

860127

Memorandum

To: Custom Milling File - Hearne Hill      Date: 01 Apr 1992  
From: M. Cannon - Metallurgical Technician      File:  
Subject: Stage #1 - Initial sample evaluation  
Copies: file

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Data:

1.0 Contact:

Contacted by: Tony Lorsa - Smithers  
Owner of ore deposit: Dave Chapman  
Date contacted: 19 Mar 92  
Composite delivered: delivered in person to the residence of  
B. Taplin approx 20 Mar 92.

2.0 Nature of Composite

Nature: Drill Core showing large deposits of Copper  
Quoted Head Assay: 1-4% Copper (Chalcopyrite), 0.01-0.4 oz Gold  
Quoted Host Rock: Anchorite/dolomite

3.0 Initial Observations

- Drill core appeared to be slightly oxidized
- when crushed, produced very little dust (slightly damp?)

## Memorandum

To: Custom Milling File - Hearne Hill                      Date: 01 Apr 1992  
From: M. Cannon - Metallurgical Technician              File:  
Subject: Stage #2 - Initial Testwork

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### 1.0 Sample Preparation

The Hearne Hill custom milling composite sample was delivered to the Equity Assay Lab 21 Mar 92 by B. Taplin. The sample was stage crushed to approx 99% -5 Mesh. As the sample was relatively dry, it was not dried before crushing.

The crushed composite was mixed by coning and quartering (4 times). 2000g sample lots were riffled out for testing. It was noted that very little dust was created during crushing, mixing and riffling of sample.

### 2.0 Bond Work Index

The Equity Silver standard Bond Work Index test was done, in duplicate, on the Hearne Hill sample. Opposing wedges of the product cake was sent to the Assay lab for an Assay. This sample was used as the "Head" assay for Hearne Hill.

It was noted that the ground ore had a sandy texture similar to Dome Mountain ore. After the 25 min grind, the slurry rinsed easily from the rods. The rods did not stick to the sides of the mill, which is a typical indication of over grinding resulting in excess slimes. The slurry had a light grey/yellow colour. The product grind cake filtered in the pressure filter in approx 15 minutes; this compares with 15 minutes for Dome Mountain, and at times, 1 to 2 hours for Equity ore. The appearance of the product cake was sandy (again, much like Dome Mountain).

When wet screening the product fractions, the sample screened quickly and easily. There appeared to be two separate types - dark green and beige. The dark green type screened into the -400 mesh fraction.

The Bond Work index for Hearne Hill was 16.65 kWh/t.

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Hearne Hill Head Assay

Head Assay was:

Cu	3.02%	Sb	0.011%
Ag	6g/t	As	0.032%
Au	0.48g/t	Fe	6.04%
		Pb	0.010%
Oxidized	0.070%	Zn	0.024%

## Memorandum

To: Custom Milling File - Hearne Hill

Date: 01 Apr 1992

From: M. Cannon - Metallurgical Technician

File:

Subject: Stage #3 - Initial Flotation Testwork

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### Introduction

Preliminary float tests were required on the Hearne Hill ore sample in order to assess project feasibility. Float Test #1 was to observe ore flotation properties as well as to decide upon reagent dosages. For this reason, Float test #1 results were not included in the averages.

### Conclusion

Hearne Hill ore is a relatively soft, floatable ore requiring low reagent dosages.

The majority of mineral is copper, probably as chalcopyrite. All other assays for minerals in the delivered sample, including gold and silver, were very low. Despite this, all these elements also appeared to float readily.

Based on these results, the feasibility of this custom milling ore project will depend upon the economics of milling a straight copper ore. The degree of representativeness of the delivered sample cannot be assessed.

### Recommendations

1. All samples sent to be assayed must be pulverized for a much longer time periods than Equity ore samples.
2. All future assays for gold be done in duplicate whenever possible. The gold levels are so low that normal assay methods may not be accurate enough.
3. If Hearne Hill were considered for milling at Equity Silver, the Gold Plant circuit would probably not be required.

Discussion

The correlation between assayed and calculated head samples from flotation testing (tests 2-4) is poor (especially Au and Ag). This may be due to the fact that the grade of the flotation tails was too low to be assayed with sufficient accuracy.

The rougher flotation stage was pulled hard. Low air addition was initially required, but as mineral was collected, the air requirement increased. The rougher and Scav stage #1 were very coppery in appearance. Scav#2 and #3 were much more silver in appearance.

Flotation recoveries indicate that the rougher stage is where the majority of the mineral is collected, with 87.1 %Cu, 96.3% Ag, and 45.6% Au recovered.

It is possible that gold in the Hearne Hill is a bit slower to float than Cu and Ag since only 45.6% Au was recovered in the rougher stage against a total recovery of 75.9%Au.

Overall total recoveries were high at 98.9% Cu, 77.7% Ag and 75.9% Au. This produced an estimated conc grade of 22.2% Cu, 81g/t Ag and 4.7g/t Au. (Scav #3 product is not included, as this stage is only used in the lab to test for the requirement for additional retention time.)

Low reagent dosages were required, with 17.5g/t PAX and 10g/t Flotanol. The natural pH of the slurry was 7.82, so lime was not required.

Difficulty was experienced in the assaying of gold in the tailings of the float tests. At first, the tailings assays were too high to be possible (higher than the heads). The tailings were re-assayed with new fire assay crucibles. The assays were more reasonable, but the duplicates did not match. The tailings were then re-pulverised, then re-assayed with new crucibles. The duplicate did match, but ranged from .03 to .44g/t Au. The assays on the high and low end of the scale were discarded, the remaining two flotation test results gave a tailings assay of 0.16g/t Au which was used for all tests.

Data:

Head Assay

	Cu (%)	Ag (g/t)	Au (g/t)
Avg Calc Head Assay	2.73	13	1.02
Assayed Head Assay	3.02	6	0.48

Recovery to Concentrate

	Cu (%)	Ag (%)	Au (%)
Correction factor (based on Sep 91 Dome, lab vs mill comparison)	0.906	0.966	0.878
Uncorrected total Recov	98.9	77.7	75.9
Corrected total Recov	89.6	75.0	66.7
Uncorrected Recov to Rougher	88.4	65.1	47.0
Corrected Recov to Rougher	80.1	62.9	41.3

Conc Grade

	Cu (%)	Ag (g/t)	Au (g/t)
Estimated Final Conc Grade	22.2	81	4.7

Reagent Dosages

	PAX (g/t)	Flotanol (g/t)	Grind (%-200#)
Dosages	17.5	10.0	94.3

Note: Correction factors based on experience with testing Dome Mountain ore have been included for comparative purposes. These factors may not be applicable in this case. Recoveries from the March Dome Mountain run suggest that the uncorrected results may be more accurate.

Equity Silver Mines Metallurgy Lab  
 Summary of Preliminary Flotation Test results  
 of Herne Hill Ore sample delivered 20 March 1992  
 File: C:\CUSTOM\HH\hhsum2-4

Head Assay	Cu (%)	Ag (g/t)	Au (g/t)
Float #2 (100% H.H.)	2.73	13	1.30
Float #3 (100% H.H.)	2.70	13	1.02
Float #4 (100% H.H.)	2.74	12	0.74
Avg Calc Head Assay:	2.72	13	1.02
Assayed Head Assay:	3.02	6	0.48

Recovery to Concentrate - Uncorr't	Recovery from Rougher Stage			Total Recovery		
	Cu (%)	Ag (%)	Au (%)	Cu (%)	Ag (%)	Au (%)
Float #2 (100% H.H.)	87.1	66.3	45.6	98.8	78.3	76.0
Float #3 (100% H.H.)	88.6	65.6	48.9	98.9	77.8	78.3
Float #4 (100% H.H.)	89.5	63.6	46.6	99.0	76.9	73.5
Avg of flts #2-#4:	88.4	65.1	47.0	98.9	77.7	75.9

Recovery to Concentrate - Corrected	Recovery from Rougher Stage			Total Recovery		
	Cu (%)	Ag (%)	Au (%)	Cu (%)	Ag (%)	Au (%)
Correction Factors:	0.906	0.966	0.878			
Float #2 (100% H.H.)	78.9	64.0	40.1	89.5	75.6	66.7
Float #3 (100% H.H.)	80.3	63.4	42.9	89.6	75.2	68.7
Float #4 (100% H.H.)	81.1	61.4	40.9	89.7	74.3	64.5
Avg of flts #2-#4:	80.1	62.9	41.3	89.6	75.0	66.7

	Estimated Final Grade			Reagent Dosages			Grind I-200mesh
	Cu (%)	Ag (g/t)	Au (g/t)	PAX (g/t)	Flotanol (g/t)	Lime (g/t)	
Float #2 (100% H.H.)	22.4	85	4.6	17.5	10.0	0	94.3
Float #3 (100% H.H.)	22.1	82	4.7	17.5	10.0	0	94.2
Float #4 (100% H.H.)	22.2	77	4.9	17.5	10.0	0	94.5
Avg of flts #2-#4:	22.2	81	4.7	17.5	10.0	0	94.3

Note: 1. Float #1 data was not used since this was a float to get reagent dosages  
 2. Au Assay for Tailings was selectively Averaged at 0.16 g/t Au

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METALLURGY LAB

Test #2

Test: Equity Silver Lab Float test of Herne Hill Composite - 19 Mar 92

Sample: 100% Herne Hill

Date: 27 Mar, 1992

Conditions: 950ml Reclaim water, 26 minute grind (75-80% -200 Mesh)

File: C:\CUSTOM\HH\hhflt#2

	Fixed Wt Tails (g)	Cu (%)	Ag (g/t)	Au (g/t)	Sb (%)	As (%)	Fe (%)	Pb (%)	Zn (%)	Oxidized Cu (%)
Calc Head	1997	2.73	13	0.73	-	-	-	-	-	-
Assayed Head		3.02	6	0.48	0.01	0.032	6.04	0.01	0.024	0.07
Tails (avg #2 to #4)		0.031	3	0.16	0.01	0.01	1.7	0.01	0.01	-

PRODUCT	WEIGHT (g)	ASSAYS			RECOVERIES			CUM'L GRADE		
		Cu (%)	Ag (g/t)	Au (g/t)	Cu (%)	Ag (%)	Au (%)	Cu (%)	Ag (g/t)	Au (g/t)
Rougher	188.40	25.2	92	3.52	87.08	66.27	45.64	25.2	92	3.5
Scav 1	31.42	19.1	76	8.69	11.01	9.13	18.79	24.3	90	4.3
Scav 2	20.94	1.82	36	8.04	0.70	2.88	11.59	22.4	85	4.6
Scav 3	16.49	0.54	28	4.25	0.16	1.77	4.82	21.0	81	4.6
Tails	1759.75	0.033	3	0.16	1.05	19.95	19.16			
Recovery to Conc					96.8	78.3	76.0			

Reagents

Minutes	PAX Flotanol		PAX Flotanol		LIME Conditioning (g/T) Time (min)	FLOAT TAILS SIZE DISTRIBUTION:		
	(ml)	(drops)	(g/T)	(g/T)				
Mill	26				0	Wt of +200 Mesh Portion:	11.57	
Rougher	3	2.0	1	10.0	5.0	1	Wt of -200 Mesh Portion:	191.44
1st Scav	2	0.5	1	2.5	5.0	1	% passing -200 Mesh:	94.30%
2nd Scav	2	0.5	0	2.5	0.0	0		
3rd Scav	2	0.5	0	2.5	0.0	0		
					17.5	10	0	

NOTES:

- Sandy texture - washed off rods easily
- Starting pH was 7.82; final pH was 7.94 (measured flt #1 only)
- Pulled hard all stages (especially rougher stage)
- most mineral appeared to float during rougher stage (very coppery looking)
- requires low air initially, but required constant increasing
- Scavenger conc looked heavy but floated without a lot of scooping
- Rougher had mega froth, light copper color
- Scav 1 foth was darker and grainier copper color
- Scav 2 & 3 were frothy conc, looked more silvery



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METALLURGY LAB

Test #3

Test: Equity Silver Lab Float test of Herne Hill Composite - 19 Mar 92

Sample: 100% Herne Hill

Date: 27 Mar, 1992

Conditions: 950ml Reclaim water, 26 minute grind (75-80% -200 Mesh)

File: C:\CUSTOM\HH\hhflt#3

	Fixed Wt Tails (g)	Cu (%)	Ag (g/t)	Au (g/t)	Sb (%)	As (%)	Fe (%)	Pb (%)	Zn Oxidized Cu (%)	Cu (%)
Calc Head	1997	2.70	13	0.73	-	-	-	-	-	-
Assayed Head		3.02	6	0.48	0.01	0.032	6.04	0.01	0.024	0.07
Tails (avg #2 to #4)		0.031	3	0.16	0.01	0.01	1.73	0.01	0.01	-

PRODUCT	WEIGHT (g)	ASSAYS			RECOVERIES			CUM'L GRADE		
		Cu (%)	Ag (g/t)	Au (g/t)	Cu (%)	Ag (%)	Au (%)	Cu (%)	Ag (g/t)	Au (g/t)
Rougher	188.68	25.3	88	3.78	88.61	65.61	48.89	25.3	88	3.8
Scav 1	31.81	16.7	76	9.67	9.86	9.55	21.08	24.1	86	4.6
Scav 2	21.22	1.20	32	5.74	0.47	2.68	8.35	22.1	82	4.7
Scav 3	11.73	0.39	32	3.18	0.08	1.48	2.56	21.0	79	4.7
Tails	1743.56	0.030	3	0.16	0.97	20.67	19.12			
Recovery to Conc					98.9	77.8	78.3			

Reagents

Minutes	PAX Flotanol		PAX Flotanol		LIME Conditioning	FLOAT TAILS SIZE DISTRIBUTION:
	(ml)	(drops)	(g/T)	(g/T)	(g/T) Time (min)	
Mill	26				0	Wt of +200 Mesh Portion: 10.47
Rougher	3	2.0	1	10.0	5.0	Wt of -200 Mesh Portion: 169.38
1st Scav	2	0.5	1	2.5	5.0	% passing -200 Mesh: 94.18%
2nd Scav	2	0.5	0	2.5	0.0	
3rd Scav	2	0.5	0	2.5	0.0	
				17.5	10	0

NOTES:

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- required low air initially, but required constant increasing
- Scavenger conc looked heavy but floated without a lot of scooping
- Rougher had mega froth, light copper color
- Scav 1 froth was darker and grainier copper color
- Scav 2 & 3 were frothy conc, looked more silvery

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Test #4

Test: Equity Silver Lab Float test of Herne Hill Composite - 19 Mar 92

Sample: 100% Herne Hill

Date: 27 Mar, 1992

Conditions: 950ml Reclaim water, 26 minute grind (75-80% -200 Mesh)

File: C:\CUSTOM\HH\hhflt#4

	Fixed Wt Tails (g)	Cu (%)	Ag (g/t)	Au (g/t)	Sb (%)	As (%)	Fe (%)	Pb (%)	Zn Oxidized Cu (%)	Cu (%)
Calc Head	1997	2.74	12	0.81	-	-	-	-	-	-
Assayed Head		3.02	6	0.48	0.01	0.032	6.04	0.01	0.024	0.07
Tails (avg #2 to #4)		0.031	3	0.16	0.01	0.01	1.73	0.01	0.01	-

PRODUCT	WEIGHT (g)	ASSAYS			RECOVERIES			CUM'L GRADE		
		Cu (%)	Ag (g/t)	Au (g/t)	Cu (%)	Ag (%)	Au (%)	Cu (%)	Ag (g/t)	Au (g/t)
Rougher	192.88	25.4	80	3.91	99.48	63.55	46.58	25.4	80	3.9
Scav 1	29.41	16.9	84	8.06	9.08	10.17	14.64	24.3	81	4.5
Scav 2	21.39	1.04	36	5.30	0.41	3.17	12.29	22.2	77	4.9
Scav 3	12.99	0.47	30	11.58	0.11	1.60	9.29	21.1	74	5.2
Tails	1740.33	0.029	3	0.16	0.92	21.50	17.20			
Recovery to Conc					99.0	76.9	73.5			

Reagents	Minutes	PAX Flotanol		LIME Conditioning		LIME Conditioning Time (min)	FLOAT TAILS SIZE DISTRIBUTION:	
		(ml)	(drops)	(g/T)	(g/T)			
Mill	26					0	Wt of +200 Mesh Portion:	11.02
Rougher	3	2.0	1	10.0	5.0	1	Wt of -200 Mesh Portion:	189.17
1st Scav	2	0.5	1	2.5	5.0	1	% passing -200 Mesh:	94.50%
2nd Scav	2	0.5	0	2.5	0.0	0		
3rd Scav	2	0.5	0	2.5	0.0	0		
				17.5	10	0		

NOTES:

- Sandy texture - washed off rods easily
- Starting pH was 7.82, final pH was 7.94 (measured flt #1 only)
- Pulled hard all stages (especially rougher stage)
- most mineral appeared to float during rougher stage (very coppery looking)
- required low air initially, but required constant increasing
- Scavenger conc looked heavy but floated without a lot of scooping
- Rougher had mega froth, light copper color
- Scav 1 froth was darker and grainier copper color
- Scav 2 & 3 were frothy conc, looked more silvery

EQUITY SILVER MINES LTD.  
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prelim float only  
Not used in data  
Summaries

Test #1  
Test: Equity Silver Lab Float test of Herne Hill Composite - 19 Mar 92  
Sample: 100% Herne Hill  
Date: 27 Mar, 1992  
Conditions: 950ml Reclaim water, 26 minute grind (75-80% -200 Mesh)  
File: C:\CUSTOM\hh\hhflt#1

	Fixed Wt Tails (g)	Cu (%)	Ag (g/t)	Au (g/t)	Sb (%)	As (%)	Fe (%)	Pb (%)	Zn Oxidized (%)	Cu (%)
Calc Head	1997	2.76	13	0.79	-	-	-	-	-	-
Assayed Head		3.02	6	0.48	0.01	0.032	6.04	0.01	0.024	0.07
Tails (avg #2 to #4)		0.031	3	0.16	0.01	0.01	1.73	0.01	0.01	-

PRODUCT	WEIGHT (g)	ASSAYS			RECOVERIES			CUM'L GRADE			
		Cu (%)	Ag (g/t)	Au (g/t)	Cu (%)	Ag (%)	Au (%)	Cu (%)	Ag (g/t)	Au (g/t)	
Rougher	186.26	20.4	84	3.28	68.83	59.70	38.75	20.4	84	3.3	
Scav 1	63.84	24.0	64	6.25	27.76	15.59	25.31	21.3	79	4.0	
Scav 2	23.84	4.92	40	6.32	2.12	3.64	9.56	19.9	76	4.2	
Scav 3	12.18	0.92	32	11.69	0.20	1.49	9.03	19.1	74	4.6	
Tails	1710.89	0.035	3	0.16	1.08	19.58	17.36				
Recovery to Conc					98.7	78.9	73.6				

Reagents	Minutes	PAX Flotanol		LIME Conditioning		FLOAT TAILS SIZE DISTRIBUTION:	
		(ml)	(drops)	(g/T)	(g/T)	(g/T)	Time (min)
Mill	26					0	
Rougher	3	1.5	1	7.5	5.0	1	
1st Scav	2	0.5	2	2.5	10.0	1	
2nd Scav	2	0.5	0	2.5	0.0	0	
3rd Scav	2	0.5	0	2.5	0.0	0	
				15	15	0	

Wt of +200 Mesh Portion: 12.53  
Wt of -200 Mesh Portion: 202.17  
% passing -200 Mesh: 94.16%

- NOTES:
- Sandy texture - washed off rods easily
  - Starting pH was 7.82, final pH was 7.94 (measured fit #1 only)
  - Pulled hard all stages (especially rougher stage)
  - most mineral appeared to float during rougher stage (very coppery looking)
  - required low air initially, but required constant increasing
  - Scavenger conc looked heavy but floated without a lot of scooping
  - Rougher had mega froth, light copper color
  - Scav 1 foth was darker and grainier copper color
  - Scav 2 & 3 were frothy conc, looked more silvery

**MEMORANDUM**

To: K.Graf - Maintenance Superintendent      Date: 27 April 1992  
From: B.Taplin - Mill Metallurgist      File:  
Subject: HEARNE HILL LABORATORY TEST RESULTS SUMMARY  
Copies: M.Holm, file

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Feed Grades

Cu	3.02%
Ag	6 g/t
Au	0.48 g/t
Oxidized Cu	0.070%

Sb	0.011%	↑ .2
As	0.032%	↓ .1
Fe	6.04%	
Pb	0.010%	} .4% .21
Zn	0.024%	

.07  
.19  
-21

Bond Work Index

Wi = 16.65 kWh/t

Recovery to Concentrate (uncorrected)

Cu	98.9%
Ag	77.7%
Au	75.9%

Concentrate Grade

Cu	22.2%
Ag	81 g/t
Au	4.7 g/t

Notes

1. Laboratory recoveries are typically higher than those achieved in the floatation circuit.
2. Cyanidation tests were not attempted due to the low feed assay ( 0.16 g/t).