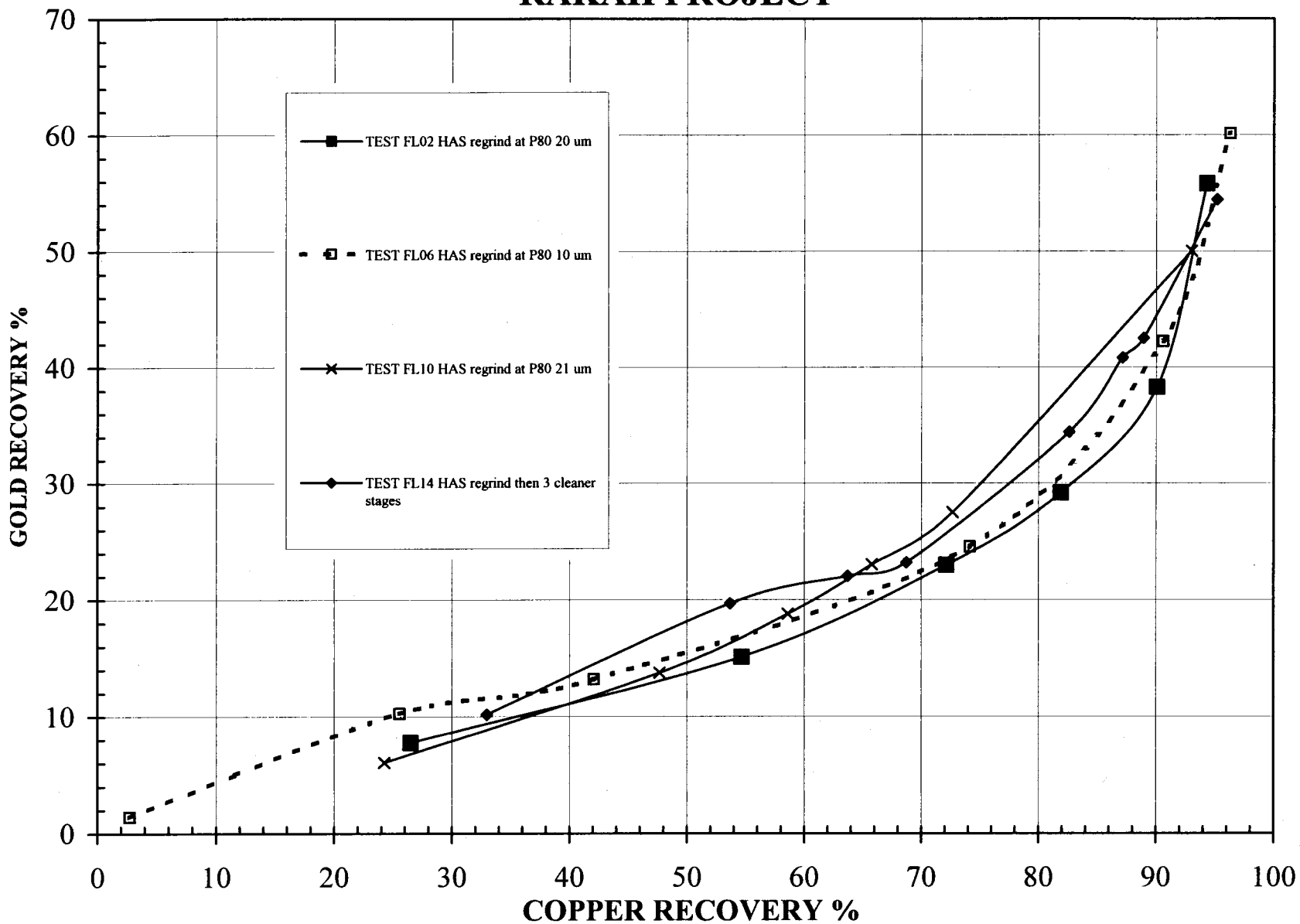
RS ORE
GOLD RESPONSE to REGRIND in CLEANER TESTS
RAKAH PROJECT



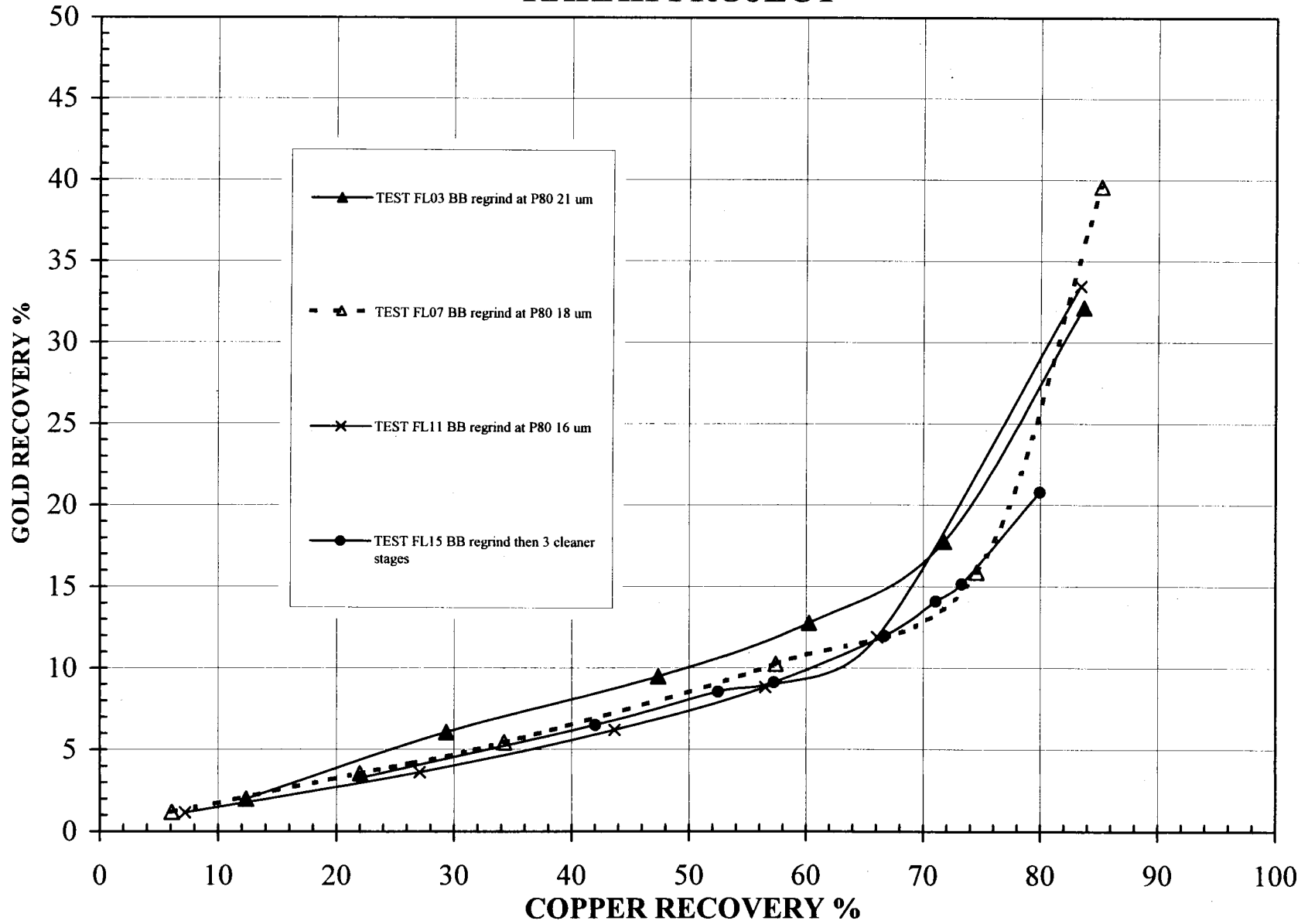
HAS ORE

GOLD RESPONSE to REGRIND in CLEANER TESTS

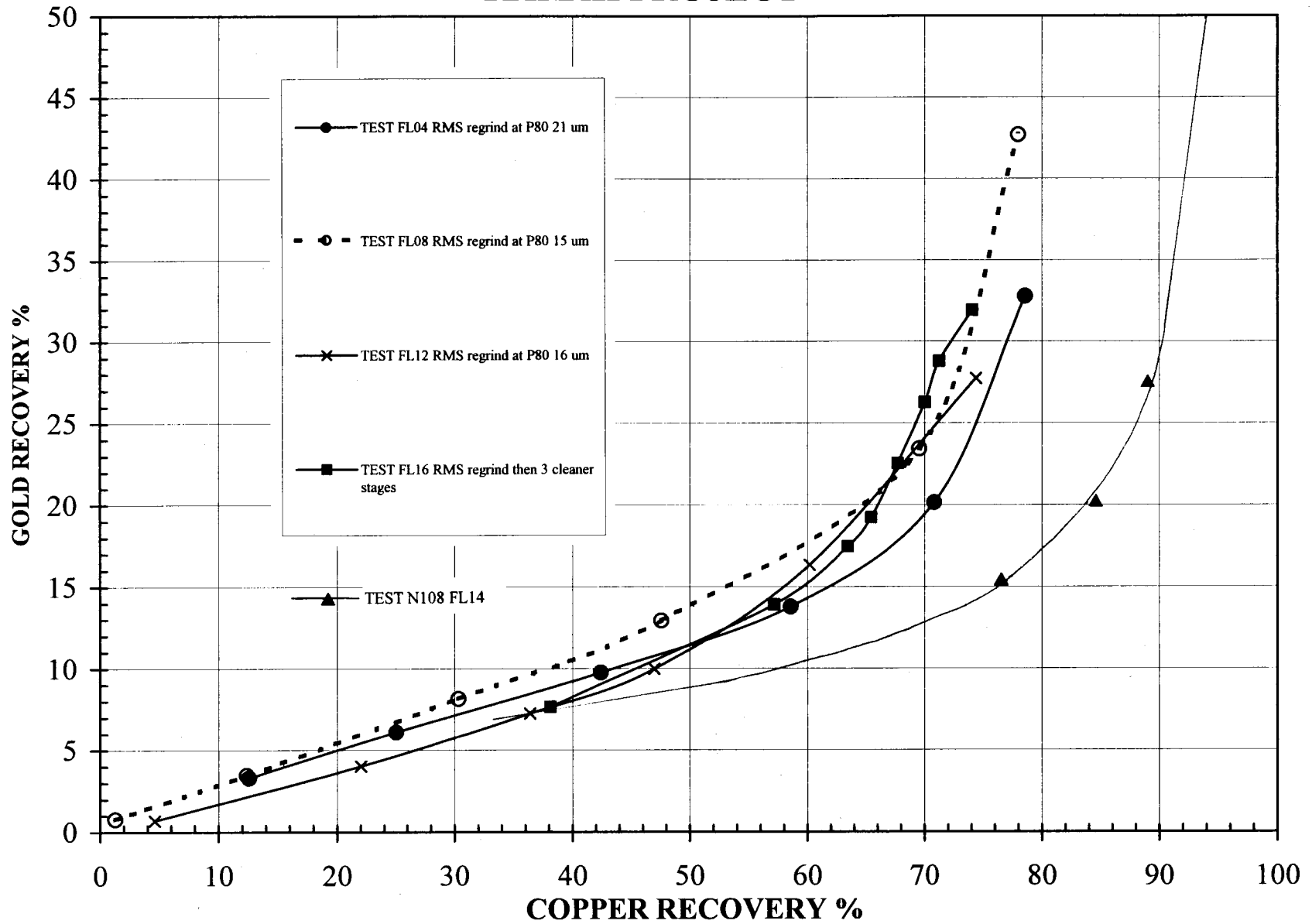
RAKAH PROJECT

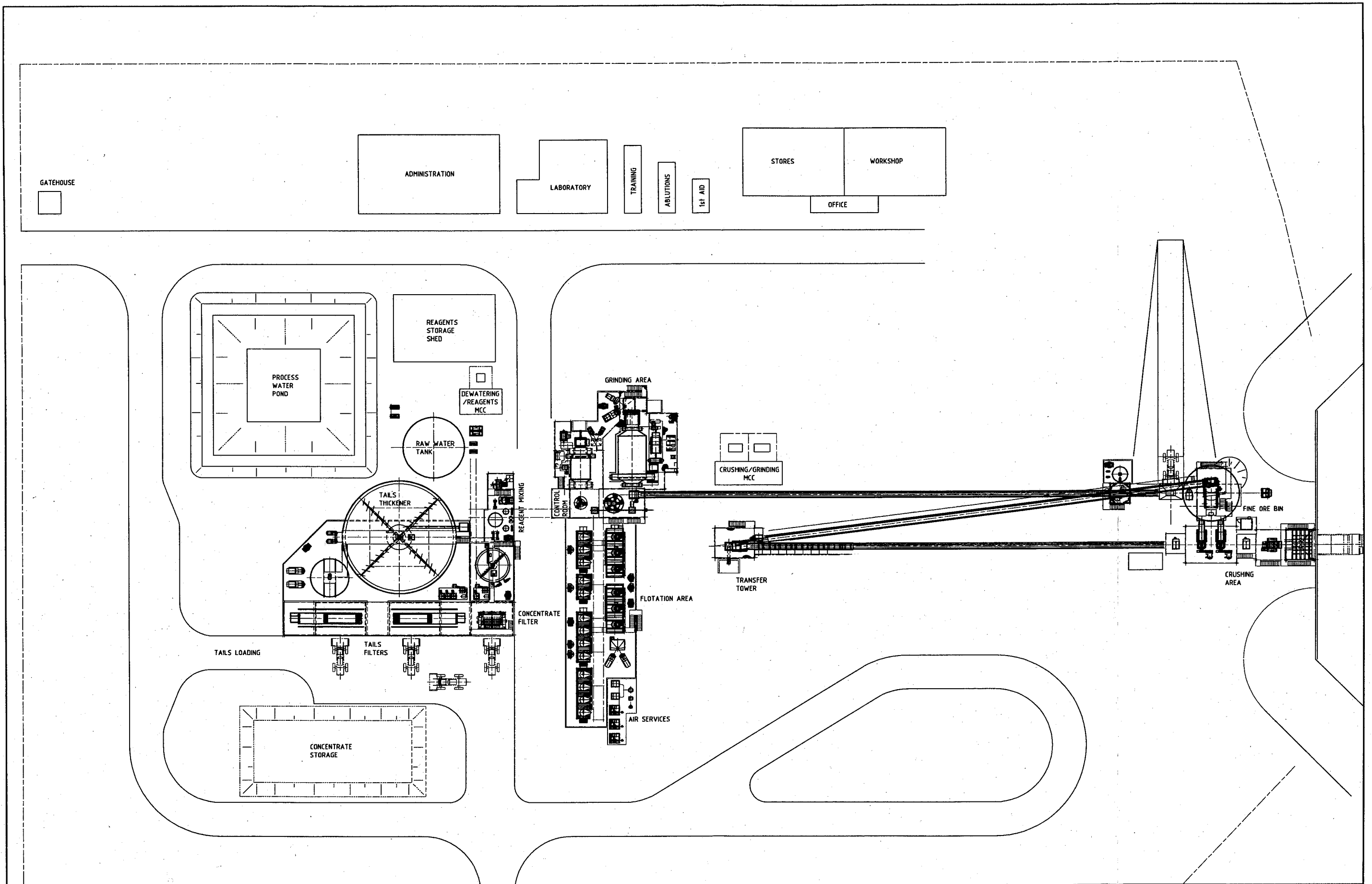


BB ORE
GOLD RESPONSE to REGRIND in CLEANER TESTS
RAKAH PROJECT

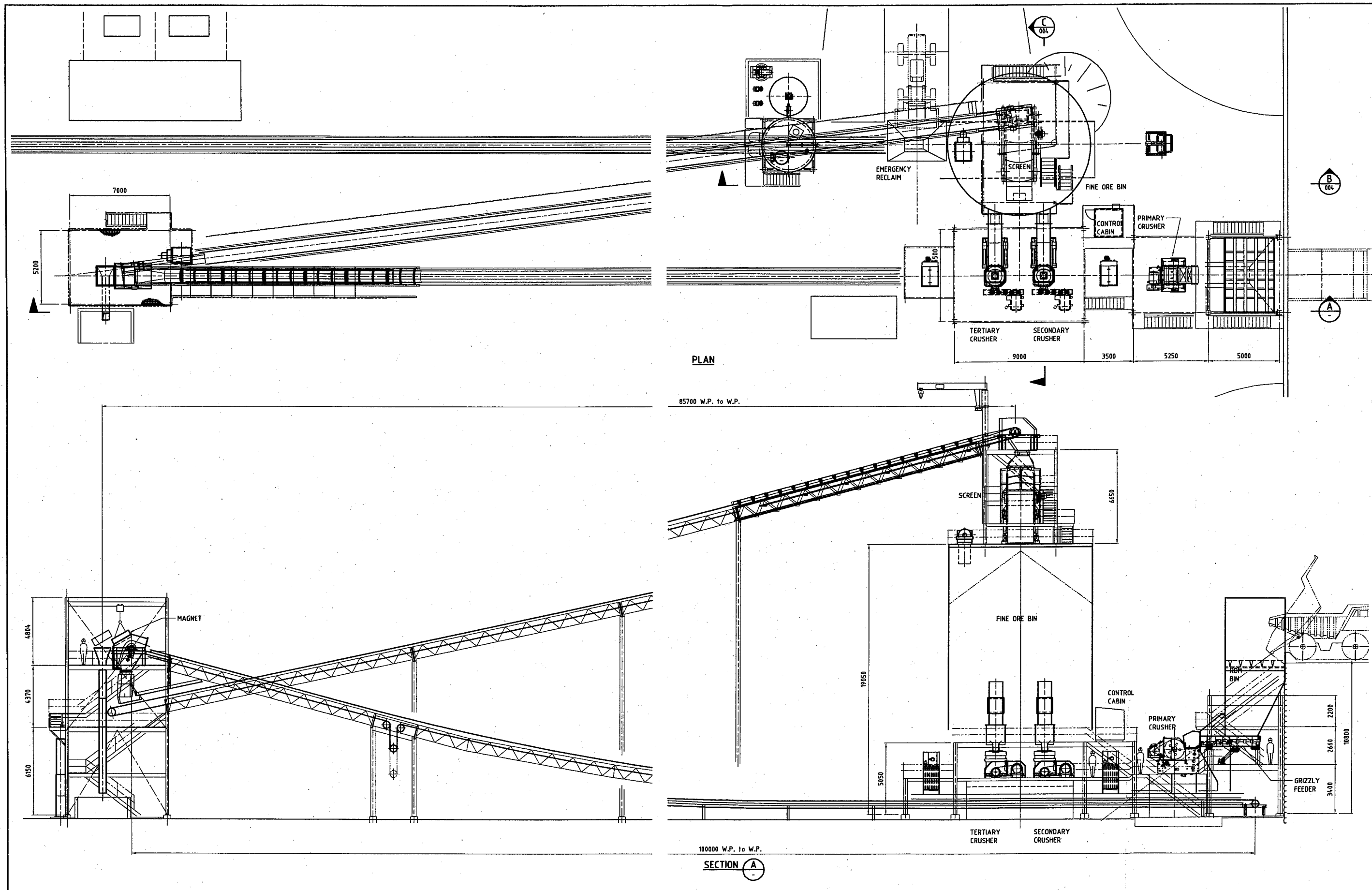


RMS ORE GOLD RESPONSE to REGRIND in CLEANER TESTS RAKAH PROJECT

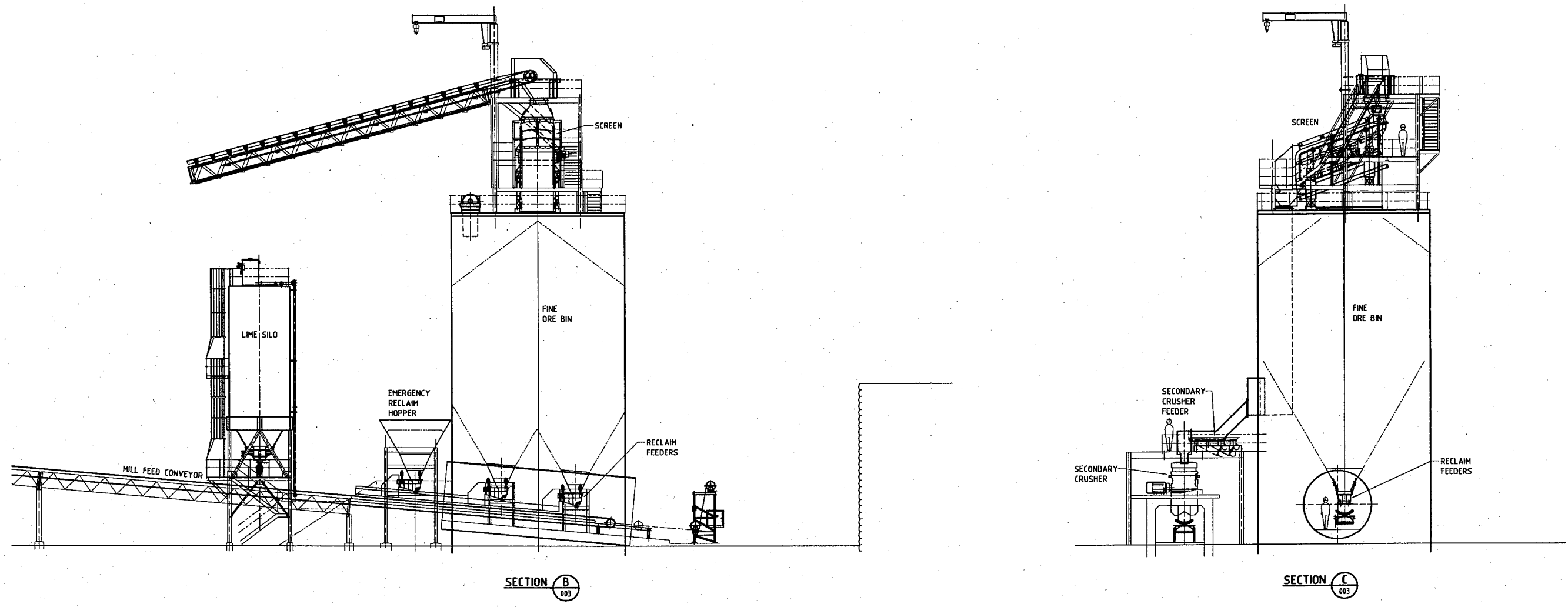




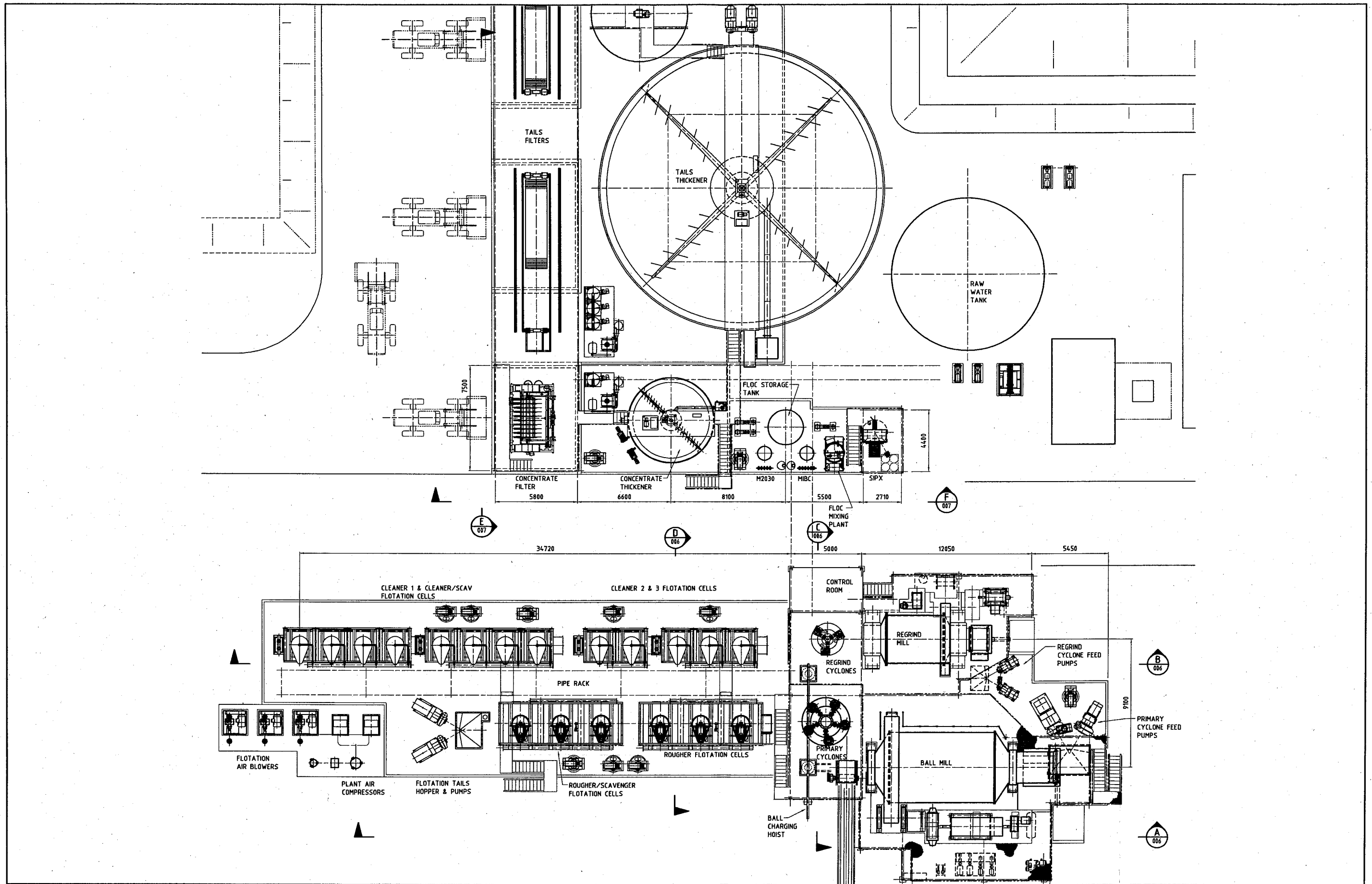
Plant layout



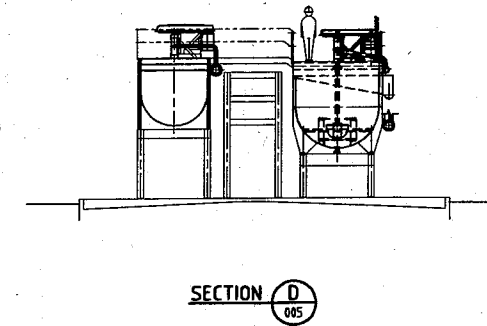
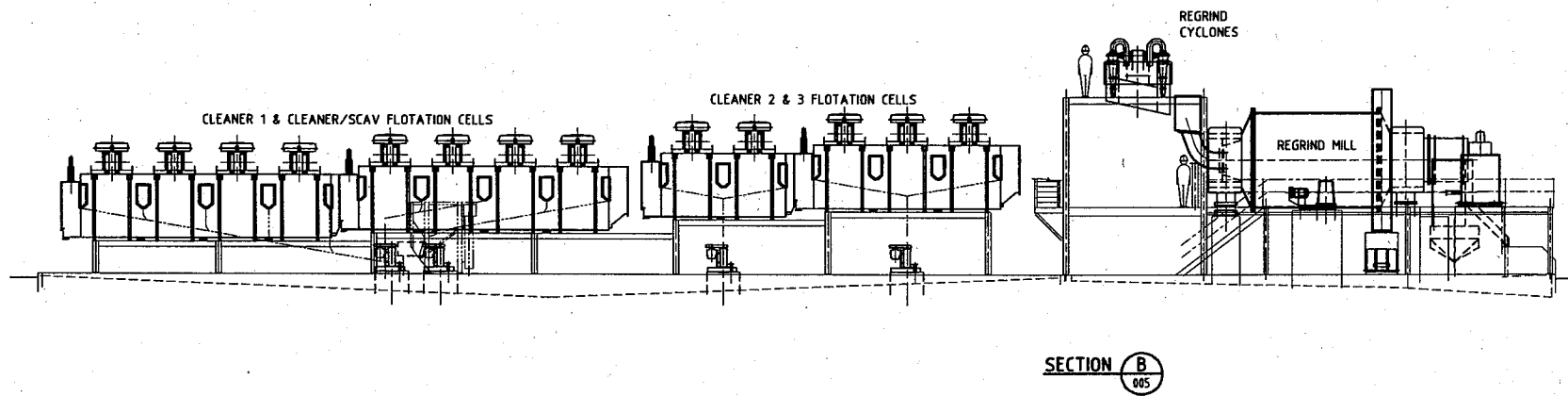
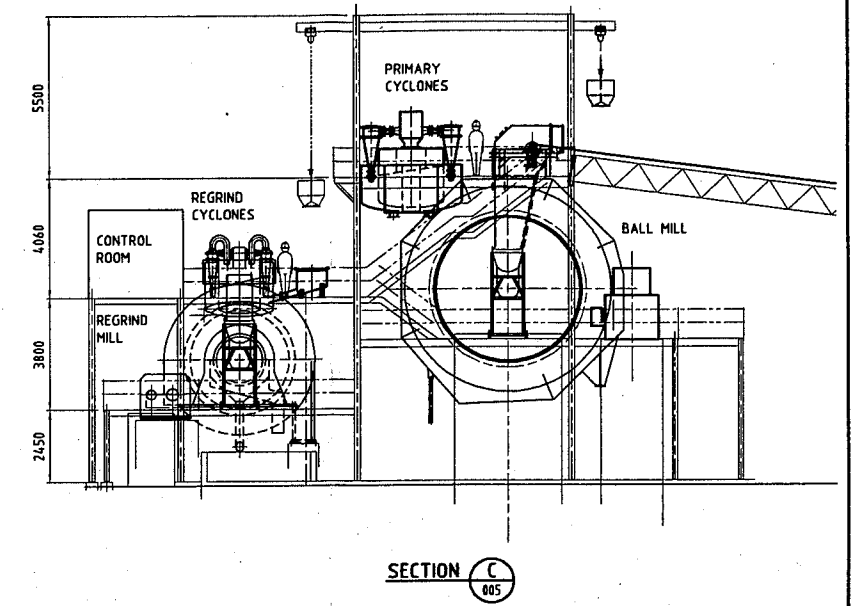
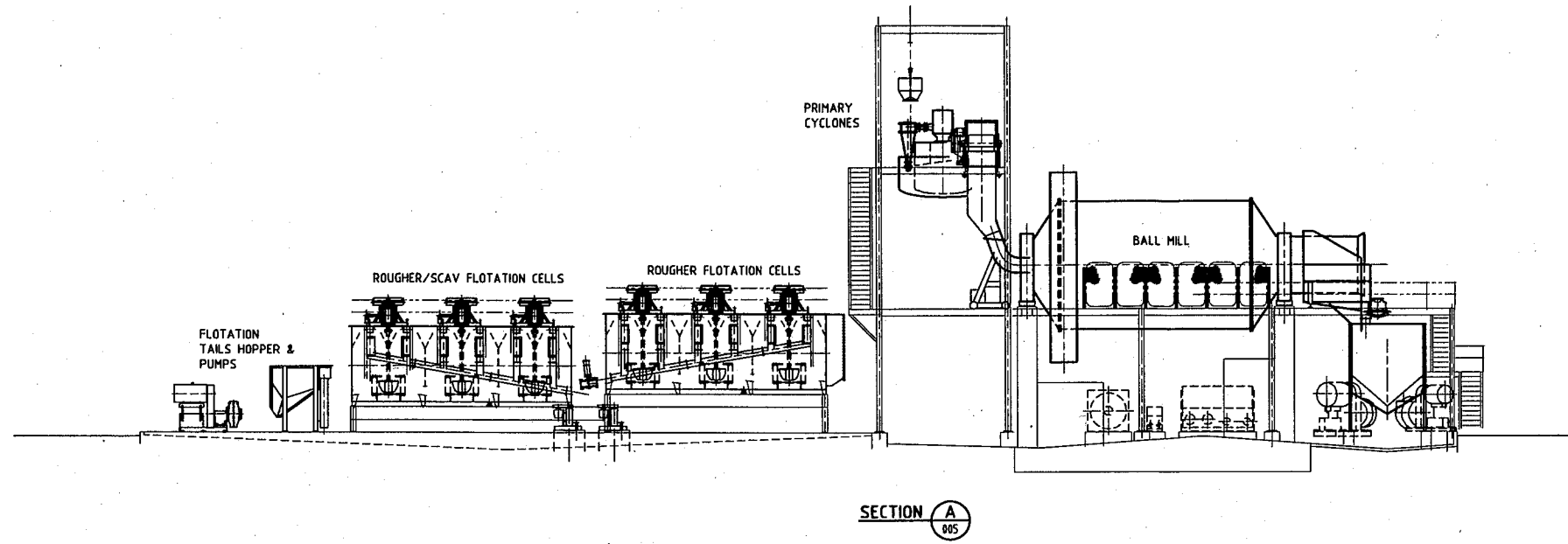
Crushing area (General arrangement SHT1)



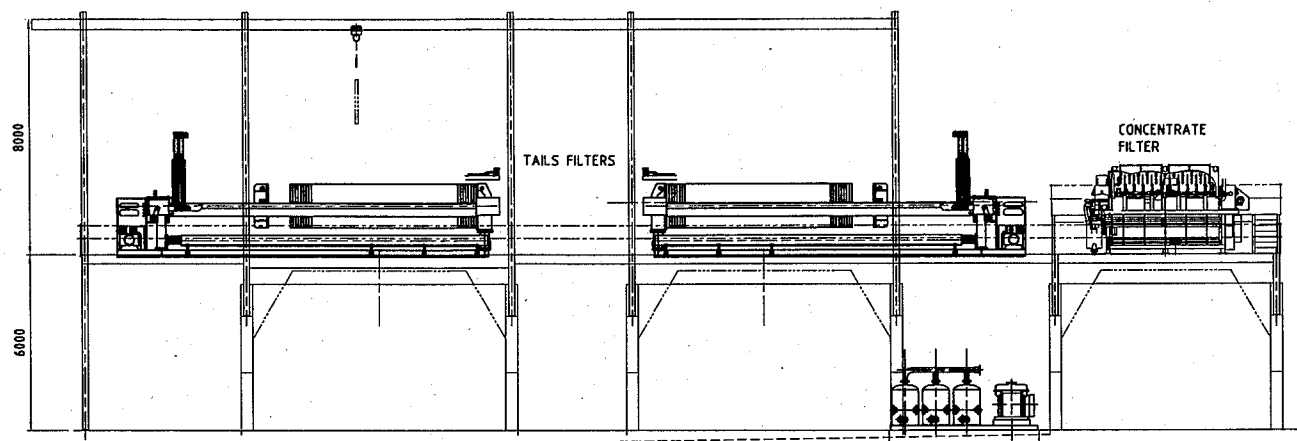
Crushing area (General arrangement SHT2)



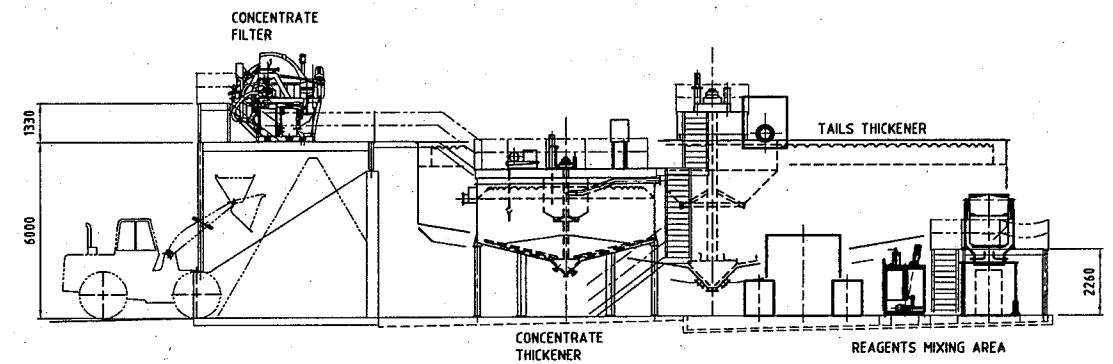
Grinding, flotation and thickening (General arrangement SHT1)



Grinding, flotation and thickening (General arrangement SHT2)

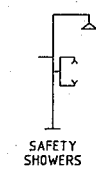
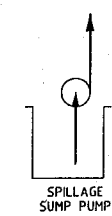
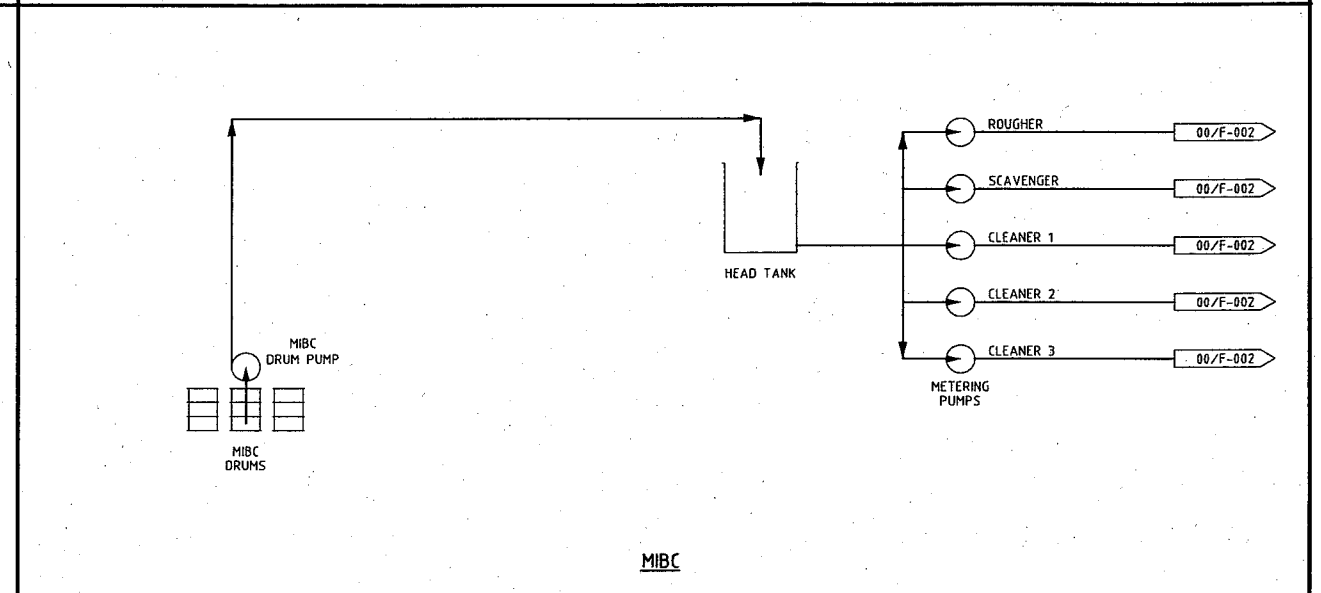
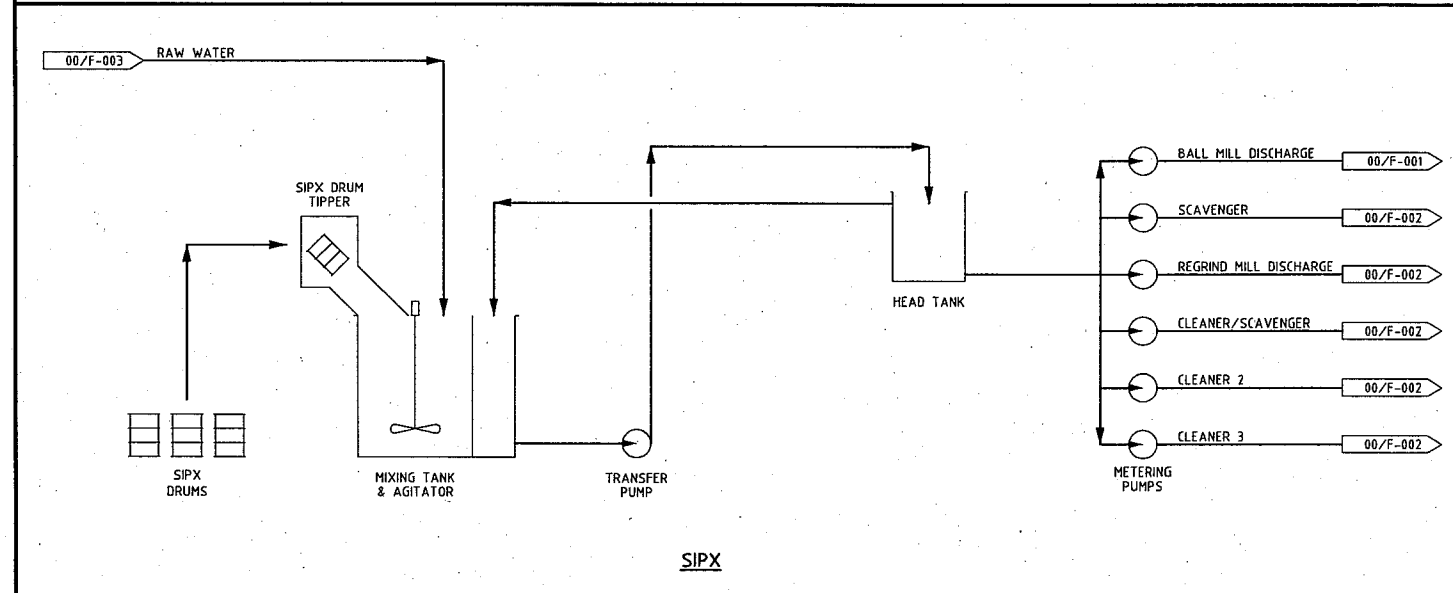
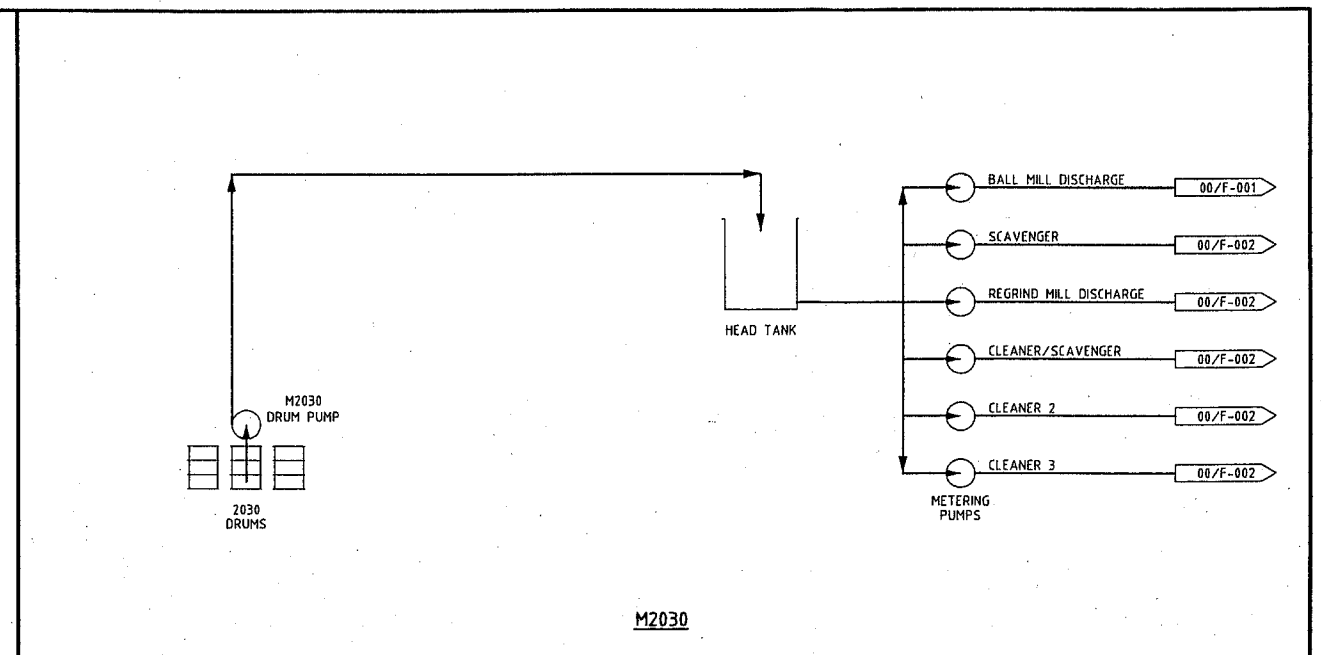
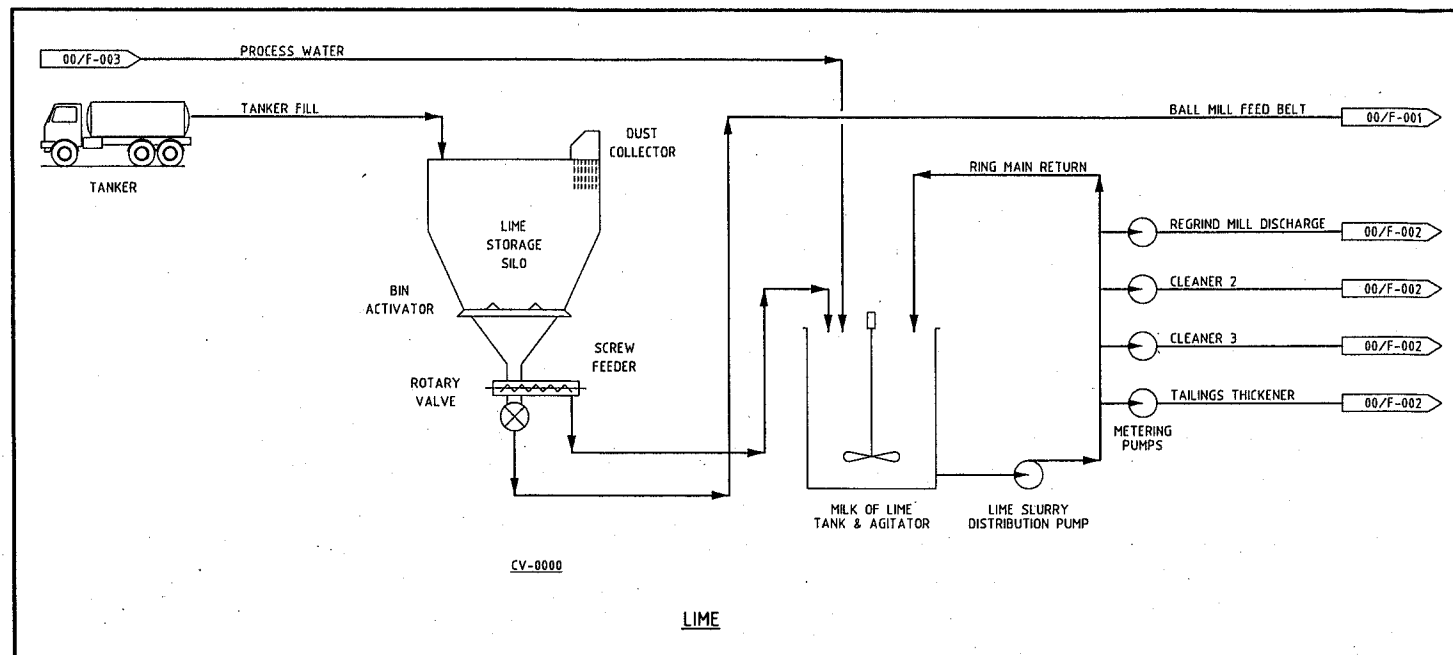


SECTION E
005

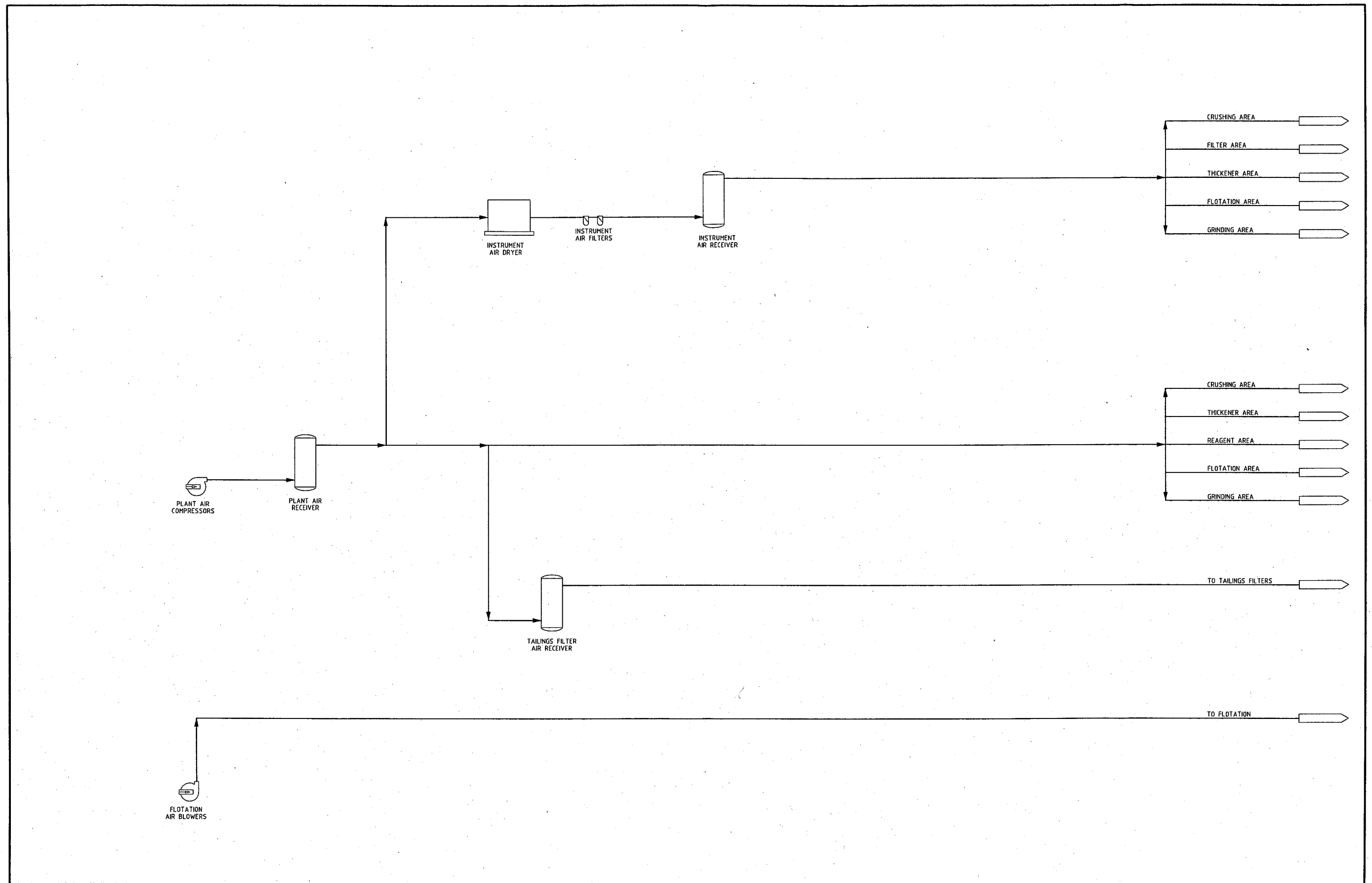


SECTION F
005

Grinding, flotation and thickening (General arrangement SHT3)



Process flow diagram (reagents)



Process flow diagram (plant air)

Appendix 2

Process plant

Appendix 2A

General arrangement

Appendix 2B

Operating Cost

Operating cost (labour) -case 2,000t/day

						LABOUR						
Topic:		PROCESS PLANT OPEX				ITEM		No.	Salary	On Costs	Total	Total
Project:		Yanqul Copper Project							Omani Rial	Omani Rial	OR /yr	S /t
Client:		MRC										
Date:												
Case:		2000 TPD										
INPUT						OUTPUT						
Total Feed Rate	730,000	tpa	Labour	OR/t	0.43							
Availability	91.3	%	Power	OR/t	0.76							
Feed Rate	91	tph	Reagents	OR/t	0.36							
Availability	8000	hrs	Consumables	OR/t	0.33							
Number of Modules	1		Maint Materials	OR/t	0.16							
Head Grade	1.24	% Cu	Miscellaneous	OR/t	0.26							
Copper Recovery	82.0	%	Total	OR/t	2.29							
					OPERATING COST, OR /a	1,674,827						
					OPERATING COST, OR /t ore	2.29						
					OPERATING COST, OR / Kg Cu	\$0.23						
					OPERATING COST, OR / Lb Cu	\$0.11						
Staff On Costs	%	30%										
Staff allowances o/t etc	%	60%										
Wages On Costs	%	35%										
Power, Rial/Kwh		0.02										
Note: All currency in Rials	Where AS\$1 =	0.1984	Omani Rial (OR)									
						STAFF						
						Metalurgy Manager	1	10,200	3,060	13,260	0.02	
						Production Metallurgist	1	6,000	1,800	7,800	0.01	
						Plant Metallurgist	1	6,000	1,800	7,800	0.01	
						Production Clerk	1	4,464	1,689	6,153	0.01	
						Sub Total	4			35,013	0.05	
						SUPERVISORS						
						Production Supervisor	1	4,800	2,880	7,680	0.01	
						Mechanical Supervisor	1	4,800	2,880	7,680	0.01	
						Electrical Supervisor	1	4,800	2,880	7,680	0.01	
						Shift Supervisors	4	5,040	1,764	27,216	0.04	
						Shift Chemist	4	3,600	2,160	23,040	0.03	
						Sub Total	11			73,296	0.10	
						PRODUCTION						
						Process Technicians	12	3,864	1,352	62,597	0.09	
						Mobile Plant Ops	4	3,864	1,352	20,866	0.03	
						Labourers	2	2,952	1,168	8,240	0.01	
						Laboratory Assayer	1	3,480	2,088	5,568	0.01	
						Laboratory Assayer	1	5,040	1,764	6,804	0.01	
						Laboratory Technician	4	3,864	1,352	20,866	0.03	
						Leave and Training Coverage	2	3,864	1,352	10,433	0.01	
						Sub Total	26			135,373	0.19	
						MAINTENANCE						
						Electrical Technicians	3	3,480	2,088	16,704	0.02	
						Maintenance Technicians	6	3,600	2,160	34,560	0.05	
						Instrument Technician	1	3,480	2,088	5,568	0.01	
						Trades Assistant	2	3,864	1,352	10,432	0.01	
						Sub Total	12			67,264	0.09	
						Grand Total	53			310,946	0.43	
						CONTINGENCY						
						TOTAL LABOUR COST, OR/a	0	%		0		
						TOTAL LABOUR COST, OR/t ore				310,946		
						TOTAL LABOUR COST, OR/t ore				0.43		

Operating cost (power and leagents) -case 2,000t/day

POWER								REAGENTS							
ITEM	Installed Duty kW	Utility Factor	kW Draw	Annual Oper. Hrs	Total kWh	Cost OR/a	Cost OR/t	ITEM	Description	Consumption	Quantity t/a	Unit Cost OR/t FIS	Total OR/a	Total OR/t	
CRUSHING								THICKENING							
Primary Crusher	110	0.7	77	8,000	615,972	12,319	0.02	Flocculant		40 g/t	29	1091	31,863	0.04	
Other	397	0.8	318	8,000	2,543,243	50,865	0.07	Sub Total					31,863	0.04	
Sub Total	507		395		3,159,215	63184	0.09								
GRINDING								FLOTATION							
Mill	2000	0.85	1700	8,000	13,599,374	271,987	0.37	Lime		5.40 kg/t	3942	45	177,390	0.24	
Other	199	0.8	159	8,000	1,270,342	25,407	0.03	MIBC		25 g/t	18	764	13,940	0.02	
Sub Total	2199		1859		14,869,716	297,394	0.41	SIPX		40 g/t	29	546	15,932	0.02	
								M2030		40 g/t	29	694	20,276	0.03	
								Sub Total					227,538	0.31	
FLOTATION								Grand Sub Total							
Flotation Cells	439	0.8	351	8,000	2,809,471	56,189	0.08						259,401		
Regrind mill	450	0.78	351	8,000	2,807,871	56,157	0.08	CONTINGENCY		0 %			0		
Other	81	0.8	65	8,000	518,376	10,368	0.01	TOTAL REAGENT COST, OR/a					259,401		
Sub Total	970		767		6,135,718	122,714	0.17	TOTAL REAGENT COST, OR/t					0.36		
THICKENING & FILTRATION															
Concentrate Handling						0									
All	90	0.8	72	8,000	575,974	11,519	0.02								
Tailings Handling															
Tailings Filter	128	0.8	102	8,000	815,962	16,319	0.02								
Other	26	0.8	21	8,000	166,392	3,328	0.00								
Sub Total	154		123		982,355	19,647	0.03								
REAGENTS															
All	40	0.8	32	8,000	255,988	5,120	0.01								
SERVICES															
All	259	0.8	207	8,000	1,654,964	33,099	0.05								
Grand Total	4218				27,633,929	552,679	0.76								
Average kw/h					3,454										
CONTINGENCY		0 %				0									
TOTAL POWER COST, OR/a						552,679									
TOTAL POWER COST, OR/t ore						0.76									

A-56

Operating cost (consumables, maintenance materials and miscellaneous)
 -case 2,000t/day

CONSUMABLES							MAINTENANCE MATERIALS						
ITEM	Consumption Set pa	kg/t ore	Quantity t/a	Unit Cost OR/ set OR/ kg		Total OR/ a	Total OR/t	ITEM	Crushing	Grinding	Flotation	Other	Total
OPERATING CONSUMABLES													
Crusher Liners	3			4960		14,880	0.02	Direct capital cost	695,251	791,997	538,216	1,142,748	3,168,212
Mill Liners		0.153	112		258	28,807	0.04	Maintenance %	5	5	2	3	4
Sub Total						43,687	0.06	Cost per annum	34,763	39,600	10,764	34,282	119,409
GRINDING MEDIA													
Mill Balls 80 mm		1.18	861		175	150,394	0.21	Grand Sub Total					119,409
Sub Total						150,394	0.21						
FILTRATION													
Filter cloths	3			16,666		49,997	0.07	CONTINGENCY	@	0 %			0
								TOTAL COST, OR/a					119,409
								TOTAL COST, OR/t ore					0.16
WATER SUPPLIES													
								ITEM	UNIT OR	TOTAL OR/a	TOTAL OR/ t		
Grand Sub Total						244,077		Office & plant general supplies	per month	1,157	13,888	0.02	
CONTINGENCY		0 %				0		Mobile Equipment (lease + fuel)	per month	3,192	38,299	0.05	
TOTAL CONSUMABLES COST, OR/a						244,077		Administration	per month	2,480	29,760	0.04	
TOTAL COST, OR/t ore						0.33		Freight	per month	1,488	17,856	0.02	
								Raw water	per month	4,400	52,800	0.07	
								Laboratory Supplies	per month	2,976	35,712	0.05	
								TOTAL COST, OR /a			188,315	0.26	
								TOTAL COST, OR /t ore				0.26	

Operating cost (labour) -case 3,000t/day

			LABOUR									
Topic:	PROCESS PLANT OPEX					ITEM	No.	Salary Omani Rial	On Costs Omani Rial	Total OR /yr	Total \$/t	
Project:	Yanqul Copper Project											
Client:	MRC											
Date:												
Case:	3000 TPD											
INPUT			OUTPUT									
Total Feed Rate	1,095,000	tpa	Labour	OR/t	0.28							
Availability	91.3	%	Power	OR/t	0.68							
Feed Rate	137	tph	Reagents	OR/t	0.36							
Availability	8000	hrs	Consumables	OR/t	0.34							
Number of Modules	1		Maint Materials	OR/t	0.14							
Head Grade	1.24	% Cu	Miscellaneous	OR/t	0.20							
Copper Recovery	82.0	%	Total	OR/t	2.00							
			OPERATING COST, OR /a		2,188,943							
			OPERATING COST, OR /t ore		2.00							
			OPERATING COST, OR / Kg Cu		\$0.20							
			OPERATING COST, OR / Lb Cu		\$0.09							
						STAFF						
						Metallurgy Manager	1	10,200	3,060	13,260	0.01	
						Production Metallurgist	1	6,000	1,800	7,800	0.01	
						Plant Metallurgist	1	6,000	1,800	7,800	0.01	
						Production Clerk	1	4,464	1,689	6,153	0.01	
						Sub Total	4			35,013	0.03	
						SUPERVISORS						
						Production Supervisor	1	4,800	2,880	7,680	0.01	
						Mechanical Supervisor	1	4,800	2,880	7,680	0.01	
						Electrical Supervisor	1	4,800	2,880	7,680	0.01	
						Shift Supervisors	4	5,040	1,764	27,216	0.02	
						Shift Chemist	4	3,600	2,160	23,040	0.02	
						Sub Total	11			73,296	0.07	
						PRODUCTION						
						Process Technicians	12	3,864	1,352	62,597	0.06	
						Mobile Plant Ops	4	3,864	1,352	20,866	0.02	
						Labourers	2	2,952	1,168	8,240	0.01	
						Laboratory Assayer	1	3,480	2,088	5,568	0.01	
						Laboratory Assayer	1	5,040	1,764	6,804	0.01	
						Laboratory Technician	4	3,864	1,352	20,866	0.02	
						Leave and Training Coverage	2	3,864	1,352	10,433	0.01	
						Sub Total	26			135,373	0.12	
						MAINTENANCE						
						Electrical Technicians	3	3,480	2,088	16,704	0.02	
						Maintenance Technicians	6	3,600	2,160	34,560	0.03	
						Instrument Technician	1	3,480	2,088	5,568	0.01	
						Trades Assistant	2	3,864	1,352	10,432	0.01	
						Sub Total	12			67,264	0.06	
						Grand Total	53			310,946	0.28	
						CONTINGENCY		0	%		0	
						TOTAL LABOUR COST, OR/a				310,946		
						TOTAL LABOUR COST, OR/t ore				0.28		

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Staff On Costs % 30%
 Staff allowances o/t etc % 60%
 Wages On Costs % 35%
 Power, Rial/Kwh 0.02
 Note: All currency in Rials Where A\$1 = 0.1984 Omani Rial (OR)

Operating cost (power and leagents) -case 3,000t/day

POWER								REAGENTS							
ITEM	Installed Duty kW	Utility Factor	kW Draw	Annual Oper. Hrs	Total kWh	Cost OR/a	Cost OR/t	ITEM	Description	Consumption	Quantity t/a	Unit Cost OR/t FIS	Total OR/a		
CRUSHING								THICKENING							
Primary Crusher	110	0.7	77	8,000	615,972	12,319	0.01	Flocculant		40 g/t	44	1091	47,795		
Other	466	0.8	372	8,000	2,979,703	59,594	0.05								
Sub Total	576		449		3,595,675	71913	0.07	Sub Total					47,795		
GRINDING								FLOTATION							
Mill	2800	0.9	2520	8,000	20,159,073	403,181	0.37	Lime		5.40 kg/t	5913	45	266,085		
Other	235	0.8	188	8,000	1,500,731	30,015	0.03	MIBC		25 g/t	27	764	20,910		
Sub Total	3035		2708		21,659,804	433,196	0.40	SIPX		40 g/t	44	546	23,897		
								M2030		40 g/t	44	694	30,415		
								Sub Total					341,307		
FLOTATION								Grand Sub Total							
Flotation Cells	508	0.8	406	8,000	3,251,050	65,021	0.06						389,102		
Regrind mill	550	0.84	462	8,000	3,695,830	73,917	0.07	CONTINGENCY		0%			0		
Other	112	0.8	89	8,000	713,567	14,271	0.01	TOTAL REAGENT COST, OR/a					389,102		
Sub Total	1170		958		7,660,448	153,209	0.14	TOTAL REAGENT COST, OR/t					0.36		
THICKENING & FILTRATION															
Concentrate Handling						0									
All	115	0.8	92	8,000	736,606	14,732	0.01								
Tailings Handling															
Tailings Filter	171	0.8	136	8,000	1,091,150	21,823	0.02								
Other	35	0.8	28	8,000	223,990	4,480	0.00								
Sub Total	206		164		1,315,140	26,303	0.02								
REAGENTS															
All	50	0.8	40	8,000	319,985	6,400	0.01								
SERVICES															
All	304	0.8	243	8,000	1,942,951	38,859	0.04								
Grand Total	5454				37,230,607	744,612	0.68								
Average kw/h					4,654										
CONTINGENCY		0%				0									
TOTAL POWER COST, OR/a						744,612									
TOTAL POWER COST, OR/t ore						0.68									

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Operating cost (consumables, maintenance materials and miscellaneous)
 -case 3,000t/day

CONSUMABLES							MAINTENANCE MATERIALS							
Total OR/t	ITEM	Consumption		Quantity	Unit Cost		Total	Total	ITEM	Crushing	Grinding	Flotation	Other	Total
		Set pa	kg/t ore	t/a	OR/ set	OR/ kg	OR/ a	OR/t						
OPERATING CONSUMABLES														
	Crusher Liners	4			16,864		67,456	0.06	Direct capital cost	886,800	1,010,200	686,500	1,457,587	4,041,087
0.04	Mill Liners		0.153	168		258	43,211	0.04	Maintenance %	5	5	2	3	4
0.04	Sub Total						110,667	0.10	Cost per annum	44,340	50,510	13,730	43,728	152,308
GRINDING MEDIA														
0.24	Mill Balls 80 mm		1.18	1292		149	192,264	0.18	Grand Sub Total					152,308
0.02	Sub Total						192,264	0.18						
0.02									CONTINGENCY	@	0%			0
0.03	FILTRATION								TOTAL COST, OR/a					152,308
0.31	Filter cloths	4			16,666		66,662	0.06	TOTAL COST, OR/t ore					0.14
MISCELLANEOUS														
									ITEM	UNIT	TOTAL	TOTAL		
										OR	OR/a	OR/t		
	Grand Sub Total						369,594		Office & plant general supplies	per month	1,157	13,888	0.01	
	CONTINGENCY		0%				0		Mobile Equipment (lease + fuel)	per month	3,192	38,299	0.03	
	TOTAL CONSUMABLES COST, OR/a						369,594		Administration	per month	3,307	39,680	0.04	
	TOTAL COST, OR/t ore						0.34		Freight	per month	2,034	24,403	0.02	
									Raw Water	per month	5,867	70,400	0.06	
									Laboratory Supplies	per month	2,976	35,712	0.03	
									TOTAL COST, OR /a			222,382	0.20	
									TOTAL COST, OR /t ore				0.20	

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REAGENTS & CONSUMABLES REQUIRED FOR FIRST FILL

REAGENTS

CONSUMABLES

ITEM	Consumption	Quantity required	Unit Cost	Total	ITEM	Consumption	Quantity	Unit Cost	Total		
		tonnes	OR/ t FIS	OR		Set req'd	kg/t ore	tonnes	OR/ set OR/ t	OR	
THICKENING					OPERATING CONSUMABLES						
Flocculant	40	g/t	7	1091	7,275	Crusher Liners	2		16,864	33,728	
Sub Total					7,275	Mill Liners		0.153	26	258	6,577
						Sub Total				40,305	
FLOTATION					GRINDING MEDIA						
Lime	5.40	kg/t	900	45	40,500	Mill Balls 80 mm		1.18	197	149	29,264
MIBC	25	g/t	4	764	3,183	Sub Total				29,264	
SIPX	40	g/t	7	546	3,637	FILTRATION					
M2030	40	g/t	7	694	4,629	Filter cloths	1		16,666	16,666	
Sub Total					51,949	Grand Sub Total				86,235	
Grand Sub Total					59,224	Grand Sub Total				86,235	
TOTAL REAGENT COST, OR					59,224	TOTAL CONSUMABLES COST, OR				86,235	

Total Cost for first fill 145,459

Exch. rate Omani R:A \$ 0.1984

Plant throughput tpa 1,000,000

Throughput for first fill 166,667

Salary for labour

LABOUR Unit: Oman Rial

ITEM	No.	Grade	basic salary per Month	allowance per Month	Total basic salary/M	Total basic salary/year	Overtime, Overhead,etc.	Grand total / year
STAFF								
Metallurgy Manager	1	2G	850		850	10,200	3,060	13,260
Production Metallurgist	1	5G	500		500	6,000	1,800	7,800
Plant Metallurgist	1	5G	500		500	6,000	1,800	7,800
Production Clerk	1	8O	277	95	372	4,464	1,689	6,153
Sub Total	4							
SUPERVISORS								
Production Supervisor	1	6G	400		400	4,800	2,880	7,680
Mechanical Supervisor	1	6G	400		400	4,800	2,880	7,680
Electrical Supervisor	1	6G	400		400	4,800	2,880	7,680
Shift Supervisors	4	7O	300	120	420	5,040	1,764	6,804
Shift Chemist	4	7G	300		300	3,600	2,160	5,760
Sub Total	11							
PRODUCTION								
Process Technicians	12	8O	230	92	322	3,864	1,352	5,216
Mobile Plant Ops	4	8O	230	92	322	3,864	1,352	5,216
Labourers	2	10O	150	96	246	2,952	1,168	4,120
Laboratory Assayer	1	7G	290		290	3,480	2,088	5,568
Laboratory Assayer	1	7O	300	120	420	5,040	1,764	6,804
Laboratory Technician	4	8O	230	92	322	3,864	1,352	5,216
Leave and Training Coverage	2	8O	230	92	322	3,864	1,352	5,216
Sub Total	26							
MAINTENANCE								
Electrical Technicians	3	7G	290		290	3,480	2,088	5,568
Maintenance Technicians	6	7G	300		300	3,600	2,160	5,760
Instrument Technician	1	7G	290		290	3,480	2,088	5,568
Trades Assistant	2	8O	230	92	322	3,864	1,352	5,216
Sub Total	12							
Grand Total	53		Regional :21	40%	Omani :32	60%		

Appendix 2C

Capital Cost

Total cost summary -case 3,000t/day process plant

Type of Estimate: DFS ± 10%

Job Currency: Oman Riyal

Estimate Revision No: A

Estimate Revision Date: 5 December 2001

Area	A	B	C	D	E	F	G	H	I	Total
	Earthworks	Civil Works	Structural Steel	Platework	Equipment	Piping	Electrical	Buildings	Miscellaneous	
00 Site Preparation & Improvements	41,200	0	0	0	0	0	0	0	0	41,200
10 Crushing	53,948	32,818	134,136	170,533	372,213	18,058	109,046	0	0	890,752
20 Grinding	0	42,074	48,910	8,513	615,586	60,216	234,943	0	0	1,010,242
30 Flotation	0	12,159	20,718	8,988	464,742	136,071	43,816	0	0	686,494
40 Concentrate Thickening, Filtration and Storage	0	191	0	293	143,505	42,134	101,947	0	0	288,070
50 Tailings Thickening and Filtration	0	24,180	23,497	15,171	745,856	217,157	26,850	0	0	1,052,711
60 Reagents	0	3,830	5,325	5,088	72,006	21,223	11,419	0	0	118,891
70 Water and Air Services	12,258	2,382	0	23,613	77,478	43,682	9,540	0	0	168,953
80 Process Plant Infrastructure	0	0	0	7,561	105,948	15,454	60,341	330,506	0	519,810
90 Power Supply & Process Control System	0	0	0	0	0	0	115,290	0	0	115,290
100 First Fill	0	0	0	0	0	0	0	0	168,006	168,006
110 Capital Spares	0	0	0	0	126,016	0	0	0	0	126,016
120 Ocean Freight	0	0	0	0	0	0	0	0	149,925	149,925
130 Preliminaries	0	0	0	0	0	0	0	0	693,625	693,625
Total	107,406	117,634	232,586	239,760	2,723,350	553,995	713,192	330,506	1,011,556	6,029,985
									EPCM	1,064,049
									BTL	0
									Grand Total	7,094,034

Total cost detail -case 3,000t/day process plant (1/2)

Type of Estimate: DFS ± 10%
Job Currency: Oman Riyal

Estimate Revision No: A
Estimate Revision Date: 5 December 2001

	<i>BareCost</i>	<i>AccuracyProvision</i>		<i>Fee</i>		<i>Total</i>
00 A	32,699	6,540	20.00%	1,962	5.00%	41,200
00 Totals	32,699	6,540		1,962		41,200
10 A	42,816	8,563	20.00%	2,569	5.00%	53,948
B	29,075	2,181	7.50%	1,563	5.00%	32,818
C	118,836	8,913	7.50%	6,387	5.00%	134,136
D	151,081	11,331	7.50%	8,121	5.00%	170,533
E	337,608	16,880	5.00%	17,724	5.00%	372,213
F	15,635	1,564	10.00%	860	5.00%	18,058
G	94,412	9,441	10.00%	5,193	5.00%	109,046
10 Totals	789,462	58,873		42,417		890,752
20 B	37,275	2,796	7.50%	2,004	5.00%	42,074
C	43,331	3,250	7.50%	2,329	5.00%	48,910
D	7,542	566	7.50%	405	5.00%	8,513
E	558,354	27,918	5.00%	29,314	5.00%	615,586
F	52,135	5,214	10.00%	2,867	5.00%	60,216
G	203,414	20,341	10.00%	11,188	5.00%	234,943
20 Totals	902,051	60,084		48,107		1,010,242
30 B	10,772	808	7.50%	579	5.00%	12,159
C	18,355	1,377	7.50%	987	5.00%	20,718
D	7,963	597	7.50%	428	5.00%	8,988
E	421,535	21,077	5.00%	22,131	5.00%	464,742
F	117,810	11,781	10.00%	6,480	5.00%	136,071
G	37,936	3,794	10.00%	2,086	5.00%	43,816
30 Totals	614,371	39,433		32,690		686,494
40 A	0	0	0.00%	0	5.00%	0
B	169	13	7.50%	9	5.00%	191
D	259	19	7.50%	14	5.00%	293
E	130,163	6,508	5.00%	6,834	5.00%	143,505
F	36,480	3,648	10.00%	2,006	5.00%	42,134
G	88,266	8,827	10.00%	4,855	5.00%	101,947
40 Totals	255,338	19,015		13,718		288,071
50 B	21,422	1,607	7.50%	1,151	5.00%	24,180
C	20,817	1,561	7.50%	1,119	5.00%	23,497
D	13,441	1,008	7.50%	722	5.00%	15,171
E	676,513	33,826	5.00%	35,517	5.00%	745,856
F	188,015	18,802	10.00%	10,341	5.00%	217,157
G	23,247	2,325	10.00%	1,279	5.00%	26,850
50 Totals	943,454	59,128		50,129		1,052,711

Total cost detail -case 3,000t/day process plant (2/2)

	<i>BareCost</i>	<i>AccuracyProvision</i>		<i>Fee</i>		<i>Total</i>	
60 B	3,393	254	7.50%	182	5.00%	3,830	
C	4,717	354	7.50%	254	5.00%	5,325	
D	4,508	338	7.50%	242	5.00%	5,088	
E		65,312	3,266	5.00%	3,429	5.00%	72,006
F	18,375	1,838	10.00%	1,011	5.00%	21,223	
G	9,887	989	10.00%	544	5.00%	11,419	
60 Totals	106,192	7,038		5,662		118,892	
70 A	9,729	1,946	20.00%	584	5.00%	12,258	
B	2,110	158	7.50%	113	5.00%	2,382	
D	20,920	1,569	7.50%	1,124	5.00%	23,613	
E	70,275	3,514	5.00%	3,689	5.00%	77,478	
F	37,820	3,782	10.00%	2,080	5.00%	43,682	
G	8,260	826	10.00%	454	5.00%	9,540	
70 Totals	149,113	11,795		8,045		168,953	
80 D	6,699	502	7.50%	360	5.00%	7,561	
E	96,098	4,805	5.00%	5,045	5.00%	105,948	
F	13,380	1,338	10.00%	736	5.00%	15,454	
G	52,243	5,224	10.00%	2,873	5.00%	60,341	
H	286,153	28,615	10.00%	15,738	5.00%	330,506	
80 Totals	454,573	40,485		24,753		519,811	
90 G	99,818	9,982	10.00%	5,490	5.00%	115,290	
90 Totals	99,818	9,982		5,490		115,290	
100 I	145,460	14,546	10.00%	8,000	5.00%	168,006	
100 Totals	145,460	14,546		8,000		168,006	
110 E	114,300	5,715	5.00%	6,001	5.00%	126,016	
110 Totals	114,300	5,715		6,001		126,016	
120 I	129,805	12,981	10.00%	7,139	5.00%	149,925	
120 Totals	129,805	12,981		7,139		149,925	
130 I	600,541	60,054	10.00%	33,030	5.00%	693,625	
130 Totals	600,541	60,054		33,030		693,625	
Job Totals:	5,337,178	405,667		287,142		6,029,987	
EPCM Totals:	925,260	92,526	10.00%	46,263	5.00%	1,064,049	
BTL Totals:						0	
Grand Totals:	6,262,438	498,193		333,405		7,094,03	

Bare cost summary -case 3,000t/day process plant

Type of Estimate: DFS ± 10%
 Job Currency: Oman Riyal

Estimate Revision No: A
 Estimate Revision Date: 5 December 2001

Area		A	B	C	D	E	F	G	H	I	Total	
		Earthworks	Civil Works	Structural Steel	Platework	Equipment	Piping	Electrical	Buildings	Miscellaneous		
00	Site Preparation & Improvements	32,699	0	0	0	0	0	0	0	0	32,699	
10	Crushing	42,816	29,075	118,836	151,081	337,608	15,635	94,412	0	0	789,463	
20	Grinding	0	37,275	43,331	7,542	558,354	52,135	203,414	0	0	902,051	
30	Flotation	0	10,772	18,355	7,963	421,535	117,810	37,936	0	0	614,371	
40	Concentrate Thickening, Filtration and Storage	0	169	0	259	130,163	36,480	88,266	0	0	255,337	
50	Tailings Thickening and Filtration	0	21,422	20,817	13,441	676,513	188,015	23,247	0	0	943,455	
60	Reagents	0	3,393	4,717	4,508	65,312	18,375	9,887	0	0	106,192	
70	Water and Air Services	9,728	2,110	0	20,920	70,275	37,820	8,260	0	0	149,113	
80	Process Plant Infrastructure	0	0	0	6,699	96,098	13,380	52,243	286,153	0	454,573	
90	Power Supply & Process Control System	0	0	0	0	0	0	99,818	0	0	99,818	
100	First Fill	0	0	0	0	0	0	0	0	145,460	145,460	
110	Capital Spares	0	0	0	0	114,300	0	0	0	0	114,300	
120	Ocean Freight	0	0	0	0	0	0	0	0	129,805	129,805	
130	Preliminaries	0	0	0	0	0	0	0	0	600,541	600,541	
Total		85,243	104,216	206,056	212,413	2,470,158	479,650	617,483	286,153	875,806	5,337,178	
											EPCM	925,260
											Grand Total	6,262,438

Bare cost report -case 3,000t/day process plant (1/26)

Type of Estimate: DFS ± 10%
 Job Currency: Oman Riyal

Estimate Revision No: A
 Estimate Revision Date: 5 December 2001

Eq Type	Eq No	KWs	Rate Code	Description	Quantity	UoM	Unit Rate	Cost Ex Works	Total Install Hrs	Total Cost Ex Works	Total Install Cost	Freight Cost	Total Cost	Price Source
Area 00 Site Preparation & Improvements														
Area 00, A Earthworks														
Pads														
			A105	Win, haul and place selected fill	1820	Cm³	6.1	0	0	0	11,029	0	11,029	Minproc est/Oman rates
Roads														
			A110	Sub-base, supply grade and compact	1000	Cm³	10.7	0	0	0	10,660	0	10,660	Minproc est/Oman rates
			A111	Road base, supply grade and compact	760	Cm³	11.8	0	0	0	8,937	0	8,937	Minproc est/Oman rates
Site Preparation														
			A002	Strip topsoil and stockpile	1850	Bm³	1.1	0	0	0	2,072	0	2,072	Minproc est/Oman rates
Total									0	0	32,698	0	32,698	
Area 00 Total									0	0	32,698	0	32,698	
Area 10 Crushing														
Area 10, A Earthworks														
Emergency Reclaim Ramp														
			A105	Win, haul and place selected fill	600	Cm³	6.1	0	0	0	3,636	0	3,636	Minproc est/Oman rates
ROM Retaining Wall														
			A212	Reinforced Earth Wall	300	m²	70.0	55	900	16,500	4,500	0	21,000	Reinforced Earth
			A105	Win, haul and place selected fill	3000	Cm³	6.1	0	0	0	18,180	0	18,180	Minproc est/Oman rates
Total									900	16,500	26,316	0	42,816	
Area 10, B Civil Works														
Bunkers														
	BK 01		0	B000 TRAMP BUNKER - Incl w/concrete	1	Ea	0.0	0	0	0	0	0	0	0
	BK 02		0	B000 FINE ORE BIN EMERGENCY FEED BUNKER - Incl w/concrete	1	Ea	0.0	0	0	0	0	0	0	0

Bare cost report -case 3,000t/day process plant (2/26)

Eq Type	Eq No	KWs	Rate Code	Description	Quantity	UoM	Unit Rate	Cost Ex Works	Total Install Hrs	Total Cost Ex Works	Total Install Cost	Freight Cost	TotalCost	Price Source
Conveyors														
			B101	Blinding concrete	4.9	m³	32.2	0	6	0	158	0	158	
			B002	Minor footings < 5m³	15.8	m³	90.9	0	190	0	1,437	0	1,437	
			B003	Major footings >5m³	32.8	m³	63.6	0	213	0	2,087	0	2,087	
			B501	HD Bolts (HDG)	330	kg	2.3	0	33	0	769	0	769	
Fine Ore Bin														
			B101	Blinding concrete	1.6	m³	31.9	0	2	0	51	0	51	
			B002	Minor footings < 5m³	15.7	m³	91.0	0	188	0	1,428	0	1,428	
			B010	Suspended slabs	2.8	m³	77.1	0	20	0	216	0	216	
			B401	HDG CS embedded steel	600	kg	1.1	0	18	0	659	0	659	
Primary Crusher Foundation														
			B101	Blinding concrete	2	m³	32.0	0	3	0	64	0	64	
			B003	Major footings >5m³	22	m³	63.6	0	143	0	1,400	0	1,400	
			B006	Walls	15	m³	98.9	0	225	0	1,484	0	1,484	
			B010	Suspended slabs	12	m³	77.3	0	84	0	927	0	927	
			B401	HDG CS embedded steel	400	kg	1.1	0	12	0	439	0	439	
			B501	HD Bolts (HDG)	120	kg	2.3	0	12	0	279	0	279	
Primary Crushing Structure														
			B101	Blinding concrete	1.2	m³	31.7	0	2	0	38	0	38	
			B002	Minor footings < 5m³	13.6	m³	91.0	0	163	0	1,237	0	1,237	
			B005	Ground slabs including kerbs	9	m³	60.6	0	45	0	545	0	545	
			B008	Columns & pedestals	1.8	m³	113.9	0	27	0	205	0	205	
			B501	HD Bolts (HDG)	120	kg	2.3	0	12	0	279	0	279	
Reclaim Area														
			B101	Blinding concrete	1.2	m³	31.7	0	2	0	38	0	38	
			B002	Minor footings < 5m³	21.7	m³	90.9	0	260	0	1,973	0	1,973	
			B005	Ground slabs including kerbs	4	m³	60.5	0	20	0	242	0	242	
			B006	Walls	10.6	m³	98.9	0	159	0	1,048	0	1,048	
			B008	Columns & pedestals	1	m³	113.0	0	15	0	113	0	113	
			B501	HD Bolts (HDG)	40	kg	2.3	0	4	0	93	0	93	
Run-on Slab														
			B005	Ground slabs including kerbs	12.1	m³	60.6	0	61	0	733	0	733	
			B006	Walls	8	m³	98.9	0	120	0	791	0	791	
Second/Tert Crusher Area														
			B101	Blinding concrete	0.5	m³	32.0	0	1	0	16	0	16	
			B002	Minor footings < 5m³	6.2	m³	90.8	0	74	0	563	0	563	
			B005	Ground slabs including kerbs	9.6	m³	60.6	0	48	0	582	0	582	
			B008	Columns & pedestals	1.2	m³	113.3	0	18	0	136	0	136	
			B501	HD Bolts (HDG)	90	kg	2.3	0	9	0	209	0	209	

Bare cost report -case 3,000t/day process plant (3/26)

Eq Type	Eq No	KWs	Rate Code	Description	Quantity	UoM	Unit Rate	Cost Ex Works	Total Install Hrs	Total Cost Ex Works	Total Install Cost	Freight Cost	TotalCost	Price Source
Second/Tert Crusher Foundation														
	B101			Blinding concrete	1.6	m³	31.9	0	2	0	51	0	51	
	B003			Major footings >5m³	19.3	m³	63.6	0	125	0	1,228	0	1,228	
	B006			Walls	24.8	m³	98.9	0	372	0	2,453	0	2,453	
	B010			Suspended slabs	23.4	m³	77.3	0	164	0	1,809	0	1,809	
	B401			HDG CS embedded steel	800	kg	1.1	0	24	0	879	0	879	
	B501			HD Bolts (HDG)	120	kg	2.3	0	12	0	279	0	279	
Transfer Station														
	B101			Blinding concrete	2.5	m³	32.0	0	3	0	80	0	80	
	B002			Minor footings < 5m³	1.5	m³	90.7	0	18	0	136	0	136	
	B003			Major footings >5m³	17.4	m³	63.6	0	113	0	1,107	0	1,107	
	B005			Ground slabs including kerbs	7	m²	60.6	0	35	0	424	0	424	
	B006			Walls	2.5	m³	98.8	0	38	0	247	0	247	
	B501			HD Bolts (HDG)	50	kg	2.3	0	5	0	116	0	116	
Total									3,099	0	29,048	0	29,048	
Area 10, C Structural Steel														
Conveyors														
	C005			Conveyor trestles	12.5	t	682.2	551	328	6,887	1,640	0	8,527	
	C006			Conveyor trusses	22.1	t	976.0	801	774	17,702	3,867	0	21,569	
	C101			Webforge grating F325MPB	170	m²	31.1	25	208	4,250	1,041	0	5,291	
	C112			Handrailing - horizontal c/w toe plate	225	m	22.9	15	354	3,375	1,771	0	5,146	
Feeder Support Structures														
	C001			Steelwork, light < 25kg/m - Paint System	0.1	t	1,000.0	801	4	80	19	1	100	
	C002			Steelwork, medium > 25 up to 75kg/m - Paint System A	3.1	t	721.3	551	98	1,708	488	40	2,236	
Primary Crushing Structure														
	C001			Steelwork, light < 25kg/m - Paint System	2.3	t	1,006.1	801	89	1,842	442	30	2,314	
	C002			Steelwork, medium > 25 up to 75kg/m - Paint System A	5.2	t	721.5	551	164	2,865	819	68	3,752	
	C003			Steelwork, heavy > 75kg/m - Paint System A	6.1	t	518.0	400	128	2,440	640	80	3,160	
	C101			Webforge grating F325MPB	51	m²	31.5	25	62	1,275	312	18	1,605	
	C108			Webforge stair treads - T3 (C255MPB) 285 x 750	50	ea	8.1	8	0	400	0	5	405	
	C112			Handrailing - horizontal c/w toe plate	52	m	23.0	15	82	780	409	8	1,197	
	C113			Handrailing - stairway	30	m	30.6	20	63	600	315	4	919	
ROM Bin Grizzly														
	GZ 01			0 C116 ROM Bin Grizzly	9.3	t	932.2	801	220	7,449	1,098	122	8,669	
				C119 Motiv 8 Impact Mountings	1	LS	3,500.0	0	0	0	3,500	0	3,500	

Bare cost report -case 3,000t/day process plant (4/26)

Eq Type	Eq No	KWs	Rate Code	Description	Quantity	UoM	Unit Rate	Cost Ex Works	Total Install Hrs	Total Cost Ex Works	Total Install Cost	Freight Cost	TotalCost	Price Source
Screen Support Structure														
	C001			Steelwork, light < 25kg/m - Paint System	4.4	t	1,006.4	801	169	3,524	847	57	4,428	
	C002			Steelwork, medium > 25 up to 75kg/m - Paint System A	5.8	t	721.4	551	183	3,195	913	76	4,184	
	C003			Steelwork, heavy > 75kg/m - Paint System A	8.6	t	518.1	400	181	3,440	903	113	4,456	
	C101			Webforge grating F325MPB	62	m ²	31.5	25	76	1,550	379	22	1,951	
	C108			Webforge stair treads - T3 (C255MPB) 285 x 750	35	ea	8.1	8	0	280	0	4	284	
	C114			Ladder c/w cage	20	m	75.2	61	53	1,220	262	21	1,503	
	C118			6mm thk floor plate	90	m ²	48.1	30	315	2,700	1,575	51	4,326	
	C112			Handrailing - horizontal c/w toe plate	80	m	23.0	15	126	1,200	630	13	1,843	
	C113			Handrailing - stairway	21	m	30.6	20	44	420	220	2	642	
Second/Tert Crusher Structure														
	C001			Steelwork, light < 25kg/m - Paint System	1.9	t	1,005.3	801	73	1,521	365	24	1,910	
	C002			Steelwork, medium > 25 up to 75kg/m - Paint System A	5.6	t	721.4	551	176	3,085	882	73	4,040	
	C101			Webforge grating F325MPB	58	m ²	31.5	25	71	1,450	355	20	1,825	
	C108			Webforge stair treads - T3 (C255MPB) 285 x 750	14	ea	8.1	8	0	112	0	1	113	
	C114			Ladder c/w cage	8	m	75.1	61	21	488	105	8	601	
	C112			Handrailing - horizontal c/w toe plate	68	m	23.0	15	107	1,020	535	11	1,566	
	C113			Handrailing - stairway	9	m	30.6	20	19	180	94	1	275	
Transfer Station														
	C001			Steelwork, light < 25kg/m - Paint System	6.2	t	1,006.5	801	239	4,966	1,193	81	6,240	
	C002			Steelwork, medium > 25 up to 75kg/m - Paint System A	6.3	t	721.4	551	198	3,471	992	82	4,545	
	C003			Steelwork, heavy > 75kg/m - Paint System A	0.8	t	517.5	400	17	320	84	10	414	
	C101			Webforge grating F325MPB	92	m ²	31.5	25	113	2,300	563	32	2,895	
	C108			Webforge stair treads - T3 (C255MPB) 285 x 750	58	ea	8.1	8	0	464	0	6	470	
	C112			Handrailing - horizontal c/w toe plate	36	m	23.0	15	57	540	283	6	829	
	C113			Handrailing - stairway	35	m	30.6	20	74	700	367	4	1,071	
Total									4,884	89,799	27,908	1,094	118,801	

Bare cost report -case 3,000t/day process plant (5/26)

Eq Type	Eq No	KWs	Rate Code	Description	Quantity	UoM	Unit Rate	Cost Ex Works	Total Install Hrs	Total Cost Ex Works	Total Install Cost	Freight Cost	Total Cost	Price Source
Area 10, D Platework														
a) ROM Bin														
BN	01		0 D001	Bins, CS flat sided, stiffened - site erected	13.8	t	726.1	501	580	6,913	2,898	209	10,020	
			D106	Site installed Q&T 360BHN liners, 20mm thk	21	m ²	133.0	96	147	2,016	735	43	2,794	
			D102	Site installed Q&T 360BHN liners, 10mm thk	61	m ²	70.8	48	267	2,928	1,334	58	4,320	
b) Emergency Feed Bin														
BN	05		0 D001	Bins, CS flat sided, stiffened - site erected	4.7	t	726.0	501	197	2,354	987	71	3,412	
			D104	Site installed Q&T 360BHN liners, 12mm thk	20	m ²	83.5	56	105	1,120	525	24	1,669	
c) Fine Ore Bin														
BN	04		0 D002	Bins, CS cylindrical, stiffened - site erected - Fine Ore Bin	79.4	t	813.7	501	4,724	39,779	23,621	1,204	64,604	
			D104	Site installed Q&T 360BHN liners, 12mm thk	154	m ²	83.5	56	809	8,624	4,042	190	12,856	
BN	02		0 D000	SECONDARY CRUSHER FEED BIN - Part of Fine Ore Bin	1	Ea	0.0	0	0	0	0	0	0	
BN	03		0 D000	TERTIARY CRUSHER FEED BIN - Part of Fine Ore Bin	1	Ea	0.0	0	0	0	0	0	0	
			D010	Fine Ore Bin Multi-Plate® Tunnel	1	LS	13,541.0	11,560	350	11,560	1,750	231	13,541	Ingal
Chutes														
CH	01		0 D003	Chutework, CS flanged and stiffened - Paint System A - Primary Crusher Feeder U/S Chute	1.3	t	805.4	601	46	781	227	39	1,047	
			D103	Shop installed Q&T 360BHN liners, 12mm thk	15	m ²	70.0	70	0	1,050	0	0	1,050	
CH	02		0 D003	Chutework, CS flanged and stiffened - Paint System A - Primary Crusher Feed Chute	1.5	t	805.3	601	53	901	262	45	1,208	
			D105	Shop installed Q&T 360BHN liners, 20mm thk	8	m ²	120.0	120	0	960	0	0	960	

Bare cost report -case 3,000t/day process plant (6/26)

Eq Type	Eq No	KWs	Rate Code	Description	Quantity	UoM	Unit Rate	Cost Ex Works	Total Install Hrs	Total Cost Ex Works	Total Install Cost	Freight Cost	TotalCost	Price Source
CH	03	0	D003	Chutework, CS flanged and stiffened - Paint System A - Primary Crusher Disch Chute	0.5	t	804.0	601	18	300	87	15	402	
			D103	Shop installed Q&T 360BHN liners, 12mm thk	3	m ²	70.0	70	0	210	0	0	210	
CH	04	0	D003	Chutework, CS flanged and stiffened - Paint System A - Crusher Product Conv Disch Chute	1.9	t	805.3	601	67	1,141	332	57	1,530	
			D103	Shop installed Q&T 360BHN liners, 12mm thk	7	m ²	70.0	70	0	490	0	0	490	
CH	05	0	D003	Chutework, CS flanged and stiffened - Paint System A - Tramp Magnet Disch Chute	1.2	t	805.8	601	42	721	210	36	967	
CH	06	0	D003	Chutework, CS flanged and stiffened - Paint System A - Screen Feed Conv Disch Chute	1.4	t	805.7	601	49	841	245	42	1,128	
			D103	Shop installed Q&T 360BHN liners, 12mm thk	2	m ²	70.0	70	0	140	0	0	140	
CH	07	0	D003	Chutework, CS flanged and stiffened - Paint System A - Product Screen Feed Chute	0.5	t	804.0	601	18	300	87	15	402	
			D103	Shop installed Q&T 360BHN liners, 12mm thk	2.7	m ²	70.0	70	0	189	0	0	189	
CH	08	0	D003	Chutework, CS flanged and stiffened - Paint System A - Product Screen Secondary Chute	1.5	t	805.3	601	53	901	262	45	1,208	
			D103	Shop installed Q&T 360BHN liners, 12mm thk	5.3	m ²	70.0	70	0	371	0	0	371	
CH	09	0	D000	PRODUCT SCREEN TERTIARY CHUTE - Incorporated into CH-08	1	Ea	0.0	0	0	0	0	0	0	
CH	10	0	D003	Chutework, CS flanged and stiffened - Paint System A - Secondary Crusher Feeder Feed Chute	2.5	t	805.6	601	88	1,502	437	75	2,014	
			D103	Shop installed Q&T 360BHN liners, 12mm thk	10	m ²	70.0	70	0	700	0	0	700	
CH	11	0	D003	Chutework, CS flanged and stiffened - Paint System A - Tertiary Crusher Feeder Feed Chute	2.5	t	805.6	601	88	1,502	437	75	2,014	
			D103	Shop installed Q&T 360BHN liners, 12mm thk	10	m ²	70.0	70	0	700	0	0	700	
CH	12	0	D000	SECONDARY CRUSHER FEED CHUTE - Incorporated into CH-10	1	Ea	0.0	0	0	0	0	0	0	
CH	13	0	D000	TERTIARY CRUSHER FEED CHUTE - Incorporated into CH-11	1	Ea	0.0	0	0	0	0	0	0	

Bare cost report -case 3,000t/day process plant (7/26)

Eq Type	Eq No	KWs	Rate Code	Description	Quantity	UoM	Unit Rate	Cost Ex Works	Total Install Hrs	Total Cost Ex Works	Total Install Cost	Freight Cost	TotalCost	Price Source
CH	14	0	D003	Chutework, CS flanged and stiffened - Paint System A - Secondary Crusher Disch Chute	0.4	t	805.0	601	14	240	70	12	322	
			D103	Shop installed Q&T 360BHN liners, 12mm thk	9	m ²	70.0	70	0	630	0	0	630	
CH	15	0	D003	Chutework, CS flanged and stiffened - Paint System A - Tertiary Crusher Disch Chute	0.4	t	805.0	601	14	240	70	12	322	
			D003	Chutework, CS flanged and stiffened - Paint System A	9	t	776.0	601	315	5,409	1,575	0	6,984	
CH	16	0	D000	FINE ORE BIN OVERFLOW CHUTE - Part of Fine Ore Bin	1	Ea	0.0	0	0	0	0	0	0	
CH	17/18	0	D003	Chutework, CS flanged and stiffened - Paint System A - Fine Ore Bin Disch Chute	1.2	t	805.8	601	42	721	210	36	967	
			D103	Shop installed Q&T 360BHN liners, 12mm thk	12.2	m ²	70.0	70	0	854	0	0	854	
			D103	Shop installed Q&T 360BHN liners, 12mm thk	12.2	m ²	70.0	70	0	854	0	0	854	
CH	19	0	D003	Chutework, CS flanged and stiffened - Paint System A - Mill Feed Conv Disch Chute	1	t	806.0	601	35	601	175	30	806	
			D103	Shop installed Q&T 360BHN liners, 12mm thk	7.4	m ²	70.0	70	0	518	0	0	518	
CH	20	0	D003	Chutework, CS flanged and stiffened - Paint System A - Product Screen Undersize Chute	1.7	t	805.3	601	60	1,021	297	51	1,369	
CH	21/22	0	D003	Chutework, CS flanged and stiffened - Paint System A - Fine Ore Feeder Discharge Chutes	2.2	t	805.9	601	77	1,322	385	66	1,773	
			D103	Shop installed Q&T 360BHN liners, 12mm thk	17	m ²	70.0	70	0	1,190	0	0	1,190	
CH	23/24	0	D003	Chutework, CS flanged and stiffened - Paint System A - Dust Collector Chutes	1.3	t	805.4	601	46	781	227	39	1,047	
CH	25	0	D003	Chutework, CS flanged and stiffened - Paint System A - Emergency Feeder Discharge Chute	1.1	t	805.5	601	39	661	192	33	886	
			D103	Shop installed Q&T 360BHN liners, 12mm thk	8.5	m ²	70.0	70	0	595	0	0	595	
Primary Crusher Foundation														
			D106	Site installed Q&T 360BHN liners, 20mm thk	5	m ²	133.0	96	35	480	175	10	665	
Second/Tert Crusher Foundation														
			D106	Site installed Q&T 360BHN liners, 20mm thk	10	m ²	133.0	96	70	960	350	20	1,330	

Bare cost report -case 3,000t/day process plant (8/26)

Eq Type	Eq No	KWs	Rate Code	Description	Quantity	UoM	Unit Rate	Cost Ex Works	Total Install Hrs	Total Cost Ex Works	Total Install Cost	Freight Cost	TotalCost	Price Source
									Total	8,442	106,071	42,204	2,783	151,058
Area 10, E Equipment														
Conveyors														
CV	01	22	E000	CRUSHER PRODUCT CONVEYOR	1	Ea	19,993.0	16,176	718	16,175	3,587	231	19,993	Minproc data
CV	02	22	E000	SCREEN FEED CONVEYOR	1	Ea	19,241.0	15,555	691	15,554	3,456	231	19,241	Minproc data
CV	03	11	E000	MILL FEED CONVEYOR	1	Ea	20,789.0	16,797	753	16,796	3,762	231	20,789	Minproc data
Crane														
CN	01	6	E000	PRODUCT SCREEN HOIST	1	Ea	3,166.0	2,877	35	2,876	175	115	3,166	Minproc data
Crushers														
CR	01	110	E000	PRIMARY CRUSHER	1	Ea	52,268.0	50,050	315	50,050	1,575	643	52,268	Metso
CR	02	150	E000	SECONDARY CRUSHER	1	Ea	71,721.0	69,300	420	69,300	2,100	321	71,721	Metso
CR	03	150	E000	TERTIARY CRUSHER	1	Ea	71,721.0	69,300	420	69,300	2,100	321	71,721	Metso
		E101		60t Crane	70	hrs	17.9	0	0	0	1,253	0	1,253	Minproc assess
Dust Collectors														
DC	01	6	E000	PRIMARY CRUSHER DUST COLLECTOR	1	Ea	2,859.0	2,597	53	2,597	262	0	2,859	Minproc data
DC	02	6	E000	FINE ORE BIN DUST COLLECTOR	1	Ea	2,859.0	2,597	53	2,597	262	0	2,859	Minproc data
DC	03	6	E000	SECONDARY CRUSHER DUST COLLECTOR	1	Ea	2,859.0	2,597	53	2,597	262	0	2,859	Minproc data
Fans														
FA	01	1	E000	SECONDARY CRUSHER OIL COOLER FAN - Incl w/crusher	1	Ea	0.0	0	0	0	0	0	0	Metso
FA	02	1	E000	TERTIARY CRUSHER OIL COOLER FAN - Incl w/crusher	1	Ea	0.0	0	0	0	0	0	0	Metso
Feeders														
FE	01	22	E000	PRIMARY CRUSHER FEEDER	1	Ea	18,322.0	17,710	123	17,710	612	0	18,322	Metso
FE	02	4	E000	SECONDARY CRUSHER FEEDER	1	Ea	3,947.0	3,642	61	3,641	306	0	3,947	Schenck
FE	03	4	E000	TERTIARY CRUSHER FEEDER	1	Ea	3,947.0	3,642	61	3,641	306	0	3,947	Schenck
FE	04/05	2	E000	FINE ORE FEEDER	2	Ea	2,940.5	2,678	105	5,356	525	0	5,881	Schenck
FE	06	2	E000	EMERGENCY RECLAIM FEEDER	1	Ea	2,940.0	2,678	53	2,678	262	0	2,940	Schenck
Heaters														
HE	01	3	E000	SECONDARY CRUSHER OIL HEATER - Incl w/crusher	1	Ea	0.0	0	0	0	0	0	0	Metso
HE	02	3	E000	TERTIARY CRUSHER OIL HEATER - Incl w/crusher	1	Ea	0.0	0	0	0	0	0	0	Metso
Hydraulic Power Packs														
HU	01	11	E000	SECONDARY CRUSHER HYDRAULIC UNIT - Incl w/crusher	1	Ea	0.0	0	0	0	0	0	0	Metso
HU	02	11	E000	TERTIARY CRUSHER HYDRAULIC UNIT - Incl w/crusher	1	Ea	0.0	0	0	0	0	0	0	Metso

Bare cost report -case 3,000t/day process plant (9/26)

A-75

Eq Type	Eq No	KWs	Rate Code	Description	Quantity	UoM	Unit Rate	Cost Ex Works	Total Install Hrs	Total Cost Ex Works	Total Install Cost	Freight Cost	TotalCost	Price Source
Lube Units														
LU	01	4	E000	SECONDARY CRUSHER LUBRICATION UNIT - Incl w/crusher	1	Ea	0.0	0	0	0	0	0	0	Metso
LU	02	4	E000	TERTIARY CRUSHER LUBRICATION UNIT - Incl w/crusher	1	Ea	0.0	0	0	0	0	0	0	Metso
Magnet														
MG	01	8	E000	TRAMP MAGNET	1	Ea	3,667.0	3,317	70	3,317	350	0	3,667	Minproc data
Metal Detector														
MD	01	0	E000	SCREEN FEED CONVEYOR METAL DETECTOR	1	Ea	1,626.0	1,451	35	1,451	175	0	1,626	Minproc data
Screen														
SC	01	15	E000	PRODUCT SCREEN	1	Ea	26,285.0	25,410	175	25,410	875	0	26,285	Metso
Weightometer														
WT	01	0	E000	MILL FEED WEIGHTOMETER	1	Ea	2,250.0	1,813	88	1,813	437	0	2,250	Minproc data
									Total	4,279	312,859	22,642	2,093	337,594
Area 10, F Piping														
F001 Area 10 - Crushing Area					1	LS	15,635.0	9,385	1,250	9,385	6,250	0	15,635	
									Total	1,250	9,385	6,250	0	15,635
Area 10, G Electrical & Instr.														
G001 Area 10 - Crushing					1	LS	94,412.0	66,922	5,498	66,922	27,490	0	94,412	
									Total	5,498	66,922	27,490	0	94,412
									Area 10 Total	28,352	601,536	181,858	5,970	789,364
Area 20 Grinding														
Area 20, B Civil Works														
Bunker														
BK	02	0	B000	BALL MILL SCATS BUNKER - Incl w/concrete	1	Ea	0.0	0	0	0	0	0	0	

Bare cost report -case 3,000t/day process plant (10/26)

A - 76

Eq Type No	Eq No	KWs	Rate Code	Description	Quantity UoM	Unit Rate	Cost Ex Works	Total Install Hrs	Total Cost Ex Works	Total Install Cost	Freight Cost	TotalCost	Price Source
Grinding Area													
			B101	Blinding concrete	12.2 m ³	32.3	0	16	0	394	0	394	
			B002	Minor footings < 5m ³	12 m ³	90.9	0	144	0	1,091	0	1,091	
			B003	Major footings >5m ³	179 m ³	63.6	0	1,164	0	11,392	0	11,392	
			B004	Major equipment foundations	187.6 m ³	79.0	0	1,126	0	14,816	0	14,816	
			B007	Plinths	4 m ³	63.5	0	32	0	254	0	254	
			B005	Ground slabs including kerbs	32.9 m ³	60.6	0	165	0	1,995	0	1,995	
			B010	Suspended slabs	23 m ³	77.3	0	161	0	1,778	0	1,778	
			B006	Walls	5 m ³	98.8	0	75	0	494	0	494	
			B008	Columns & pedestals	4 m ³	113.8	0	60	0	455	0	455	
			B401	HDG CS embedded steel	1420 kg	1.1	0	43	0	1,561	0	1,561	
			B501	HD Bolts (HDG)	1230 kg	2.3	0	123	0	2,869	0	2,869	
Sump													
	SU 03		0 B201	1050 mm Ø 1200mm std precast sump - Grinding area spillage sump	1 No	169.0	0	0	0	169	0	169	
Total								3,107	0	37,268	0	37,268	
Area 20, C Structural Steel													
Grinding Area													
			C007	Steelwork, light < 25kg/m - Paint System	8.8 t	1,006.5	801	339	7,048	1,694	115	8,857	
			C008	Steelwork, medium > 25 up to 75kg/m - Paint System B	22 t	721.6	551	693	12,122	3,465	289	15,876	
			C102	Webforge grating F325MPG	270 m ²	35.5	29	331	7,830	1,653	95	9,578	
			C109	Webforge stair treads - T3 (C255MPG) 285 x 750	80 ea	9.1	9	0	720	0	9	729	
			C112	Handrailing - horizontal c/w toe plate	172 m	23.0	15	271	2,580	1,354	29	3,963	
			C113	Handrailing - stairway	48 m	30.6	20	101	960	504	6	1,470	
			C117	Machinery guards	40 m ²	71.3	65	49	2,600	245	7	2,852	
Total								1,783	33,860	8,915	550	43,325	

Bare cost report -case 3,000t/day process plant (11/26)

Eq Type	Eq No	KWs	Rate Code	Description	Quantity	UoM	Unit Rate	Cost Ex Works	Total Install Hrs	Total Cost Ex Works	Total Install Cost	Freight Cost	TotalCost	Price Source
Area 20, D Platework														
Chutes														
CH	02	0	D004	Chutework, CS flanged and stiffened - Paint System B - Ball Mill Scats Chute	0.7	t	804.3	601	25	420	122	21	563	
			D103	Shop installed Q&T 360BHN liners, 12mm thk	14	m ²	70.0	70	0	980	0	0	980	
CH	03	0	D004	Chutework, CS flanged and stiffened - Paint System B - Ball Mill Discharge Chute	1	t	806.0	601	35	601	175	30	806	
			D113	Rubber lining 6mm thk	15	m ²	37.0	37	0	555	0	0	555	
CH	04	0	D004	Chutework, CS flanged and stiffened - Paint System B - Ball Mill Scats Chute	0.2	t	805.0	601	7	120	35	6	161	
			D101	Shop installed Q&T 360BHN liners, 10mm thk	1.3	m ²	60.0	60	0	78	0	0	78	
Hopper														
HP	01	0	D006	Hoppers CS, flat sided, stiffened - Ball Mill Discharge Hopper	2.2	t	744.5	601	50	1,322	250	66	1,638	
			D113	Rubber lining 6mm thk	32	m ²	67.2	37	0	1,184	0	967	2,151	
Kibble														
KB	01	0	D000	BALL CHARGING KIBBLE	1	Ea	606.0	496	18	496	87	23	606	Minproc data
									Total	134	5,756	669	1,113	7,538
Area 20, E Equipment														
Ball Mill														
ML	01	2,800	E000	BALL MILL	1	Ea	506,785.0	476,160	6,125	476,160	30,625	0	506,785	outokumpu
TR	01	0	E000	BALL MILL TROMMEL - Part of Ball Mill supply	1	Ea	0.0	0	0	0	0	0	0	outokumpu
DV	01	30	E000	BALL MILL INCHING DRIVE - Part of Ball Mill supply	1	Ea	0.0	0	0	0	0	0	0	outokumpu
LU	01	30	E000	BALL MILL TRUNNION BEARING LUBE UNIT - Part of Ball Mill supply	1	Ea	0.0	0	0	0	0	0	0	outokumpu
LU	02	8	E000	BALL MILL GEARBOX LUBE UNIT - Part of Ball Mill supply	1	Ea	0.0	0	0	0	0	0	0	outokumpu
CH	01	0	E000	BALL MILL FEED SPOUT - Part of Ball Mill supply	1	Ea	0.0	0	0	0	0	0	0	outokumpu
			E103	140t Heavy Lift Crane	185	hrs	25.0	0	0	0	4,625	0	4,625	Minproc assess
Cyclone														
CY	01	0	E000	PRIMARY CYCLONES	1	Ea	21,393.0	20,693	140	20,693	700	0	21,393	Ludowici
Hoist														
HT	01	3	E000	BALL CHARGING HOIST	1	Ea	2,754.0	2,579	35	2,579	175	0	2,754	Minproc data
Pumps														
PP	01/02	150	E000	PRIMARY CYCLONE FEED PUMP	2	Ea	9,743.5	9,044	280	18,087	1,400	0	19,487	KSB Ajax
PP	03	11	E000	GRINDING AREA SPILLAGE PUMP	1	Ea	1,834.0	1,617	44	1,616	218	0	1,834	Minproc data

Bare cost report -case 3,000t/day process plant (12/26)

A - 78

Eq Type	Eq No	KWs	Rate Code	Description	Quantity	UoM	Unit Rate	Cost Ex Works	Total Install Hrs	Total Cost Ex Works	Total Install Cost	Freight Cost	TotalCost	Price Source
Tech Taylor Valve	XM 01		0 E000	CYCLONE FEED TECH TAYLOR VALVE	1	Ea	1,473.0	1,369	21	1,368	105	0	1,473	Minproc data
Total									6,645	520,503	37,848	0	558,351	
Area 20, F Piping														
			F002	Area 20 - Grinding Area	1	LS	52,135.0	31,285	4,170	31,285	20,850	0	52,135	
Total									4,170	31,285	20,850	0	52,135	
Area 20, G Electrical & Instr.														
			G002	Area 20 - Grinding	1	LS	203,414.0	182,204	4,242	182,204	21,210	0	203,414	
Total									4,242	182,204	21,210	0	203,414	
Area 20 Total									20,081	773,608	126,760	1,663	902,031	
Area 30 Flotation														
Area 30, B Civil Works														
Bunker														
	BK 01		0 B000	REGRIND MILL SCATS BUNKER - Incl w/concrete	1	Ea	0.0	0	0	0	0	0	0	
Flotation Area														
			B101	Blinding concrete	3.4	m ²	32.1	0	4	0	109	0	109	
			B002	Minor footings < 5m ²	24.7	m ²	90.9	0	296	0	2,246	0	2,246	
			B007	Plinths	6	m ²	63.5	0	48	0	381	0	381	
			B005	Ground slabs including kerbs	69.1	m ²	60.6	0	346	0	4,190	0	4,190	
			B006	Walls	5	m ²	98.8	0	75	0	494	0	494	
			B008	Columns & pedestals	9.3	m ²	113.9	0	140	0	1,059	0	1,059	
			B501	HD Bolts (HDG)	400	kg	2.3	0	40	0	933	0	933	
Sumps														
	SU 03		0 B201	1050 mm Ø 1200mm std precast sump - Rougher Concentrate sump	1	No	169.0	0	0	0	169	0	169	
	SU 04		0 B201	1050 mm Ø 1200mm std precast sump - Cleaner 1 concentrate sump	1	No	169.0	0	0	0	169	0	169	
	SU 05		0 B201	1050 mm Ø 1200mm std precast sump - Cleaner-Scavenger concentrate sump	1	No	169.0	0	0	0	169	0	169	
	SU 06		0 B201	1050 mm Ø 1200mm std precast sump - Cleaner 2 concentrate sump	1	No	169.0	0	0	0	169	0	169	
	SU 07		0 B201	1050 mm Ø 1200mm std precast sump - Cleaner 3 concentrate sump	1	No	169.0	0	0	0	169	0	169	
	SU 09		0 B201	1050 mm Ø 1200mm std precast sump - Cleaner 2 tails sump	1	No	169.0	0	0	0	169	0	169	
	SU 10/11		0 B201	1050 mm Ø 1200mm std precast sump - Flotation spillage sumps	2	No	169.0	0	0	0	338	0	338	

Bare cost report -case 3,000t/day process plant (13/26)

Eq Type	Eq No	KWs	Rate Code	Description	Quantity	UoM	Unit Rate	Cost Ex Works	Total Install Hrs	Total Cost Ex Works	Total Install Cost	Freight Cost	TotalCost	Price Source	
									Total	949	0	10,764	0	10,764	
Area 30, C Structural Steel															
Flotation Area															
			C007	Steelwork, light < 25kg/m - Paint System	4.2	t	1,006.4	801	162	3,364	808	55	4,227		
			C008	Steelwork, medium > 25 up to 75kg/m - Paint System B	16.4	t	721.6	551	517	9,036	2,583	215	11,834		
			C102	Webforge grating F325MPG	18	m ²	35.4	29	22	522	110	6	638		
			C109	Webforge stair treads - T3 (C255MPG) 285 x 750	30	ea	9.1	9	0	270	0	3	273		
			C112	Handrailing - horizontal c/w toe plate	36	m	23.0	15	57	540	283	6	829		
			C113	Handrailing - stairway	18	m	30.6	20	38	360	189	2	551		
									Total	795	14,092	3,973	287	18,352	
Area 30, D Platework															
Chutes															
	CH	01	0 D004	Chutework, CS flanged and stiffened - Paint System B - Re grind Mill Feed Chute	0.3	t	803.3	601	11	180	52	9	241		
			D113	Rubber lining 6mm thk	8	m ²	37.0	37	0	296	0	0	296		
	CH	03	0 D004	Chutework, CS flanged and stiffened - Paint System B - Re grind Mill Discharge Chute	0.9	t	804.4	601	32	540	157	27	724		
			D113	Rubber lining 6mm thk	16	m ²	37.0	37	0	592	0	0	592		
	CH	04	0 D004	Chutework, CS flanged and stiffened - Paint System B - Re grind Mill Scats Chute	0.3	t	803.3	601	11	180	52	9	241		
			D113	Rubber lining 6mm thk	6	m ²	37.0	37	0	222	0	0	222		
Hoppers															
	HP	01	0 D007	Hoppers CS, cylindrical, stiffened - Re grind Mill Discharge Hopper	0.8	t	738.8	601	18	480	87	24	591		
			D113	Rubber lining 6mm thk	9	m ²	37.0	37	0	333	0	0	333		
	HP	08	0 D007	Hoppers CS, cylindrical, stiffened - Cleaner-Scavenger Tails Hopper	1.2	t	740.0	601	26	721	131	36	888		
			D113	Rubber lining 6mm thk	16	m ²	37.0	37	0	592	0	0	592		

Bare cost report -case 3,000t/day process plant (14/26)

Eq Type	Eq No	KWs	Rate Code	Description	Quantity	UoM	Unit Rate	Cost Ex Works	Total Install Hrs	Total Cost Ex Works	Total Install Cost	Freight Cost	TotalCost	Price Source
Launders														
LA	01	0	D008	Launders, CS flanged - Rougher Cell Concentrate Launder	0.9	t	770.0	601	25	540	126	27	693	
LA	02	0	D008	Launders, CS flanged - Scavenger Cell Concentrate Launder	0.9	t	770.0	601	25	540	126	27	693	
LA	03	0	D008	Launders, CS flanged - Cleaner 1 Cell Concentrate Launder	0.9	t	770.0	601	25	540	126	27	693	
LA	04	0	D008	Launders, CS flanged - Cleaner Scavenger Concentrate Launder	0.9	t	770.0	601	25	540	126	27	693	
LA	05	0	D008	Launders, CS flanged - Cleaner 2 Cell Concentrate Launder	0.3	t	770.0	601	8	180	42	9	231	
LA	06	0	D008	Launders, CS flanged - Cleaner 3 Cell Concentrate Launder	0.3	t	770.0	601	8	180	42	9	231	
Total									214	6,656	1,067	231	7,954	
Area 30, E Equipment														
Cyclone														
CY	01	0	E000	REGRIND CYCLONES	1	Ea	13,344.0	12,777	114	12,776	568	0	13,344	Ludowici
Flotation Cells														
FT	01/03	37	E000	ROUGHER FLOTATION CELL	3	Ea	12,641.7	12,030	368	36,088	1,837	0	37,925	ConSep
FT	04/06	37	E000	ROUGHER-SCAVENGER FLOTATION CELL	3	Ea	12,641.7	12,030	368	36,088	1,837	0	37,925	ConSep
FT	07/08	22	E000	CLEANER 1 FLOTATION CELL	2	Ea	8,234.5	7,797	175	15,594	875	0	16,469	ConSep
FT	09/14	22	E000	CLEANER-SCAVENGER FLOTATION CELL	6	Ea	8,234.5	7,797	525	46,782	2,625	0	49,407	ConSep
FT	15/17	22	E000	CLEANER 2 FLOTATION CELL	3	Ea	8,590.7	8,154	263	24,460	1,312	0	25,772	ConSep
FT	18/19	22	E000	CLEANER 3 FLOTATION CELL	2	Ea	9,310.5	8,873	175	17,746	875	0	18,621	ConSep
Pumps														
PP	01/02	30	E000	REGRIND CYCLONE FEED PUMP	2	Ea	3,985.0	3,635	140	7,270	700	0	7,970	KSB Ajax
PP	03	3	E000	ROUGHER CONCENTRATE PUMP	1	Ea	1,416.0	1,242	35	1,241	175	0	1,416	Minproc data
PP	04	6	E000	CLEANER 1 CONCENTRATE PUMP	1	Ea	1,735.0	1,518	44	1,517	218	0	1,735	Minproc data
PP	05	3	E000	CLEANER-SCAVENGER CONCENTRATE PUMP	1	Ea	1,416.0	1,242	35	1,241	175	0	1,416	Minproc data
PP	06	6	E000	CLEANER 2 CONCENTRATE PUMP	1	Ea	1,735.0	1,518	44	1,517	218	0	1,735	Minproc data
PP	07	3	E000	CLEANER 3 CONCENTRATE PUMP	1	Ea	1,416.0	1,242	35	1,241	175	0	1,416	Minproc data
PP	08	45	E000	CLEANER-SCAVENGER TAILS PUMP	1	Ea	5,304.0	4,911	79	4,911	393	0	5,304	KSB Ajax
PP	10/11	6	E000	FLOTATION SPILLAGE PUMP	2	Ea	1,736.0	1,518	88	3,035	437	0	3,472	Minproc data

Bare cost report -case 3,000t/day process plant (15/26)

Eq Type	Eq No	KWs	Rate Code	Description	Quantity	UoM	Unit Rate	Cost Ex Works	Total Install	Total Cost Ex Works	Total Install Cost	Freight Cost	TotalCost	Price Source
Regrind Mill														
ML	01	550	E000	REGRIND MILL	1	Ea	194,310.0	178,560	3,150	178,560	15,750	0	194,310	outokumpu
TR	01	0	E000	REGRIND MILL TROMMEL - Part of Regrind Mill supply	1	Ea	0.0	0	0	0	0	0	0	outokumpu
DV	01	11	E000	REGRIND MILL INCHING DRIVE - Part of Regrind Mill supply	1	Ea	0.0	0	0	0	0	0	0	outokumpu
LU	01	8	E000	REGRIND MILL LUBE UNIT - Part of Regrind Mill supply	1	Ea	0.0	0	0	0	0	0	0	outokumpu
CH	02	0	E000	REGRIND MILL FEED SPOUT - Part of Regrind Mill supply	1	Ea	0.0	0	0	0	0	0	0	outokumpu
			E103	140t Heavy Lift Crane	95	hrs	25.0	0	0	0	2,375	0	2,375	Minproc assess
Tech Taylor Valve														
XM	01	0	E000	REGRIND CYCLONE FEED TECH TAYLOR VALVE	1	Ea	907.0	837	14	837	70	0	907	Minproc data
Total									5,649	390,904	30,615	0	421,519	
Area 30, F Piping														
			F003	Area 30 - Flotation	1	LS	117,810.0	70,685	9,425	70,685	47,125	0	117,810	
Total									9,425	70,685	47,125	0	117,810	
Area 30, G Electrical & Instr.														
			G003	Area 30 - Flotation	1	LS	37,936.0	21,651	3,257	21,651	16,285	0	37,936	
Total									3,257	21,651	16,285	0	37,936	
Area 30 Total									20,289	503,988	109,829	518	614,335	
Area 40 Concentrate Thickening, Filtration and Storage														
Area 40, A Earthworks														
Open Stokpile Storage Area														
BD	01	0	A000	CONCENTRATE STORAGE AREA	1	Ea	0.0	0	0	0	0	0	0	
Total									0	0	0	0	0	
Area 40, B Civil Works														
Sump														
SU	05	0	B201	1050 mm Ø 1200mm std precast sump - Concentrate area spillage sump	1	No	169.0	0	0	0	169	0	169	
Total									0	0	169	0	169	
Area 40, D Platework														
Feed Box														
BX	01	0	D009	Feed Boxes, CS flanged c/w inlet/outlet nozzles - Concentrate Thickener Feed Box	0.2	t	740.0	601	6	120	28	0	148	
			D113	Rubber lining 6mm thk	3	m²	37.0	37	0	111	0	0	111	

Bare cost report -case 3,000t/day process plant (16/26)

Eq Type	Eq No	KWs	Rate Code	Description	Quantity	UoM	Unit Rate	Cost Ex Works	Total Install Hrs	Total Cost Ex Works	Total Install Cost	Freight Cost	TotalCost	Price Source	
									Total	6	231	28	0	259	
Area 40, E Equipment															
Agitator															
AG	01	6	E000	CONCENTRATE FILTER AGITATOR - Part of Filter supply	1	Ea	0.0	0	0	0	0	0	0		
Filter															
FL	01	0	E000	CONCENTRATE FILTER	1	Ea	91,380.0	89,280	420	89,280	2,100	0	91,380	Eimco	
FL	01A	4	E000	CONCENTRATE FILTER DRIVE - Part of Filter supply	1	Ea	0.0	0	0	0	0	0	0		
FR	01	0	E000	CONCENTRATE FILTER FILTRATE RECEIVER - Part of Filter supply	1	Ea	0.0	0	0	0	0	0	0		
PP	03	90	E000	CONCENTRATE FILTER VACUUM PUMP - Part of Filter supply	1	Ea	0.0	0	0	0	0	0	0		
PP	04	3	E000	CONCENTRATE FILTER FILTRATE PUMP - Part of Filter supply	1	Ea	0.0	0	0	0	0	0	0		
Pumps															
PP	01/02	3	E000	CONCENTRATE THICKENER UNDERFLOW PUMP	2	Ea	2,750.0	2,488	105	4,975	525	0	5,500	Minproc data	
PP	05	6	E000	CONCENTRATE AREA SPILLAGE PUMP	1	Ea	1,735.0	1,518	44	1,517	218	0	1,735	Minproc data	
Thickener															
TH	01	4	E000	CONCENTRATE THICKENER	1	Ea	29,935.0	25,792	700	25,792	3,500	643	29,935	Eimco	
			E101	60t Crane	90	hrs	17.9	0	0	0	1,611	0	1,611	Minproc assess	
									Total	1,269	121,564	7,954	643	130,161	
Area 40, F Piping															
			F004	Area 40 - Concentrate Thickening, Filtration Storage	1	LS	36,480.0	21,880	2,920	21,880	14,600	0	36,480		
									Total	2,920	21,880	14,600	0	36,480	
Area 40, G Electrical & Instr.															
			G004	Area 40 - Concentrate Thickening & Filtration	1	LS	88,266.0	67,681	4,117	67,681	20,585	0	88,266		
									Total	4,117	67,681	20,585	0	88,266	
									Area 40 Total	8,311	211,356	43,336	643	255,335	
Area 50 Tailings Thickening and Filtration															
Area 50, B Civil Works															
Bunker															
BK	01	0	B000	TAILINGS FILTER CAKE BUNKER - Incl w/concrete	1	Ea	0.0	0	0	0	0	0	0		

Bare cost report -case 3,000t/day process plant (17/26)

Eq Type	Eq No	KWs	Rate Code	Description	Quantity	UoM	Unit Rate	Cost Ex Works	Total Install Hrs	Total Cost Ex Works	Total Install Cost	Freight Cost	TotalCost	Price Source
Sump														
SU	05		0 B201	1050 mm Ø 1200mm std precast sump - Tailings area spillage sump	1	No	169.0	0	0	0	169	0	169	
Thickening/Filtration Area														
			B101	Blinding concrete	4.5	m ³	32.2	0	6	0	145	0	145	
			B002	Minor footings < 5m ²	54.6	m ²	91.0	0	655	0	4,966	0	4,966	
			B003	Major footings >5m ²	33.1	m ²	63.6	0	215	0	2,106	0	2,106	
			B007	Plinths	7.2	m ²	63.6	0	58	0	458	0	458	
			B005	Ground slabs including kerbs	71	m ²	60.6	0	355	0	4,306	0	4,306	
			B006	Walls	58.4	m ²	98.9	0	876	0	5,778	0	5,778	
			B008	Columns & pedestals	11.8	m ²	113.9	0	177	0	1,344	0	1,344	
			B501	HD Bolts (HDG)	920	kg	2.3	0	92	0	2,146	0	2,146	
Total									2,434	0	21,418	0	21,418	
Area 50, C Structural Steel														
Filtration Area														
			C007	Steelwork, light < 25kg/m - Paint System	2.9	t	1,006.2	801	112	2,322	558	38	2,918	
			C008	Steelwork, medium > 25 up to 75kg/m - Paint System B	9.8	t	721.4	551	309	5,399	1,543	128	7,070	
			C102	Webforge grating F325MPG	97	m ²	35.5	29	119	2,813	594	34	3,441	
			C109	Webforge stair treads - T3 (C255MPG) 285 x 750	10	ea	9.1	9	0	90	0	1	91	
			C114	Ladder c/w cage	7	m	75.0	61	18	427	91	7	525	
			C112	Handrailing - horizontal c/w toe plate	88	m	23.0	15	139	1,320	693	15	2,028	
			C113	Handrailing - stairway	6	m	30.5	20	13	120	63	0	183	
Thickener Access														
			C007	Steelwork, light < 25kg/m - Paint System	1.7	t	1,005.9	801	65	1,361	327	22	1,710	
			C008	Steelwork, medium > 25 up to 75kg/m - Paint System B	1.5	t	720.7	551	47	826	236	19	1,081	
			C102	Webforge grating F325MPG	9	m ²	35.4	29	11	261	55	3	319	
			C109	Webforge stair treads - T3 (C255MPG) 285 x 750	38	ea	9.1	9	0	342	0	4	346	
			C112	Handrailing - horizontal c/w toe plate	17	m	22.9	15	27	255	133	2	390	
			C113	Handrailing - stairway	23	m	30.6	20	48	460	241	3	704	
Total									908	15,996	4,534	276	20,806	
Area 50, D Platework														
Feed Box														
BX	01		0 D009	Feed Boxes, CS flanged c/w inlet/outlet nozzles - Tailings Thickener Feed Box	0.4	t	770.0	601	11	240	56	12	308	
			D113	Rubber lining 6mm thk	6	m ²	37.0	37	0	222	0	0	222	

Bare cost report -case 3,000t/day process plant (18/26)

Eq Type	Eq No	KWs	Rate Code	Description	Quantity	UoM	Unit Rate	Cost Ex Works	Total Install Hrs	Total Cost Ex Works	Total Install Cost	Freight Cost	TotalCost	Price Source
Tailings Filter Compressor														
PV	01/02	0	D000	TAILINGS FILTER COMPRESSOR AIR RECEIVER	2	Ea	350.0	0	140	0	700	0	700	
Tanks														
TK	01	0	D000	TAILINGS FILTER SURGE TANK	1	Ea	12,210.0	6,995	998	6,995	4,987	228	12,210	Minproc est/Oman rates
									Total	1,149	7,457	5,743	240	13,440
Area 50, E Equipment														
Agitator														
AG	01	55	E000	TAILINGS FILTER SURGE TANK AGITATOR	1	Ea	16,971.0	16,096	175	16,096	875	0	16,971	Minproc data
Hoist														
HT	01	6	E000	TAILINGS FILTER MAINTENANCE HOIST	1	Ea	3,214.0	2,778	88	2,777	437	0	3,214	Minproc data
Pumps														
PP	01/02	22	E000	TAILINGS THICKENER UNDERFLOW PUMP	2	Ea	6,511.5	6,162	140	12,323	700	0	13,023	KSB Ajax
PP	03/04	110	E000	TAILINGS FILTER FEED PUMP	2	Ea	10,576.0	9,920	263	19,840	1,312	0	21,152	Minproc data
PP	05	6	E000	TAILINGS AREA SPILLAGE PUMP	1	Ea	1,735.0	1,518	44	1,517	218	0	1,735	Minproc data
Tailings Filter														
FL	01/02	0	E000	TAILINGS FILTER	2	Ea	174,761.5	170,387	1,750	340,773	8,750	0	349,523	outokumpu
FL	01/02A	8	E000	TAILINGS FILTER HYDRAULIC POWER PACK - Incl w/filter price	2	Ea	0.0	0	0	0	0	0	0	outokumpu
FL	01/02B	0	E000	TAILINGS FILTER WASH CARRIAGE LIFT - Incl w/filter price	2	Ea	0.0	0	0	0	0	0	0	outokumpu
FL	01/02C	0	E000	TAILINGS FILTER WASH CARRIAGE TRAVEL - Incl w/filter price	2	Ea	0.0	0	0	0	0	0	0	outokumpu
XM	02	0	E000	TAILINGS FILTER MEMBRANE PRESSING STATION	1	Ea	12,249.0	11,899	70	11,899	350	0	12,249	outokumpu
PP	06	55	E000	TAILINGS FILTER CLOTH CLEANING HP PUMP	1	Ea	10,389.0	9,864	105	9,864	525	0	10,389	outokumpu
VB	01	1	E000	TAILINGS FILTER VIBRATORS - Incl w/filter price	1	Ea	0.0	0	0	0	0	0	0	outokumpu
		E101		60t Crane	220	hrs	17.9	0	0	0	3,938	0	3,938	Minproc assess
Tailings Filter Compressor														
CP	01/02	400	E000	TAILINGS FILTER AIR COMPRESSOR	2	Ea	65,792.5	64,480	525	128,960	2,625	0	131,585	CAPS Aust
FL	03/04	0	E000	TAILINGS FILTER COMPRESSOR AIR FILTER	2	Ea	2,849.5	2,500	140	4,999	700	0	5,699	CAPS Aust
Tech Taylor Valve														
XM	01	0	E000	TAILINGS FILTER FEED TECH TAYLOR VALVE	1	Ea	907.0	837	14	837	70	0	907	Minproc data

Bare cost report -case 3,000t/day process plant (19/26)

Eq Type	Eq No	KWs	Rate Code	Description	Quantity	UoM	Unit Rate	Cost Ex Works	Total Install	Total Cost Ex Works	Total Install Cost	Freight Cost	TotalCost	Price Source
Thickener														
TH	01		8 E000	TAILINGS THICKENER	1	Ea	96,147.0	71,424	4,725	71,424	23,625	1,098	96,147	Eimco
			E102	100t Heavy Lift Crane	475	hrs	21.0	0	0	0	9,975	0	9,975	Minproc assess
Total									8,038	621,309	54,100	1,098	676,507	
Area 50, F Piping														
			F005	Area 50 - Tailings Thickening and	1	LS	188,015.0	112,815	15,040	112,815	75,200	0	188,015	
Total									15,040	112,815	75,200	0	188,015	
Area 50, G Electrical & Instr.														
			G005	Area 50 - Tailings Thickening &	1	LS	23,247.0	19,022	845	19,022	4,225	0	23,247	
Total									845	19,022	4,225	0	23,247	
Area 50 Total									28,413	776,599	165,220	1,614	943,433	
Area 60 Reagents														
Area 60, B Civil Works														
Lime Silo														
			B004	Major equipment foundations	10	m ²	78.9	0	60	0	789	0	789	
			B005	Ground slabs including kerbs	9	m ²	60.6	0	45	0	545	0	545	
Reagents Area														
			B101	Blinding concrete	0.5	m ²	32.0	0	1	0	16	0	16	
			B002	Minor footings < 5m ²	4	m ²	90.8	0	48	0	363	0	363	
			B007	Plinths	5.3	m ²	63.6	0	42	0	337	0	337	
			B005	Ground slabs including kerbs	13.6	m ²	60.6	0	68	0	824	0	824	
			B008	Columns & pedestals	1.6	m ²	113.8	0	24	0	182	0	182	
			B501	HD Bolts (HDG)	70	kg	2.3	0	7	0	163	0	163	
Sump														
SU	08		0 B201	1050 mm Ø 1200mm std precast sump - Reagents area spillage sump	1	No	169.0	0	0	0	169	0	169	
Total									295	0	3,388	0	3,388	
Area 60, C Structural Steel														
Reagents Area														
			C007	Steelwork, light < 25kg/m - Paint System	1.3	t	1,006.2	801	50	1,041	250	17	1,308	
			C008	Steelwork, medium > 25 up to 75kg/m - Paint System B	1.9	t	720.5	551	60	1,046	299	24	1,369	
			C102	Webforge grating F325MPG	25	m ²	35.4	29	31	725	153	8	886	
			C109	Webforge stair treads - T3 (C255MPG) 285 x 750	15	ea	9.1	9	0	135	0	1	136	
			C112	Handrailing - horizontal c/w toe plate	32	m	23.0	15	50	480	252	5	737	
			C113	Handrailing - stairway	9	m	30.6	20	19	180	94	1	275	
Total									210	3,607	1,048	56	4,711	

Bare cost report -case 3,000t/day process plant (20/26)

	Eq Type	Eq No	KWs	Rate Code	Description	Quantity	UoM	Unit Rate	Cost Ex Works	Total Install Hrs	Total Cost Ex Works	Total Install Cost	Freight Cost	TotalCost	Price Source
Area 60, D Platework															
Chutes															
	CH	01	0	D000	LIME DISCHARGE CHUTE	1	Ea	483.0	397	18	396	87	0	483	Minproc assess
Tanks															
	TK	02	0	D000	MILK OF LIME TANK	1	Ea	1,083.0	860	32	860	157	66	1,083	Minproc est/Oman rates
	TK	03	0	D000	SIPX MIX AND STORAGE TANK	1	Ea	514.0	415	16	415	78	21	514	Minproc est/Oman rates
	TK	04	0	D000	SIPX HEAD TANK	1	Ea	110.0	65	9	65	43	2	110	Minproc est/Oman rates
	TK	06	0	D000	M2030 HEAD TANK	1	Ea	120.0	65	9	65	43	12	120	Minproc est/Oman rates
	TK	08	0	D000	MIBC HEAD TANK	1	Ea	110.0	65	9	65	43	2	110	Minproc est/Oman rates
	TK	09	0	D000	FLOCCULANT STORAGE TANK	1	Ea	2,080.0	1,645	61	1,645	306	129	2,080	Minproc est/Oman rates
								Total		152	3,511	757	232	4,500	
Area 60, E Equipment															
Agitators															
	AG	02	3	E000	MILK OF LIME TANK AGITATOR	1	Ea	1,706.0	1,488	44	1,488	218	0	1,706	Minproc data
	AG	03	1	E000	SIPX MIX AND STORAGE TANK AGITATOR	1	Ea	1,123.0	992	26	992	131	0	1,123	Minproc data
Drum Tipper															
	DT	01	0	E000	SIPX DRUM TIPPER	1	Ea	483.0	397	18	396	87	0	483	Minproc assess
Flocculant Package															
	FP	01	6	E000	FLOCCULANT SYSTEM	1	Ea	6,836.0	6,487	70	6,486	350	0	6,836	Minproc assess
Lime Silo Package															
	BN	01	0	E000	LIME SILO	1	Ea	25,332.0	21,626	595	21,625	2,975	732	25,332	Minproc data
	AT	01	1	E000	LIME SILO ACTIVATOR - cost with	1	Ea	0.0	0	0	0	0	0	0	
	FE	01	1	E000	LIME DISCHARGE ROTARY VALVE - cost with silo	1	Ea	0.0	0	0	0	0	0	0	
	FE	02	2	E000	LIME BIN DISCHARGE FEEDER - cost with silo	1	Ea	0.0	0	0	0	0	0	0	
	DC	01	2	E000	LIME SILO DUST COLLECTOR - cost with silo	1	Ea	0.0	0	0	0	0	0	0	
				E101	60t Crane	50	hrs	17.9	0	0	0	895	0	895	Minproc assess

Bare cost report -case 3,000t/day process plant (21/26)

Eq Type	Eq No	KWs	Rate Code	Description	Quantity	UoM	Unit Rate	Cost Ex Works	Total Install Hrs	Total Cost Ex Works	Total Install Cost	Freight Cost	TotalCost	Price Source		
Pumps																
PP	01/02	6	E000	LIME SLURRY DISTRIBUTION PUMP	2	Ea	1,365.0	1,190	70	2,380	350	0	2,730	Minproc data		
PP	03	1	E000	SIPX TRANSFER PUMP	1	Ea	627.0	496	26	496	131	0	627	Minproc data		
PP	04	0	E000	M2030 DRUM PUMP	1	Ea	384.0	298	18	297	87	0	384	Minproc data		
PP	06	0	E000	MIBC DRUM PUMP	1	Ea	664.0	578	18	577	87	0	664	Minproc data		
PP	08	6	E000	REAGENTS AREA SPILLAGE PUMP	1	Ea	1,735.0	1,518	44	1,517	218	0	1,735	Minproc data		
PP	09/12	0	E000	LIME DOSING PUMPS	4	Ea	867.3	736	105	2,944	525	0	3,469	Minproc data		
PP	13/18	0	E000	SIPX METERING PUMPS	6	Ea	867.2	736	158	4,416	787	0	5,203	Minproc data		
PP	19/24	0	E000	M2030 METERING PUMPS	6	Ea	867.2	736	158	4,416	787	0	5,203	Minproc data		
PP	25/29	0	E000	MIBC METERING PUMPS	5	Ea	867.2	736	131	3,680	656	0	4,336	Minproc data		
Safety Shower/Eyewash																
SE	01/10	0	E000	SAFETY SHOWER	10	Ea	457.5	370	175	3,700	875	0	4,575	Minproc data		
									Total	1,654	55,410	9,159	732	65,301		
Area 60, F Piping																
					F006	Area 60 - Reagents	1	LS	18,375.0	11,025	1,470	11,025	7,350	0	18,375	
									Total	1,470	11,025	7,350	0	18,375		
Area 60, G Electrical & Instr.																
					G006	Area 60 - Reagents	1	LS	9,887.0	4,722	1,033	4,722	5,165	0	9,887	
									Total	1,033	4,722	5,165	0	9,887		
									Area 60 Total	4,814	78,275	26,867	1,020	106,162		
Area 70 Water and Air Services																
Area 70, A Earthworks																
Dam																
DA	01	0	A002	Strip topsoil and stockpile	375	Bm³	1.1	0	0	0	420	0	420	Minproc est/Oman rates		
					A103	Cut to fill	1200	Bm³	1.7	0	0	0	1,992	0	1,992	Minproc est/Oman rates
					A205	Compacted sand bedding	150	Cm³	7.4	0	0	0	1,111	0	1,111	Minproc est/Oman rates
					A210	Geofabric membrane	1950	m²	0.6	0	0	0	1,092	0	1,092	Minproc est/Oman rates
					A209	HDPE liner 1.0mm thk	1950	m²	2.4	0	0	0	4,699	0	4,699	Minproc est/Oman rates
					A211	Liner trenching & backfill	50	Bm³	8.3	0	0	0	413	0	413	Minproc est/Oman rates
									Total	0	0	9,727	0	9,727		

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Bare cost report -case 3,000t/day process plant (22/26)

Eq Type	Eq No	KWs	Rate Code	Description	Quantity	UoM	Unit Rate	Cost Ex Works	Total Install Hrs	Total Cost Ex Works	Total Install Cost	Freight Cost	TotalCost	Price Source
Area 70, B Civil Works														
Water Storage														
			B002	Minor footings < 5m³	4.6	m³	90.9	0	55	0	418	0	418	
			B005	Ground slabs including kerbs	2	m³	60.5	0	10	0	121	0	121	
			B011	Tank ring beams	9.4	m³	98.9	0	113	0	930	0	930	
			B501	HD Bolts (HDG)	120	kg	2.3	0	12	0	279	0	279	
			B012	Ring beam infill	67	Cm³	4.7	0	38	0	314	0	314	
			B013	Infill topping 75mm thk	57	m²	0.8	0	9	0	45	0	45	
Total									237	0	2,107	0	2,107	
Area 70, D Platework														
Air Receivers														
	PV	01	0	D000 PLANT AIR RECEIVER	1	Ea	924.0	794	26	793	131	0	924	Minproc data
	PV	02	0	D000 INSTRUMENT AIR RECEIVER	1	Ea	583.0	496	18	496	87	0	583	Minproc data
Tanks														
	TK	01	0	D000 RAW WATER TANK	1	Ea	19,411.0	11,550	1,496	11,550	7,481	380	19,411	Minproc est/Oman rates
Total									1,540	12,839	7,699	380	20,918	
Area 70, E Equipment														
Blower														
	BL	01/03	55	E000 FLOTATION AIR BLOWER	3	Ea	13,384.3	12,772	368	38,316	1,837	0	40,153	outokumpu
Compressor														
	CP	01/02	37	E000 PLANT AIR COMPRESSOR	2	Ea	5,439.5	5,134	123	10,267	612	0	10,879	Atlas Copco
Dryer														
	DR	01	2	E000 INSTRUMENT AIR DRYER	1	Ea	1,414.0	1,239	35	1,239	175	0	1,414	Atlas Copco
Filter														
	FL	01/02	0	E000 AIR FILTER	2	Ea	277.5	190	35	380	175	0	555	Atlas Copco
Fire Protection														
	XM	01	0	E000 FIRE PROTECTION EQUIPMENT	1	Ea	3,982.0	3,983	0	3,982	0	0	3,982	Minproc assess
Pumps														
	PP	01/02	75	E000 PROCESS WATER PUMPS	2	Ea	2,808.5	2,284	210	4,567	1,050	0	5,617	KSB Ajax
	PP	03/04	19	E000 RAW WATER PUMP	2	Ea	1,415.5	1,110	123	2,219	612	0	2,831	KSB Ajax
	PP	05	0	E000 DIESEL FIRE WATER PUMP	1	Ea	4,838.0	4,402	88	4,401	437	0	4,838	KSB Ajax
Total									980	65,371	4,898	0	70,269	
Area 70, F Piping														
			F007	Area 70 - Water and Air Services	1	LS	37,820.0	22,695	3,025	22,695	15,125	0	37,820	
Total									3,025	22,695	15,125	0	37,820	

Bare cost report -case 3,000t/day process plant (23/26)

Eq Type	Eq No	KWs	Rate Code	Description	Quantity	UoM	Unit Rate	Cost Ex Works	Total Install Hrs	Total Cost Ex Works	Total Install Cost	Freight Cost	TotalCost	Price Source
Area 70, G Electrical & Instr.														
			G007	Area 70 - Water & Air services	1	LS	8,260.0	4,875	677	4,875	3,385	0	8,260	
								Total	677	4,875	3,385	0	8,260	
								Area 70 Total	6,459	105,780	42,941	380	149,101	
Area 80 Process Plant Infrastructure														
Area 80, D Platework Tanks														
	TK 01		0	D000 DIESEL STORAGE TANK	1	Ea	6,698.0	6,349	70	6,348	350	0	6,698	DRA Tank
								Total	70	6,348	350	0	6,698	
Area 80, E Equipment														
Lab Equipment														
	XM 01		31	E000 LABORATORY EQUIPMENT	1	Ea	60,799.0	57,124	735	57,124	3,675	0	60,799	Minesite Lab Eng
Truck Workshop														
			E001	20t EOT Workshop Cranes	2	ea	17,649.5	15,000	875	30,000	4,375	924	35,299	
								Total	1,610	87,124	8,050	924	96,098	
Area 80, F Piping														
			F008	Area 80 - Process Plant Infrastructure	1	LS	1,920.0	1,145	155	1,145	775	0	1,920	
			F009	Laboratory	1	LS	11,460.0	6,885	915	6,885	4,575	0	11,460	
								Total	1,070	8,030	5,350	0	13,380	
Area 80, G Electrical & Instr.														
			G008	Area 80 - Process Plant Infrastructure	1	LS	52,243.0	36,743	3,100	36,743	15,500	0	52,243	
								Total	3,100	36,743	15,500	0	52,243	
Area 80, H Buildings														
Plant Buildings														
	BD 01		0	H001 Administration Building	350	m ²	119.7	0	0	0	41,895	0	41,895	Minproc est/Oman rates
	BD 02		0	H002 Workshop Building	216	m ²	98.9	0	0	0	21,362	0	21,362	Minproc est/Oman rates
	BD 03		0	H003 Stores Building	216	m ²	98.9	0	0	0	21,362	0	21,362	Minproc est/Oman rates

Bare cost report -case 3,000t/day process plant (24/26)

Eq Type	Eq No	KWs	Rate Code	Description	Quantity	UoM	Unit Rate	Cost Ex Works	Total Install Hrs	Total Cost Ex Works	Total Install Cost	Freight Cost	Total Cost	Price Source
BD	04	0	H004	Reagents Building	216	m ²	98.9	0	0	0	21,362	0	21,362	Minproc est/Oman rates
BD	05/06	0	H005	Laboratory Building	120	m ²	98.9	0	0	0	11,868	0	11,868	Minproc est/Oman rates
BD	07	0	H006	Mill Control Room	18	m ²	111.3	0	0	0	2,003	0	2,003	Minproc est/Oman rates
BD	08	0	H007	Training Room	36	m ²	96.3	0	0	0	3,466	0	3,466	Minproc est/Oman rates
BD	09	0	H008	Workshop and Stores Office	36	m ²	96.3	0	0	0	3,466	0	3,466	Minproc est/Oman rates
BD	10	0	H009	Ablutions	27	m ²	164.0	0	0	0	4,428	0	4,428	Minproc est/Oman rates
BD	11	0	H010	First Aid Room	18	m ²	82.4	0	0	0	1,483	0	1,483	Minproc est/Oman rates
BD	12	0	H011	Crusher Control Room	4	m ²	168.5	0	0	0	674	0	674	Minproc est/Oman rates
BD	13	0	H012	Process Plant Switch Room	50.4	m ²	139.0	0	0	0	7,005	0	7,005	Minproc est/Oman rates
BD	14	0	H013	Crusher Switch Room	18	m ²	107.0	0	0	0	1,926	0	1,926	Minproc est/Oman rates
BD	15	0	H014	Gate House	16	m ²	82.4	0	0	0	1,318	0	1,318	Minproc est/Oman rates
BD	16	8	H015	Truck Workshop	7680	m ²	17.0	0	0	0	130,560	0	130,560	Minproc assess
BD	17	0	H016	Tyre Shop	100	m ²	119.7	0	0	0	11,970	0	11,970	Minproc est/Oman rates
Total									0	0	286,148	0	286,148	
Area 80 Total									5,850	138,245	315,398	924	454,567	

Area 90 Power Supply & Process Control System

Area 90, G Electrical & Instr.

G009	Area 90 - Power Supply & Process Plant Control System	1	LS	99,818.0	96,048	754	96,048	3,770	0	99,818
Total						754	96,048	3,770	0	99,818

Bare cost report -case 3,000t/day process plant (25/26)

I6 - A

Eq Type	Eq No	KWs	Rate Code	Description	Quantity	UoM	Unit Rate	Cost Ex Works	Total Install Hrs	Total Cost Ex Works	Total Install Cost	Freight Cost	Total Cost	Price Source		
										Area 90 Total	754	96,048	3,770	0	99,818	
Area 100 First Fill																
Area 100, I Miscellaneous																
			I901	First Fill - Reagents & Consumables -	1	LS	145,460.0	0	0	0	145,460	0	145,460			
Total									0	0	145,460	0	145,460			
										Area 100 Total	0	0	145,460	0	145,460	
Area 110 Capital Spares																
Area 110, E Equipment																
			E901	Capital Spares - 5%	1	LS	114,300.0	114,300	0	114,300	0	0	114,300			
Total									0	114,300	0	0	114,300			
										Area 110 Total	0	114,300	0	0	114,300	
Area 120 Ocean Freight																
Area 120, I Miscellaneous																
			I914	Ocean Freight - mechanical	1	LS	125,350.0	0	0	0	0	125,350	125,350	UTI		
			I916	Ocean Freight - electrical	1	LS	4,455.0	0	0	0	0	4,455	4,455	UTI		
Total									0	0	0	129,805	129,805			
										Area 120 Total	0	0	0	129,805	129,805	
Area 130 Preliminaries																
Area 130, I Miscellaneous																
Accommodation & Messing																
			I001	Accommodation & Messing - Directs	16350	days	2.7	0	0	0	44,063	0	44,063	ADNH Compass		
			I002	Accommodation & Messing - Indirects	4905	days	5.8	0	0	0	28,326	0	28,326	ADNH Compass		
			I003	Accommodation & Messing - Camp Staff	1635	days	2.7	0	0	0	4,406	0	4,406	ADNH Compass		
Commissioning																
			I912	Commissioning assist	1	LS	24,570.0	0	0	0	24,570	0	24,570			
			I913	Vendors representatives	1	LS	72,530.0	0	0	0	72,530	0	72,530			

Bare cost report -case 3,000t/day process plant (26/26)

Eq Type	Eq No	KWs	Rate Code	Description	Quantity	UoM	Unit Rate	Cost Ex Works	Total Install Hrs	Total Cost Ex Works	Total Install Cost	Freight Cost	TotalCost	Price Source
Mobilisation & demob														
			1903	Mobilisation/demob earthworks	1	LS	5,505.0	0	0	0	5,505	0	5,505	
			1905	Mobilisation/demob concrete contractor	1	LS	6,605.0	0	0	0	6,605	0	6,605	
			1906	Mobilisation/demob st'wk/mech/piping contractor	1	LS	37,035.0	0	0	0	37,035	0	37,035	
			1907	Mobilisation/demob tankage contractor	1	LS	15,015.0	0	0	0	15,015	0	15,015	
			1908	Mobilisation/demob building contractor	1	LS	6,355.0	0	0	0	6,355	0	6,355	
			1911	Mobilisation/demob heavy cranes	1	LS	5,845.0	0	0	0	5,845	0	5,845	
Preliminaries														
			1909	Construction camp	1	LS	308,950.0	0	0	0	308,950	0	308,950	ADNH Compass
			1910	Temporary facilities	1	LS	33,790.0	0	0	0	33,790	0	33,790	Minproc assess
			1904	Preliminaries earthworks contractor	1	LS	7,545.0	0	0	0	7,545	0	7,545	
				Total					0	0	600,540	0	600,540	
				Area 130 Total					0	0	600,540	0	600,540	
				Grand Total					123,323	3,399,735	1,794,677	142,537	5,336,949	

Appendix 2D

Equipment List

Equipment list (1/11)

Equip No	Duty	Stkby	Title	Specification	Estimated kW(s)(ea)	Revision
CR 10 01	1	0	PRIMARY CRUSHER	Nordberg C100 or equivalent 1000 mm by 760 mm feed opening CSS nominal 100 mm, CSS minimum 75 mm maximum feed 100% passing 800 mm crusher is fed by vibrating grizzly FE-1001 at nominal feed rate from ROM Bin 110 t/h, or 2000 t/day complete lining system	110	A
CR 10 02	1	0	SECONDARY CRUSHER	Nordberg HP300 (standard) or equivalent nominal capacity 220 t/h Maximum feed size 150 mm CSS nominal 25 mm, CSS minimum 20 mm complete package including lubrication systems with lube oil cooling, electric motors, belts, guards, instrumentation, replaceable wear liners, automatic tramp release system, purge air equipment	220	B
FE 10 01	1	0	PRIMARY CRUSHER FEEDER	Nominal capacity 110 t/h Nordberg B10-42-2V or equivalent 1000 mm wide by 4400 mm long, 2200 mm long feed plate area plus split grizzly decks hydraulic drive, variable speed control grizzly openings 75 mm	22	A
FE 10 02	1	0	SECONDARY CRUSHER FEEDER	vibrating pan feeder nominal capacity 220 t/h complete with hinged nose for crusher maintenance, wear liners, safety slings, dust covers	4	B
FE 10 04/05	1	1	FINE ORE BIN DISCHARGE FEEDER	Nominally 600 wide x 1500, or equivalent, design capacity 100 t/h for 14 mm maximum lump size, complete with vibrating motors, feed chute, dust covers, wear liners and safety slings	2.2	A
FE 10 06	1	0	EMERGENCY RECLAIM FEEDER	Nominally 600 wide x 1500, or equivalent, design capacity 100 t/h for 14 mm maximum lump size, complete with vibrating motors, dust covers, wear liners and safety slings	2.2	A

Equipment list (2/11)

Equip No		Duty	Stdby	Title	Specification	Estimated kW/s/ea	Revision
SC	10 01	1	0	PRODUCT SCREEN	Nordberg TS202, or equivalent 1.5 m by 4.9 m double deck top deck aperture 28 mm, bottom deck aperture 14 mm nominal feed rate 330 t/h	15	B
CY	20 01	1	0	PRIMARY CYCLONES	Cluster of THREE duty and ONE standby 510 mm cyclones complete with distribution box, manual isolation valves to each cyclone, pressure gauges and tappings, overflow and underflow launders, and support steelwork	0	B
ML	20 01	1	0	BALL MILL	4.42 m diameter by 6.24 EGL overflow ball mill complete with lining systems, feed chute, discharge trommel, jacking cradle, all drive components, ancillary items and systems	2000	B
PP	20 01/ 02	1	1	PRIMARY CYCLONE FEED PUMP	Warman 10/8 FAH, or equivalent nominal capacity 378 m ³ /h, design 450 m ³ /h @ 30 m TDH; nominal solids flow rate 365 t/h, solids SG 3.2, solids 58 %w/w, slurry density 1.66 t/m ³	150	A
CY	30 01	1	0	REGRIND CYCLONES	Cluster of TWO duty and ONE standby 250 mm cyclones complete with distribution box, manual isolation valves to each cyclone, pressure gauges and tappings, overflow and underflow launders, and support steelwork	0	A
FT	30 01/ 03	3	0	ROUGHER FLOTATION CELL	Trough shaped 16 m ³ cells complete with double sided launders and double launder for variable rougher-scav partition. Nominal tailings slurry flow rate 189 m ³ /h.	37	A
FT	30 04/ 06	2	0	ROUGHER-SCAVENGER FLOTATION CELL	Trough shaped 16 m ³ cells complete with double sided launder. Nominal tailings slurry flow rate 166 m ³ /h	37	B

Equipment list (3/11)

Equip/No		Duty	Stdby	Title	Specification	Estimated kW/s (ea)	Revision
FT	30 07/08	2	0	CLEANER 1 FLOTATION CELL	Trough shaped 8 m3 cell complete with double sided launder. First bank with double launder for variable cleaner/cleaner-scavenger partition. Nominal tailings slurry flow rate 81 m3/h. (combined with cleaner-scavenger in a 2+4 configuratin)	22	A
FT	30 09/14	4	0	CLEANER-SCAVENGER FLOTATION CELL	Trough shaped 8 m3 cells complete with double sided launder. First bank with double launder for variable cleaner/cleaner-scavenger partition. Nominal tailings slurry flow rate 70 m3/h. (combined with cleaner 1 in a 2+4 configuratin)	22	B
FT	30 15/17	2	0	CLEANER 2 FLOTATION CELL	Trough shaped 8 m3 cells complete with double sided launder. Nominal tailings slurry flow rate 40 m3/h. (combined with cleaner 3 in a 2+2 configuratin)	22	B
FT	30 18/19	2	0	CLEANER 3 FLOTATION CELL	Trough shaped 8 m3 cells complete with double sided launder. Nominal tailings slurry flow rate 26 m3/h. (combined with cleaner 2 in a 2+2 configuratin)	22	A
ML	30 01	1	0	REGRIND MILL	2.74 m diameter by 3.55 EGL overflow ball mill complete with lining systems, feed chute, discharge trommel, jacking cradle, all drive components, ancillary items and systems	400	B
PP	30 01/02	1	1	REGRIND CYCLONE FEED PUMP	Warman 4/3 CAH nominal capacity 63 m3/h, design 80 m3/h @ 30 m TDH - nominal solids flow rate 40 t/h, solids SG 4.3, solids 42 %w/w, slurry density 1.48 t/m3	30	A
PP	30 08	1	0	COMBINED TAILS PUMP	Warman 8/6 EAH nominal capacity 236 m3/h, design 285 m3/h @ 15 m TDH; - nominal solids flow rate 87 t/h, solids SG 3.1, solids 29.4 %w/w, slurry density 1.25 t/m3	45	A

Equipment list (4/11)

Equip No		Duty	Stdby	Title	Specification	Estimated kW/S (ea)	Revision
FL	40 01	1	0	CONCENTRATE FILTER	Vacuum disc filter, filter area 28 m ² ; nominal slurry feed rate 3.6 m ³ /h; slurry feed properties - nominal solids flow rate 4.6 t/h, solids SG 4.3, solids 65 %w/w, slurry density 2.0 t/m ³ , filter cake moisture content 16 %; filter package complete with vacuum pump, filtrate receiver and filtrate pump, instrumentation, electric motors, and other items necessary to complete the package	0	B
TH	40 01	1	0	CONCENTRATE THICKENER	Conventional thickener, diameter 6 m nominal feed rate 13.5 m ³ /h, solids flow rate 4.6 t/h, solids content 30 %w/w, slurry density 1.3 t/m ³ complete package including tank, rake, rake drive and lift mechanism, walkway and bridge structure, bed mass and level instrumentation, and other items necessary to complete the package	4	A
FL	50 01	1	0	TAILINGS FILTER	Pressure filter, filtration area 54 m ² ; nominal slurry feed rate 75 m ³ /h; slurry feed properties - nominal solids flow rate 87 t/h, solids SG 3.1, solids 65 %w/w, slurry density 1.8 t/m ³ , filter cake moisture content 12 %; filter package complete with vacuum pump, filtrate receiver and filtrate pump, belt lift fan, instrumentation, electric motors, and other items necessary to complete the package	22	B
PP	50 01/02	1	1	TAILINGS THICKENER UNDERFLOW PUMP	Warman 6/4 DAH; nominal capacity 74 m ³ /h, design 90 m ³ /h @ 15 m TDH; slurry properties - nominal solids flow rate 87 t/h, solids SG 3.1, solids 65 %w/w, slurry density 1.8 t/m ³	22	A

Equipment list (5/11)

Equip. No.		Duty	Stdbby	Title	Specification	Estimated kWs/ea	Revision
TK	50 01	1	0	TAILINGS THICKENER	Hi-rate thickener 16 metre diameter; nominal feed rate 271 m ³ /h, solids flow rate 87 t/h, solids content 26.3 %w/w, slurry density 1.22 t/m ³ ; complete package including tank, rake, hydraulic rake drive and lift mechanism, walkway and bridge structure, bed mass and level instrumentation, and other items necessary to complete the package	7.5	B
FE	60 01	1	0	LIME BIN DISCHARGE FEEDER	Screw feeder capacity 0.5 to 4.0 t/h, length 4 m, handling a maximum of 80 mm quicklime lumps. Vendor to specify feeder diameter and style of screw. Feeder is variable speed control (by others)	2.2	A
BL	70 01/02	1	1	FLOTATION AIR BLOWER	Roots or centrifugal blower package complete with pressure relief valving and sound proofing for 85 dBA maximum @ 1 metre capacity 7900 Am ³ /h @ 30 kPa discharge pressure	90	A
CP	70 01/02	1	1	PLANT AIR COMPRESSOR	Rotary screw compressor package capacity FAD 350 m ³ /h @ 750 kPa	45	A
PP	70 01/02	1	1	PROCESS WATER PUMPS	Southern Cross Iso 200x150-400, or equivalent centrifugal 1475 rpm; nominal capacity 243 m ³ /h, design capacity 300 m ³ /h @ 45 TDH; complete with 4 pole electric motor and common baseplate	50	A
PP	70 03/04	1	1	RAW WATER PUMP	Southern Cross Iso 125x80-400, or equivalent centrifugal 1475 rpm; nominal capacity 60 m ³ /h @ 50 TDH; complete with 4 pole electric motor and common baseplate	18.5	A
SC	70 05	1	0	DIESEL FIRE WATER PUMP	Southern Cross Iso 80x50-250, or equivalent centrifugal with 2900 rpm diesel engine drive, nominal capacity 50 m ³ /h @ 50 TDH; complete package required including all controls and instrumentation	0	A

Equipment list (6/11)

Equip No	Duty	Stdy	Title	Specification	Estimated kW/(ea)	Revision	Selection
CR 10 01	1	0	PRIMARY CRUSHER	Nordberg C100 or equivalent 1000 mm by 760 mm feed opening CSS nominal 100 mm, CSS minimum 75 mm maximum feed 100% passing 800 mm crusher is fed by vibrating grizzly FE-1001 at nominal feed rate from ROM Bin 156 t/h, or 3000 t/day complete lining system	110	A	
CR 10 02	1	0	SECONDARY CRUSHER	Nordberg HP200 (standard) or equivalent nominal capacity 140 t/h Maximum feed size 150 mm CSS nominal 25 mm, CSS minimum 20 mm complete package including lubrication systems with lube oil cooling, electric motors, belts, guards, instrumentation, replaceable wear liners, automatic tramp release system, purge air equipment	150	A	
CR 10 03	1	0	TERTIARY CRUSHER	Nordberg HP200 (shorthead) or equivalent nominal capacity 120 t/h Maximum feed size 28 mm CSS nominal 14 mm, CSS minimum 10 mm complete package including lubrication systems with lube oil cooling, electric motors, belts, guards, instrumentation, replaceable wear liners, automatic tramp release, purge air equipment	150	A	
FE 10 01	1	0	PRIMARY CRUSHER FEEDER	Nominal capacity 156 t/h Nordberg B10-42-2V or equivalent 1000 mm wide by 4400 mm long, 2200 mm long feed plate area plus split grizzly decks hydraulic drive, variable speed control grizzly openings 75 mm	22	A	
FE 10 02	1	0	SECONDARY CRUSHER FEEDER	Schenck 900 x 2400 BFF, or equivalent nominal capacity 140 t/h complete with hinged nose for crusher maintenance, wear liners, safety slings, dust covers	4	A	

Equipment list (7/11)

Equip No.	Duty	Stby	Title	Specification	Estimated kWs (ea)	Revision	Selection
FE 10 03	1	0	TERTIARY CRUSHER FEEDER	Schenck 900 x 2400 BFF, or equivalent nominal capacity 120 t/h complete with hinged nose for crusher maintenance, wear liners, safety slings, dust covers	4	A	
FE 10 04/05	1	1	FINE ORE BIN DISCHARGE FEEDER	Nominally 600 wide x 1500, or equivalent, design capacity 150 t/h for 12 mm maximum lump size, complete with vibrating motors, feed chute, dust covers, wear liners and safety slings	2.2	A	
FE 10 06	1	0	EMERGENCY RECLAIM FEEDER	Nominally 600 wide x 1500, or equivalent, design capacity 150 t/h for 12 mm maximum lump size, complete with vibrating motors, dust covers, wear liners and safety slings	2.2	A	
SC 10 01	1	0	PRODUCT SCREEN	Nordberg TS302, or equivalent 1.8 m by 6.1 m double deck top deck aperture 28 mm, bottom deck aperture 12 mm nominal feed rate 415 t/h	15	A	
CY 20 01	1	0	PRIMARY CYCLONES	Cluster of FOUR duty and ONE standby 510 mm cyclones complete with distribution box, manual isolation valves to each cyclone, pressure gauges and tappings, overflow and underflow launders, and support steelwork	0	A	
ML 20 01	1	0	BALL MILL	5.03 m diameter by 7.20 EGL overflow ball mill complete with lining systems, feed chute, discharge trommel, jacking cradle, all drive components, ancillary items and systems	2800	A	
PP 20 01/02	1	1	PRIMARY CYCLONE FEED PUMP	Warman 10/8 FAH, or equivalent nominal capacity 568 m ³ /h, design 680 m ³ /h @ 30 m TDH slurry properties - nominal solids flow rate 547 t/h, solids SG 3.2, solids 58 %w/w, slurry density 1.66 t/m ³	150	A	

Equipment list (8/11)

Equip No.	Duty	Stdby	Title	Specification	Estimated kWs/ea	Revision	Selection
CY 30 01	1	0	REGRIND CYCLONES	Cluster of TWO duty and ONE standby 250 mm cyclones complete with distribution box, manual isolation valves to each cyclone, pressure gauges and tappings, overflow and underflow launders, and support steelwork	0	A	
FT 30 01/03	3	0	ROUGHER FLOTATION CELL	Trough shaped 16 m3 cells complete with double sided launders and double launder for variable rougher-scav partition. Nominal tailings slurry flow rate 284 m3/h.	37	A	
FT 30 04/06	3	0	ROUGHER-SCAVENGER FLOTATION CELL	Trough shaped 16 m3 cells complete with double sided launder. Nominal tailings slurry flow rate 249 m3/h	37	A	
FT 30 07/08	2	0	CLEANER 1 FLOTATION CELL	Trough shaped 8 m3 cell complete with double sided launder. First bank with double launder for variable cleaner/cleaner-scavenger partition. Nominal tailings slurry flow rate 121 m3/h. (combined with cleaner-scavenger in a 4+4 configuratin)	22	A	
FT 30 09/14	6	0	CLEANER-SCAVENGER FLOTATION CELL	Trough shaped 8 m3 cells complete with double sided launder. First bank with double launder for variable cleaner/cleaner-scavenger partition. Nominal tailings slurry flow rate 121 m3/h. (combined with cleaner 1 in a 4+4 configuratin)	22	A	
FT 30 15/17	3	0	CLEANER 2 FLOTATION CELL	Trough shaped 8 m3 cells complete with double sided launder. Nominal tailings slurry flow rate 59 m3/h. (combined with cleaner 3 in a 3+2 configuratin)	22	A	
FT 30 18/19	2	0	CLEANER 3 FLOTATION CELL	Trough shaped 8 m3 cells complete with double sided launder. Nominal tailings slurry flow rate 39 m3/h. (combined with cleaner 2 in a 3+2 configuratin)	22	A	
ML 30 01	1	0	REGRIND MILL	3.05 m diameter by 4.05 EGL overflow ball mill complete with lining systems, feed chute, discharge trommel, jacking cradle, all drive components, ancillary items and systems	550	A	

Equipment list (9/11)

Equip.No.	Duty	Stdby	Title	Specification	Estimated kW/s (ea)	Revision	Selection
PP 30 01/02	1	1	REGRIND CYCLONE FEED PUMP	Warman 4/3 CAH nominal capacity 95 m3/h, design 115 m3/h @ 30 m TDH slurry properties - nominal solids flow rate 59 t/h, solids SG 4.3, solids 42 %w/w, slurry density 1.48 t/m3	30	A	
PP 30 08	1	0	CLEANER-SCAVENGER TAILS PUMP	Warman 8/6 EAH nominal capacity 353 m3/h, design 424 m3/h @ 15 m TDH slurry properties - nominal solids flow rate 130 t/h, solids SG 3.1, solids 29.4 %w/w, slurry density 1.25 t/m3	45	A	
FL 40 01	1	0	CONCENTRATE FILTER	Vacuum disc filter, filter area 42 m2 nominal slurry feed rate 5.4 m3/h slurry feed properties - nominal solids flow rate 7.0 t/h, solids SG 4.3, solids 65 %w/w, slurry density 2.0 t/m3, filter cake moisture content 16 % filter package complete with vacuum pump, filtrate receiver and filtrate pump, instrumentation, electric motors, and other items necessary to complete the package	0	A	
TH 40 01	1	0	CONCENTRATE THICKENER	Conventional thickener, diameter 6 m nominal feed rate 17.9 m3/h, solids flow rate 7.0 t/h, solids content 30 %w/w, slurry density 1.3 t/m3 complete package including tank, rake, rake drive and lift mechanism, walkway and bridge structure, bed mass and level instrumentation, and other items necessary to complete the package	4	A	
FL 50 01	1	0	TAILINGS FILTER	Pressure filter, nominal slurry feed rate 111 m3/h slurry feed properties - nominal solids flow rate 130 t/h, solids SG 3.1, solids 65 %w/w, slurry density 1.8 t/m3, filter cake moisture content 12 %	22	A	

Equipment list (10/11)

Equip No.	Duty	Stdby	Title	Specification	Estimated kW (ea)	Revision	Selection
PP 50 01/02	1	1	TAILINGS THICKENER UNDERFLOW PUMP	Warman 6/4 DAH nominal capacity 111 m3/h, design 133 m3/h @ 15 m TDH slurry properties - nominal solids flow rate 130 t/h, solids SG 3.1, solids 65 %w/w, slurry density 1.8 t/m3	22	A	
TK 50 01	1	0	TAILINGS THICKENER	Hi-rate thickener 20 metre diameter nominal feed rate 405 m3/h, solids flow rate 130 t/h, solids content 26.3 %w/w, slurry density 1.22 t/m3 complete package including tank, rake, hydraulic rake drive and lift mechanism, walkway and bridge structure, bed mass and level instrumentation, and other	7.5	A	
FE 60 01	1	0	LIME BIN DISCHARGE FEEDER	Screw feeder capacity 0.5 to 4.0 t/h, length 4 m, handling a maximum of 80 mm quicklime lumps. Vendor to specify feeder diameter and style of screw. Feeder is variable speed control (by others)	2.2	A	
BL 70 01/02	1	1	FLOTATION AIR BLOWER	Roots or centrifugal blower package complete with pressure relief valving and sound proofing for 85 dBA maximum @ 1 metre capacity 7900 Am3/h @ 30 kPa discharge pressure	90	A	
CP 70 01/02	1	1	PLANT AIR COMPRESSOR	Rotary screw compressor package capacity FAD 350 m3/h @ 750 kPa	45	A	
PP 70 01/02	1	1	PROCESS WATER PUMPS	Southern Cross Iso 200x150-400, or equivalent centrifugal 1475 rpm nominal capacity 324 m3/h, design capacity 405 m3/h @ 45 TDH complete with 4 pole electric motor and common baseplate	75	A	
PP 70 03/04	1	1	RAW WATER PUMP	Southern Cross Iso 125x80-400, or equivalent centrifugal 1475 rpm nominal capacity 60 m3/h @ 50 TDH complete with 4 pole electric motor and common baseplate	18.5	A	

Equipment list (11/11)

Equip. No.			Duty	Stdby	Title	Specification	Estimated kWs (ea)	Revision	Selection
SC	70	05	1	0	DIESEL FIRE WATER PUMP	Southern Cross Iso 80x50-250, or equivalent centrifugal with 2900 rpm diesel engine drive, nominal capacity 50 m ³ /h @ 50 TDH complete package required including all controls and instrumentation	0	A	

Appendix 2E

Tailings Dam Capital Cost

HAYL-AS SAFIL PRE-FEASIBILITY STUDY
OPTION B - DRY TAILINGS DISPOSAL, TAILINGS DAM CONSTRUCTION (1/2)

Number	Item Description	Unit	Quantity Phase 1	Quantity Phase 2	Rate (US\$)	Amount (US\$) Phase 1	Amount (US\$) Phase 2	
BILL 1	HAYL-AS SAFIL PRE-FEASIBILITY STUDY							
	OPTION B - DRY TAILINGS DISPOSAL							
	TAILINGS DAM CONSTRUCTION							
	Site Clearing							
	1.1	Clear dam footprint and inundation area of all vegetation including trees and grub up roots, windrow and dispose off site	ha	14.5	15.5	2200.00	31,900.00	34,100.00
	Topssoil Strip							
	1.2	Strip topsoil to a nominal 150 mm depth and stockpile in designated area for reuse	m ³	21750	23250	1.75	38,062.50	40,687.50
	General Excavation							
	1.3	Excavate to spoil Class 1 unsuitable material from embankment footprint	m ³	26500	28500	1.50	39,750.00	42,750.00
	1.4	Trimming, ripping and preparation of inundation area	ha	13	14	3500.00	45,500.00	49,000.00
	Borrow Area Development							
	1.5	Clear, grub and strip unusable material from the borrow area	m ²	1200	1300	0.22	264.00	286.00
	1.6	Drill, blast, rip Class 2 rockfill material to stockpile	m ³	25000	0	2.00	50,000.00	0.00
	1.7	Excavate Class 1 earthfill material to stockpile for embankments and cushion layer	m ³	82600	52900	0.58	47,908.00	30,682.00
	Drainage Material							
	1.8	Crush and screen blasted rock to provide filter drainage materials	m ³	0	0	0.00	0.00	0.00
	Embankment Construction							
1.9	Rip to 300 depth and compact foundation layer Load, haul, place and compact:	m ²	67100	42850	0.20	13,420.00	8,570.00	
1.10	Compact Zone 1 Class 1 fill	m ³	29300	18700	1.61	47,173.00	30,107.00	
1.11	Zone 2 selected fill	m ³	0	0	1.61	0.00	0.00	
1.12	Class 2 rockfill	m ³	15000	10000	1.82	27,300.00	18,200.00	
1.13	Granular material to embankment foundation drainage	m ³	0	0	5.00	0.00	0.00	
Supply and place:								
1.14	Perforated HDPE pipe (100 diam.)	m	0	0	20.00	0.00	0.00	
1.15	Geotextile (500g/m ²)	m ²	0	0	3.50	0.00	0.00	
HDPE Liner Preparation								
1.16	Excavate, trim and grade 6000 wide access bench	m	1600	1100	10.00	16,000.00	11,000.00	
1.17	Trim rock which protrudes through cushion layer	m ³	5000	0	20.00	100,000.00	0.00	
1.18	Prepare inundation area to a finish suitable to receive liner cushion layer	ha	14	15	2500.00	35,000.00	37,500.00	
1.19	Place and compact 300 cushion layer (Class 1)	m ³	42000	45500	1.61	67,620.00	73,255.00	
1.20	Supply and Place 1.5 mm HDPE liner including of anchor trench	m ²	144600	153600	5.00	723,000.00	768,000.00	
1.21	Supply and lay geotextile 500g/m ² to embankment	m ²	12800	8200	3.50	44,800.00	28,700.00	
1.22	Excavate and backfill 600 x 500 liner anchor trench	m	1600	1100	10	16,000.00	11,000.00	
Overliner Basin Drainage								
1.23	Place Type A gravel surround to collection pipes Supply and place:	m ³	0	0	2.50	0.00	0.00	
1.24	Perforated HDPE pipe (100 diam.)	m	0	0	20.00	0.00	0.00	
1.25	Perforated HDPE pipe (200 diam.)	m	0	0	40.00	0.00	0.00	
1.26	Solid HDPE pipes (200 diam.)	m	0	0	40.00	0.00	0.00	
1.27	Geotextile (500g/m ²)	m ²	0	0	3.50	0.00	0.00	
1.28	Supply and fix butterfly valves (200 diam.)	nr	0	0	1000.00	0.00	0.00	

HAYL-AS SAFIL PRE-FEASIBILITY STUDY
OPTION B - DRY TAILINGS DISPOSAL, TAILINGS DAM CONSTRUCTION (2/2)

Number	Item Description	Unit	Quantity Phase 1	Quantity Phase 2	Rate (US\$)	Amount (US\$) Phase 1	Amount (US\$) Phase 2
Underliner Leak Detection System							
1.29	Place Type A gravel surround to collection pipes	m ³	0	0	2.50	0.00	0.00
Supply and place:							
1.30	Perforated HDPE pipe (100 diam.)	m	0	0	20.00	0.00	0.00
1.31	Solid HDPE pipes (200 diam.)	m	0	0	40.00	0.00	0.00
1.32	Geotextile (500g/m ²)	m ²	0	0	3.50	0.00	0.00
Tailings Delivery and Distribution System							
Wet Disposal Option							
Supply and install:							
1.33	110 diam. slotted uPVC pipe	nr	0	0	20.00	0.00	0.00
1.34	250 diam. knife gate valve	nr	0	0	750.00	0.00	0.00
1.35	HDPE pipe (250 OD SDR11)	m	0	0	90.00	0.00	0.00
1.36	80 diam. pinch valves	nr	0	0	600.00	0.00	0.00
1.37	250 to 80 HDPE branch saddles	nr	0	0	40.00	0.00	0.00
1.38	1m Heavy duty water delivery 80 diam. hose	nr	0	0	15.00	0.00	0.00
1.39	Centrifugal tailings delivery pump (at plant site),incl. check valves	nr	0	0	10000.00	0.00	0.00
Permanent Installations for Tailings Handling							
Dry Disposal Option							
1.33A	Provide concrete bunkers for temporary storage of tailings at plant site	nr					
1.34A	Provide 11m diameter filter bed thickener including mechanicals	nr					
1.35A	Provide and install filter press system for dewatering of tailings	nr					
1.36B	Filter press building (240m ²)	nr					
Decant and Return Water System							
Wet Disposal Option							
Supply and install:							
1.40	Return water pump	nr	0	0	10000.00	0.00	0.00
1.41	Floating barge	sum	0	0	50000.00	0.00	0.00
1.42	HDPE pipe (180 OD SDR 17)	m	0	0	80.00	0.00	0.00
Drainage Collection System							
1.43	Excavate Toe drain	m ³	3600	2400	10.00	36,000.00	24,000.00
1.44	Supply and install return water pump	sum	1	1	1000.00	1,000.00	1,000.00
1.45	Excavation of sump	m ³	1600	1600	10.00	16,000.00	16,000.00
1.46	Trimming of excavated surface	m ²	1250	1250	5.00	6,250.00	6,250.00
1.47	Excavate and backfill 600 x 500 liner anchor trench	m	160	160	10.00	1,600.00	1,600.00
Supply and place:							
1.48	1.5 HDPE liner to toe drains	m ²	4300	2700	5.00	21,500.00	13,500.00
1.49	1.0 HDPE liner to drainage collection sumps	m ²	1650	1650	5.00	8,250.00	8,250.00
1.50	Geotextile liner protection (500g/m ²)	m ²	1650	1650	3.50	5,775.00	5,775.00
1.51	Solid HDPE pipe (200 diam.)	m	20	20	40.00	800.00	800.00
1.52	Reinforced concrete to form pump sump (incl. all formwork)	m ³	2	2	200.00	400.00	400.00
1.53	Mesh reinforcement	t	1	1	500.00	500.00	500.00
Instrumentation							
1.54	Performance monitoring instrumentation	PC	1	0	10000.00	10,000.00	0.00
TO SUMMARY OF BILL 1						1,451,772.50	1,261,912.50

HAYL-AS SAFIL PRE-FEASIBILITY STUDY
OPTION B - DRY TAILINGS DISPOSAL, ACCESS ROADS

Number	Item Description	Unit	Quantity Phase 1	Quantity Phase 2	Rate (US\$)	Amount (US\$) Phase 1	Amount (US\$) Phase 2	
BILL 2	HAYL-AS SAFIL PRE-FEASIBILITY STUDY							
	OPTION B - DRY TAILINGS DISPOSAL							
	ACCESS ROADS							
	Clearing							
	2.1	Clear all vegetation from road alignments including trees and grub up roots, windrow and dispose off site	ha	22.5	0	2,200.00	49,500.00	0.00
	Topsoil Strip							
	2.2	Strip topsoil to a nominal 150 depth and stockpile in designated area for reuse	m ²	3050	0	1.75	5,337.50	0.00
	General Construction							
	2.3	Supply and deliver locally won road construction materials	m ³	58350	0	1.50	87,525.00	0.00
	2.3	E/O for screening and blending	m ³	6200	0	5.00	31,000.00	0.00
2.4	Construct 10m wide road to section as detailed on drawing	m	1500	0	9.50	14,250.00	0.00	
2.5	Construct access ramp to depository as detailed on drawing	m ³	52150	0	2.50	130,375.00	0.00	
Supply and Install:								
2.6	450 Diameter pipe culvert beneath access ramp	m	120	0	125	15,000.00	0.00	
2.7	600 x 1200 multicell, precast box culverts to access road	m	192	0	150	28,800.00	0.00	
2.8	Reinforced concrete head and wingwalls to box culverts including formwork and reinforcement	nr	2	0	1000	2,000.00	0.00	
TO SUMMARY OF BILL 2						363,787.50	0.00	

HAYL-AS SAFIL PRE-FEASIBILITY STUDY
 OPTION B - DRY TAILINGS DISPOSAL, DIVERSION CHANNEL

Number	Item Description	Unit	Quantity Phase 1	Quantity Phase 2	Rate (US\$)	Amount (US\$) Phase 1	Amount (US\$) Phase 2	
BILL 3	HAYL-AS SAFIL PRE-FEASIBILITY STUDY							
	OPTION B - DRY TAILINGS DISPOSAL							
	DIVERSION CHANNEL							
	Site Clearing							
	3.1	Clear diversion alignment of all vegetation including trees and grub up roots, windrow and dispose off site	ha	0.45	0	2,200.00	990.00	0.00
	Topsoil Strip							
	3.2	Strip topsoil to a nominal 150 mm depth and stockpile in designated area for reuse	m ²	4500	0	1.75	7,875.00	0.00
	General Excavation							
	3.2	Excavate Class 1 material to stockpile for reuse	m ³	1700	0	1.50	2,550.00	0.00
	3.3	Trimming and preparation	m ²	5000	0	2.50	12,500.00	0.00
Diversion Berm Construction								
3.4	Filling and compacting of Class 1 to berm from general excavation	m ³	0	0	10.00	0.00	0.00	
TO SUMMARY OF BILL 3						23,915.00	0.00	

Appendix 3

Permeability test for the drill holes

Drill-hole Permeability Test (Unsteady Method)

Name of project : The Mineral Exploration in the Yanqul-Ghuzayn Area, Sultanate of Oman

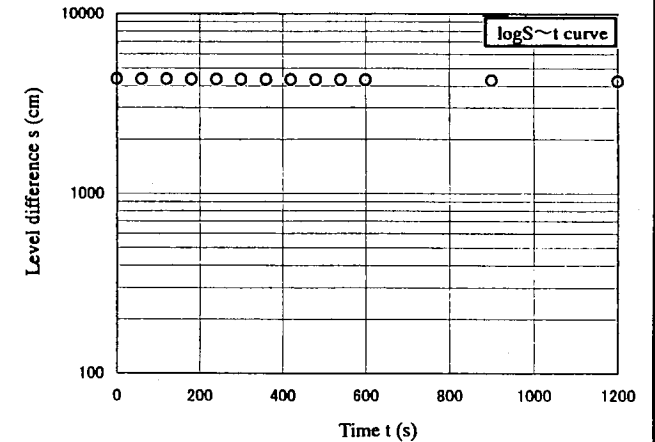
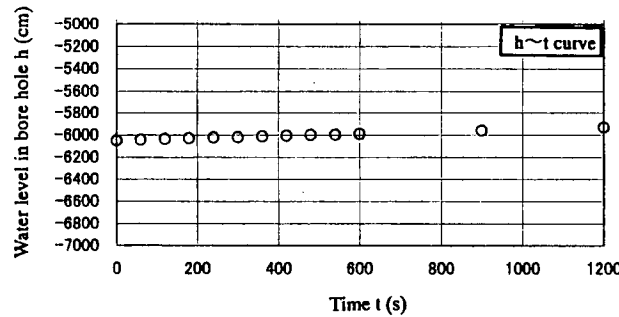
Date tested : 2001/2/16

Drill hole No. : MJOY-W1

Measured by : Chandran Nair

Test method	Recovery test	Length of testing section : L (cm)	5813	Classification of aquifer	Unconfined
Testing section (m)	16.87~75.00	Groundwater level : h ₀ (cm)	-1687	Ground level (m)	-
Inner diameter of pumping pipe : d (cm)	7.6	Diameter of drill hole : D (cm)	31.1	Weather	Fine
Gradient of linear part of logt~t curve : m (s ⁻¹)	9.81E-06	Permeability coefficient : k (cm/s)	1.66E-07		

Time : t (s)	Groundwater level in the hole : h (cm)	Level difference to original GWL : S (cm)
0	-6052	4365
60	-6045	4358
120	-6038	4351
180	-6032	4345
240	-6025	4338
300	-6022	4335
360	-6014	4327
420	-6009	4322
480	-6002	4315
540	-5998	4311
600	-5992	4305
900	-5963	4276
1200	-5934	4247
1800	-5878	4191
2400	-5825	4138
3000	-5775	4088
3600	-5723	4036
4500	-5665	3978
5400	-5565	3878
6300	-5495	3808
7200	-5415	3728



Remarks :

Equations used for permeability test

$$k = \frac{0.66d^2 \log(2L/D)}{L} \cdot m \quad \left[\quad m = \frac{\log(s_1/s_2)}{t_2 - t_1} \quad \right]$$

Drill-hole Permeability Test (Unsteady Method)

Name of project : The Mineral Exploration in the Yanqul-Ghuzayn Area, Sultanate of Oman

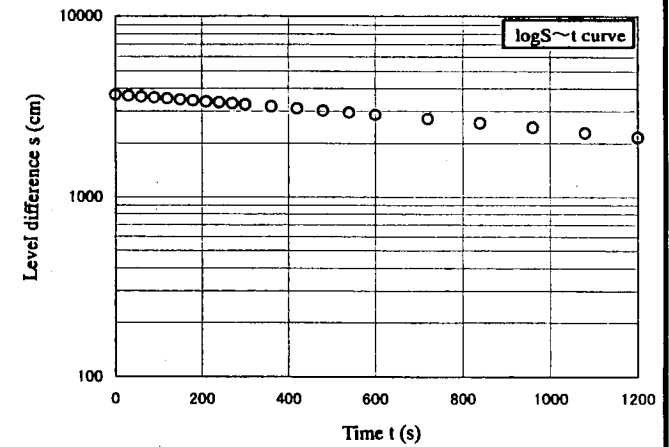
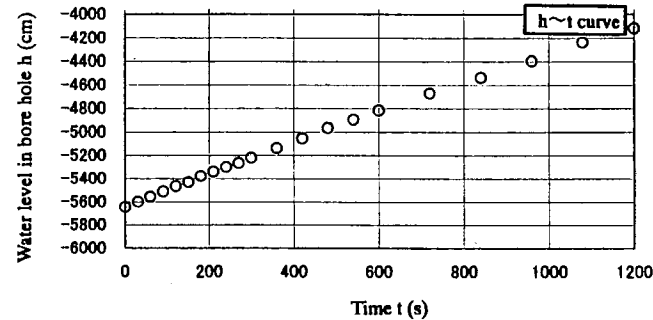
Date tested : 2001/2/11

Drill hole No. : MJOY-W2 (1)

Measured by : Chandran Nair

Test method	Recovery test	Length of testing section : L (cm)	5557	Classification of aquifer	Unconfined
Testing section (m)	19.73~75.00	Groundwater level : h ₀ (cm)	-1973	Ground level (m)	-
Inner diameter of pumping pipe : d (cm)	7.6	Diameter of drill hole : D (cm)	31.1	Weather	Fine
Gradient of linear part of log t~t curve : m (s ⁻¹)	1.84E-04	Permeability coefficient : k (cm/s)	3.23E-06		

Time : t (s)	Groundwater level in the hole : h (cm)	Level difference to original GWL : S (cm)
0	-5646	3673
30	-5601	3628
60	-5558	3585
90	-5513	3540
120	-5467	3494
150	-5432	3459
180	-5380	3407
210	-5342	3369
240	-5302	3329
270	-5268	3295
300	-5222	3249
360	-5139	3166
420	-5055	3082
480	-4968	2995
540	-4898	2925
600	-4821	2848
720	-4674	2701
840	-4536	2563
960	-4396	2423
1080	-4238	2265
1200	-4118	2145
1500	-3805	1832
1800	-3514	1541
2100	-3237	1264
2400	-3039	1066
2700	-2861	888
3000	-2675	702
3300	-2519	546
3600	-2394	421



Remarks :

Equations used for permeability test

$$k = \frac{0.66d^2 \log(2L/D)}{L} \cdot m \quad \left[\quad m = \frac{\log(s_1/s_2)}{t_2 - t_1} \quad \right]$$

Drill-hole Permeability Test (Unsteady Method)

Name of project : The Mineral Exploration in the Yanqul-Ghuzayn Area, Sultanate of Oman

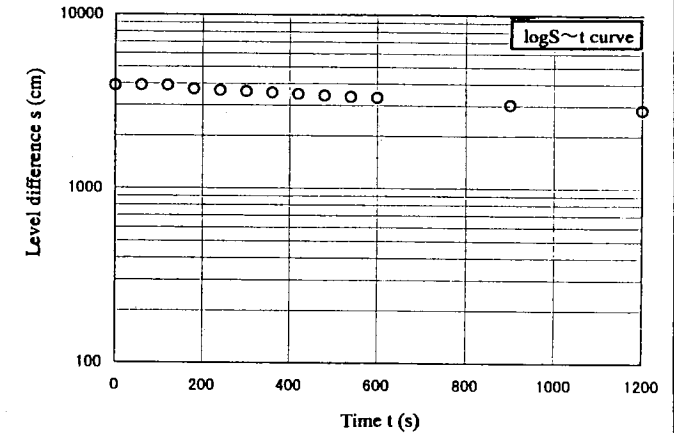
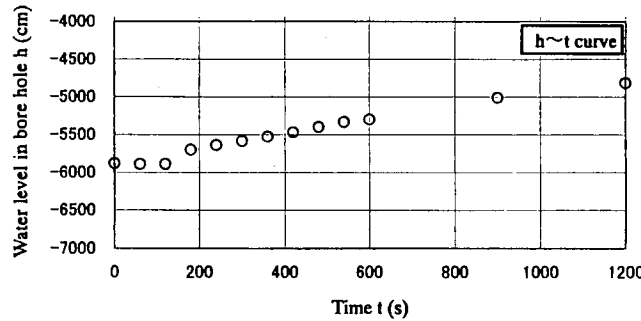
Date tested : 2001/2/11

Drill hole No. : MJOY-W2 (2)

Measured by : Chandran Nair

Test method	Recovery test	Length of testing section : L (cm)	5503	Classification of aquifer	Unconfined
Testing section (m)	19.97~75.00	Groundwater level : h ₀ (cm)	-1997	Ground level (m)	-
Inner diameter of pumping pipe : d (cm)	7.6	Diameter of drill hole : D (cm)	31.1	Weather	Fine
Gradient of linear part of log t~t curve : m (s ⁻¹)	1.24E-04	Permeability coefficient : k (cm/s)	2.20E-06		

Time : t (s)	Groundwater level in the hole : h (cm)	Level difference to original GWL : S (cm)
0	-5880	3883
60	-5889	3892
120	-5889	3892
180	-5703	3706
240	-5644	3647
300	-5588	3591
360	-5533	3536
420	-5473	3476
480	-5403	3406
540	-5340	3343
600	-5307	3310
900	-5015	3018
1200	-4817	2820
1800	-4335	2338
2400	-3918	1921
3000	-3577	1580
3600	-3301	1304



Remarks :

Equations used for permeability test

$$k = \frac{0.66d^2 \log(2L/D)}{L} \cdot m \quad \left[\quad m = \frac{\log(s_1/s_2)}{t_2 - t_1} \quad \right]$$

Drill-hole Permeability Test (Unsteady Method)

Name of project : The Mineral Exploration in the Yanqul-Ghuzayn Area, Sultanate of Oman

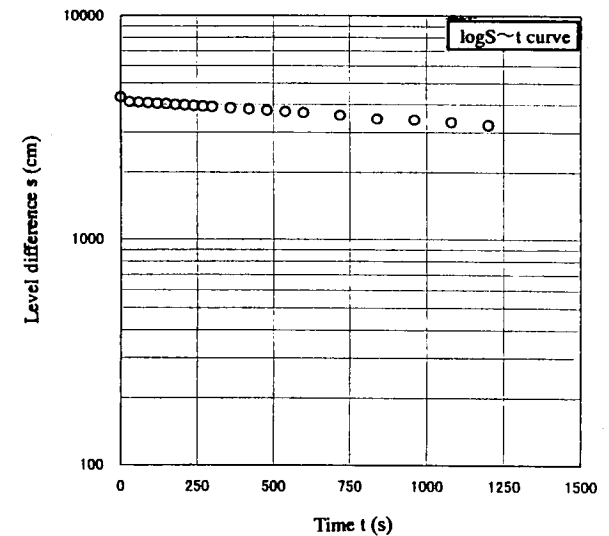
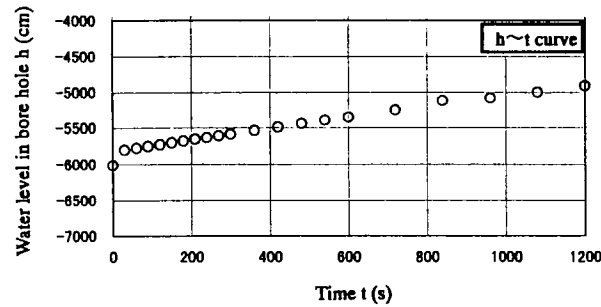
Date tested : 2001/2/11

Drill hole No. : MJOY-W3 (1)

Measured by : Chandran Nair

Test method	Recovery test	Length of testing section : L (cm)	5855	Classification of aquifer	Unconfined
Testing section (m)	16.45~75.00	Groundwater level : h ₀ (cm)	-1687	Ground level (m)	-
Inner diameter of pumping pipe : d (cm)	7.6	Diameter of drill hole : D (cm)	31.1	Weather	Fine
Gradient of linear part of log t~t curve : m (s ⁻¹)	8.76E-05	Permeability coefficient : k (cm/s)	1.47E-06		

Time : t (s)	Groundwater level in the hole : h (cm)	Level difference to original GWL : S (cm)
0	-6012	4325
30	-5802	4115
60	-5780	4093
90	-5755	4068
120	-5732	4045
150	-5707	4020
180	-5682	3995
210	-5656	3969
240	-5635	3948
270	-5613	3926
300	-5590	3903
360	-5540	3853
420	-5493	3806
480	-5445	3758
540	-5398	3711
600	-5353	3666
720	-5254	3567
840	-5122	3435
960	-5084	3397
1080	-5000	3313
1200	-4910	3223



Remarks :

Equations used for permeability test

$$k = \frac{0.66d^2 \log(2L/D)}{L} \cdot m \quad \left[\quad m = \frac{\log(s_1/s_2)}{t_2 - t_1} \quad \right]$$

Drill-hole Permeability Test (Unsteady Method)

Name of project : The Mineral Exploration in the Yanqul-Ghuzayn Area, Sultanate of Oman

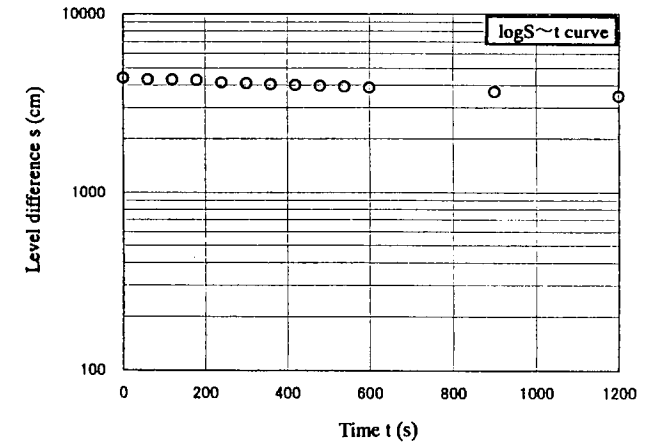
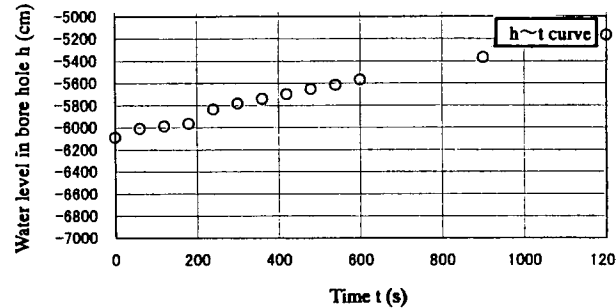
Date tested : 2001/2/11

Drill hole No. : MJOY-W3 (2)

Measured by : Chandran Nair

Test method	Recovery test	Length of testing section : L (cm)	5788	Classification of aquifer	Unconfined
Testing section (m)	17.12~75.00	Groundwater level : h ₀ (cm)	-1712	Ground level (m)	-
Inner diameter of pumping pipe : d (cm)	7.6	Diameter of drill hole : D (cm)	31.1	Weather	Fine
Gradient of linear part of log t~t curve : m (s ⁻¹)	8.94E-05	Permeability coefficient : k (cm/s)	1.51E-06		

Time : t (s)	Groundwater level in the hole : h (cm)	Level difference to original GWL : S (cm)
0	-6090	4378
60	-6012	4300
120	-5993	4281
180	-5969	4257
240	-5837	4125
300	-5785	4073
360	-5744	4032
420	-5702	3990
480	-5656	3944
540	-5618	3906
600	-5570	3858
900	-5370	3658
1200	-5170	3458
1800	-4798	3086
2400	-4407	2695
3000	-4043	2331
3600	-3739	2027
4500	-3339	1627
5400	-2998	1286
6300	-2737	1025
7200	-2527	815
8400	-2328	616
9600	-2175	463
10800	-2027	315



Remarks :

Equations used for permeability test

$$k = \frac{0.66d^2 \log(2L / D)}{L} \cdot m \quad \left[\quad m = \frac{\log(s_1 / s_2)}{t_2 - t_1} \quad \right]$$

Drill-hole Permeability Test (Unsteady Method)

Name of project : The Mineral Exploration in the Yanqul-Ghuzayn Area, Sultanate of Oman

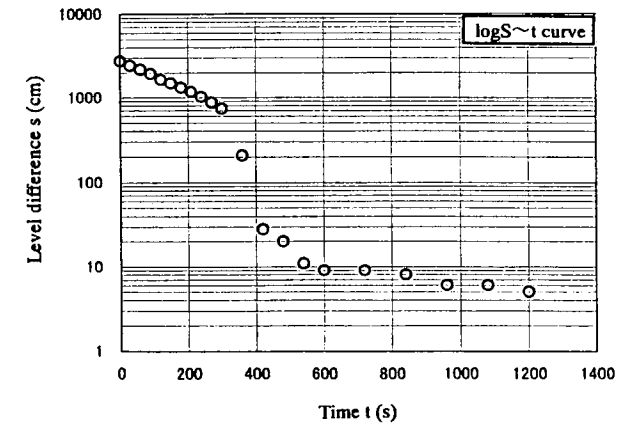
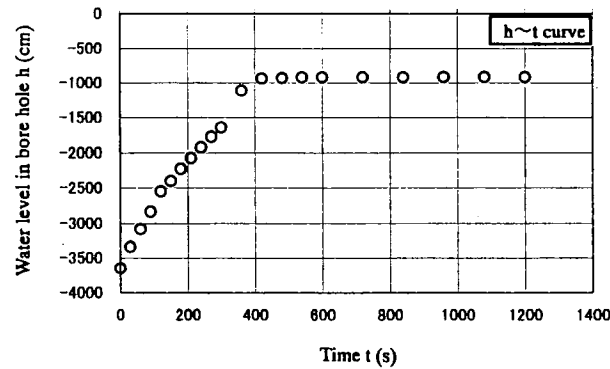
Date tested : 2001/2/11

Drill hole No. : MJOY-W4

Measured by : Chandran Nair

Test method	Recovery test	Length of testing section : L (cm)	6591	Classification of aquifer	Unconfined
Testing section (m)	9.09~75.00	Groundwater level : h ₀ (cm)	-909	Ground level (m)	-
Inner diameter of pumping pipe : d (cm)	7.6	Diameter of drill hole : D (cm)	31.1	Weather	Fine
Gradient of linear part of log t~t curve : m (s ⁻¹)	1.92E-03	Permeability coefficient : k (cm/s)	2.92E-05		

Time : t (s)	Groundwater level in the hole : h (cm)	Level difference to original GWL : S (cm)
0	-3650	2741
30	-3340	2431
60	-3086	2177
90	-2835	1926
120	-2550	1641
150	-2400	1491
180	-2230	1321
210	-2078	1169
240	-1925	1016
270	-1778	869
300	-1646	737
360	-1116	207
420	-937	28
480	-929	20
540	-920	11
600	-918	9
720	-918	9
840	-917	8
960	-915	6
1080	-915	6
1200	-914	5



Remarks :

Equations used for permeability test

$$k = \frac{0.66d^2 \log(2L/D)}{L} \cdot m \quad \left[\quad m = \frac{\log(s_1/s_2)}{t_2 - t_1} \quad \right]$$

Drill-hole Permeability Test (Unsteady Method)

Name of project : The Mineral Exploration in the Yanqul-Ghuzayn Area, Sultanate of Oman

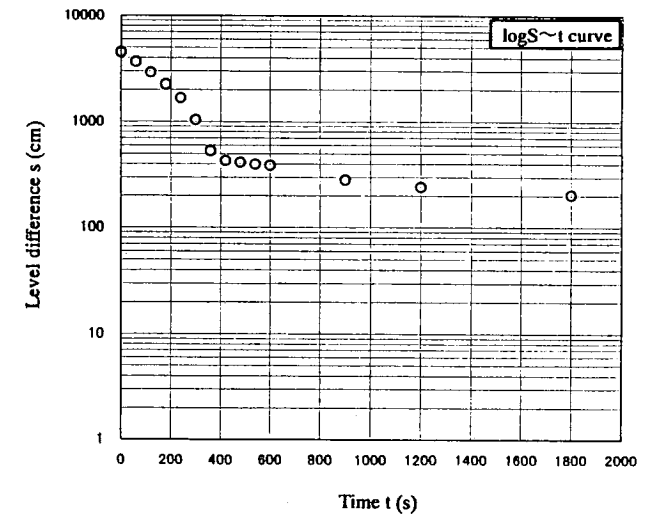
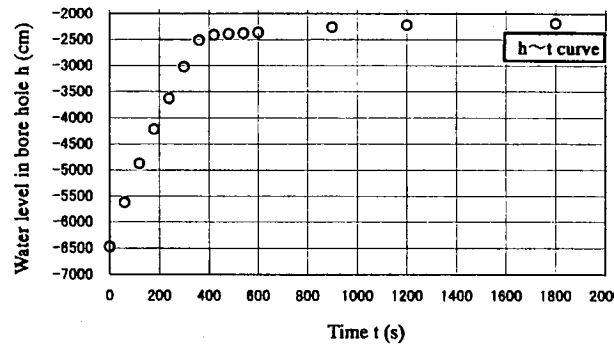
Date tested : 2001/2/11

Drill hole No. : MJOY-W5

Measured by : Chandran Nair

Test method	Recovery test	Length of testing section : L (cm)	5511	Classification of aquifer	Unconfined
Testing section (m)	19.89~75.00	Groundwater level : h ₀ (cm)	-1989	Ground level (m)	-
Inner diameter of pumping pipe : d (cm)	7.6	Diameter of drill hole : D (cm)	31.1	Weather	Fine
Gradient of linear part of log t~t curve : m (s ⁻¹)	2.58E-03	Permeability coefficient : k (cm/s)	4.55E-05		

Time : t (s)	Groundwater level in the hole : h (cm)	Level difference to original GWL : S (cm)
0	-6478	4489
60	-5630	3641
120	-4878	2889
180	-4222	2233
240	-3638	1649
300	-3028	1039
360	-2518	529
420	-2417	428
480	-2402	413
540	-2386	397
600	-2374	385
900	-2270	281
1200	-2230	241
1800	-2192	203
2400	-2174	185
3000	-2161	172
3600	-2149	160
4500	-2138	149
5400	-2128	139
6300	-2122	133
7200	-2113	124



Remarks :

Equations used for permeability test

$$k = \frac{0.66d^2 \log(2L/D)}{L} \cdot m \quad \left[\quad m = \frac{\log(s_1/s_2)}{t_2 - t_1} \quad \right]$$

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 4

Drilling equipments and consumed materials

Drilling equipment for metallurgical and geotechnical tests

	Rig-1	Rig-2
Model	RAMROD-II	VOL-180
Maker	Joy Manufacturing Co. USA	Voltas Ltd. India
Mounting	Truck mounted 4WD	Truck mounted 4WD
Drilling capacity with NX size wire line coring	450 m	650 m
Angle hole drilling capacity	Upto 60 deg.	Vertical only
Circulation pump	35 GPM 800 PSI	37 GPM 1000 PSI

Drilling for metallurgical test: Rig-1

Mineral exploration drilling: Rig-1 and Rig-2

Drilling equipment for environmental survey

No.	DESCRIPTION	SPECIFICATION
1	Model - As per manufacturer's	Ingersoll Rand , T4W HP 900
2	Mast Rating / Max.Static Hook Load	31,750 Kgs
3	Draw Weight / Pull Back	17,000 Kgs
4	Pipe Racking System/Capacity	Swing In / Out Carousel ; 76.0 Mtr
5	Power Pack Engine Type / Capacity	GM 12V 71 TA ; 530 HP
6	Foam Injection Pump Type/Capacity/Pressure	Triplex single acting ; 95.0 Ltr/Min ; 3791.7 kPa
7	Rotary table / Type	Top Head Drive ; Hydraulic
8	Max.Torque /RPM	9763 Nm / 80 RPM
9	Table Opening	20 "
10	Levelling Jack	Two at drilling end & One at front
11	Tank volumes - Fuel	600 Litres
12	Working Clearance - below crown	8.2 Metres
13	Compressor for Air/Foam drilling , Type/Output	Screw Type ; 2412.9 kPa / 425 Lps
14	Power Source	Direct drive from Diesel engine
15	Overall Weight - Tonnes	24 T
16	Overall Length - Metres	10.7 M
17	Overall Width - Metres	2.4 M
18	Overall Height When Travelling - Metres	3.9 M
19	Is Rig Carrier or Trailer or Skid Mounted	Carrier Mounted
20	Carrier Engine - Type / Capacity	Cummins L10C ; 240 HP @2100 RPM
21	No. of Front Axles	One
22	No. of Front Driving Axles	None
23	No. of Rear Axles	Two
24	No. of Rear Driving Axles	Two
25	Transport speed on graded roads	50 Km/Hr
26	Drill pipe	4 1/2" dia Internal up set , 25' long

Consumed material-(1) Exploration

Hole No.	MJOY-1	MJOY-2	MJOY-3	MJOY-4	MJOY-5	MJOY-6	MJOY-7	MJOY-8	MJOY-9
Bit: NW	1	1	1	1	1	1	1	1	1
Bit: NX	1	1	1	1	1	1	1	1	1
Bit: BX	-	-	-	-	-	-	-	-	-
Light Oil (l)	30	25	30	30	35	30	35	30	20
Mud (kg)	240	210	260	200	280	260	280	260	160
Cement (kg)	100	100	150	100	150	150	150	150	150

Hole No.	MJOY-10	MJOY-11	MJOY-12	MJOY-13	MJOY-14	MJOY-15	MJOY-16	MJOY-17	MJOY-18
Bit: NW	1	1	1	1	1	1	1	1	1
Bit: NX	1	1	1	1	1	1	1	1	1
Bit: BX	-	-	-	-	-	-	-	-	-
Light Oil (l)	20	20	20	20	20	20	20	20	20
Mud (kg)	110	140	110	110	120	140	120	110	110
Cement (kg)	100	100	100	100	150	200	100	100	200

Hole No.	MJOY-19	MJOY-20	MJOY-21	MJOY-22	MJOY-23	MJOY-24	MJOY-25	MJOY-26	MJOY-27
Bit: NW	1	1	1	1	1	1	1	1	1
Bit: NX	1	1	1	1	1	1	1	1	1
Bit: BX	-	-	-	-	-	-	-	-	-
Light Oil (l)	20	20	20	20	20	20	20	20	20
Mud (kg)	140	120	140	110	110	120	160	140	110
Cement (kg)	150	150	150	100	100	100	200	100	100

Consumed material-(1) Metallurgical test

Hole No.	MJOY-P1	MJOY-P2	MJOY-P3	MJOY-P4	MJOY-P5
Bit: NC	1	1	1	1	1
Bit: NW	1	1	1	1	1
Bit: NX	-	-	-	-	-
Light Oil (l)	20	20	20	20	20
Mud (kg)	120	100	150	150	170
Cement (kg)	150	100	160	200	150

Consumed material-(2) Geotechnical test

Hole No.	MJOY-T1	MJOY-T2	MJOY-T3	MJOY-T4	MJOY-T5
Bit: NC	1	1	1	1	1
Bit: NW	1	1	1	1	1
Bit: NX	-	-	-	-	-
Light Oil (l)	10	10	10	10	10
Mud (kg)	60	70	130	70	120
Cement (kg)	100	130	180	130	160

Appendix 5

Generalized drilling results and progress record of drilling

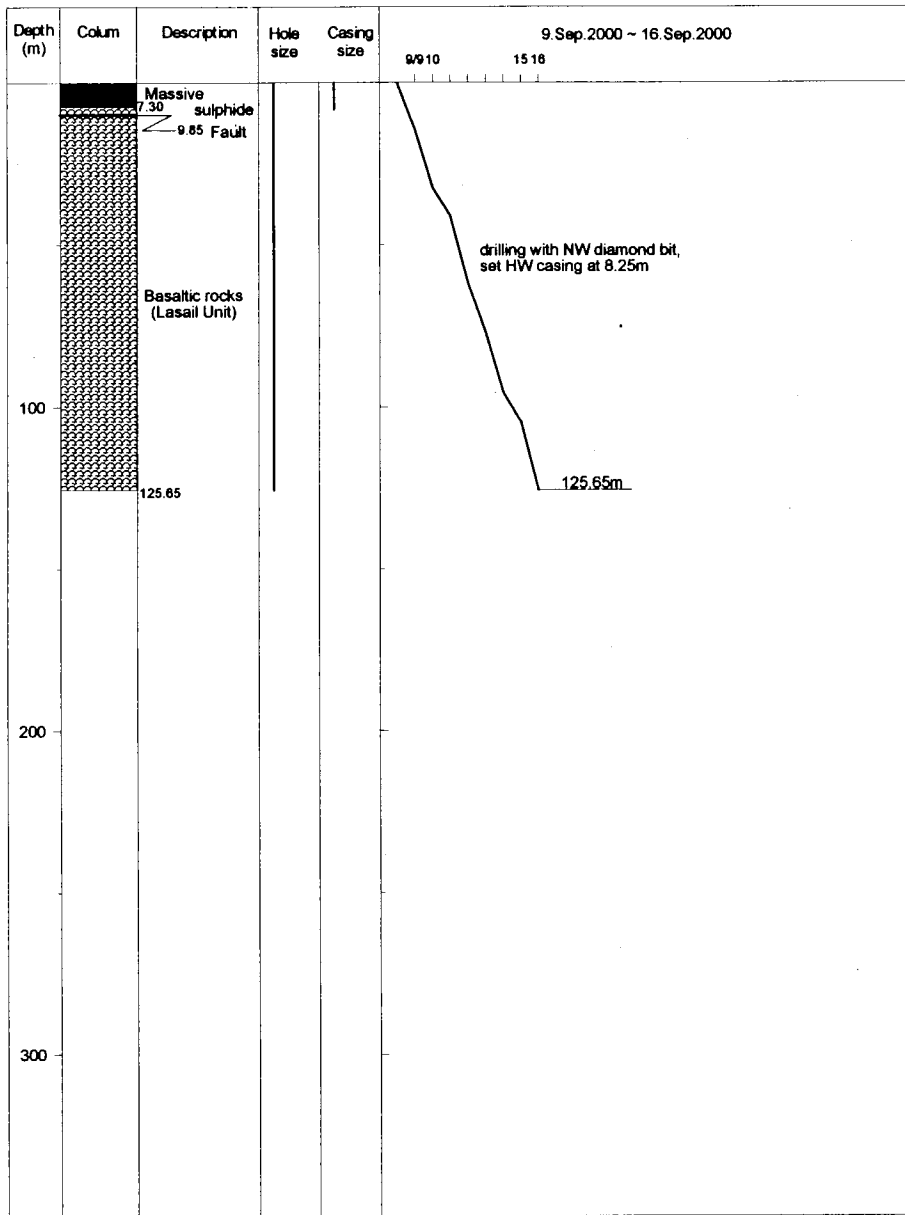
Progress record of drilling for metallurgical test

	Hole No.	MJOY-P1	MJOY-P2	MJOY-P3	MJOY-P4	MJOY-P5
Drilling Period	Preparation Days (A)	00/9/8 1	00/9/17 0.5	00/9/25 0.5	00/10/8 0.5	00/10/19 0.5
	Drilling Days (B)	9/9 to 9/16 8	9/18 to 9/24 7	9/26 to 10/7 11.5	10/8 to 10/18 10.5	10/20 to 10/29 10
	Removing Days (C)	9/17 0.5	9/25 0.5	10/7 0.5	10/19 0.5	10/30 0.5
	Total days (D)	9.5	8	12.5	11.5	11
Depth	Planned depth (E)	125m	125m	125m	125m	125m
	Drilled depth (F)	125.65m	125.80m	125.65m	137.55m	126.00m
Recovery	Overburden (G)	0.00m	1.00m	1.00m	1.00m	0.75m
	Core length (H)	116.40m	123.95m	120.25m	125.70m	122.90m
	Recovery (H/F)	93%	99%	96%	91%	98%
Casing	HW casing	8.25m	4.00m	3.00m	14.25m	7.10m
	NW casing	-	-	-	-	-
	NX casing	-	-	-	-	-
Rate	meter /day (F/B)	15.71m	17.97m	10.93m	13.10m	12.60m
	meter/ total day (F/D)	13.23m	15.73m	10.05m	11.96m	11.45m

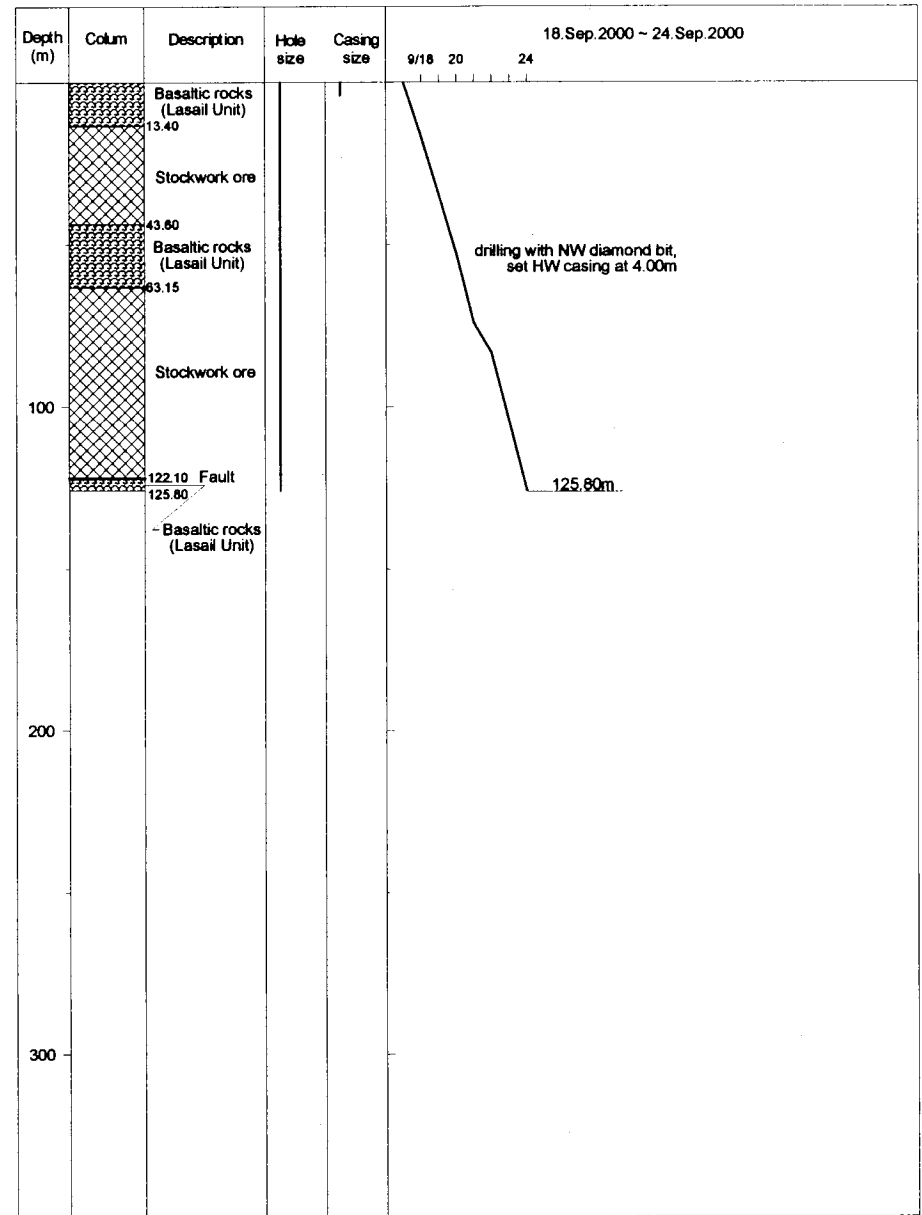
Progress record of drilling for geotechnical test

	Hole No.	MJOY-T1	MJOY-T2	MJOY-T3	MJOY-T4	MJOY-T5
Drilling Period	Preparation Days (A)	01/9/16 0.5	01/9/18 0.5	01/9/20 0.5	01/9/23 0.5	01/9/25 0.5
	Drilling Days (B)	9/16 to 9/17 1.5	9/18 to 9/19 1.5	9/20 to 9/22 2	9/23 to 9/24 1.5	9/25 to 9/27 2
	Removing Days (C)	9/18 0.5	9/20 0.5	9/22 0.5	9/24 0.5	9/27 0.5
	Total days (D)	2.5	2.5	3	2.5	3
Depth	Planned depth (E)	25m	25m	25m	25m	25m
	Drilled depth (F)	25.10m	25.25m	25.35m	25.15m	25.25m
Recovery	Overburden (G)	3.70m	0.00m	0.00m	0.00m	3.00m
	Core length (H)	23.60m	23.70m	25.35m	22.65m	24.25m
	Recovery (H/F)	94%	94%	100%	90%	96%
Casing	HW casing	-	-	-	-	-
	NW casing	-	-	3.00m	3.00m	3.00m
	NX casing	-	-	-	-	-
Rate	meter /day (F/B)	16.73m	16.83m	12.68m	16.77m	12.63m
	meter/ total day (F/D)	10.04m	10.10m	8.45m	10.06m	8.42m

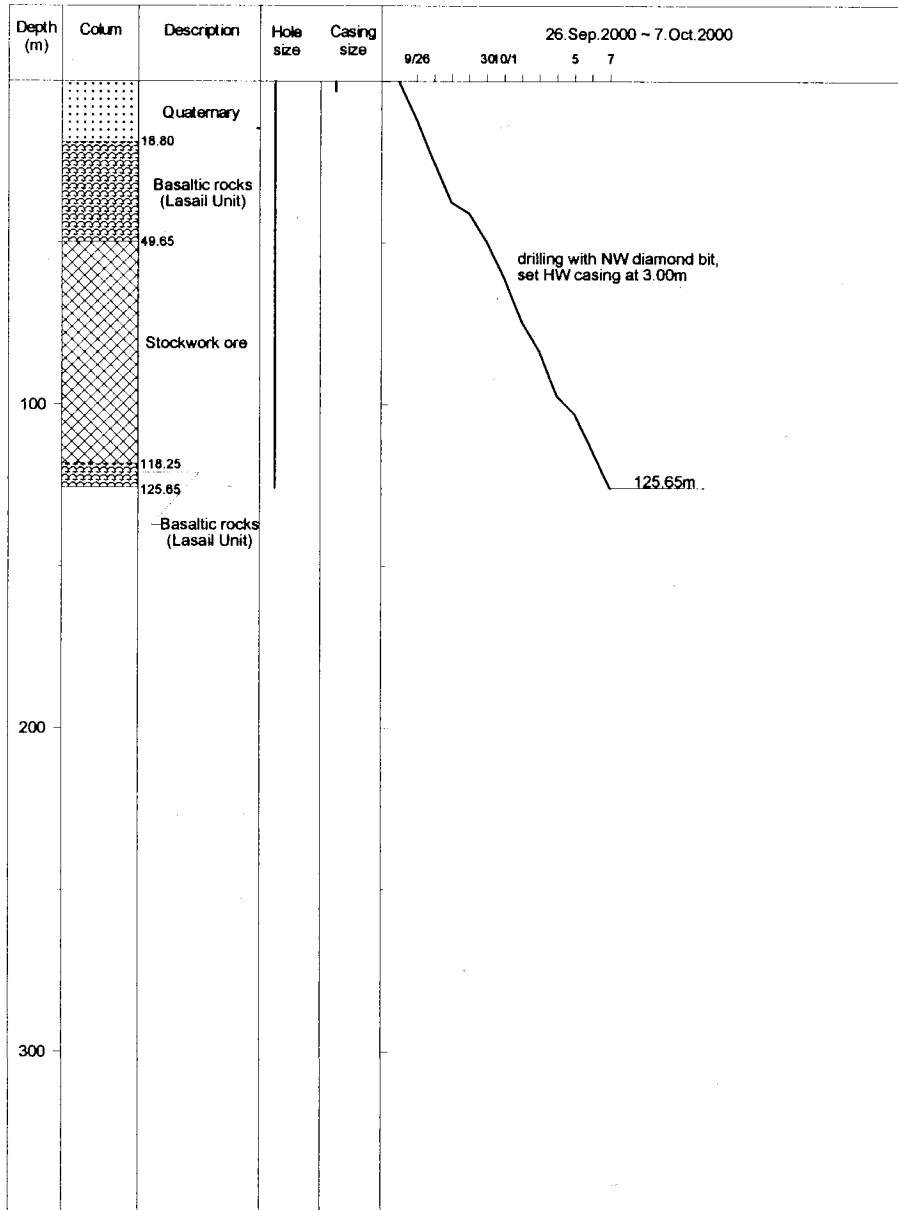
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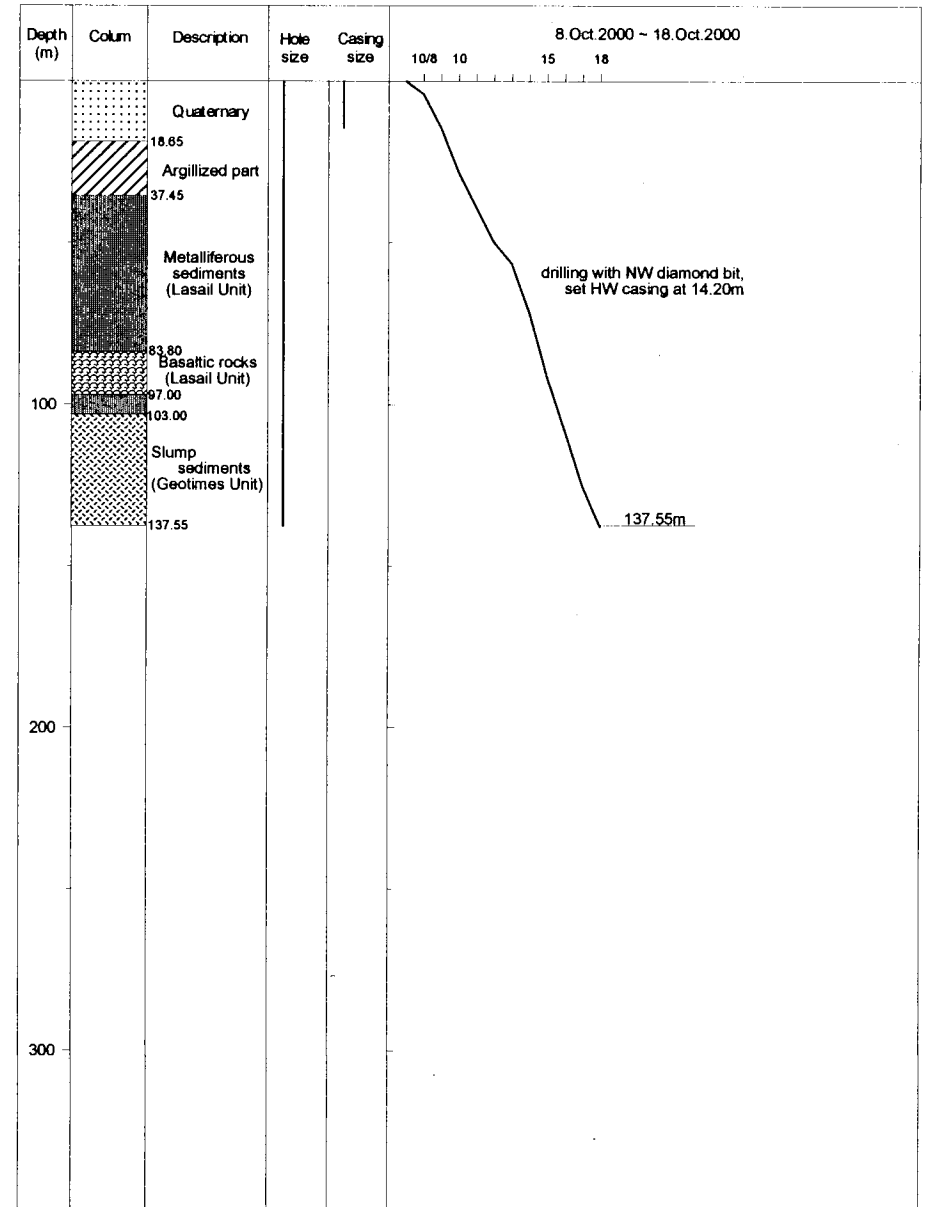
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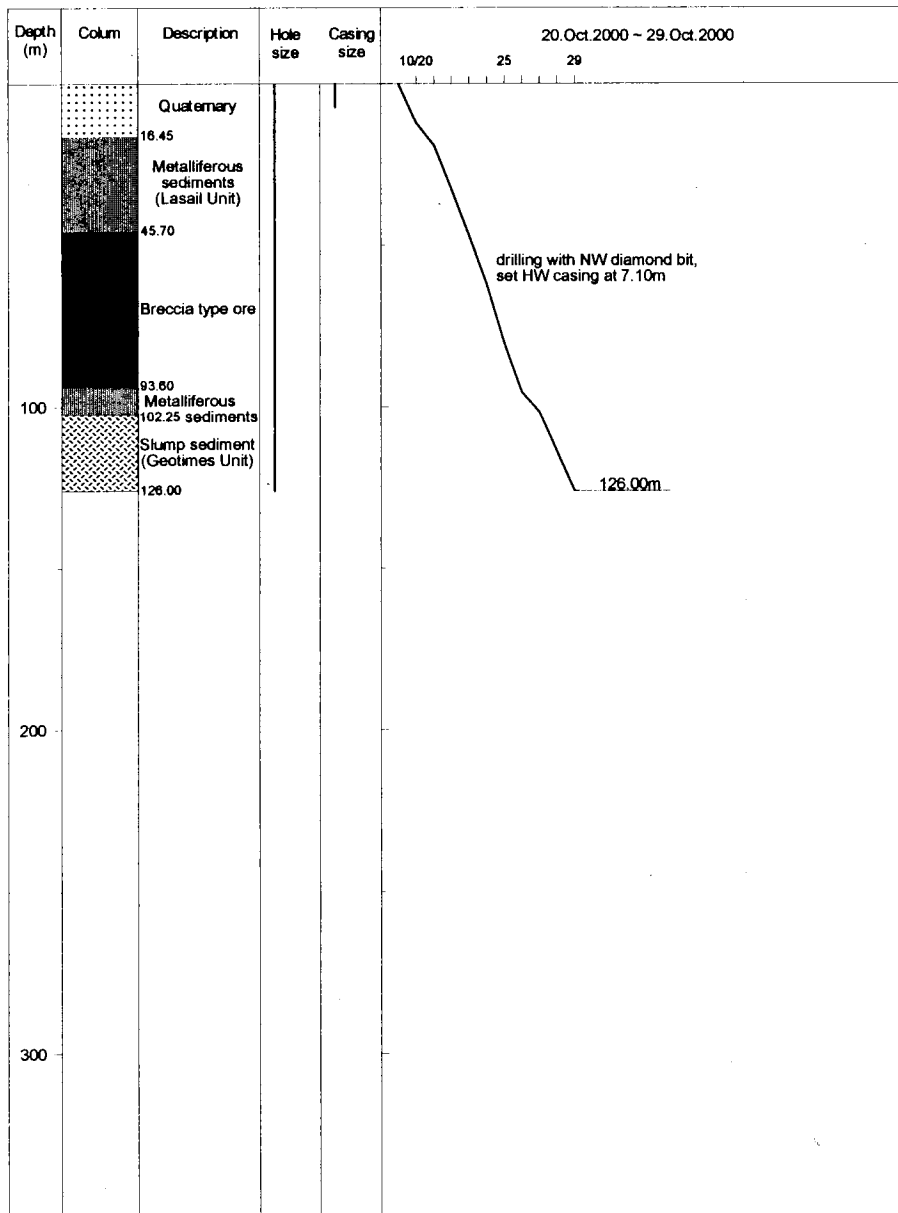
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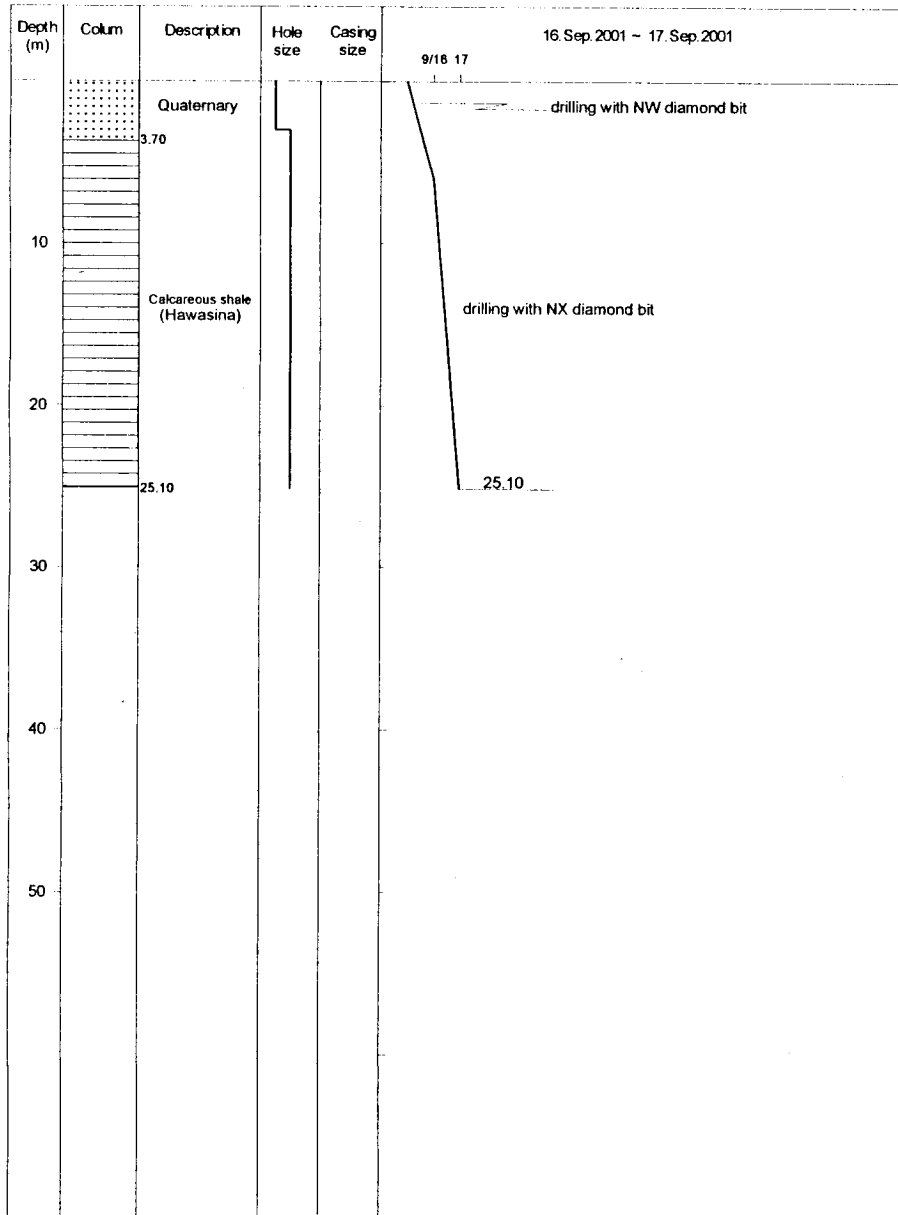
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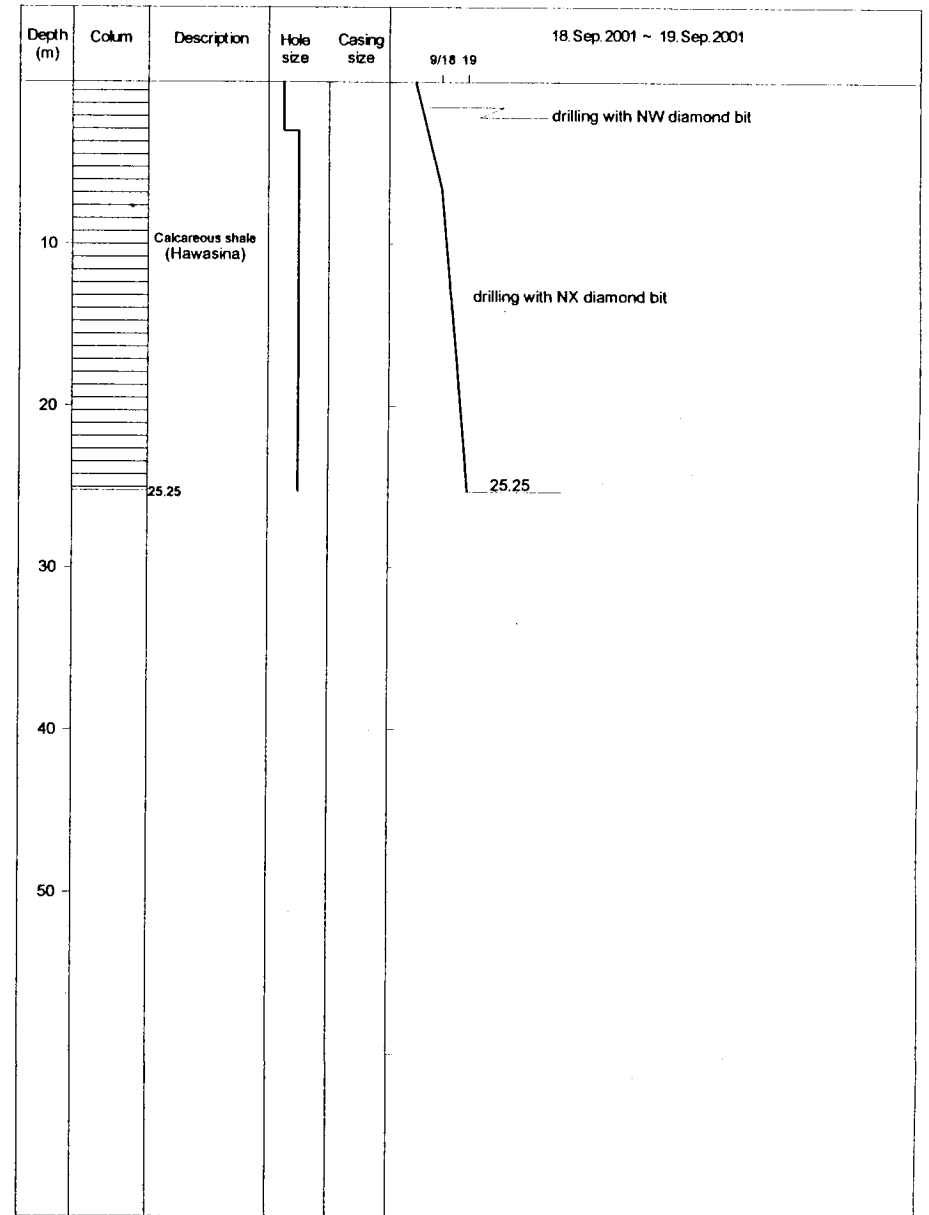
MJOY-P5



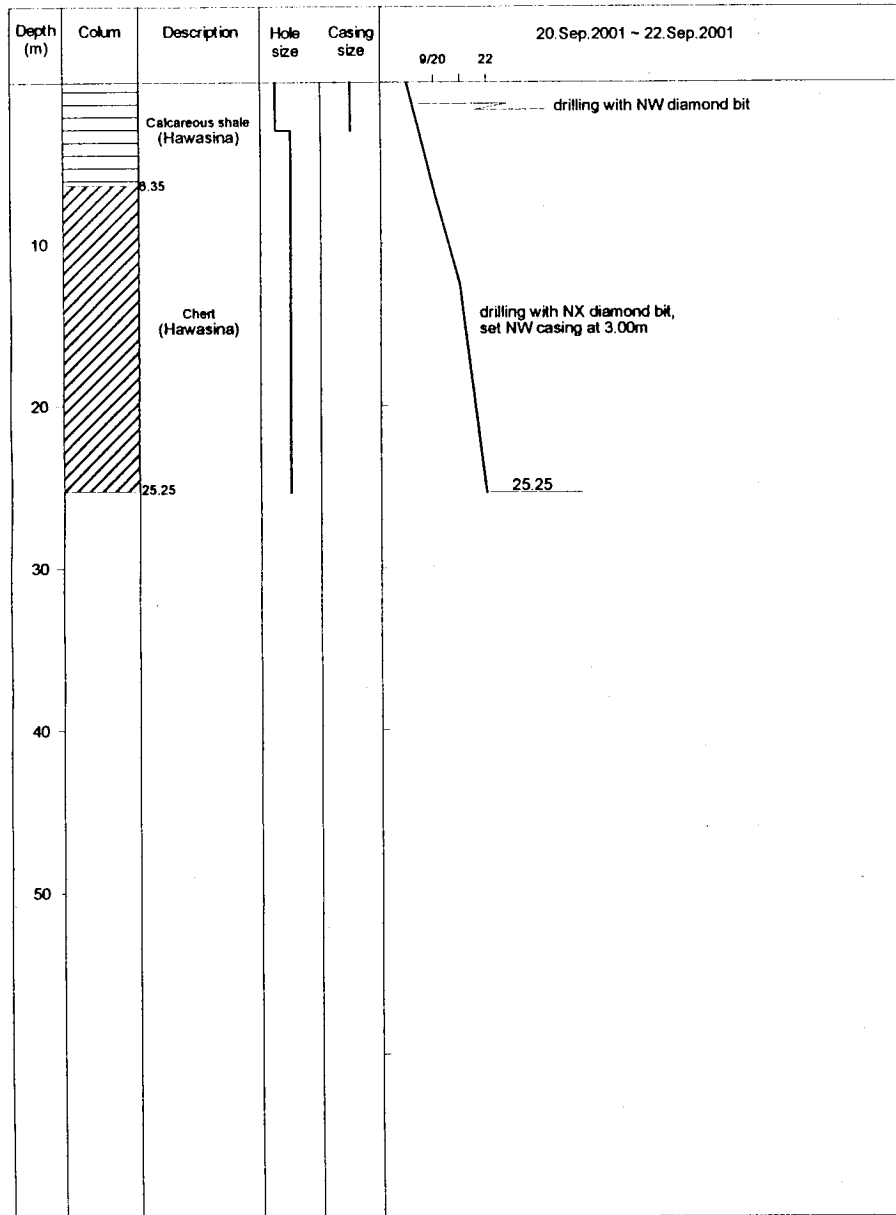
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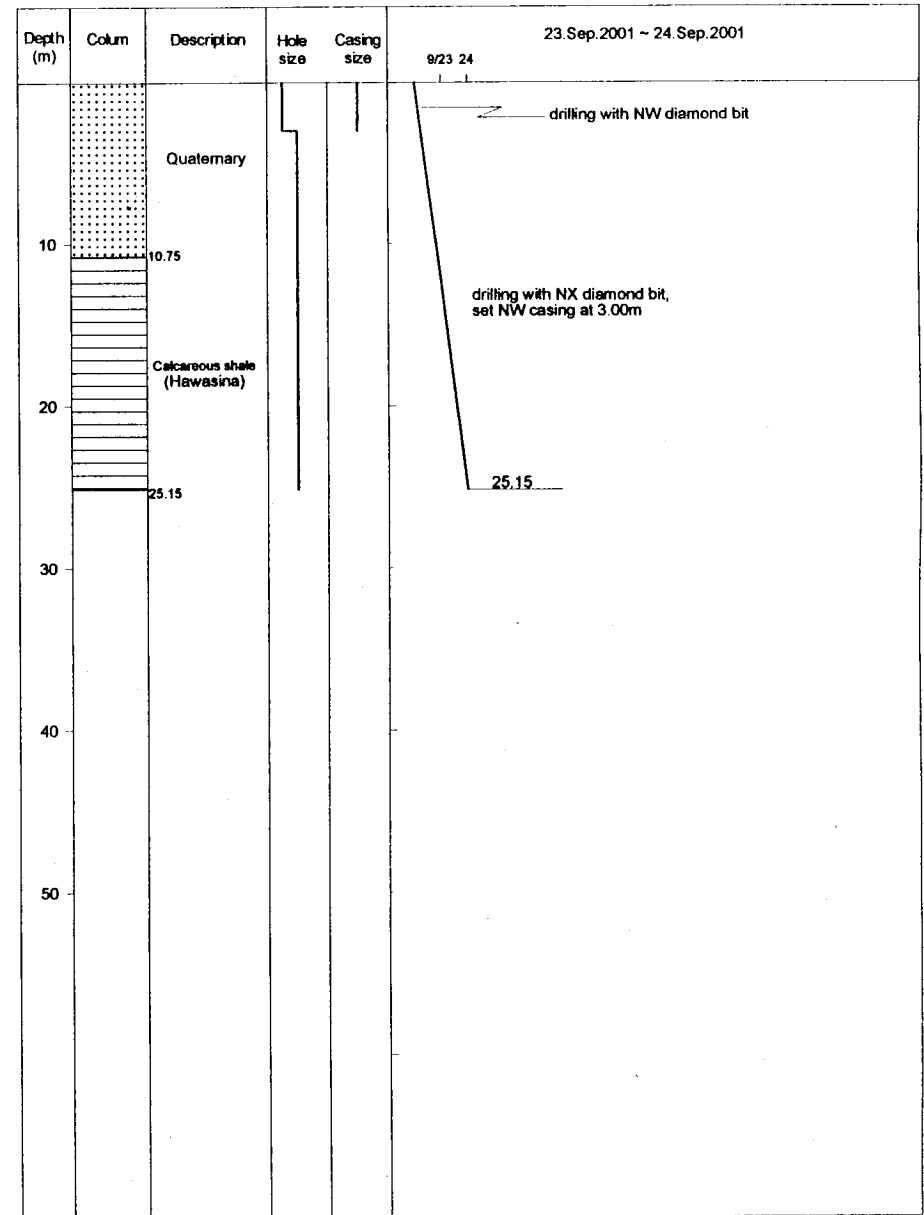
MJOY-T2



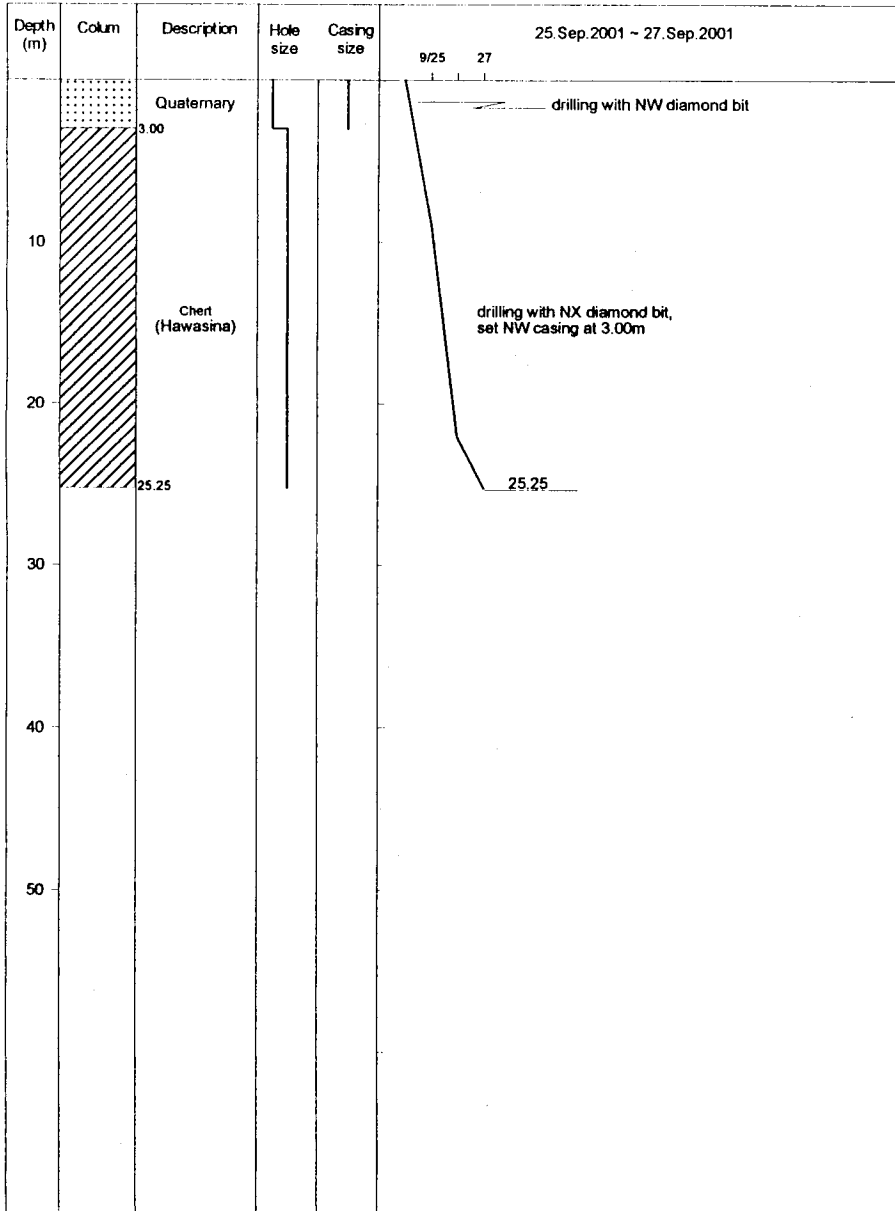
MJOY-T3



MJOY-T4



MJOY-T5



Appendix 6

Geologic core logs

Appendix 6A

Geologic core logs for the drill holes of metallurgical test

Hole No. P1 (125.65m ; from 0.00 m to 50.00 m)

Depth (m)	Chart	Lithology	Alteration						Mineralization						Sampling		Ore Assay											
			Silicification	Argillization	Quartz veinlets	Epidote veinlets	Epidote dissemt.	Calcite veinlets	Massive Sulphide	Stockwork	Pyrite veinlets	Pyrite dissemt.	Chalcocopyrite dissemt.	Chalcocopyrite veinlets	Sphalerite dissemt.	Sphalerite veinlets	Magnetite	Depth (m)	D.L (m)	Au (g/t)	Ag (g/t)	Cu (%)	Zn (%)					
0		0.00m to 7.30m: Sludge of massive sulphide ore.																										
7.30		7.30m to 7.75m: Silicified and argillized part, with gypsum veinlets.																										
7.75		7.75m to 9.83m: Argillized part, with gypsum veinlets.																										
9.83		9.83m to 9.87m: Fault, 60deg. to core axis.																										
9.87		9.87m to 22.83m: LASALL UNIT: Pillow lava with variole texture, greenish grey.																										
22.83		22.83m to 22.87m: Fault, 60deg. to core axis.																										
22.87		22.87m to 35.00m: LASALL UNIT: Pillow lava with variole texture, greenish grey.																										
35.00		35.00m to 35.85m: Breccia : consisting of silicified basalt, metalliferous sediment, quartz veinlets, chalcocopyrite filled by clastics and pyrite.																										
35.85		35.85m to 65.10m: LASALL UNIT: Pillow lava with variole texture, greenish grey, with clear variole.																										
50																												

Hole No. P1 (125.65m ; from 50.00 m to 100.00 m)

Depth (m)	Chart	Lithology	Alteration										Mineralization							Sampling		Ore Assay					
			Silicification	Argillization	Quartz veinlets	Epidote veinlets	Epidote dissemi.	Calcite veinlets	Massive Sulphide	Stockwork	Pyrite veinlets	Pyrite dissemi.	Chalcopyrite dissemi.	Chalcopyrite veinlets	Sphalerite dissemi.	Sphalerite veinlets	Magnetite	Depth (m)	D.L (m)	Au (g/t)	Ag (g/t)	Cu (%)	Zn (%)				
50		35.85m to 65.10m: LASAIL UNIT: Pillow lava with variole texture, greenish grey, with clear variole.																									
55																											
60																											
65		85.10m to 86.15m: Massive lava : greenish grey. 66.15m to 67.30m: LASAIL UNIT: Pillow lava with variole texture, greenish grey(Lasail unit). 67.30m to 69.30m: Massive lava : greenish grey. 69.30m to 72.95m: LASAIL UNIT: Pillow lava with variole texture, greenish grey. 72.95m to 78.90m: Massive lava : greenish grey.																									
70																											
75																											
80		78.90m to 118.05m: LASAIL UNIT: Pillow lava with variole texture, greenish grey.																									
85																											
90																											
95																											
100																											

Hole No. P5 (126.00m ; from 0.00 m to 50.00 m)

Depth (m)	Chart	Lithology	Alteration									Mineralization							Sampling		Ore Assay								
			Silicification	Argilization	Quartz veins	Epidote veins	Epidote dissement	Calcite veins	Massive Sulphide	Stockwork	Pyrite veins	Pyrite dissement	Chalcopyrite dissement	Chalcopyrite veins	Sphalerite veins	Sphalerite dissement	Magnetite veins	Magnetite	Depth (m)	D.L (m)	Au (g/t)	Ag (g/t)	Cu (%)	Zn (%)					
0		0.00m to 0.75m: Sludge																											
		0.75m to 2.75m: Consolidated alluvial deposits: calccrete.																											
		2.75m to 3.25m: Sludge																											
		3.25m to 16.45m: Consolidated alluvial deposits: calccrete.																											
5																													
10																													
15																													
20		16.45m to 20.10m: Reddish brown metalliferous sediments, slightly weathered.																											
		20.10m to 27.30m: Metalliferous sediment; reddish brown with whitish part, gossanised in places.																											
25																													
30		27.30m to 33.60m: Argilized metalliferous sediments; light grey color.																											
35		33.60m to 39.35m: Argilized metalliferous sediments with pyrite layer and gravels light grey color.																											
40		39.35m to 43.50m: Reddish brown metalliferous sediments with pyrite very thin layer																											
45		43.50m to 45.70m: Reddish brown metalliferous sediments with pyrite gravels.																											
50		45.70m to 52.30m: Massive sulphide : breccia type, with accidental breccia of Lassaé basalt, jasper, silicified basalt.																											

Hole No. P5 (126.00m ; from 50.00 m to 100.00 m)

Depth (m)	Chart	Lithology	Alteration						Mineralization						Sampling		Ore Assay							
			Silicification	Argilization	Quartz veins	Epидote veins	Epидote dissemi.	Calcite veins	Massive Sulphide	Stockwork	Pyrite veins	Pyrite dissemi.	Chalcopyrite dissemi.	Chalcopyrite veins	Sphalerite dissemi.	Sphalerite veins	Magnetite	Depth (m)	D.L (m)	Au (g/t)	Ag (g/t)	Cu (%)	Zn (%)	
50		45.70m to 52.30m: Massive sulphide; breccia type, with accidental breccia of Lasail basalt, jasper, silicified basalt.																						
		52.30m to 52.60m: Basalt dyke with cp. veinlets.																						
55		52.60m to 68.65m: Massive sulphide; breccia type, with accidental breccia of Lasail basalt, jasper, silicified basalt.																						
60																								
65																								
70		68.65m to 69.75m: Hyaloclastite.																						
75		69.75m to 81.30m: Massive sulphide; breccia type, with accidental breccia of Lasail basalt, jasper, silicified basalt.																						
80																								
85		81.30m to 93.60m: Reddish brown metalliferous sediment, with angular gravels of py.-cp.basalt, with synthetic py.-cp. layers.																						
90																								
95		93.60m to 102.25m: Reddish brown metalliferous sediments.																						
100																								

Hole No. P5 (126.00m ; from 100.00 m to 126.00 m)

Depth (m)	Chart	Lithology	Alteration											Mineralization											Sampling		Ore Assay				
			Silicification	Argillization	Quartz veins/veins	Epoxide veins/veins	Epoxide dissemi.	Calcite veins/veins	Melchiorite	Sulphide	Stockwork	Pyrite veins/veins	Pyrite dissemi.	Chalcopyrite dissemi.	Chalcopyrite veins/veins	Sphalerite dissemi.	Sphalerite veins/veins	Magnetite	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Zn (%)							
100		93.60m to 102.25m: Reddish brown metaliferous sediments.																													
102.25		102.25m 114.10m: Slumped mudstone with reddish brown metaliferous sediment lens and basalt breccia.																													
114.10		114.10m to 118.60m: Reddish brown metaliferous sediment.																													
118.60		118.60m to 126.00m: Slumped mudstone with reddish brown metaliferous sediment lens.																													
126.00		End of Hole : 126.00m																													
130																															
135																															
140																															
145																															
150																															

Appendix 6B






Geologic core logs for the drill holes of groundwater survey


D. H. No. MJOY-W1

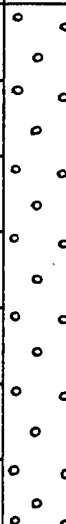


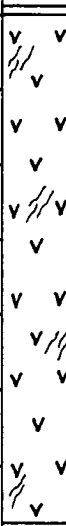
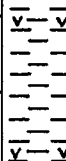
(1)


Ele.	Depth (m)	Colum	Geology	Description	Groundwater	Remarks
			Wadi sediments	Mainly ultramatic gravels		
	10.00					
	13.00					
			Chert	Reddish brown, chert with intercalation of grey slate		
	20.00					
			Chert and slate	Reddish brown chert and grey slate		
	30.00					
			Slate	Grey, slate with small amount of reddish brown chert		
	37.00					
	40.00					
					-16.87m	

Ele.	Depth (m)	Colum	Geology	Description	Groundwater	Remarks
	50.00		Slate	Grey, slate with small amount of reddish brown chert		
	60.00					
	63.00		Chert	Reddish brown.		
	70.00					
	71.00		Slate	Dark grey, slate with intercalation of reddish brown chert		
	75.00		(End of hole.)			

Ele.	Depth (m)	Colum	Geology	Description	Groundwater	Remarks
			Wadi sediments	unconsolidated		
	10.00					
	16.00		Chert	Reddish brown, chert with small amount of light green slate	-19.73m 	
	20.00					
	30.00					
	36.00		Chert	Reddish brown, chert with intercalation of grey slate		
	40.00					

Ele.	Depth (m)	Colum	Geology	Description	Groundwater	Remarks
	42.00		Slate	Dark grey		
		∨ ∨	Basalt	Brown		
		∨				
		∨ ∨				
		∨				
		∨ ∨				
		∨				
	50.00	∨ ∨				
		∨				
		∨ ∨				
		∨				
	54.00	∨ ∨	Basalt	Dark grey~grey		
		∨				
		∨ ∨				
		∨				
		∨ ∨				
		∨				
	60.00	∨ ∨				
		∨				
		∨ ∨				
		∨				
		∨ ∨				
		∨				
	70.00	∨ ∨				
		∨				
		∨ ∨				
		∨				
		∨ ∨				
		∨				
	75.00	∨	(End of hole.)			

Ele.	Depth (m)	Colum	Geology	Description	Groundwater	Remarks
			Wadi sediments	unconsolidated		
	10.00				-9.09m	
	14.00		Sand	Yellowish brown		
	18.00		Slate	Grey, slate with quartz veinlets		
	22.00		Basalt	Green, silicified basalt with quartz veinlets		
	30.00					
	35.50		Chert	Reddish brown, chert with intercalation of green basalt		
	40.00					

Ele.	Depth (m)	Colum	Geology	Description	Groundwater	Remarks
			Chert	Reddish brown, chert with intercalation of green basalt		
	50.00					
	54.00					
	60.00		Chert	Reddish brown, chert with intercalation of grey slate		
	70.00					
	75.00		(End of hole.)			

D. H. No. MJOY-W5

(1)

Ele.	Depth (m)	Colum	Geology	Description	Groundwater	Remarks
	10.00	○ ○	Wadi sediments	Gravels consisting of ultramafic rocks, basalts, reddish brown chert		
	20.00	○ ○			-19.89m	
	22.00	∨ ∨	Basalt	Reddish brown		
	25.00	∨ ∨	Basalt	Reddish brown~grey		
	30.00	∨ ∨	Basalt	Light greenish grey, silicified basalts, pyrite disseminated		
	31.00	∨ ∨				
	32.00	∨ ∨	Basalt	Dark grey~brownish grey		
	40.00	∨ ∨				

Ele.	Depth (m)	Colum	Geology	Description	Groundwater	Remarks
	42.00	v v	Basalt	Dark grey~brownish grey		
	46.00	v v	Basalt	Dark reddish brown		
	50.00	v v	Basalt	Dark grey~brownish grey		
	53.00	v v				
	60.00	v v	Basalt	Dark grey		
	65.00	v v				
	70.00	v v	Basalt	Dark grey~brownish grey		
	75.00		(End of hole.)			