APPENDIX 12

PRELIMINARY METALLURGICAL TESTWORK REPORT

AMMTEC LTD.

AMMTEC LTD

PRELIMINARY METALLURGICAL TESTWORK

CONDUCTED UPON

ORE SAMPLES FROM THE TWIN HILLS GOLD DEPOSIT

FOR

HOMESTAKE EXPLORATION
(PLUTONIC RESOURCES LTD)

REPORT NO. A6573B

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SUMMARY

A defined program of metallurgical testwork was carried out in conjunction with several composites of samples of ore originating from the Twin Hills Gold Deposit.

Salient test data are summarised below.

- **Head Assays**

  Selected head assays are presented in the following tables :

(a) 309 Deposit

Element	Unit	Composite 1 98TRCD748 (171-175m)	Composite 2 98TRCD748 (179-189m)	Composite 3 98TRCD748 (191-230m)	Composite 4 TRCD698 (167-178m)	High Grade Composite A 98TRCD748 (172-174m)	High Grade Composite B TRCD698 (168-171m)
$Au^{(1)}$	g/t	4.80	2.98	2.30	12.2	12.1	36.6
$Au^{(2)}$	g/t	6.20	2.52	2.18	8.38	14.0	35.6
Ag	g/t	21	2	3	4	64	13
As	g/t	142	97	126	135	130	53
$C_{ORGANIC}$	%	0.27	0.20	0.22	0.19	0.16	0.10
Cu	g/t	12	8	10	9	10	6
Fe	%	1.24	1.37	1.73	1.20	1.08	0.96
Ni	g/t	<5	8	6	9	<5	<5
Pb	g/t	<5	<5	<5	<5	<5	<5
S_{TOTAL}	%	0.93	0.97	1.27	1.02	0.87	0.47
Sb	g/t	<2	<2	<2	<2	<2	<2
Zn	g/t	35	33	38	95	32	32

(b) Lone Sister Deposit

Element	Unit	Composite 5 98LRCD134 (71.3-86m)	Composite 6 98LRCD134 (108-114m)	Composite 7 98LRCD134 (116-126m)	Composite 8 98LRCD134 (126-136m)	High Grade Composite C 98LRCD134 (71.3-72 + 78-80m)
$Au^{(1)}$	g/t	8.16	1.35	2.44	2.24	26.0
$Au^{(2)}$	g/t	7.02	1.43	2.12	2.08	26.4
Ag	g/t	30	5	4	5	64
As	g/t	1493	176	331	425	860
$C_{ORGANIC}$	%	0.03	<0.03	<0.03	<0.03	0.03
Cu	g/t	16	9	14	10	33
Fe	%	1.49	1.54	1.78	1.54	1.44
Ni	g/t	11	6	7	7	10
Pb	g/t	133	125	137	124	120
S_{TOTAL}	%	0.83	0.55	1.05	0.92	0.84
Sb	g/t	9	4	5	9	12
Zn	g/t	332	255	145	165	257

- Optical, polished section, mineralogical examination of the Twin Hills gold ore composites revealed the following :

(a) The ore samples (used to generate the various composites) consist of low levels of iron sulphides in quartz gangue matrix. The sulphides are predominantly pyrite/marcasite. There were trace concentrations of chalcopyrite, covellite, pyrrhotite, sphalerite and arsenopyrite.

(b) Gold occurrences, detected optically, were typically rich in silver, being predominantly electrum gold with some argentian gold (<25%silver).

(c) The electrum gold occurs mainly as liberated grains, as inclusions in pyrite and as fine gold in silicate gangue closely associated with pyrite. There were gold occurrences of less than one micron size.

(d) Silver minerals (apart from electrum) were also detected optically as naumannite (silver selenide Ag_2Se), freibergite, native silver and acanthite.

(e) Carbon occurrences were also detected optically.

- **True Mineral SG Determination**

Ore Source	Sample Identity	True SG (1)	True SG (2)	True SG (Average)
309 Deposit	Composite #1	2.65	2.64	2.65
	Composite #2	2.68	2.66	2.67
	Composite #3	2.69	2.67	2.68
	Composite #4	2.64	2.66	2.65
	H/G Composite A	2.64	2.65	2.65
	H/G Composite B	2.65	2.64	2.65
Lone Sister Deposit	Composite #5	2.67	2.69	2.68
	Composite #6	2.66	2.64	2.65
	Composite #7	2.65	2.67	2.66
	Composite #8	2.66	2.68	2.67
	H/G Composite C	2.66	2.66	2.66

- **Comminution Testwork**

The following tests were carried out in conjunction with composites 2, 3, 7 and 8 only. Due to sample mass restrictions the other composites were not tested.

(a) Bond Abrasion Index Determinations

Sample Identity	Feed Size (mm)	Bond Abrasion Index (Ai)
Composite #2	-19.0 +12.7	1.2522
Composite #3		1.2046
Composite #7		1.0037
Composite #8		1.1064

(b) Bond Rod Mill Work Index Determinations

Sample Identity	Micrometres		Grp (g/rev)	Test Aperture Pi (μm)	Rod Mill Work Index (kWh/t)
	F_{K80}	P_{K80}			
Composite #2	10694	930	2.717	1180	31.1
Composite #3	10358	866	2.443	1180	31.8
Composite #7	10359	853	2.673	1180	29.7
Composite #8	10535	800	2.621	1180	28.7

(c) Bond Ball Mill Work Index Determinations

Sample Identity	Micrometres		Gbp (g/rev)	Test Aperture Pi (μm)	Ball Mill Work Index (kWh/t)
	F_{K80}	P_{K80}			
Composite #2	2615	88	0.687	106	26.3
Composite #3	2574	86	0.663	106	26.7
Composite #7	2580	86	0.752	106	24 0
Composite #8	2637	90	0.506	106	34.2

- **Extractive Metallurgical Testwork**

(a) Direct Cyanidation Time Leach Testwork

Ore Source	Sample Identity	Test No. HS	Grind Size P_{80} (μm)	Calc'd Head Au (g/t)	Au Extraction @ Hours (%)					Consumption (kg/t)	
					2	4	8	24	48	Lime	NaCN
309 Deposit	Composite #1	4081	75	6.23	30.34	36.12	39.97	45.26	47.67	0.22	0.82
	Composite #2	4082	75	2.27	6.61	7.93	8.59	9.25	9.25	0.30	0.81
	Composite #3	4083	75	2.43	3.70	4.94	5.56	7.41	8.64	0.30	0.86
	Composite #4	4084	75	9.19	55.82	63.66	64.96	65.61	66.92	0.30	0.79
	H/G Comp. A	4089	75	13.5	38.11	48.52	55.61	56.72	58.05	0.31	1.06
	H/G Comp. B	4090	75	34.5	70.87	80.00	84.35	85.22	86.09	0.25	0.60
Lone Sister Deposit	Composite #5	4085	75	8.61	58.19	74.22	79.79	86.41	87.11	0.30	1.22
	Composite #6	4086	75	1.68	65.91	73.04	76.60	80.17	81.95	0.30	0.86
	Composite #7	4087	75	2.70	47.74	64.40	73.28	78.83	82.16	0.30	0.89
	Composite #8	4088	75	2.32	60.72	68.48	71.06	74.94	77.52	0.30	0.93
	H/G Comp. C	4091	75	28.5	65.88	79.59	89.65	94.87	95.40	0.25	0.85

(b) Gravity Separation/Cyanidation Time Leach Testwork

Ore Source	Sample Identity	Test No. HS	Grind Size P_{80} (μm)	Calc'd Head Au (g/t)	Au Extraction @ (%)					Consumption (kg/t)	
					Gravity	2 hrs	8 hrs	48 hrs	Total	Lime	NaCN
309 Deposit	Composite #1	4070	75	7.29	48.27	6.59	7.82	10.29	58.56	0.33	0.89
	Composite #2	4071	75	2.79	27.73	3.23	3.77	3.77	31.50	0.33	0.67
	Composite #3	4072	75	2.50	42.48	1.20	2.40	2.40	44.87	0.33	0.53
	Composite #4	4073	75	8.67	46.13	29.42	31.84	31.84	77.97	0.33	0.67
	H/G Comp. A	4078	75	13.6	49.34	20.48	23.24	24.23	73.57	0.41	0.54
	H/G Comp. B	4079	75	30.8	43.92	38.76	43.24	44.65	88.57	0.41	0.47
Lone Sister Deposit	Composite #5	4074	75	7.74	12.18	34.87	57.92	74.77	86.96	0.33	0.96
	Composite #6	4075	75	1.62	15.41	44.39	51.79	64.73	80.15	0.33	0.54
	Composite #7	4076	75	2.51	19.40	51.42	57.40	62.18	81.58	0.33	0.57
	Composite #8	4077	75	2.40	5.59	57.55	65.05	72.56	78.15	0.33	0.46
	H/G Comp. C	4080	75	27.7	20.61	50.65	68.87	74.84	95.44	0.41	0.66

(c) Diagnostic Gold Analysis

Ore Source	Sample Identity	Grind Size P_{80} (μm)	Mode of Gold Occurrence							
			Gravity Recoverable		Free (Cyanidable)		Locked In Sulphides		Silicate Encapsulated	
			g/t	Dist'n (%)	g/t	Dist'n (%)	g/t	Dist'n (%)	g/t	Dist'n (%)
309 Deposit	Composite #1	75	3.52	49.09	0.75	10.46	1.57	21.90	1.33	18.55
	Composite #2	75	0.77	28.84	0.11	4.12	0.85	31.84	0.94	35.21
	Composite #3	75	1.06	41.09	0.06	2.23	0.45	17.44	1.01	39.15
	Composite #4	75	4.00	46.57	2.76	32.13	0.95	11.06	0.88	10.24
	H/G Comp. A	75	6.72	49.67	3.30	24.39	1.33	9.83	2.18	16.11
	H/G Comp B	75	13.5	44.12	13.8	45.10	1.72	5.62	1.58	5.16
Lone Sister Deposit	Composite #5	75	0.94	12.02	5.79	74.04	1.06	13.55	0.03	0.38
	Composite #6	75	0.25	14.25	1.05	59.83	0.45	25.64	0.005	0.28
	Composite #7	75	0.49	19.41	1.56	61.78	0.47	18.61	0.005	0.20
	Composite #8	75	0.13	5.38	1.74	72.05	0.54	22.36	0.005	0.214
	H/G Comp. C	75	5.70	20.55	20.7	74.61	1.29	4.65	0.053	0.19

- Testwork results evaluated during the course of the test program revealed the following :

(a) In addition to gold the Twin Hills gold ore composites contain significant concentrations of silver. The silver was identified by mineralogical examination to be present as electrum, argentian, native and as silver bearing minerals.

(b) The 309 Deposit ore samples contain enough concentrations of organic carbon to cause preg-robbing if a direct cyanidation leaching (CIP mode) process route was to be utilised for processing the ore.

(c) Comminution testwork results indicate relatively high Bond abrasion index values, in excess of 1.0. The Bond rod mill wrk index results were also high, being in excess of 28 kWh/t, whilst the Bond ball mill work index results were in excess of 24 kWh/t.

(d) Direct cyanidation (CIP mode, i.e. no activated carbon added to the leach pulps) leach testwork results in conjunction with the 309 Deposit composites indicated variable gold extraction levels, being as low as 8.64% and as high as 86.09%. The Lone Sister Deposit composites had higher gold extraction levels, being as low as 77.82% and as high as 95.40%.

(e) The 309 Deposit and Lone Sister ore samples contain significant concentrations of coarse/free gold which can be easily recovered using conventional gravity separation techniques.

(f) Removing the gravity gold content of the 309 Deposit composites prior to cyanidation has resulted in higher gold extraction levels than were achieved via the direct cyanidation method. The Lone Sister composites, which contain no organic carbon, gave similar gold extraction levels from gravity separation/leach testwork as was achieved from direct cyanidation leach testwork.

(g) Diagnostic gold analysis results indicate that a significant proportion of the gold content of the 309 Deposit and Lone Sister ore samples is present as sulphide inclusions. Diagnostic data also indicate that for the 309 Deposit there is significant gold locked up in silicate gangue as fine grains at the test grind size P_{80} of 75 microns. The 309 deposit ore samples, however, contain high concentrations of organic carbon which may be preg-robbing, it is therefore highly likely that some of the gold reported as being silicate encapsulated is in fact readsorbed by the organic carbon contact of the ore samples.

1. INTRODUCTION

Messrs John Turney and David Mason, representing Homestake Exploration Plutonic Resources Ltd, requested that AMMTEC conduct a defined program of metallurgical testwork in conjunction with several samples of ore originating from the 309 Deposit and Lone Sister Deposit of the Twin Hills Gold Project.

This test program, representing a preliminary evaluation of the orebody, included the following :

- Sample preparation including the formation of several composites.
- Comprehensive head assays.
- Optical, polished section mineralogical examination.
- True mineral SG determinations.
- Comminution testwork including the evaluation of Bond abrasion index, Bond rod mill work index and Bond ball mill work index of several composites.
- Grind establishment testwork.
- Direct cyanidation time leach testwork.
- Gravity separation followed by cyanidation time leach testing of gravity tails.
- Diagnostic gold analysis.

The test program is presented as flow diagrams in Figures 1 and 2.

2. THE SAMPLES

Several samples of ½ HQ core, representing individual intercepts of two drill holes from the 309 Deposit and one drill hole from the Lone Sister Deposit, were received for this test program. Comprehensive ore sample details are presented in Appendix I. The ore samples were from the following drill holes :

- 98TRCD748 and TRCD698 : 309 Deposit ~120 kg
- 98LRCD134 : Lone Sister Deposit ~ 140 kg

3. SAMPLE PREPARATION

The ore samples from each intercept were stage crushed to minus 20 mm and utilised to generate the following composites by blending ore samples from the intercepts nominated by the client.

Ore Source	Composite Identification	Wt (kg)
309 Deposit	Composite #1 : 98TRCD748 (171-175 m)	8.5
	Composite #2 : 98TRCD748 (179-189 m)	40
	Composite #3 : 98TRCD748 (191-230 m)	36
	Composite #4 : 98TRCD748 (167-178 m)	11
	High Grade Composite A : 98TRCD748 (172-174 m)	4
	High Grade Composite B : TRCD748 (168-171 m)	6
Lone Sister Deposit	Composite #5 : 98LRCD134 (71.3-86 m)	19
	Composite #6 : 98LRDC134 (108-114 m)	24
	Composite #7 : 98LRCD134 (116-126 m)	40
	Composite #8 : 98LRCD134 (126-136 m)	40
	High Grade Composite C : 98LRCD134 (71.3-72 m + 78-80 m)	5.5

Due to sample mass restrictions comminution tests were carried out in conjunction with composites 2, 3, 7 and 8 only. Sub-samples of each of these composites were removed for Bond abrasion index, rod mill work index and ball mill work index determinations.

The remainder of composites 2, 3, 7 and 8 and all of the other composites were stage crushed to minus 2.0 mm. Each of the crushed composites were subsequently homogenised and split into one kilogram sub-samples using a rotary sample splitting device.

4. ANALYTICAL

All assay samples generated during the course of the test program were submitted to AMMTEC's assay laboratory for analysis using the following analytical methods :

Gold in solids :	Fire assay/AAS finish
Gold in solution :	DIBK extraction/AAS finish
Sulphur :	*Leco* furnace
Organic Carbon :	*Perkin Elmer* analyser
Antimony :	Fusion/ICP finish
General elemental scan	Multiacid digestion/ICP finish

5. TEST WATER

Perth tap water was utilised for all slurry preparation prior to the required testwork.

6. HEAD ASSAY

Comprehensive head assays, carried out by AMMTEC's assay laboratory, are presented in Appendix II, whilst selected head assays are tabulated as follows :

6.1 309 Deposit

Element	Unit	Composite 1 98TRCD748 (171-175m)	Composite 2 98TRCD748 (179-189m)	Composite 3 98TRCD748 (191-230m)	Composite 4 TRCD698 (167-178m)	High Grade Composite A 98TRCD748 (172-174m)	High Grade Composite B TRCD698 (168-171m)
$Au^{(1)}$	g/t	4.80	2.98	2.30	12.2	12.1	36.6
$Au^{(2)}$	g/t	6.20	2.52	2.18	8.38	14.0	35.6
Ag	g/t	21	2	3	4	64	13
As	g/t	142	97	126	135	130	53
$C_{ORGANIC}$	%	0.27	0.20	0.22	0.19	0.16	0.10
Cu	g/t	12	8	10	9	10	6
Fe	%	1.24	1.37	1.73	1.20	1.08	0.96
Ni	g/t	<5	8	6	9	<5	<5
Pb	g/t	<5	<5	<5	<5	<5	<5
S_{TOTAL}	%	0.93	0.97	1.27	1.02	0.87	0.47
Sb	g/t	<2	<2	<2	<2	<2	<2
Zn	g/t	35	33	38	95	32	32

6.2 Lone Sister Deposit

Element	Unit	Composite 5 98LRCD134 (71.3-86m)	Composite 6 98LRCD134 (108-114m)	Composite 7 98LRCD134 (116-126m)	Composite 8 98LRCD134 (126-136m)	High Grade Composite C 98LRCD134 (71.3-72 + 78-80m)
$Au^{(1)}$	g/t	8.16	1.35	2.44	2.24	26.0
$Au^{(2)}$	g/t	7.02	1.43	2.12	2.08	26.4
Ag	g/t	30	5	4	5	64
As	g/t	1493	176	331	425	860
$C_{ORGANIC}$	%	0.03	<0.03	<0.03	<0.03	0.03
Cu	g/t	16	9	14	10	33
Fe	%	1.49	1.54	1.78	1.54	1.44
Ni	g/t	11	6	7	7	10
Pb	g/t	133	125	137	124	120
S_{TOTAL}	%	0.83	0.55	1.05	0.92	0.84
Sb	g/t	9	4	5	9	12
Zn	g/t	332	255	145	165	257

7. MINERALOGICAL EXAMINATION

One kilogram sub-samples of each of Twin Hills gold ore composites were dispatched to mineralogists "Roger Townend & Associates Pty Ltd" for optical, polished section, mineralogical examination.

Detailed mineralogy report is presented in Appendix III. Observations from this report include the following :

(a) The ore samples (used to generate the various composites) consist of low levels of iron sulphides in quartz gangue matrix. The sulphides are predominantly pyrite/marcasite. There were trace concentrations of chalcopyrite, covellite, pyrrhotite, sphalerite and arsenopyrite.

(b) Gold occurrences, detected optically, were typically rich in silver, being predominantly electrum gold with some argentian gold (<25% silver).

(c) The electrum gold occurs mainly as liberated grains, as inclusions in pyrite and as fine gold in silicate gangue closely associated with pyrite. There were gold occurrences of less than one micron size.

(d) Silver minerals (apart from electrum) were also detected optically as naumannite (silver selenide Ag_2Se), freibergite, native silver and acanthite.

(e) Carbon occurrences were also detected optically.

8. TRUE MINERAL SG DETERMINATION

Sub-samples of each of the Twin Hills gold ore composites were pulverised and tested in duplicate to determine the True Mineral SG of each sample.

8.1 Test Procedure

The test procedure was as follows :

(1) Ring mill the sample to nominal –38 μm.

(2) Weigh 20 grams of dry sample into a 50 ml pycnometer and make up to volume with xylene.

(3) Measure the following :

M_1 : sample weight

M_2 : sample + xylene weight

M_3 : xylene weight (to fill 50 ml pycnometer)

M_4 : H_2O weight (to fill 50 ml pycnometer)

(4) Calculate the true mineral SG from the equation:

$$True\ SG = \frac{M_1}{M_1 - (M_2 - M_3)} \times \frac{M_3}{M_4}$$

8.2 Test Results

Ore Source	Sample Identity	True SG (1)	True SG (2)	True SG (Average)
309 Deposit	Composite #1	2.65	2.64	2.65
	Composite #2	2.68	2.66	2.67
	Composite #3	2.69	2.67	2.68
	Composite #4	2.64	2.66	2.65
	H/G Composite A	2.64	2.65	2.65
	H/G Composite B	2.65	2.64	2.65
Lone Sister Deposit	Composite #5	2.67	2.69	2.68
	Composite #6	2.66	2.64	2.65
	Composite #7	2.65	2.67	2.66
	Composite #8	2.66	2.68	2.67
	H/G Composite C	2.66	2.66	2.66

9. COMMINUTION TESTWORK

The following physical tests were carried out in conjunction with composites 2, 3, 7 and 8.

9.1 Bond Abrasion Index Determinations

9.1.1 Test Procedure

Each composite was tested to determine its abrasion index value using the standard procedure developed by F.C. Bond.

The testing machine consists of an impeller rotating at 632 rpm within a contra-rotating drum. The impeller incorporates a *Bisalloy, 500 Brinell* hardness steel paddle.

Four successive 400 gram samples of ore (-19 mm+12.7 mm) are processed for 15 minutes each in the testing machine. At the completion of the test the weight lost by the paddle is measured to 0.10 of a milligram. The abrasion index, Ai, is equivalent to the paddle weight loss expressed in grams.

The products from the four 15 minute test periods are combined and then screened.

9.1.2 Abrasion Index Value

The abrasion index of each composite was evaluated to be :

Sample Identity	Feed Size (mm)	Bond Abrasion Index (Ai)
Composite #2	-19.0 +12.7	1.2522
Composite #3		1.2046
Composite #7		1.0037
Composite #8		1.1064

9.1.3 Size Analyses of Combined Products from Abrasion Testwork

A comprehensive size analysis of the combined products from the four 15 minute periods of each abrasion test is given below.

Size (mm)	Weight % Retained			
	Composite #2	Composite #3	Composite #7	Composite #8
+12.5	34.34	35.09	39.29	41.82
+10.0	19.52	18.66	16.71	17.43
+8.0	6.12	7.25	7.69	5.62
4.0	10.87	10.29	8.89	8.10
+2.0	5.69	6.16	4.79	4.18
+1.0	4.14	4.41	3.57	3.58
-1.0	19.32	18.14	19.06	19.26

9.2 Bond Rod Mill Work Index Determinations

Each composite was tested using the standardised procedure detailed by F.C. Bond[1] to determine its Bond rod mill work index.

9.2.1 Test Procedure

The test procedure was as follows :

(1) The test sample was stage crushed to 100% passing 12.7 mm. Test portions were carefully split out for the work index test.

(2) A known volume of ore (1250 mls) was ground in the standard mill for a counted number of revolutions.

(3) The ground material was screened at a test aperture of 1180 μm to remove the -1180 μm material.

(4) Fresh feed was added to the +1180 μm fraction to make up to the original test weight.

(5) The number of mill revolutions was adjusted at each cycle until a stable recirculating load was achieved.

(6) The work index was calculated from the formula :

$$(Wi)_R = \frac{62.0}{(Pi)^{0.23} \times (Grp)^{0.625} \times \left(\frac{10}{\sqrt{P_{K80}}} - \frac{10}{\sqrt{F_{K80}}}\right)} \times 1.102$$

Where:

$(Wi)_R$ = Work index value expressed in kWh/tonne

Pi = Grindability test aperture (micrometres)

Grp = Mean of equilibrium grindability values (g/rev)

P_{K80} = 80% passing size of the equilibrium product (micrometres)

F_{K80} = 80% passing size of the feed to period 1 (micrometres)

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[1]F.C. Bond "Crushing and Grinding Calculations" (1961). British Chemical Engineering, Vol 6, Nos 6, 8.

9.2.2 Test Results

Grindability test data and the calculated work index values are presented below.

Sample Identity	Micrometres		Grp (g/rev)	Test Aperture Pi (μm)	Rod Mill Work Index (kWh/t)
	F_{K80}	P_{K80}			
Composite #2	10694	930	2.717	1180	31.1
Composite #3	10358	866	2.443	1180	31.8
Composite #7	10359	853	2.673	1180	29.7
Composite #8	10535	800	2.621	1180	28.7

Detailed test report sheets are presented in Appendix IV.

9.3 Bond Ball Mill Work Index Determinations

Each composite was tested using the standardised procedure detailed by F.C. Bond[2] to determine its Bond ball mill work index.

9.3.1 Test Procedure

The test procedure was as follows :

(1) The sample was stage crushed to 100% passing 3.35 mm. Test portions were carefully split out for the work index test.

(2) A known volume of ore (700 mls) was ground in the standard mill for a counted number of revolutions.

(3) The ground material was screened at a test aperture of 106 µm to remove the -106 µm material.

(4) Fresh feed was added to the +106 µm fraction to make up to the original test weight.

(5) The number of mill revolutions was adjusted at each cycle until a stable recirculating load was achieved.

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[2]F.C. Bond "Crushing and Grinding Calculations" (1961). British Chemical Engineering, Vol 6, Nos 6, 8.

(6) The work index was calculated from the formula :

$$(Wi)_B = \frac{44.5}{(Pi)^{0.23} \times (Gbp)^{0.82} \times \left(\frac{10}{\sqrt{P_{K80}}} - \frac{10}{\sqrt{F_{K80}}} \right)} \times 1.102$$

Where:

$(Wi)_B$ = Work index value expressed in kWh/tonne

Pi = Grindability test aperture (micrometres)

Gbp = Mean of equilibrium grindability values (g/rev)

P_{K80} = 80% passing size of the equilibrium product (micrometres)

F_{K80} = 80% passing size of the feed to period 1 (micrometres)

9.3.2 Test Results

Grindability test data and the calculated work index value are presented below :

Sample Identity	Micrometres		Gbp (g/rev)	Test Aperture Pi (μm)	Ball Mill Work Index (kWh/t)
	F_{K80}	P_{K80}			
Composite #2	2615	88	0.687	106	26.3
Composite #3	2574	86	0.663	106	26.7
Composite #7	2580	86	0.752	106	24 0
Composite #8	2637	90	0.506	106	34.2

Comprehensive test report sheets are presented in Appendix V.

10. EXTRACTIVE METALLURGY TESTWORK

10.1 Grind Establishment (Mill Calibration) Testwork

One kilogram sub-samples of each of the Twin Hills gold ore composites (except the high grade composites) were ground in a stainless steel laboratory rod mill, at 50% solids (w/w), for various times.

The milled solids were wet screened at 75 microns. The plus 75 micron fractions were dried and then re-screened at 75 microns.

These sizing data were subsequently utilised to determine the grinding times necessary to realise the target grind size P_{80}'s stipulated by the client, viz :

Sample Identity	Feed Size	Target Grind Size (μm)	Requisite Grind Time * (minutes)
Composite #1	<2.0 mm	75	23.3
Composite #2	<2.0 mm	75	23.5
Composite #3	<2.0 mm	75	23.7
Composite #4	<2.0 mm	75	21.3
Composite #5	<2.0 mm	75	22.8
Composite #6	<2.0 mm	75	19.8
Composite #7	<2.0 mm	75	20.0
Composite #8	<2.0 mm	75	21.2

* 1.0 kilogram charge

10.2 Direct Cyanidation Time Leach Testwork

Three kilogram sub-samples of each of the Twin Hill gold ore composites (one kg of each of the High Grade composites was processed) were ground in the stainless steel laboratory rod mill at 50% solids (w/w), in Perth tap water, to grind size P_{80} of 75 microns and leached in accordance with the following procedure.

10.2.1 Test Procedure

(1) The ground solids were transferred from the rod mill into 6 litre baffled, mechanically agitated leaching vessels where the slurry density was adjusted to 40% solids (w/w) by decanting of clear supernatant liquor.

(2) The slurry samples were agitated for a period of 5 minutes prior to measuring the natural pH and dissolved oxygen levels of the pulps.

(3) An addition of hydrated lime (60% CaO) was made to each slurry sample to establish a pulp pH of about 10 which was checked after five more minutes of agitation and if necessary more lime was added.

(4) An addition of solid sodium cyanide was made to each slurry sample to establish an initial cyanide solution strength of 0.1% (w/w).

(5) Intermediate 100 ml slurry samples were removed after times of 2, 4, 8 and 24 hours had elapsed. These were filtered to provide solution samples for gold analysis and cyanide solution strength determination via titration with silver nitrate.

At each sampling period the leach pH and dissolved oxygen levels were also measured and, if necessary, more lime and cyanide were added to maintain pH and solution cyanide strength (>0.05%).

(6) At the termination of the leach tests (48 hours) the terminal pH, dissolved oxygen and cyanide levels were measured and a solution sample was taken for gold analysis.

The residual weight of the slurry samples was measured prior to filtering, washing, drying and weighing the leach residue solids.

(7) Sub-samples of each leach residue were submitted for gold analysis.

10.2.2 Test Results

Ore Source	Sample Identity	Test No. HS	Grind Size P_{80} (μm)	Calc'd Head Au (g/t)	Au Extraction @ Hours (%)					Consumption (kg/t)	
					2	4	8	24	48	Lime	NaCN
309 Deposit	Composite #1	4081	75	6.23	30.34	36.12	39.97	45.26	47.67	0.22	0.82
	Composite #2	4082	75	2.27	6.61	7.93	8.59	9.25	9.25	0.30	0.81
	Composite #3	4083	75	2.43	3.70	4.94	5.56	7.41	8.64	0.30	0.86
	Composite #4	4084	75	9.19	55.82	63.66	64.96	65.61	66.92	0.30	0.79
	H/G Comp. A	4089	75	13.5	38.11	48.52	55.61	56.72	58.05	0.31	1.06
	H/G Comp. B	4090	75	34.5	70.87	80.00	84.35	85.22	86.09	0.25	0.60
Lone Sister Deposit	Composite #5	4085	75	8.61	58.19	74.22	79.79	86.41	87.11	0.30	1.22
	Composite #6	4086	75	1.68	65.91	73.04	76.60	80.17	81.95	0.30	0.86
	Composite #7	4087	75	2.70	47.74	64.40	73.28	78.83	82.16	0.30	0.89
	Composite #8	4088	75	2.32	60.72	68.48	71.06	74.94	77.52	0.30	0.93
	H/G Comp. C	4091	75	28.5	65.88	79.59	89.65	94.87	95.40	0.25	0.85

Comprehensive test report sheets are presented in Appendix VI.

10.2.3 Comments

- Direct cyanidation leach testwork in conjunction with the 309 Deposit gold ore composites resulted in variable gold extractions levels, being as low as 8.64% (Composite #3) and as high as 86.9% (High Grade Composite B).

The ore composites from the Lone Sister Deposit gave reasonably uniform results, being as low as 77.52% (Composite #8) and as high as 95.40% (High Grade Composite C).

- Cyanidable gold leaching kinetics were relatively rapid with leaching having been effectively accomplished 8 hours from the start of the leaching process.

- Reagent consumption levels were low at less than 0.5 kg/t lime and at 0.60 – 1.22 kg/t sodium cyanide. These consumption levels may be higher if highly saline bore water were to be utilised for the full scale product plant operation.

10.3 Gravity Separation/Cyanidation Time Leach Testwork

10.3.1 Gravity Separation/Mercury Amalgamation

(1) Three kilogram sub-samples of each of the Twin Hills gold ore composites (1.0 kg of each of the High Grade Composites were processed) were ground in the stainless steel laboratory rod mill at 50% solids (w/w), in Perth tap water to grind size P_{80} of 75 microns and passed through the 3" laboratory scale *Knelson* concentrator.

(2) Each *Knelson* concentrate was amalgamated with 5.0 grams of mercury.

(3) Each loaded mercury amalgam was recovered and assayed for total gold content.

(4) Amalgamation tailings (*Knelson* concentrate minus its coarse/free gold content) were combined with the *Knelson* tailings and subjected to cyanidation leach testwork (refer to Section 10.3.2).

10.3.1.1 Test Results

Ore Source	Sample Identity	Grind Size P_{80} (μm)	Sample Wt Processed (kg)	Gravity Gold		Gravity Tail	
				Total Au (μg)	Dist'n (%)	Total Au (μg)	Dist'n (%)
309 Deposit	Composite #1	75	3.0	10555	48.27	11310	51.73
	Composite #2	75	3.0	2320	27.73	6045	72.27
	Composite #3	75	3.0	3190	42.48	4320	57.52
	Composite #4	75	3.0	11995	46.13	14010	53.87
	H/G Comp. A	75	1.0	6720	49.34	6900	50.66
	H/G Comp. B	75	1.0	13530	43.92	17275	56.08
Lone Sister Deposit	Composite #5	75	3.0	2830	12.18	20400	87.82
	Composite #6	75	3.0	750	15.41	4116	84.59
	Composite #7	75	3.0	1460	19.40	6066	80.60
	Composite #8	75	3.0	402	5.59	6792	94.41
	H/G Comp. C	75	1.0	5700	20.61	21960	79.37

The above results indicate that with the exception of Composite #8 (Lone Sister) the other Twin Hills composites contain significant concentrations of coarse/free gold which can be easily recovered using conventional gravity separation techniques.

10.3.2 Cyanidation Time Leach Testwork on Gravity Tailings

These tests were carried out in accordance with the procedure described in Section 10.2.1.

10.3.2.1 Test Results

Ore Source	Sample Identity	Test No. HS	Grind Size P_{80} (μm)	Calc'd Head Au (g/t)	Au Extraction @ (%)					Consumption (kg/t)	
					Gravity	2 hrs	8 hrs	48 hrs	Total	Lime	NaCN
309 Deposit	Composite #1	4070	75	7.29	48.27	6.59	7.82	10.29	58.56	0.33	0.89
	Composite #2	4071	75	2.79	27.73	3.23	3.77	3.77	31.50	0.33	0.67
	Composite #3	4072	75	2.50	42.48	1.20	2.40	2.40	44.87	0.33	0.53
	Composite #4	4073	75	8.67	46.13	29.42	31.84	31.84	77.97	0.33	0.67
	H/G Comp. A	4078	75	13.6	49.34	20.48	23.24	24.23	73.57	0.41	0.54
	H/G Comp. B	4079	75	30.8	43.92	38.76	43.24	44.65	88.57	0.41	0.47
Lone Sister Deposit	Composite #5	4074	75	7.74	12.18	34.87	57.92	74.77	86.96	0.33	0.96
	Composite #6	4075	75	1.62	15.41	44.39	51.79	64.73	80.15	0.33	0.54
	Composite #7	4076	75	2.51	19.40	51.42	57.40	62.18	81.58	0.33	0.57
	Composite #8	4077	75	2.40	5.59	57.55	65.05	72.56	78.15	0.33	0.46
	H/G Comp. C	4080	75	27.7	20.61	50.65	68.87	74.84	95.44	0.41	0.66

Comprehensive test report sheets are presented in Appendix VII.

10.3.2.2 Comments

- Cyanidation leach testwork on gravity tailings generated from the previous section resulted in variable overall gold extraction levels for the composites from 309 Deposit. The overall gold extraction levels from gravity separation/cyanidaton leach testwork were significantly higher than were achieved from direct cyanidation leach testwork (Section 10.2).

- The ore composites from the Lone Sister Deposit gave similar gold extraction levels from gravity separation/cyanidation leach testwork to those achieved from direct leach testwork (Section 10.2).

- It is interesting to note that the Lone Sister composites contain very low concentrations of organic carbon (some assays were below detection limit of 0.03%) whilst the 309 Deposit composites contain organic carbon. It is therefore highly likely that the removal of the gravity gold content of the 309 Deposit composites has prevented this gold from being re-adsorbed during the direct leaching process. The Lone Sister composites (which contain no organic carbon) have given almost identical results from direct cyanidation leach and gravity separation/cyanidation leach.

- All leach tests resulted in low reagent consumption levels of less than 0.5 kg/t lime and less than 1.0 kg/t sodium cyanide.

10.4 Diagnostic Gold Analysis

After reviewing the results obtained from preceding sections, the client instructed that diagnostic gold analysis work was to be carried out, in conjunction with leach residues from testwork on Twin Hill composites (Section 10.3) so as to evaluate the mode of gold occurrence in each composite.

In order to identify and quantify the mode of gold occurrence in each of the Twin Hills gold ore composites the leach residues obtained from Section 10.3 were tested as follows :

(1) Do not pulverise the sample. Assay using an aqua regia digest of a 30 gram sample. The acid digest liberates all gold associated with those minerals amenable to attack which includes all sulphides and most iron oxide phases although very high magnetite and hematite ores may not be totally digested.

(2) AAS assay of gold in the acidic leach liquor provides a measure of liberated gold.

(3) The washed residue solids from the acidic digest were dried, weighed and completely fire assayed to provide a measure of essentially silicate encapsulated gold content.

Combining the gravity separation/cyanidation testwork results with the diagnostic results the mode of gold occurrence for each of the Twin Hills composites has been categorised in the following table :

Ore Source	Sample Identity	Grind Size P_{80} (μm)	Mode of Gold Occurrence							
			Gravity Recoverable		Free (Cyanidable)		Locked In Sulphides		Silicate Encapsulated	
			g/t	Dist'n (%)	g/t	Dist'n (%)	g/t	Dist'n (%)	g/t	Dist'n (%)
309 Deposit	Composite #1	75	3.52	49.09	0.75	10.46	1.57	21.90	1.33	18.55
	Composite #2	75	0.77	28.84	0.11	4.12	0.85	31.84	0.94	35.21
	Composite #3	75	1.06	41.09	0.06	2.23	0.45	17.44	1.01	39.15
	Composite #4	75	4.00	46.57	2.76	32.13	0.95	11.06	0.88	10.24
	H/G Comp. A	75	6.72	49.67	3.30	24.39	1.33	9.83	2.18	16.11
	H/G Comp B	75	13.5	44.12	13.8	45.10	1.72	5.62	1.58	5.16
Lone Sister Deposit	Composite #5	75	0.94	12.02	5.79	74.04	1.06	13.55	0.03	0.38
	Composite #6	75	0.25	14.25	1.05	59.83	0.45	25.64	0.005	0.28
	Composite #7	75	0.49	19.41	1.56	61.78	0.47	18.61	0.005	0.20
	Composite #8	75	0.13	5.38	1.74	72.05	0.54	22.36	0.005	0.214
	H/G Comp. C	75	5.70	20.55	20.7	74.61	1.29	4.65	0.053	0.19

Detailed test report sheets are presented in Appendix VIII.

10.4.1 Comments

- Diagnostic testwork results indicate that a major proportion of the gold content of each of the Twin Hills composites is present as sulphide mineral inclusions. (This has been confirmed via mineralogical examination.)

- Diagnostic data indicate that the silicate encapsulated fine gold content of the 309 Deposit composites was quite high (except for High Grade Composite B) being as high as 39.15% of the gold content of Composite #3. Due to the presence of organic carbon in these composites it is suspected that some of the gold reported as being silicate encapsulated could be as gold re-adsorbed during the leaching process.

11. RECOMMENDATIONS

- Due to the suspicion of preg-robbing action (especially as regards 309 Deposit ore composites) by the inherent organic carbon content of the composites, it is recommended that all future leach tests be carried out using the CIL mode of processing (i.e. activated carbon should be added to the slurry samples at the start of the cyanidation process).

CIL cyanidation leach tests should be carried out on each composite to determine the ultimate gold extraction levels achievable from the cyanidation process route.

- As the Twin Hills gold ore composites assayed about 1.0% sulphur it is most probable that a high gold grade, low weight concentrate could be generated from sulphide flotation of the composites. Fine grinding of the flotation concentrate should be carried out next to determine if gold extraction levels could be maximised beyond those achieved from the CIL cyanidation route.

FIGURES

FIGURE 1 : METALLURGICAL TEST PROGRAMME FLOWSHEET - SAMPLE PREPARATION & COMMINUTION TESTWORK

HOMESTAKE EXPLORATION (PLUTONIC OPERATIONS LTD) : TWIN HILLS GOLD PROJECT

SEVERAL SAMPLES OF 1/2 HQ CORE FROM THE FOLLOWING DEPOSITS :

1) 309 DEPOSIT : INDIVIDUAL INTERCEPTS FROM DRILL HOLES 98TRCD748 & TRCD698 ~ 120 Kg

1) LONE SISTER DEPOSIT : INDIVIDUAL INTERCEPTS FROM DRILL HOLE 98LRCD134 ~ 140 Kg

FOR THE ORE SAMPLES FROM EACH DEPOSIT CONDUCT THE FOLLOWING :

STAGE CRUSH TO < 20mm

MIX / SPLIT : ROTARY SAMPLE SPLITTER

GENERATE THE FOLLOWING COMPOSITES :

* COMPOSITE # 1 : 309 DEPOSIT 98TRCD748 (171 - 175m) ~ 8.5 Kg
* COMPOSITE # 2 : 309 DEPOSIT 98TRCD748 (179 - 189m) ~ 40 Kg
* COMPOSITE # 3 : 309 DEPOSIT 98TRCD748 (191 - 230m) ~ 36 Kg
* COMPOSITE # 4 : 309 DEPOSIT TRCD698 (167 - 178m) ~ 11 Kg
* COMPOSITE # 5 : LONE SISTER DEPOSIT 98LRCD (71.3 - 86m) ~ 19 Kg
* COMPOSITE # 6 : LONE SISTER DEPOSIT 98LRCD (108 - 114m) ~ 24 Kg
* COMPOSITE # 7 : LONE SISTER DEPOSIT 98LRCD (116 - 126m) ~ 40 Kg
* COMPOSITE # 8 : LONE SISTER DEPOSIT 98LRCD (126 - 136m) ~ 40 Kg
* COMPOSITE HIGH GRADE "A" : 309 DEPOSIT 98TRCD748 (172 - 174m) ~ 4 Kg
* COMPOSITE HIGH GRADE "B" : 309 DEPOSIT TRCD698 (168 - 171m) ~ 6 Kg
* COMPOSITE HIGH GRADE "C" : LONE SISTER DEPOSIT 98LRCD (71.3-72m + 78-80m) ~ 5.5 Kg

CONDUCTED THE FOLLOWING FOR NOMINATED COMPOSITES :

1 x 5.0 Kg

CONDUCT BOND ABRASION INDEX DETERMINATION

CONDUCT THIS TEST FOR :

* COMPOSITE 2
* COMPOSITE 3
* COMPOSITE 7
* COMPOSITE 8

1 x 10 Kg

STAGE CRUSH TO < 12.7mm

CONDUCT BOND ROD MILL WORK INDEX DETERMINATION

CONDUCT THIS TEST FOR :

* COMPOSITE 2
* COMPOSITE 3
* COMPOSITE 7
* COMPOSITE 8

1 x 7 Kg

STAGE CRUSH TO < 3.35mm

CONDUCT BOND BALL MILL WORK INDEX DETERMINATION

CONDUCT THIS TEST FOR :

* COMPOSITE 2
* COMPOSITE 3
* COMPOSITE 7
* COMPOSITE 8

REMAINDER OF COMPOSITES 2, 3, 7 & 8 AND EACH OF THE OTHER COMPOSITES

STAGE CRUSH TO < 2.0mm

MIX / SPLIT : ROTARY SAMPLE SPLITTER [PREPARE 1.0 Kg SUB-SAMPLES OF EACH COMPOSITE]

FOR USE IN EXTRACTIVE METALLURGY TESTWORK [REFER TO FIGURE 2]

FIGURE 2 : METALLURGICAL TEST PROGRAMME FLOWSHEET : EXTRACTIVE METALLURGY TESTWORK

HOMESTAKE EXPLORATION : PLUTONIC OPERATIONS LTD - TWIN HILLS GOLD PROJECT

11 x GOLD ORE COMPOSITES [GENERATED FROM FIGURE 1] @ 100% < 2.0mm
* COMPOSITE # 1 : 309 DEPOSIT 98TRCD748 (171 - 175m) ~ 8.5 Kg
* COMPOSITE # 2 : 309 DEPOSIT 98TRCD748 (179 - 189m) ~ 18 Kg
* COMPOSITE # 3 : 309 DEPOSIT 98TRCD748 (191 - 230m) ~ 14 Kg
* COMPOSITE # 4 : 309 DEPOSIT TRCD698 (167 - 178m) ~ 11 Kg
* COMPOSITE # 5 : LONE SISTER DEPOSIT 98LRCD (71.3 - 86m) ~ 19 Kg
* COMPOSITE # 6 : LONE SISTER DEPOSIT 98LRCD (108 - 114m) ~ 24 Kg
* COMPOSITE # 7 : LONE SISTER DEPOSIT 98LRCD (116 - 126m) ~ 18 Kg
* COMPOSITE # 8 : LONE SISTER DEPOSIT 98LRCD (126 - 136m) ~ 18 Kg
* COMPOSITE HIGH GRADE "A" : 309 DEPOSIT 98TRCD748 (172 - 174m) ~ 4 Kg
* COMPOSITE HIGH GRADE "B" : 309 DEPOSIT TRCD698 (168 - 171m) ~ 6 Kg
* COMPOSITE HIGH GRADE "C" : LONE SISTER DEPOSIT 98LRCD (71.3-72m + 78-80m) ~ 5.5 Kg

FOR EACH COMPOSITE CONDUCT THE FOLLOWING :

1 x 1.0 Kg

HEAD ASSAYS
Au (DUPLICATE)
As, S, Sb,
$C_{ORGANIC}$
ICP SCAN
& TRUE SG
DETERMINATION

1 x 1.0 Kg

MINERALOGICAL
EXAMINATION

3 x 1.0 Kg

GRIND
ESTABLISHMENT
TESTWORK
[MILL CALIBRATION]

P80 : 75µm

1 x 3.0 Kg

GRIND TO :
P80 : 75µm

DIRECT CYANIDATION TIME LEACH TESTWORK

1) 40% SOLIDS (w/w)
2) pH 10 : LIME
3) NaCN : 0.1% (w/w)
(MAINTAIN > 0.05%)
4) TIME SERIES SAMPLES
@ 2, 4, 8, 24 & 48 HOURS
5) MONITOR pH, DO,
& NaCN LEVELS
6) ASSAY LIQUOR
SAMPLES : Au
7) ASSAY LEACH
RESIDUE : Au

1) REPORT CYANIDABLE GOLD EXTRACTION LEVEL.
2) PREPARE GOLD DISSOLUTION CURVE TO ASSESS LEACHING KINETICS.
3) REPORT REAGENT CONSUMPTION LEVELS.

1 x 3.0 Kg

GRIND TO :
P80 : 75µm

GRAVITY SEPARATION (KNELSON CONCENTRATOR)

KNELSON TAILS

GRAVITY CONCENTRATE

MERCURY AMALGAMATION

AMALGAM TAILS

LOADED MERCURY AMALGAM

ASSAY : TOTAL Au

CYANIDATION TIME LEACH TESTWORK

LEACH CONDITIONS
AS PER BASELINE (DIRECT)
CYANIDATION TEST.

CONDUCT DIAGNOSTIC GOLD ANALYSIS ON LEACH RESIDUES

1) REPORT GRAVITY RECOVERABLE GOLD CONTENT
2) REPORT CYANIDABLE GOLD CONTENT
3) REPORT TOTAL GOLD EXTRACTION LEVEL FROM GRAVITY SEPARATION & CYANIDATION LEACH.
4) PREPARE GOLD DISSOLUTION CURVE TO ASSESS GOLD LEACHING KINETICS.
5) REPORT REAGENT CONSUMPTION LEVELS

RESERVE

NOTE : USE SITE OR PERTH TAP WATER FOR LEACH TESTWORK AS SPECIFIED BY THE CLIENT

APPENDICES

APPENDIX I

ORE SAMPLE DETAILS

(SUPPLIED BY CLIENT)

309 Deposit 1/2 HQ core Metallurgical Samples Drillhole 98TRCD748
1/2 NQ core Samples Drillhole TRCD 698

HOLE NO.	INTERVAL (m)	MET SAMPLE NO	LAB SAMPLE NO	1/4 HQ CORE ASSAY g/t Au	REPEAT g/t Au	Ag (ppm)
98TRCD748	171-172	QT60082	QT54152	0.49		2
	172-173	QT60083	QT54153	30.2	31.6	96
	173-174	QT60084	QT54154	15.4	15.7	73
	174-175	QT60085	QT54155	0.94		4
	179-180	QT60090	QT54160	0.17		1
	180-181	QT60091	QT54161	7.18	7.3	4
	181-182	QT60092	QT54162	0.63		2
	182-183	QT60093	QT54163	4.1	3.89	7
	183-184	QT60094	QT54164	2.39		4
	184-185	QT60095	QT54165	0.4		2
	185-186	QT60096	QT54166	2.05	2.07	1
	186-187	QT60097	QT54167	0.36		1
	187-188	QT60098	QT54168	3.39	3.74	3
	188-189	QT60099	QT54169	0.12		2
	191-192	QT60102	QT54172	0.96		1
	192-193	QT60103	QT54173	0.86	0.89	2
	193-194	QT60104	QT54174	1.24		1
	194-195	QT60105	QT54175	4.3	4.3	8
	195-196	QT60106	QT54176	0.09		2
	226-227	QT60137	QT54207	0.84	0.8	2
	227-228	QT60138	QT54208	10.2	10.6	6
	228-229	QT60139	QT54209	3.7	3.6	5
	229-230	QT60140	QT54210	0.43		1

TRCD698	167-168	698/167-168	QT26487	1.86		
	168-169	698/168-169	QT26488	17	12.08	
	169-170	698/169-170	QT26489	50	47.08	
	170-171	698/170-171	QT26490	27.7	19.44	
	171-172	698/171-172	QT26491	1.08	1.5	
	172-173	698/172-173	QT26492	0.99		
	173-174	698/173-174	QT26493	1.48		
	174-175	698/174-175	QT26494	3.37		
	175-176	698/175-176	QT26495	13.5	9.72	
	176-177	698/176-177	QT26496	3.12		
	177-178	698/177-178	QT26497	0.26		

Lone Sister 1/2 HQ Metallurgical Samples Drillhole 98LRCD134

HOLE NO	INTERVAL (m)	MET SAMPLE NO	LAB SAMPLE NO	1/4 HQ CORE ASSAY g/t Au	REPEAT g/t Au
98LRCD134	71.3-72	QT60162	QT54312	35	36.4
	77-78	QT60168	QT54318	1.04	
	78-79	QT60169	QT54319	21.2	21.4
	79-80	QT60170	QT54320	8	8
	80-81	QT60171	QT54321	1.55	
	81-82	QT60172	QT54322	2.93	
	82-83	QT60173	QT54323	1.88	
	83-84	QT60174	QT54324	1.81	
	84-85	QT60175	QT54325	1.3	
	85-86	QT60176	QT54326	1.18	
	108-109	QT60199	QT54349	2.24	
	109-110	QT60200	QT54350	2.61	
	110-111	QT60201	QT54351	2.28	
	111-112	QT60202	QT54352	0.35	
	112-113	QT60203	QT54353	1.19	
	113-114	QT60204	QT54354	2.67	
	116-117	QT60207	QT54357	1.5	
	117-118	QT60208	QT54358	1.7	
	118-119	QT60209	QT54359	2.05	
	119-120	QT60210	QT54360	0.96	1.12
	120-121	QT60211	QT54361	2.19	
	121-122	QT60212	QT54362	2.29	
	122-123	QT60213	QT54363	3.29	
	123-124	QT60214	QT54364	2.33	2.33
	124-125	QT60215	QT54365	1.55	
	125-126	QT60216	QT54366	2.28	
	126-127	QT60217	QT54367	1.46	
	127-128	QT60218	QT54368	1.89	
	128-129	QT60219	QT54369	3.37	3.12
	129-130	QT60220	QT54370	3.97	4.14
	130-131	QT60221	QT54371	3.07	3.05
	131-132	QT60222	QT54372	1.65	
	132-133	QT60223	QT54373	1.14	
	133-134	QT60224	QT54374	2.43	2.38
	134-135	QT60225	QT54375	2.3	2.22
	135-136	QT60226	QT54376	1.54	

APPENDIX II

COMPREHENSIVE HEAD ASSAYS : COMPOSITES

HOMESTAKE EXPLORATION / PLUTONIC RESOURCES LTD

TWIN HILLS GOLD PROJECT : DETAILED HEAD ASSAYS

ELEMENT	UNIT	COMPOSITE 1 309 DEPOSIT 98TRCD748 171 - 175m	COMPOSITE 2 309 DEPOSIT 98TRCD748 179 - 189m	COMPOSITE 3 309 DEPOSIT 98TRCD748 191 - 230m	COMPOSITE 4 309 DEPOSIT TRCD698 167 - 178m	COMPOSITE 5 LONE SISTER 98LRCD134 71.3 - 86m	COMPOSITE 6 LONE SISTER 98LRCD134 108 - 114m	COMPOSITE 7 LONE SISTER 98LRCD134 116 - 126m	COMPOSITE 8 LONE SISTER 98LRCD134 126 - 136m	H/G COMP A 309 DEPOSIT 98TRCD748 172 - 174m	H/G COMP B 309 DEPOSIT TRCD698 168 - 171m	H/G COMP C LONE SISTER 98LRCD134 71.3 - 72 + 78 - 79m + 79 - 80m
Au (1)	g/t	4.80	2.98	2.30	12.2	8.16	1.35	2.44	2.24	12.1	36.6	26.0
Au (2)	g/t	6.20	2.52	2.18	8.38	7.02	1.43	2.12	2.08	14.0	35.6	26.4
Ag	g/t	21	2	3	4	30	5	4	5	64	13	64
Al	%	2.35	2.75	2.91	2.90	3.58	4.39	4.50	4.12	2.27	1.57	3.51
As	g/t	142	97	126	135	1493	176	331	425	130	53	860
Ba	g/t	236.00	280	276	299	525	264	270	203	216	136	590
Bi	g/t	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
$C_{ORGANIC}$	%	0.27	0.20	0.22	0.19	0.03	< 0.03	< 0.03	< 0.03	0.16	0.10	0.03
Ca	g/t	1508	1348	1371	2290	194	85	132	122	1349	2006	205
Cd	g/t	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Co	g/t	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Cr	g/t	134	48	57	230	260	189	197	224	147	42	69
Cu	g/t	12	8	10	9	16	9	14	10	10	6	33
Fe	%	1.24	1.37	1.73	1.20	1.49	1.54	1.78	1.54	1.08	0.96	1.44
K	%	2.92	3.10	4.08	3.50	4.04	5.41	5.56	4.85	2.58	1.64	3.55
Li	g/t	45	41	41	27	52	32	30	33	48	35	66
Mg	g/t	409	459	647	570	1170	1402	588	772	385	333	1121
Mn	g/t	81	71	110	32	107	158	67	66	80	50	90
Mo	g/t	172	81	52	70	< 5	< 5	7	< 5	142	65	19
Na	g/t	387	356	383	240	524	530	515	423	340	207	513
Ni	g/t	< 5	8	6	9	11	6	7	7	< 5	< 5	10
P	g/t	574	562	598	920	27	29	45	68	451	755	29
Pb	g/t	< 5	< 5	< 5	< 5	133	125	137	124	< 5	< 5	120
S_{TOTAL}	%	0.93	0.97	1.27	1.02	0.83	0.55	1.05	0.92	0.87	0.47	0.84
Sb	g/t	< 2	< 2	< 2	< 2	9	4	5	9	< 2	< 2	12
Sr	g/t	53	66	57	67	36	45	60	57	47	46	35
Ti	g/t	747	944	896	874	380	406	406	428	736	484	266
V	g/t	6	12	8	12	17	8	11	6	7	6	18
Y	g/t	10	10	11	11	208	248	270	244	9	6	199
Zn	g/t	35	33	38	95	332	255	145	165	32	32	257
Zr	g/t	44	52	60	58	926	1092	1076	1059	42	26	849

APPENDIX III

MINERALOGICAL EXAMINATION REPORT

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our ref. 99021

your ref.27550

Screening(106 mic.) and TBE separation of eleven gold ore samples.
Polished section examintion of twenty two TBE sks. XRD analysis of eleven TBE floats.

(A 6573. Twin Hills Gold Project.)

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(PATALYN PTY LTD TRADING FOR THE TOWNEND FAMILY TRUST)

SUMMARY OF RESULTS.

The eleven samples consist of low levels of iron sulphides in quartz dominant matrix, containing gold that is usually rich in silver.

The sulphides are pyrite > marcasite >>others. In the samples with finely disseminated pyrites, carbon is also present.The marcasite is not always secondary to pyrrhotite.

The gold mineralization is dominantly electrum, with some argentian gold(<25% silver).

The electrum/Ag gold occurs mainly as liberated particles, as inclusions in pyrite, and in quartz closely associated with pyrite etc. As inclusions in pyrite, and sometimes quartz, the electrum can be only microns in dimension. Rare examples are in silver ores, that include naumannite , the silver selenide.

Silver minerals are present, apart from the electrum ,in about one third of the samples , as naumannite, freibergite,native silver and once acanthite.

GANGUE

The floats were examined by XRD and optical microscopy. Overall they were of a similar nature.

RESULTS

	QUARTZ	FELDSPAR	MICA	KAOLIN
COMP. 1	DOMINANT	ACCESSORY		
COMP. 2	DOMINANT	TRACE		
COMP. 3	DOMINANT	ACCESSORY		
COMP. 4	DOMINANT	ACCESSORY	TRACE	
COMP. 5	DOMINANT	TRACE		
COMP. 6	DOMINANT	ACCESSORY	TRACE	TRACE
COMP. 7	DOMINANT	MINOR		TRACE
COMP. 8	DOMINANT	ACCESSORY	TRACE	
HG A.	DOMINANT	TRACE		
HG B.	DOMINANT	TRACE		
HG C.	DOMINANT	TRACE	ACCESSORY	

The quartz often appears to have a fine grained ? chalcedonic nature. The feldapar is probably a soda-rich plagioclase. The mica is sericite.

DOMINANT > 50%(MOST >90%) MINOR 10-20%, ACCESSORY 1-10%
TRACE <1%

SAMPLE COMP 1. +0.1MM 88.1%,TBE SKS 0.37%

POLISHED SECTION

OPAQUES	
PYRITE	DOMINANT
TI OXIDES	MINOR
MARCASITE	ACCESSORY
CARBON	ACCESSORY
PYRRHOTITE	TRACE
NAUMANNITE	TRACE
ELECTRUM	TRACE

The fraction contains about 25% PYRITE.

This occurs in several ways. The most common is as disseminations in gangue. The pyrites sizes and density is very variable.They probably grade to the 90% + pyrite aggregate.Single crystals are rare.

Present also in this combination is sporadic Ti oxide, and less common carbon.The carbon occurs as sub 0.1mm anhedral grains, rarely greater than 5% of the whole.

GOLD/SILVER

Silver is represented by naumannite (Ag2Se) and silver gold alloys.

The naumannite occurs as concentrations of particles in quartz, to 100 microns , with pyrite and electrum. It is also found as sub 5 micron specks in pyrites that are also electrum bearing.

Six occurrences of electrum were detected.

Two were as fines in pyrite.These were a trio and a cluster of > 10 specks .Dimensions ranged from 1-20 microns .One of these contained naumannite.

Four were composite with quartz, pyrite and once naumannite.One example had Ag >Au.Dimensions ranged from 50 to 150 microns.

SAMPLE COMP 1 -0.1MM 11.9%,TBE SKS 0.3%

POLISHED SECTION

OPAQUES	MAJOR
PYRITE	DOMINANT
GOETHITE	MINOR
MAGNETITE	ACCESSORY
CHALCOPYRITE	TRACE
COVELLITE	TRACE
PYRRHOTITE	TRACE
NAUMANNITE	TRACE
ELECTRUM	TRACE
GOLD	TRACE

The fraction contains about 50% Pyrite.

The pyrite occurs mainly as discrete fresh single crystals, often with faces. There is a minor population of pyrite as fines in gangue. The other sulphides present are negligible , also as discrete grains.

The oxides are discrete goethite > magnetite.(Some goethite may be derived from the extensive tramp iron present.)

SILVER GOLD

Silver was present as naumannite and the alloy.
The naumannite was host to pyrite and electrum.

Seven occurrences of electrum were detected .

Three were apparently liberated . These were equant, amoeboid shaped or linear. Dimensions were 0.1mm, 0.2 x0.03mm, and 70 microns. One had Ag >Au.

Two were fines in pyrites , of 1-10 microns.,

One was a linear (100 x 40 micron) strip attached to pyrite.

One was a composite of pyrite, plus electrum , of 15 microns plus spots of electrum in naumannite.

SAMPLE COMP 2 +0.1MM 90.1%, TBE SKS 0.4%

POLISHED SECTION

OPAQUES	
PYRITE	DOMINANT
TI OXIDES	MINOR
CARBON	ACCESSORY
SPHALERITE	TRACE
CHALCOPYRITE	TRACE
ARSENOPYRITE	TRACE
ARGENTIAN GOLD	TRACE

The fraction contains about 30% Pyrite.

The pyrite occurs in several habits.Predominantly it is found either as disseminations in silicate + gangue, or as almost monomineralic aggregates.These two types can exceed 2.5mm across.In the former pyrite concentrations and grainsizes vary greatly.Pyrites can be less than 10 microns to 0-.1mm where faces are common. There are a few liberated single euhedra. Several massive part microcrystalline pyrites may contain marcasite.

Rare composites with other sulphides include chalcopyrite/sphalerite + - rare arsenopyrite rhombs.

The oxides are solely of Ti , colourless ? rutile with the disseminated pyrites, rarely dominant. Carbon was laos present as sub 0.1mm particles in the pyrite gangue Ti oxide associations. Once it was a 0.2mm mass enclosing fine pyrites. One or two silicate chips had very fine carbon disseminated without pyrite.

GOLD

One occurrences was detected optically.

This was a strip of argentian gold in pyrite, that measured 20 microns or 20 x 1 microns.

SAMPLE COMP. 2 -0.1MM 9.9%,TBE SKS 0.5%

POLISHED SECTION

OPAQUES	DOMINANT
PYRITE	DOMINANT
RUTILE	ACCESSORY
CARBON	ACCESSORY
SPHALERITE	TRACE
CHALCOPYRITE	TRACE
FAHLORE	TRACE
PYRRHOTITE	TRACE
ELECTRUM	TRACE

The fraction contains about 70% Pyrite.

The pyrite occurs predominantly as fresh single crystals, often with faces. It is also found in fine clusters in gangue. In the latter case, there can also be accompanying fine rutile and carbon. Rarely carbon content equals pyrite, and once there was a simple 50:50 composite.

The other sulphides are traces of discrete grains, or once ?tetrahedrite attached to chalcopyrite.

GOLD

One occurrence was detected optically.

This was an almost liberated electrum ?flake of 175 x 30 microns, with a little silica attached.

SAMPLE COMP. 3 +0.1MM 85.9%,TBE SKS 0.53%

POLISHED SECTION

OPAQUES	DOMINANT
PYRITE	DOMINANT
RUTILE	ACCESSORY
CARBON	ACCESSORY
MAGNETITE	TRACE
ILMENITE	TRACE
PYRRHOTITE	TRACE

The sink fraction contains about 30% Pyrite.

The pyrite occurs in several habits. Most commonly it is present as fine clusters through gangue, where it often accompanied by fine colourless Ti oxides, ? rutile.Crystal shapes in these clusters are subhedral.Gangue free aggregate are also common. Single crystals of anhedra reach 0.7mm. There are a few hollow atoll shapes, and once coarse equivalent. Other sulphides are restricted to a single example of pyrrhotite attached to magnetite.

The oxides are dominated by a colourless Ti oxide, that is often present in the pyrite gangue associations.

Carbon was sporadically present .It occurred as sub 0.1mm individuals in the pyrite-rutile -gangue associations. Once it was the dominant phase , to 0.4mm hosting fine pyrites.Another example cemented coarse pyrites clusters.

No gold or silver species were detected optically.

SAMPLE COMP. 3 -0.1MM 14.1%,TBE SKS 0.58%

POLISHED SECTION

OPAQUES	MAJOR
PYRITE	DOMINANT
RUTILE	MINOR
CHALCOPYRITE	TRACE
ARSENOPYRITE	TRACE
GALENA	TRACE
ARGENTIAN GOLD	TRACE
ELECTRUM	
CARBON	TRACE

The fraction contains about 70% pyrite.

The pyrite occurs predominantly as fresh discrete often euhedral crystals. It is also found in aggregates, and as fines in gangue.In the latter case it may be accompanied by rutile.

The other sulphides are discrete traces only. Oxides are limited to Ti oxides.

GOLD

Three examples were identified.

One was a free equant 40 mic. cross section of electrum gold.

The second was a more linear argentian gold(50 x 20 microns)with fine pyrite inclusions.

The SEM detected a cluster of very fine golds from 0.5 microns to 14 , of argentian gold in K feldspar.

SAMPLE COMP. 4 +0.1MM 90.0%,TBE SKS 0.37%

POLISHED SECTION

OPAQUES	MAJOR
PYRITE	DOMINANT
TI OXIDES	MINOR
CARBON	ACCESSORY
PYRRHOTITE	TRACE
ARGENTIAN GOLD	TRACE

The fraction contains about 25% PYRITE.

The pyrite occurs in several forms. Most commonly it is as disseminations in gangue,where the pyrite size and density is very variable, from 0.1mm to less than 10 micron individuals. Also important are monomineralic aggregates ,where single crystals reach 0.6mm, some with faces. Quite commonly the gangue host to the pyrite fines is 90% Ti oxides, possibly leucoxene.

Other sulphides are limited to rare pyrrhotite as inclusions in coarser pyrite, or 0.2mm mass in gangue.

The oxides are colourless Ti oxides, often dominant, usually disseminated with gangue/pyrite etc.

Carbon is present as sub 0.15mm particles in some of the pyrite gangue associations., in the silicate.

GOLD

One example was detected optically

This was a 0.2mm mass of argentian gold (SEM), set in quartz /apatite.

SAMPLE COMP 4 -0.1MM 10%,TBE SKS 0.89%

POLISHED SECTION

OPAQUES	MAJOR
PYRITE	DOMINANT
RUTILE	MINOR
SPHALERITE	TRACE
CARBON	TRACE
ARGENTIAN GOLD	TRACE

The fraction contains about 25% Pyrite.

The pyrite occurs as fresh single crystals, some with faces, and equally as fines in gangue, that may also be replete with fine Ti oxides. Rare examples of the former enclosed carbon.

GOLD

Seven occurrences were detected These were mostly argentian species, possibly electrum.

Five were essentially liberated.

These were of a variety of shapes from narrow flakes to almost hackly habit. Dimensions for the flake was 90x5 microns whereas the hackly types were about 0.1mm. Several of the latter had fine inclusions of pyrite.The smaller examples were 60 x 30 and 70 microns.

Two were as single fines in pyrite. These golds were 12 and 15 microns.

SAMPLE COMP. 5 +0.1MM 91.2%,TBE SKS 0.32%

POLISHED SECTION

OPAQUES	MAJOR
PYRITE	MAJOR
MARCASITE	MAJOR
ARSENOPYRITE	MINOR
TI OXIDES	ACCESSORY
FREIBERGITE	ACCESSORY
ACANTHITE	TRACE
SILVER	TRACE
ELECTRUM	TRACE

The fraction contains about 25% of Sulphides.

The sulphides are pyrite=marcasite> arsenopyrite. The pyrite occurs commonly as disseminations in gangue mainly quartz? Crystals are often euhedral. The pyrite is also common as more massive and often linear shapes with included marcasite, ex ? pyrrhotite.Rarely pyrite is found rimming arsenopyrite.

The marcasite is dominantly present as bladed polycrystalline clusters to 2mm overall, some of radial arrangements. These can be in contact with arsenopyrite rhombs. Separately arsenopyrite forms coarse rhomb clusters in gangue, ?quartz.

The oxides are limited to sporadic fine Ti oxides in gangue with pyrite, some may be titanite.

GOLD SILVER.

Silver is represented by native silver, acanthite, freibergite and various members of the electrum -silver series.

The native silver was a complex zoned body with a sulphur bearing silver margin , hosted by quartz - muscovite. Another example was a 250 x 120 micron 50:50 intergrowth of silver and freibergite.A trace of acanthite accompanied one high silver electrum in quartz.

The polished area contained ten occurrences of silver gold mineralization.

These ranged from electrum to pure silver in composition. These occurred as free particles, as composites with gangue, mainly quartz, and composite with freibergite(Ag rich tetrahedrite)

The free electrums can be variable in composition with Ag>Au in part. Shapes are quite irregular and sizes are in excess of 100 microns to 250 x 200.

SAMPLE C5 +0.1MM cont.

The electrums composite with quartz or included in it, are also quite coarse grained with dimensions from 100 to 200 microns. Some are groups of 5 to 130x 40 micron range within the same host.

Silver rich gold was disseminated through freibergite.

SAMPLE COMP 5 -0.1MM 8.8%, TBE SKS 1.4%

POLISHED SECTION

OPAQUES	MAJOR
PYRITE	DOMINANT
MARCASITE	MAJOR
ARSENOPYRITE	MINOR
LEUCOXENE	ACCESSORY
DIGENITE	TRACE
COVELLITE	TRACE
FREIBERGITE	TRACE
ACANTHITE	TRACE
SPHALERITE	TRACE
GALENA	TRACE
SILVER	TRACE
ELECTRUM	TRACE
GOLD	TRACE

The fraction contains about 50% ores that are dominantly Sulphides.

The sulphides are pyrite > marcasite > arsenopyrite.

The fresh pyrite dominantly occurs as single crystals, that are often euhedral .Composites or fines are rare, except with marcasite. The marcasite occurs either as acicular bunches, or as blocky twins, some with pyrite.The arsenopyrite is mostly a discrete flattened rhomb.

Other sulphides were digenite,and silver rich tetrahedrite.(freibergite)

GOLD SILVER

The silver was present as native silver, acanthite, freibergite, and alloyed with gold.

The silver was attached to freibergite lined by acanthite,overall measuring 50 microns. Other examples were a composite of freibergite, acanthite and sphalerite, or acanthite,pyrite and galena.

Nine examples of gold silver alloy were detected.

Five were liberated. One of these was a low silver gold of microns. The others were electrum with maximum dimensions from 0.1 to 0.15mm, both elongate and equant.

Two were included in pyrite , and were argentian, of 5 and 15 microns.

One was a 0.1mm argentian gold with a smaller pyrite attached. One was a pair of 10 and 20 micron golds ,in freibergite associated with covellite and pyrite.

SAMPLE COMP 6 +0.1MM 92.6%,TBE SKS 0.23%

POLISHED SECTION

OPAQUES	
PYRITE	MAJOR
GOETHITE	MAJOR
MARCASITE	MINOR
LEUCOXENE	ACCESSORY
GALENA	TRACE
ELECTRUM	TRACE

The section contains about 30% ores that are a roughly equal mixture of Sulphides and Goethite.

The sulphides are pyrite and marcasite .The pyrite mostly occurs as disseminations in gangue mainly silica. These are euhedra to 0.2mm. Rarely they are composite with secondary marcasite. Single pyrite or massive material is rare.The marcasite mostly occurs as clusters of acicular polycrystalline bodies in gangue.There is also coarser twinned marcasite with primary pyrite. Galena was a trace inclusion in the euhedral pyrite.

Discrete goethites are always separate from the iron sulphides.Rarely leucoxene cements acicular marcasites.

GOLD SILVER

Three occurrences were noted.

Two were fines in pyrite/marcasite . One was a trio, the other more than 20 particles.The gold is electrum , and the size range is <1 to 10 microns. galena and arsenopyrite are also inclusions.

One was a 100 x50 micron mass of electrum attached to goethite and muscovite.

SAMPLE COMP 6. -0.1MM 7.4%,TBE SKS 1.05%

POLISHED SECTION

OPAQUES	DOMINANT
PYRITE	DOMINANT
MARCASITE	MINOR
SPHALERITE	TRACE
GALENA	TRACE
GOETHITE	TRACE
RUTILE	TRACE
ARGENTIAN GOLD	TRACE

The fraction is composed of about 80% pyrite.

The pyrite occurs very predominantly as fresh single crystals in the 0.05-0.15mm range.Most have faces. Marcasite is occasionally as separate simple twins, of equant habit , or as minor components of the pyrite.

Other sulphides are galena often as fines in pyrite, rarely discrete,and discrete sphalerite.

Oxides are negligible.

GOLD

Nine occurrences of argentian gold/electrum was detected optically.

These were entirely as inclusions in pyrite.

.There were single particles to clusters of three or four. The size range was 1-0.5 to 10 microns. Some were accompanied by inclusions of galena.

SAMPLE COMP 7 +0.1MM 84.6% TBE SKS 0.46%

POLISHED SECTION

OPAQUES	MAJOR
PYRITE	MAJOR
GOETHITE	MAJOR
MARCASITE	MINOR
LEUCOXENE	ACCESSORY
PYRRHOTITE	TRACE
ARGENTIAN GOLD	TRACE

The fraction is a mixed sulphide oxide assemblage, plus silicate gangue.

The sulphides are pyrite >marcasite, and the oxides, goethite , in part ex the iron sulphides.

The pyrite mainly occurs as disseminations of euhedra in silicate or goethite host.The pyrites usually show crystal faces, with sizes from 50 to 250 microns. Commonly these are also part marcasitic. Rarely marcasite occurs as separate acicular shapes.

Often the pyrite where enclosed in a goethite host, is part replaced by the goethite.There was one separate body of pyrrhotite.

Goethite is prominent as separate coarse masses, of a non pseudomorphous texture.

GOLD

Five occurrences were detected optically.

These ere largely present as fine clusters of argentian golds to electrums in pyrites, that were themselves enclosed by either silicate gangue or goethite.

The argentian golds were from 1 to 6 particles in pyrites of 100-200 microns and shape euhedral to anhedral. The golds measured 1-20 microns. In one example, there was also a argentian gold separately in the surrounding goethite.

SAMPLE COMP 7 -0.1MM 84.6%,TBE SKS 1.85%

POLISHED SECTION

OPAQUES	DOMINANT
PYRITE	DOMINANT
MARCASITE	MINOR
ARSENOPYRITE	ACCESSORY
GOETHITE	ACCESSORY
PYRRHOTITE	TRACE
ELECTRUM	TRACE

The fraction is a Pyrite concentrate.

The pyrite very predominantly occurs as discrete euhedra around 0.1mm. Rarely they show part oxidation to goethite. Commonly there is evidence of two stages of pyrite growth. Marcasite is usually separate from the pyrite, in coarse crystalline grains. The arsenopyrite is discrete, rarely oxidised on its fringes. Galena is not rare as fines in pyrite.

GOLD

Three occurrences were detected optically.

These were all electrum inclusions in pyrite.These were two single particles of 10 microns, and a quartet of 1-5 microns.

COMP. 8 +0.1MM 89.4%,TBE SKS 0.54%

POLISHED SECTION

OPAQUES	MAJOR
PYRITE	MAJOR
MARCASITE	MAJOR
GOETHITE	MAJOR
LEUCOXENE	ACCESSORY
ARSENOPYRITE	ACCESSORY
GALENA	TRACE
SPHALERITE	TRACE
ARGENTIAN GOLD	TRACE

The fraction is a mixed Sulphide Oxide assemblage, in addition to the silicate gangue, plus ? siderite.

The sulphides are predominantly of iron, with pyrite about equal to marcasite. Some pyrites occur as fresh single crystals to a mm, but most are sub half a mm.More commonly pyrite and marcasite are intergrown in various textures. These tend to occur in aggregates hosted by non opaque gangue,or in sub mm solely sulphide bodies. Typically the marcasite is in strips in a non cleaved pyrite, overall suggestive of a pyrrhotite derivation. A blocky shaped marcasite also occurs on the fringes of primary-looking pyrite.

Arsenopyrite was identified as clusters of rhombs flanking rod shaped marcasite. Galena is present as fines in pyrite, and once ,marcasite . There was one sphalerite/marcasite composite.

A little pyrite is present as relics in goethite.The goethite is predominantly discrete .

GOLD

Three occurrences were detected optically.The two sulphide examples were argentian.

One was a cluster of >20 particles from 1 to 50 microns, in pyrite ,associated with fine galena.The pyrite is enclosed in coarse silicate gangue.

One was a pair of particles , at a dual marcasite contact.The gold measured 2 and 3 microns

The third was a low silver gold speck of 5 microns, in goethite.

SAMPLE COMP. 8 -0.1MM 89.4%,TBE SKS 1.4%

POLISHED SECTION

OPAQUES	DOMINANT
PYRITE	DOMINANT
MARCASITE	ACCESSORY
GOETHITE	ACCESSORY
MAGNETITE	ACCESSORY
GALENA	TRACE
PYRRHOTITE	TRACE
CHALCOPYRITE	TRACE
ELECTRUM	TRACE

The fraction is a Pyrite concentrate.

The pyrite occurs as discrete mostly euhedral fresh single crystals around 0.1mm.Many show evidence of zonal growth. The marcasite is commonly present as a composite with pyrite. Fine crystalline lamellae are rare. Galena is not rare as an inclusion.

Pyrrhotite and rare chalcopyrite are discrete. Oxides are discrete magnetite or goethite.

GOLD

Five occurrences of gold were detected, probably electrum.

These were all in iron sulphides. Four were in pyrite, and one in marcasite .

These were single , two and three particles with a size range of 2 to 12 microns.

SAMPLE HG COMP A +0.1MM 83.5%,TBE SKS 0.7%

POLISHED SECTION

OPAQUES	DOMINANT
PYRITE	DOMINANT
MARCASITE	ACCESSORY
GOETHITE	ACCESSORY
RUTILE	ACCESSORY
ARSENOPYRITE	TRACE
GALENA	TRACE
CARBON	TRACE
ARGENTIAN GOLD	TRACE

The fraction is dominated by fresh pyrite that predominantly occurs as disseminations in gangue.

There is probably a complete gradation from weakly disseminated sub 50 micron individuals to a mm+ coalesced monomineralic mass. Disseminated pyrites tend to have faces. There is rare pyrite in ? siderite that appear part altered. The marcasite is as very subordinate part of some pyrite aggregates, and arsenopyrite is rare. Within the pyrite , there are inclusions of galena.

Rutile is an occasional dissemination in gangue with pyrites.Rarely fine carbon was also present.Goethite is subordinate to siderite.

GOLD

Nine occurrences were detected in the area scanned. All the golds were argentian.

Six of them were as inclusionS in pyrite. These ranged from a single particle of 10 microns to clusters of particles. Dimensions were from 1 to 10 microns. The pyrites sizes ranged from 0.1 to 0.25 mm, and some were part of coarser gangue.

One was a 250 micron mass , composite with pyrite, and a larger body of gangue.

One was a 5 micron speck, in arsenopyrite, attached to coarser pyrite.

The ninth was a very irregular liberated argentian gold of 150 microns.

SAMPLE HG COMP. A -0.1MM 16.5%,TBE SKS 0.58%

POLISHED SECTION

OPAQUES	MAJOR
PYRITE	DOMINANT
PYRRHOTITE	ACCESSORY
SPHALERITE	ACCESSORY
MARCASITE	TRACE
COVELLITE	TRACE
FAHLORE	TRACE
GOETHITE	TRACE
RUTILE	TRACE
ACANTHITE	TRACE
NAUMANNITE	TRACE
ARGENTIAN GOLD	TRACE
ELECTRUM	TRACE

The dominant sulphides occupy about 70% of the fraction.

These are dominated by fresh Pyrite. The pyrite occurs as euhedra, as aggregates and uncommonly as fines in gangue. Composites with other sulphides , eg sphalerite, are rare.

Pyrrhotite occurs as fresh discrete equant grains.The rare marcasite is ex pyrrhotite. There are traces of separate copper sulphides.Oxides are negligible.

GOLD SILVER

The silver occurs as electrum, naumannite and acanthite. The naumannite is found composite with silica, or as a matrix to pyrite clusters with silica, and as a 0.15x0.04mm composite with acanthite, hosting electrum.

Sixteen examples of gold silver alloy were detected optically.

Eight of these were liberated, as electrum.These were of equant to linear or flake shape. The former were around 0.1mm diameter, the latter 0.2x0.03mm, and 0.15x0.08mm.

Four were associated with pyrite. One of these was a 6 micron speck in pyrite. The others had major electrum. These were a 130x20 micron electrum with pyrite inclusions; a pyrite, with electrum, of 10 and 15 microns attached; a 25 and 40 micron electrum attached to pyrite.

There was a triple composite of pyrite, silica and a 50 micron electrum.

One small arsenopyrite contained a 20x10 micron electrum inclusion.

SAMPLE HG COMP. B +0.1MM 89.2%,TBE SKS 0.142%

POLISHED SECTION

OPAQUES	MAJOR
PYRITE	DOMINANT
RUTILE	ACCESSORY
COVELLITE	TRACE
CARBON	TRACE
ELECTRUM	TRACE

The fraction is about 50% Pyrite.

The fresh pyrite occurs either as disseminations in gangue or as single crystals composite with gangue.The former fragments can exceed 2mm.The disseminated pyrites are sub 0.1mm perfect polyhedra. Some examples also have fine rutile and rarely carbon in the gangue.

Covellite was composite with gangue and ? malachite.

GOLD

Two occurrences were detected optically.

One was a coarse free equant argentian gold of 500 microns diameter.

The other was several argentian golds of 60x15,15, and 10 microns, at a silica/apatite contact, all attached to pyrite.

No silver species, other than the alloy were detected.

SAMPLE HG COMP. B -0.1MM 10.8%, TBE SKS 0.61%

POLISHED SECTION

OPAQUES	,MINOR
PYRITE	DOMINANT
CHALCOPYRITE	TRACE
FAHLORE	TRACE
COVELLITE	TRACE
GOETHITE	TRACE
HEMATITE	TRACE
RUTILE	TRACE
FREIBERGITE?	TRACE
ELECTRUM	ACCESSORY

The fraction contains about 20% Pyrite.

The pyrite occurs as fresh discrete single euhedral crystals, as small aggregates, and uncommonly as fines with rutile in gangue.

Other sulphides are limited to rare copper sulphides, the chalcopyrite around a fahlore core.

Oxides are negligible.

GOLD SILVER

Nineteen occurrences were detected optically.These were dominantly electrum. The only other likely silver bearer detected was possible freibergite.

Fifteen of these appeared to be liberated, apart from some having fine pyrite inclusions. Their shapes varied from hackly, to rounded in section. Dimensions were from 0.06 x 0.03 to 50 microns.

Two were composite with sulphides. One had pyrite in both sides, the gold of 90X20 microns. The other was flanked by chalcopyrite and pyrite, the gold of 40 X15 microns.

Two were wholly within gangue.One of these was low in silver , of 40 microns. The other was a coarse 100x 40 microns electrum ,in gangue, also containing pyrites.

SAMPLE HG COMP. C +0.1MM 87.1%, TBE SKS 0.2%

POLISHED SECTION

OPAQUES	MAJOR
MARCASITE	MAJOR
PYRITE	MAJOR
ARSENOPYRITE	ACCESSORY
GALENA	TRACE
FAHLORE	TRACE
ELECTRUM	ACCESSORY

The fraction contains about 50% Iron Sulphides.

These are marcasite > pyrite.The marcasite mainly occurs in semi stellate arranged acicular masses often enclosed in gangue to 2mm. Some of these are flanked by pyrite. Otherwise the pyrite occurs as coarse euhedra in gangue or finer clusters in gangue. Arsenopyrite forms clusters of medium sized rhombs in gangue.The other sulphides are traces only.

GOLD SILVER

Silver was present as freibergite and electrum.The freibergite was composite with marcasite/pyrite and galena. It was also in quartz with pyrite and electrum.

Ten occurrences of electrum were detected.

Only two were apparently liberated. These were very argentian types around 0.2mm.

Seven were in non opaque gangue.Five were apparently single particles .Some of quite irregular shape, with sizes from sub microns to 100x50, and 180x70 microns.Their composition was electrum.

One was at least 8 particles in a linear gangue of quartz.The electrum measured from 0.04 to 0.2mm.

One was a series of fines in pyrite strips, associated with freibergite , and attached to coarser gangue that was quartz.The golds ranged from 3 to 15 microns.

SAMPLE HG COMP. C -0.1MM 12.9%,TBE SKS 0.78%

POLISHED SECTION

OPAQUES	MAJOR
PYRITE	DOMINANT
ARSENOPYRITE	ACCESSORY
MARCASITE	ACCESSORY
LEUCOXENE/RUTILE	ACCESSORY
CHALCOPYRITE	TRACE
GALENA	TRACE
SPHALERITE	TRACE
FREIBERGITE	TRACE
ELECTRUM	TRACE

The fraction contains about 60% Pyrite.

The pyrite occurs as discrete fresh euhedral single crystals in the 0.05-0.15mm range.There is a small quantity as fines in gangue.Composites with other ores are negligible. There are rare inclusions of galena or sphalerite. The marcasite is present as separate clutches of microcrystalline lamellae, rarely composite with pyrite. The arsenopyrite forms occasional twinned rhombs, one example rims pyrite.The chalcopyrite and ?freibergite are discrete or the latter is in gangue.

GOLD

The silver was as the alloy or freibergite.The latter is discrete or as fines in quartz with fine electrum.

Seven gold occurrences were detected .

Three of these appeared liberated. These were electrums,measuring 0.15mm, 0.15x0.05 and 0.1mm.

Two were fines in pyrite. One was a pair of 2,and 4 microns also with sphalerite present, and the other a 0.5 and 2 micron speck in pyrite, composite with marcasite.

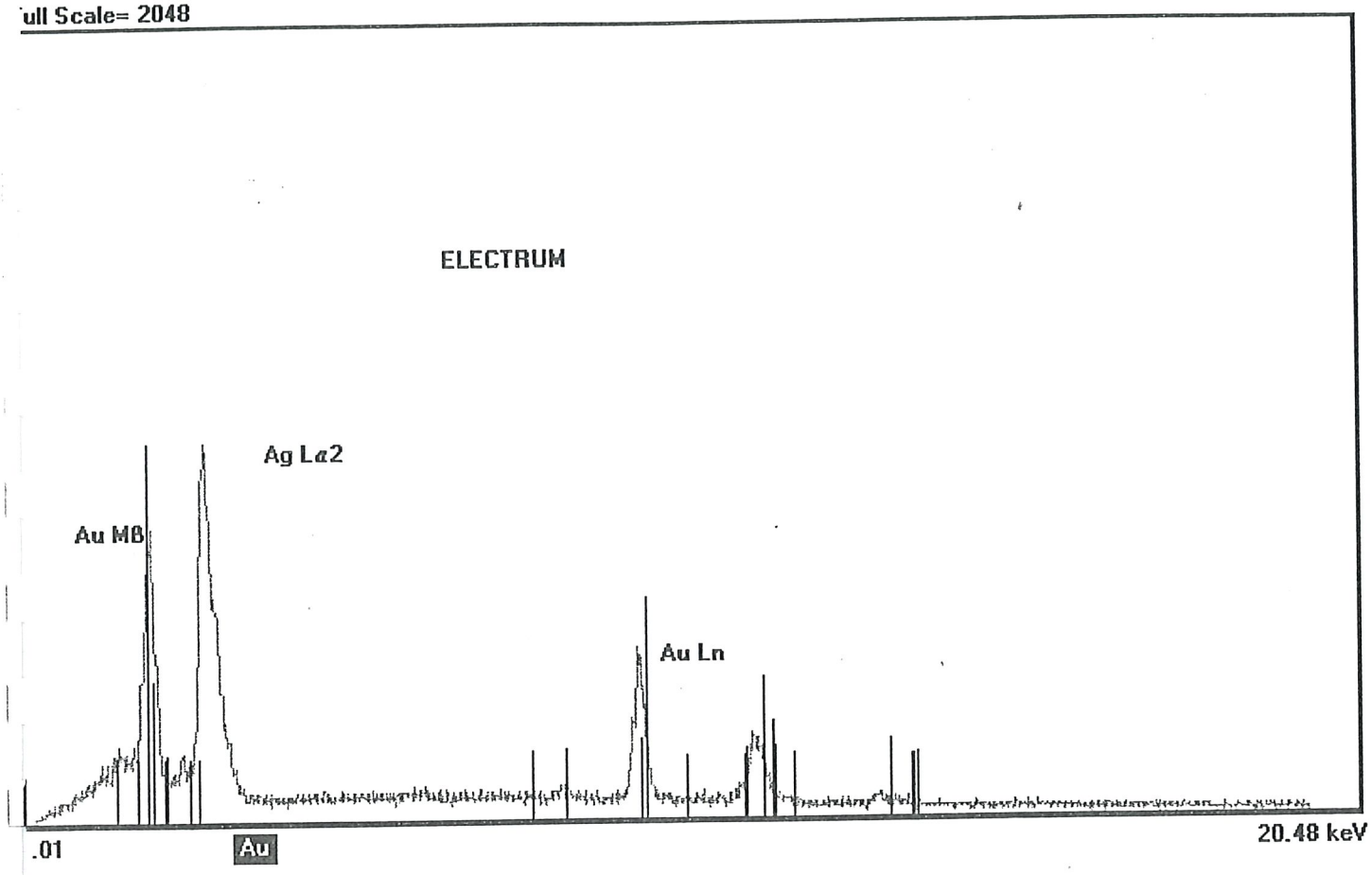
One was a simple composite of 0.05mm with minor incorporated pyrite.

One was a 20 micron electrum, attached to quartz that had 1-2 micron inclusions of electrum and freibergite.

Roger Townend _Assoc.

Spectrum ID = COMP. 1

Full Scale= 2048

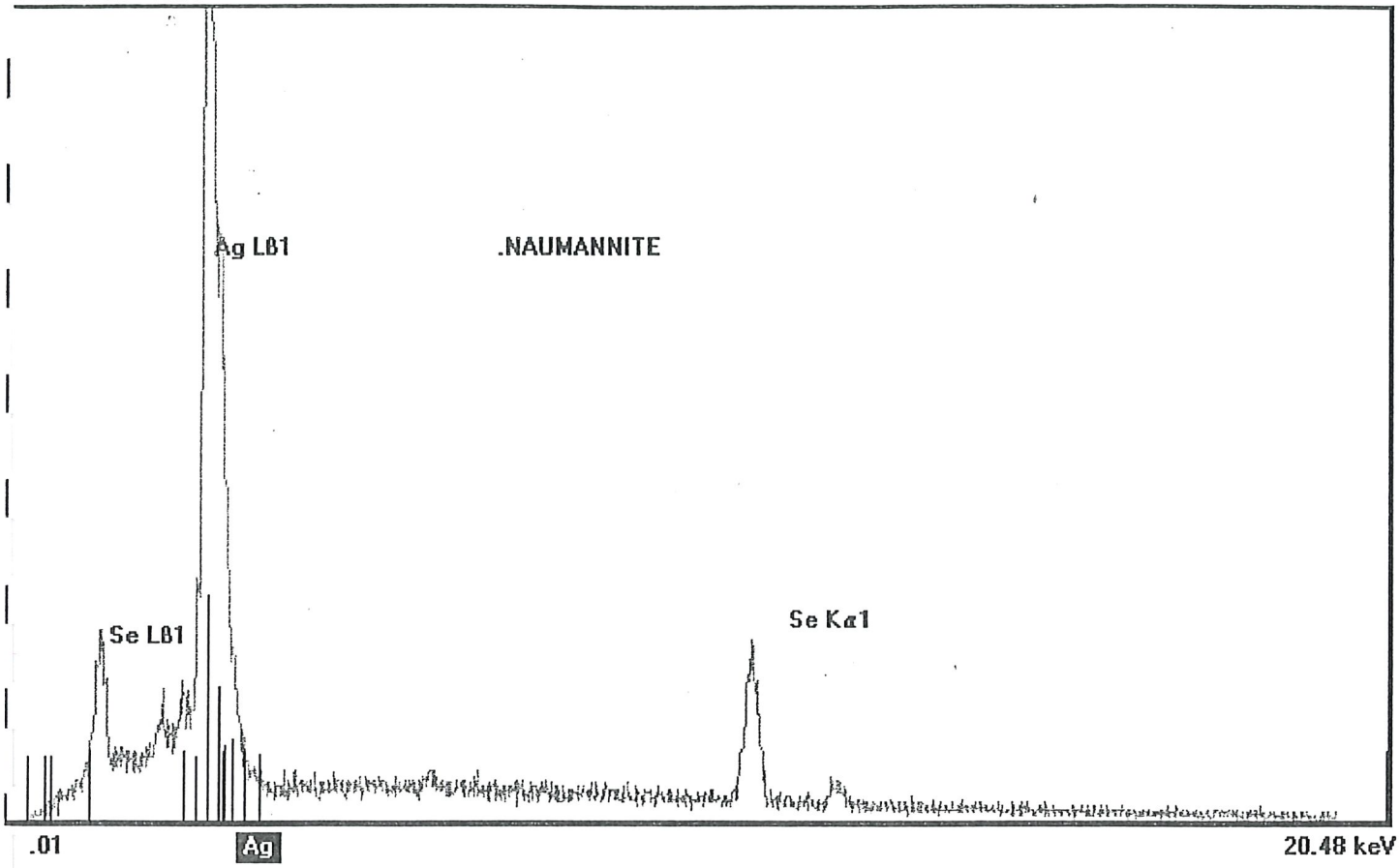


CR30910E

Roger Townend _Assoc.

Spectrum ID = COMP 1 -0.1MM

Full Scale= 1024



CR30910E

Roger Townend _Assoc.

Spectrum ID = COMP 1 -0.1MM

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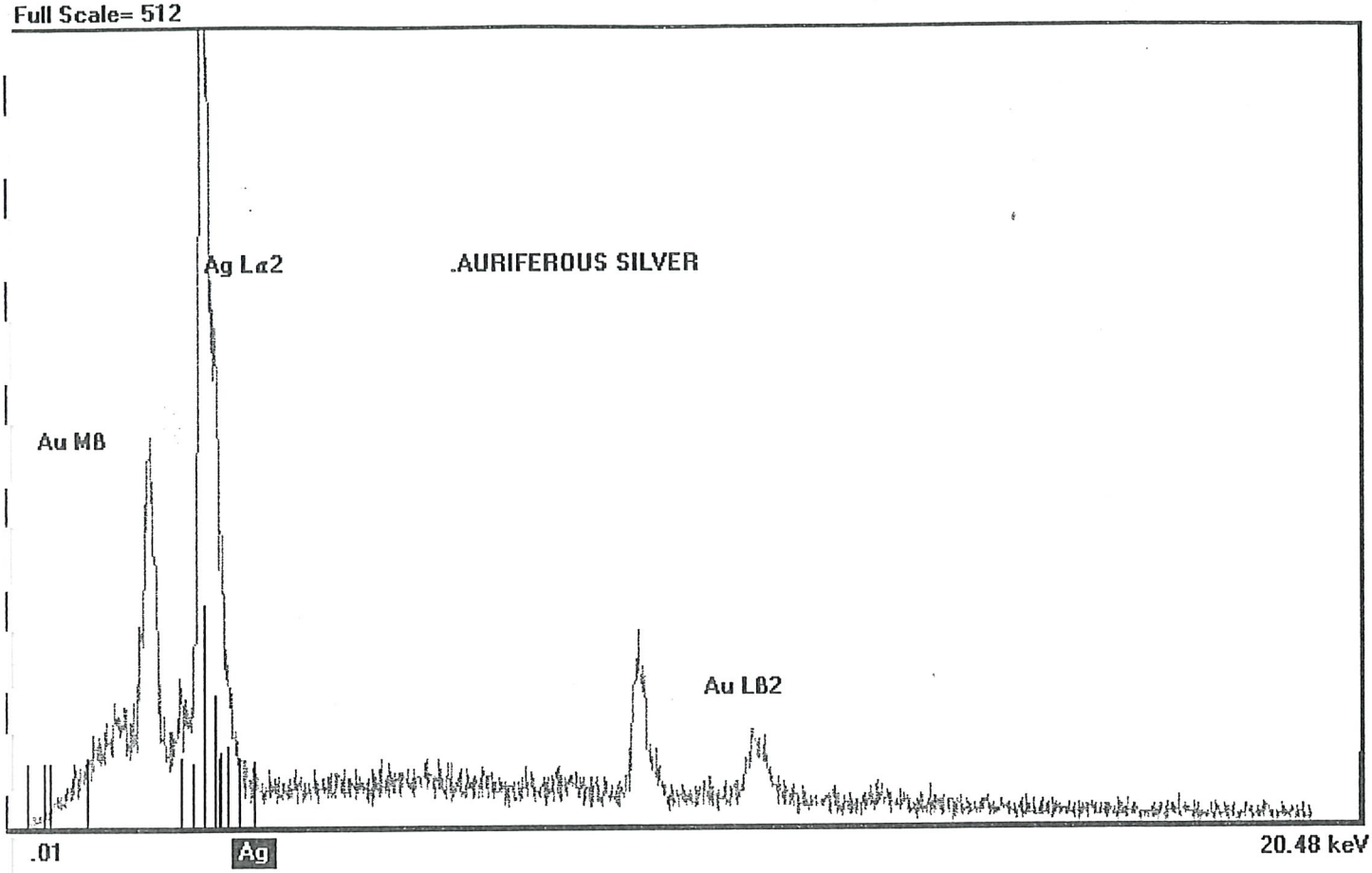

loger Townend _Assoc.

Spectrum ID = COMP 5.

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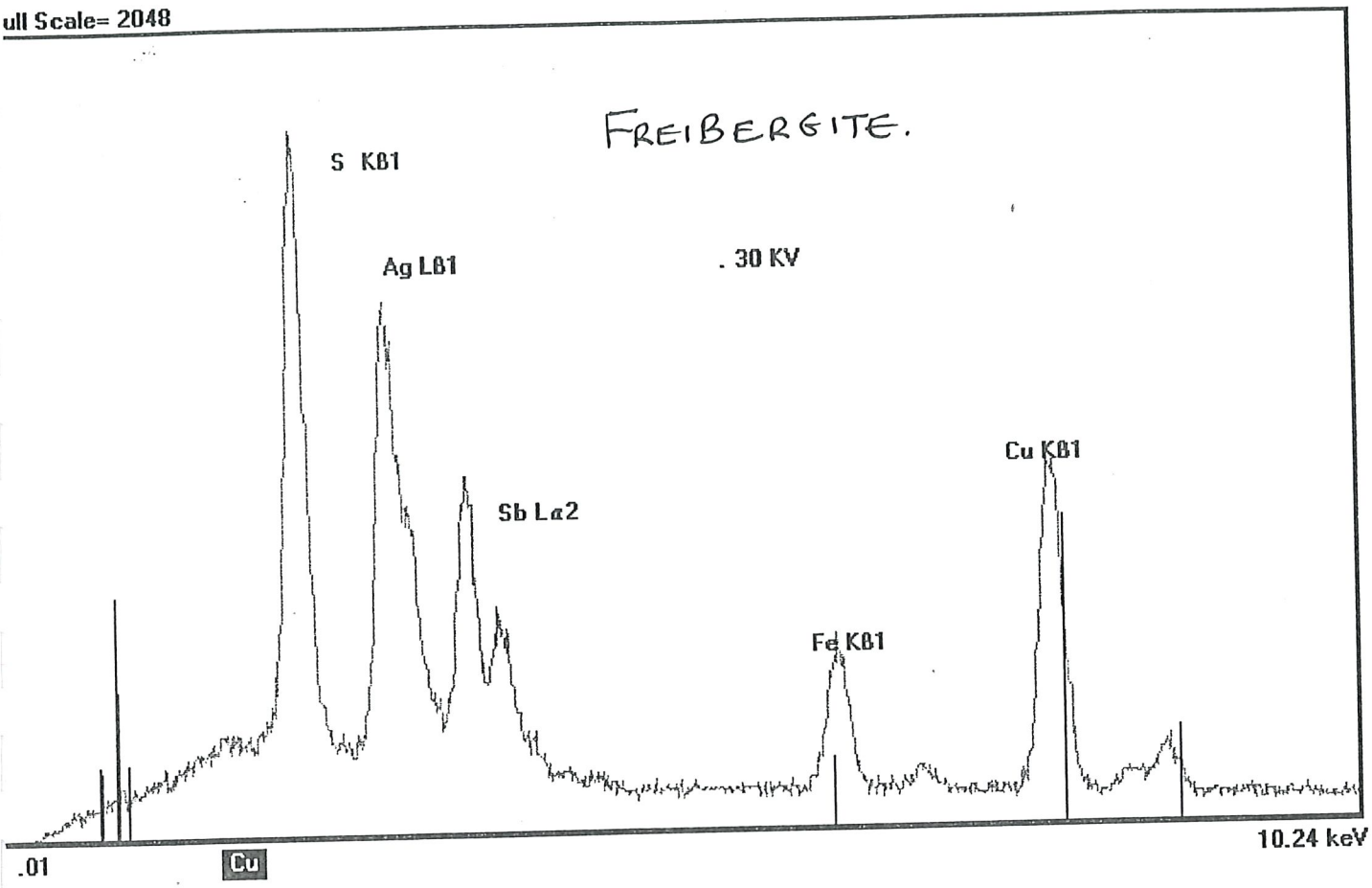
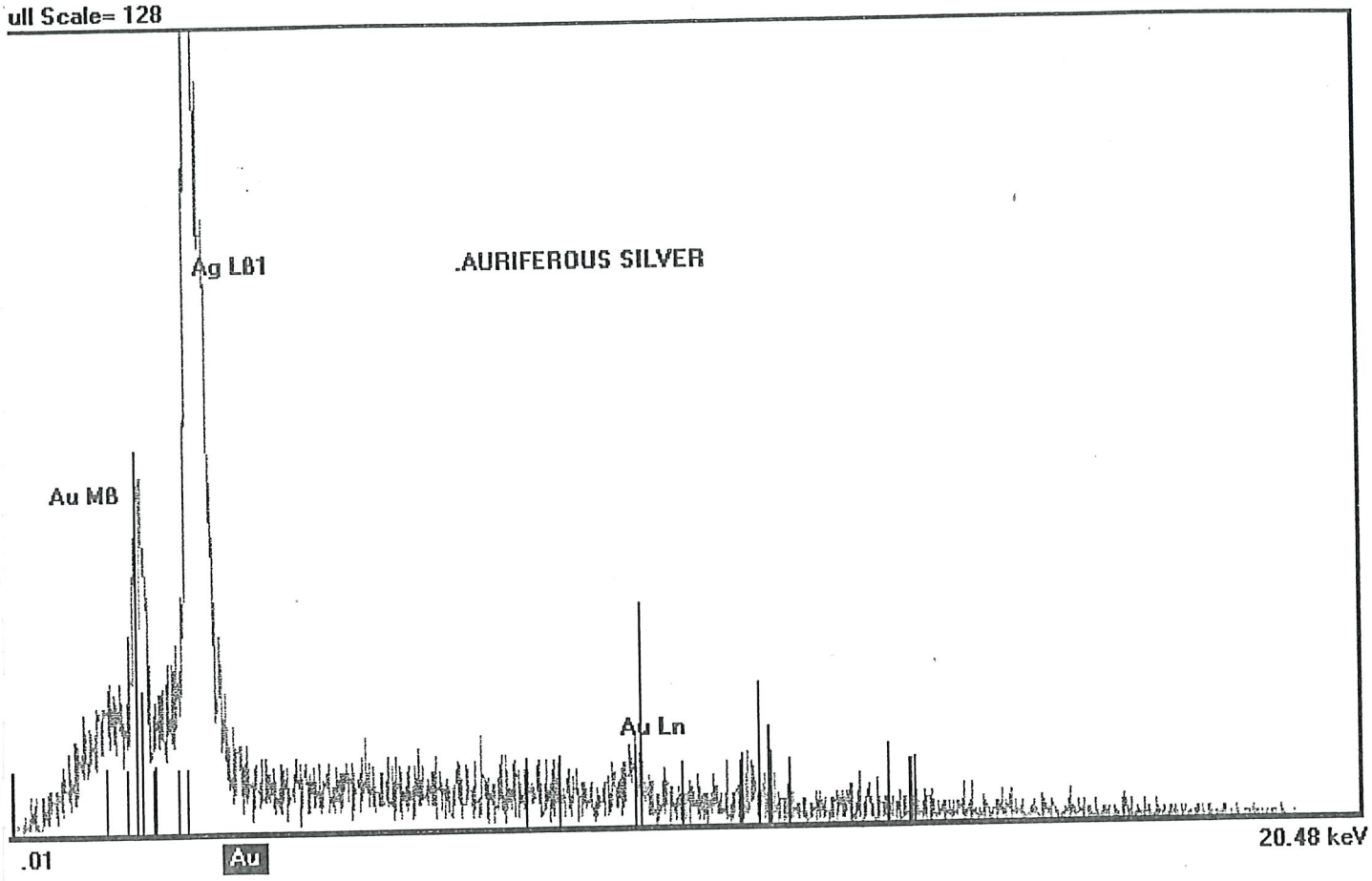


CR30910E

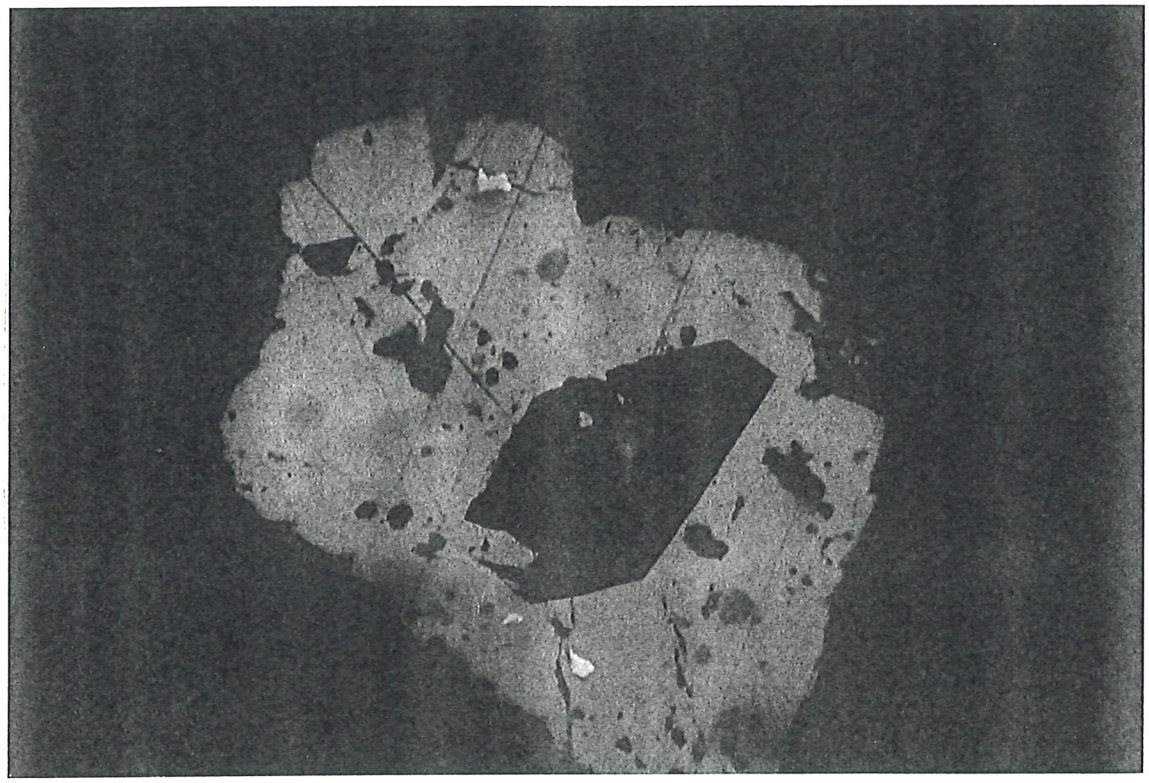
Roger Townend _Assoc.

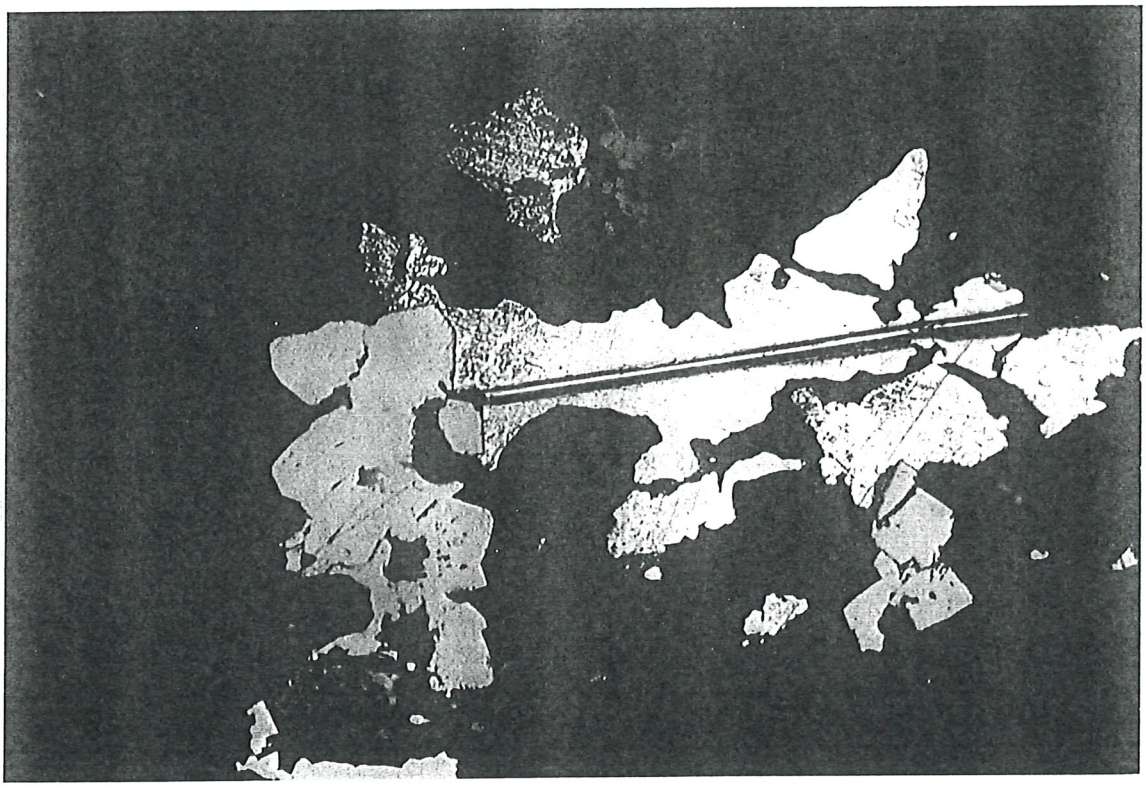
Spectrum ID = COMP 5.



CR30910E

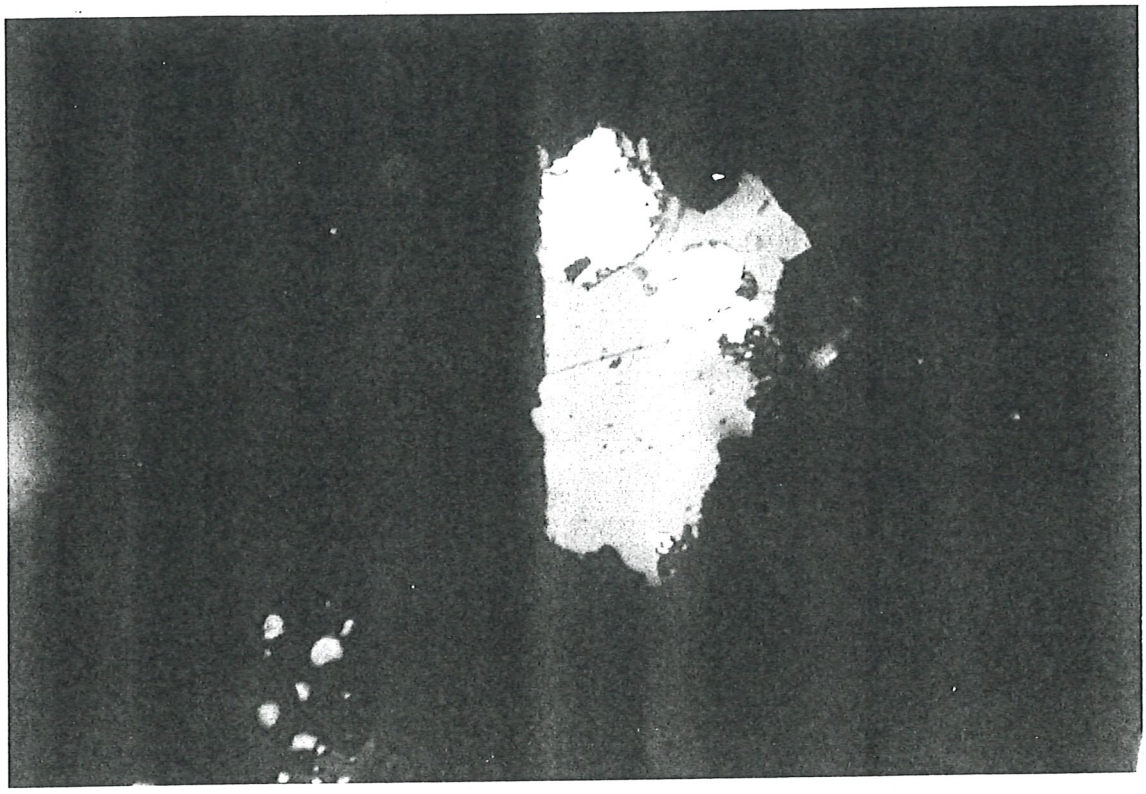
COMP 1. ELECTRUM PLUS ? NAUMANNITE(GREY) INCLUSIONS IN PYRITE. FIELD WIDTH 0.21MM

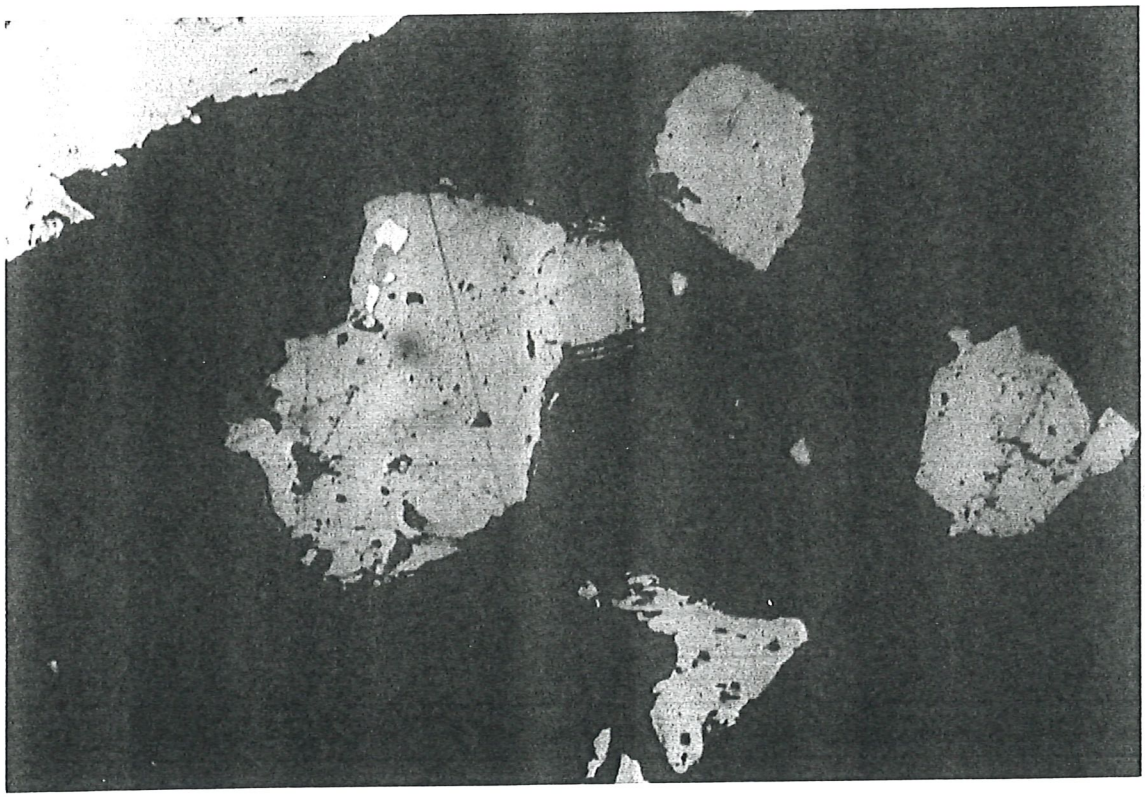




COMP. 1. AURIFEROUS SILVER(AG>AU), COMPOSITE WITH PYRITE, QUARTZ AND A LITTLE NAUMANNITE(GREY). FIELD WIDTH 0.21MM

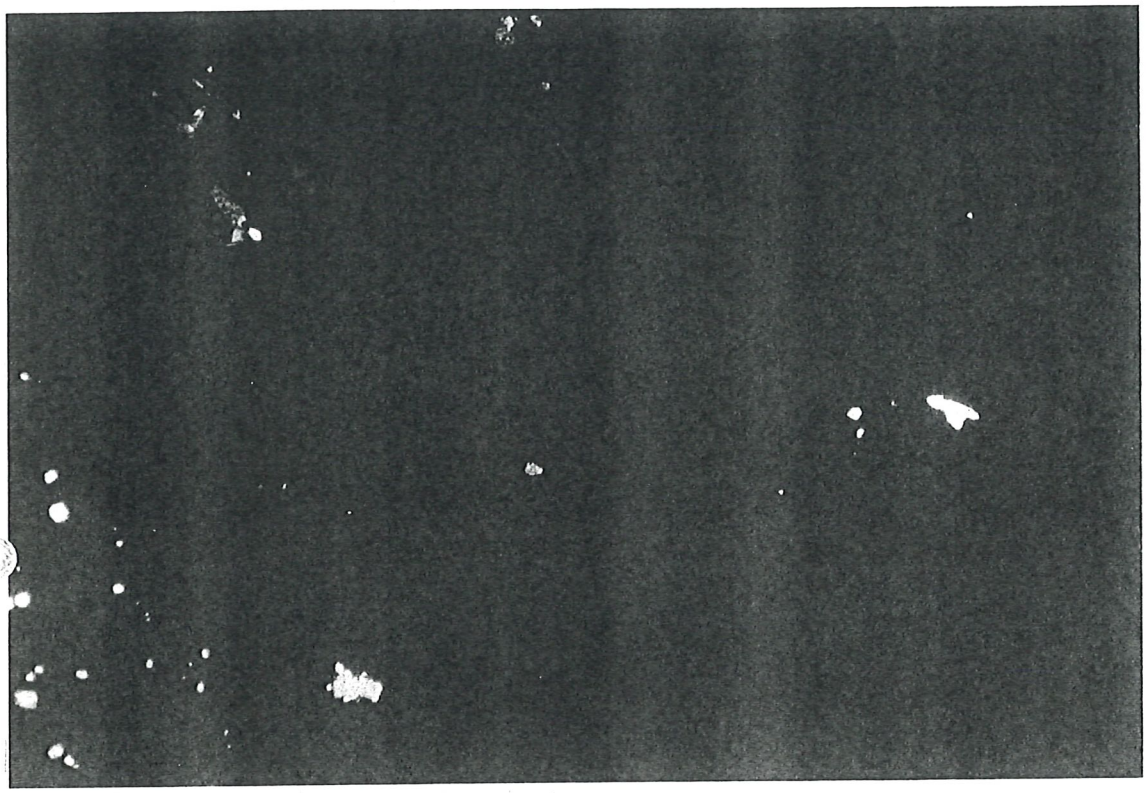
COMP. 1 ELECTRUM AND PYRITE HOSTED BY NAUMANNITE. FIELD WIDTH 0.21MM

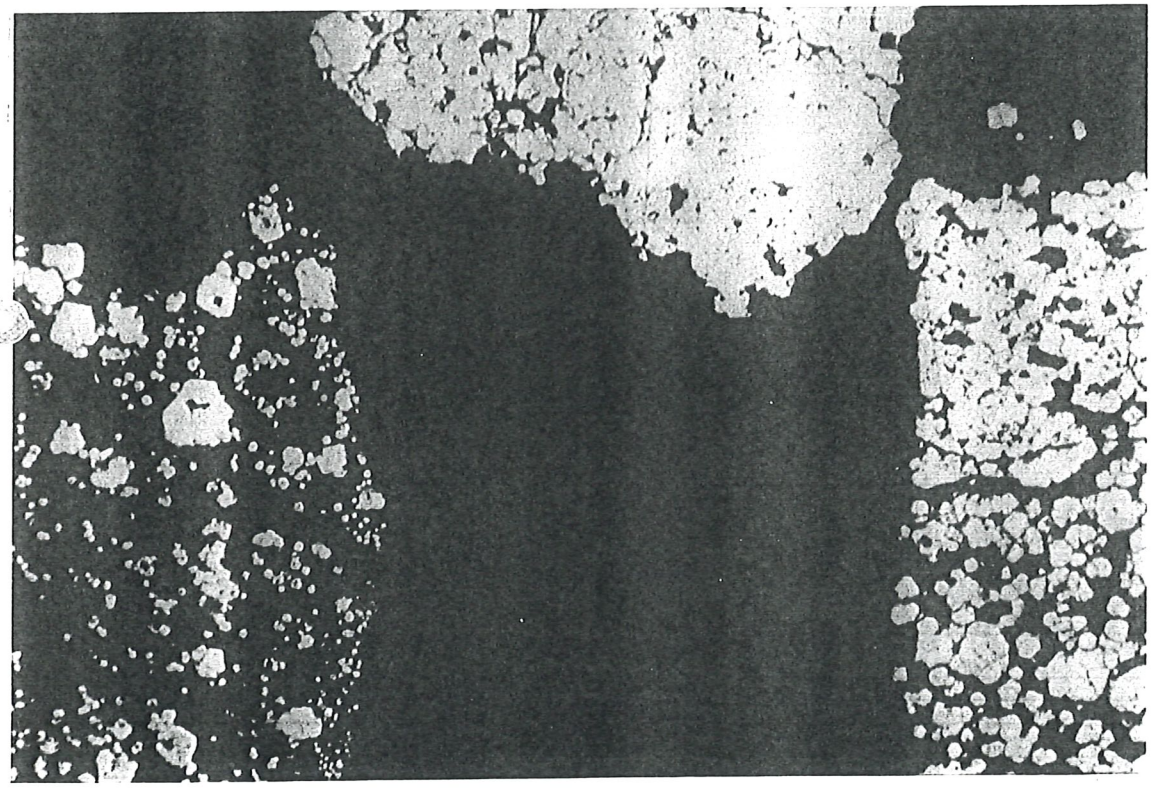




COMP. 1 ARGENTIAN GOLDS IN PYRITE. FIELD WIDTH 0.21MM

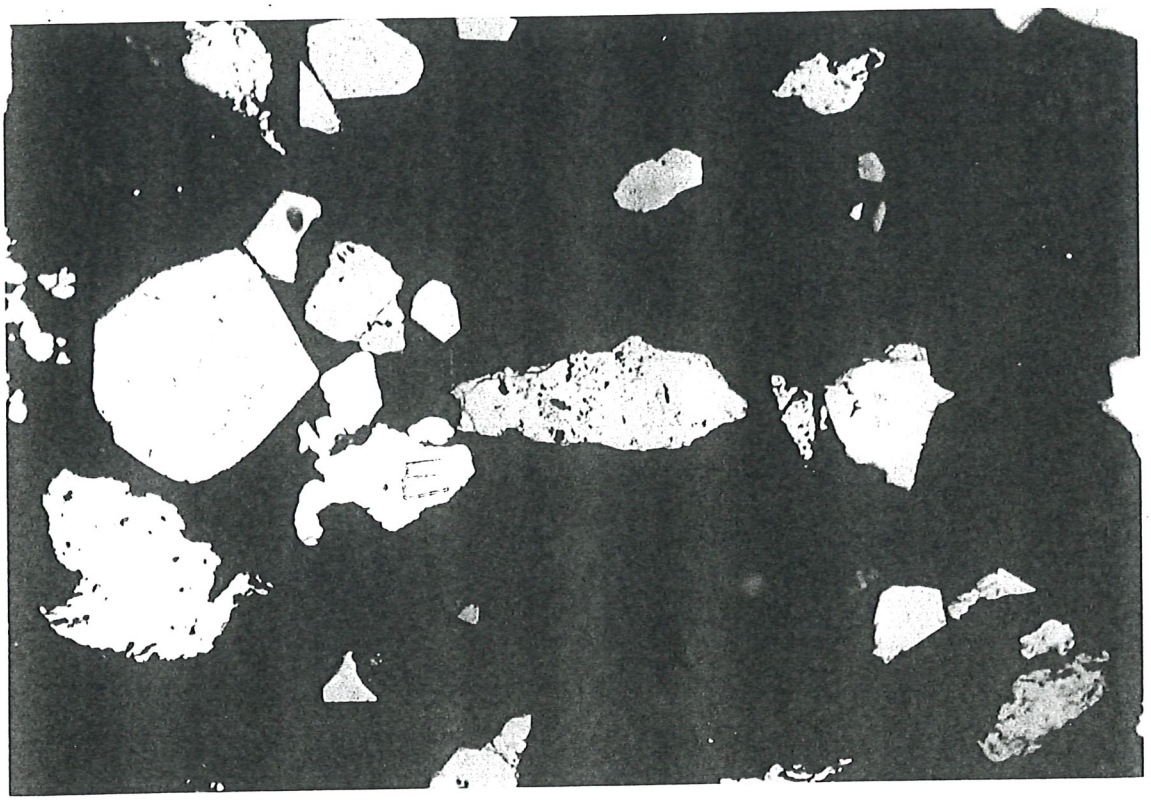
COMP. 1 ELECTRUMS IN QUARTZ .FIELD WIDTH 1MM

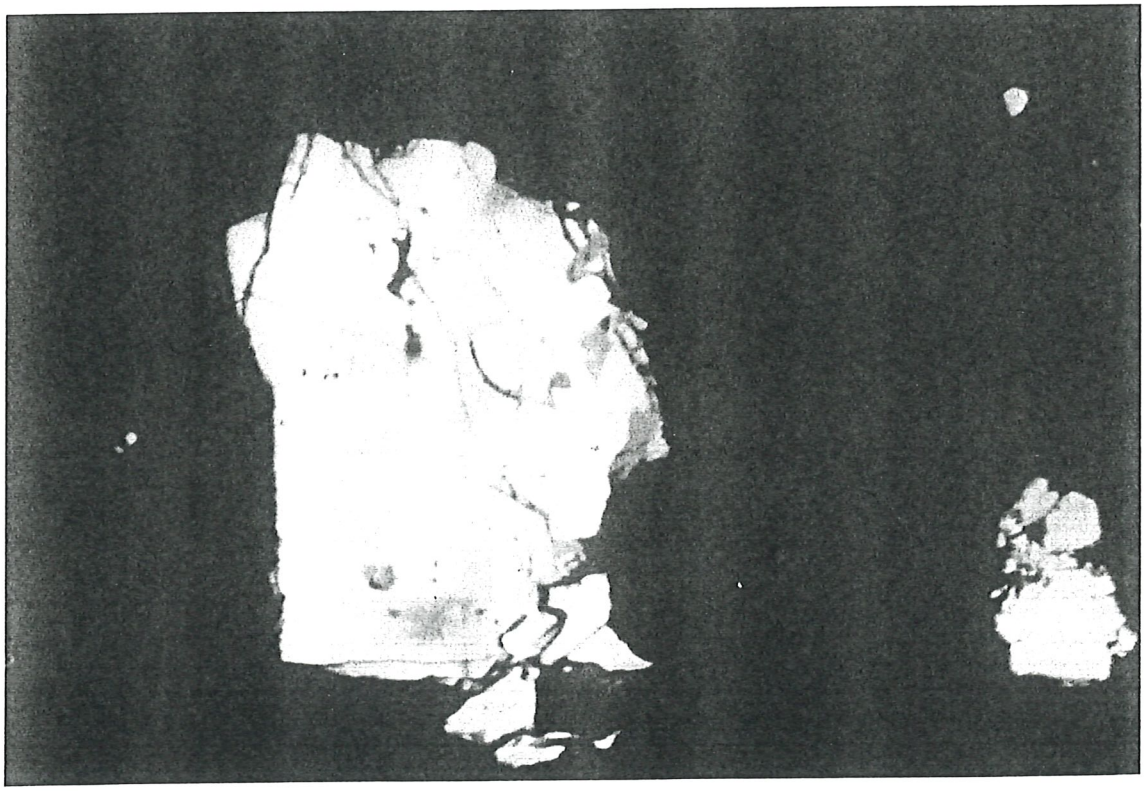




COMP. 1. VARIOUS PYRITE TEXTURES. FIELD WIDTH 2MM

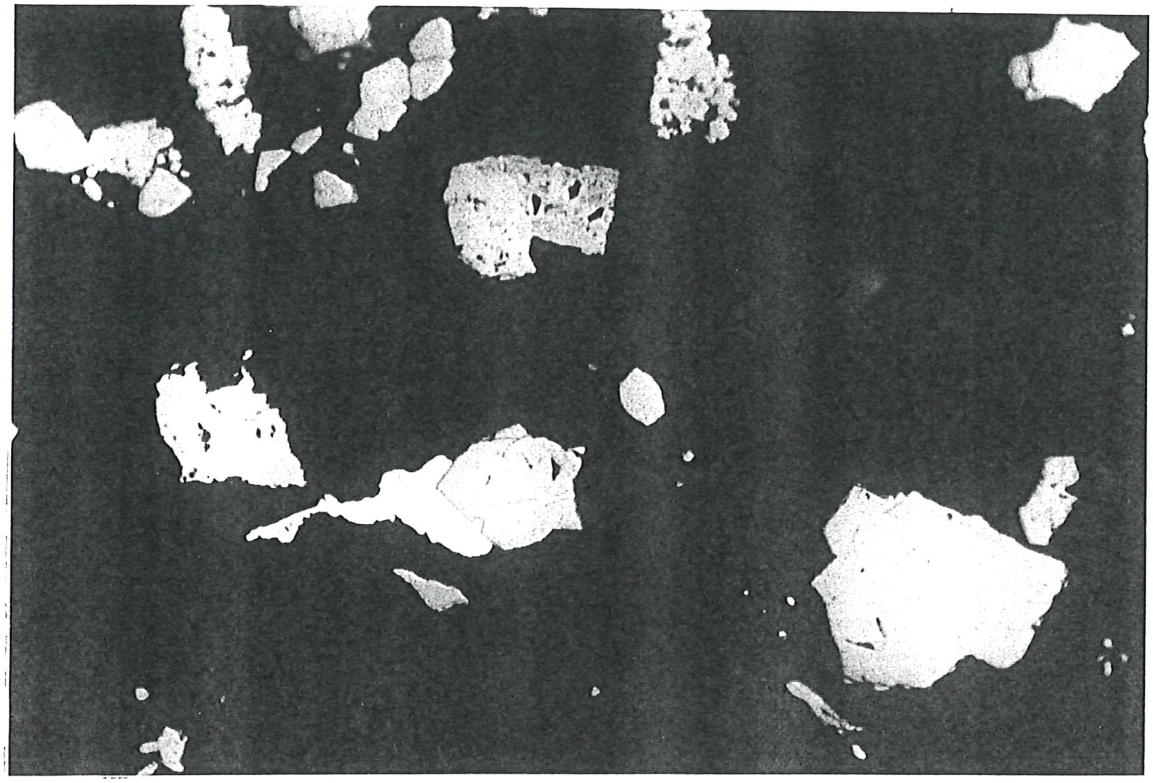
COMP. 1 FREE ELECTRUM (E), PLUS FREE PYRITES, FIELD WIDTH 0.54MM

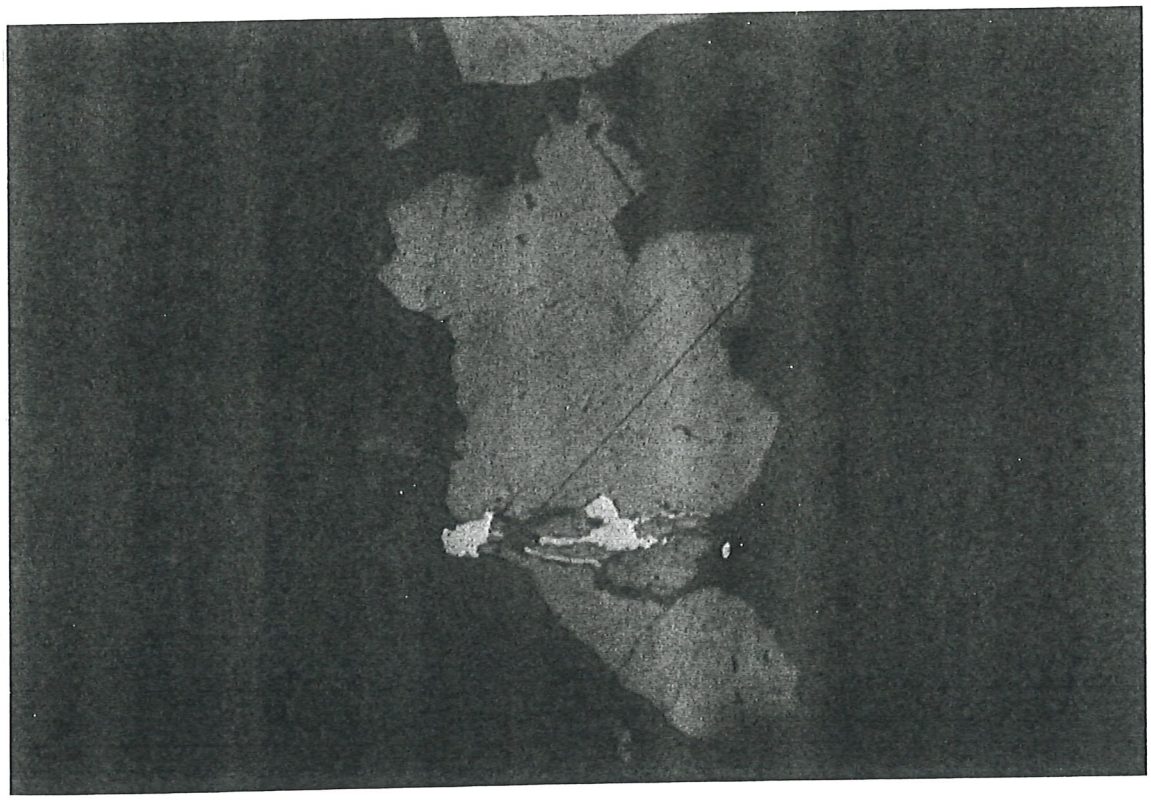




COMP. 1 ELECTRUMS IN PYRITE, ALSO ?NAUMANNITE. FIELD WIDTH 0.21MM

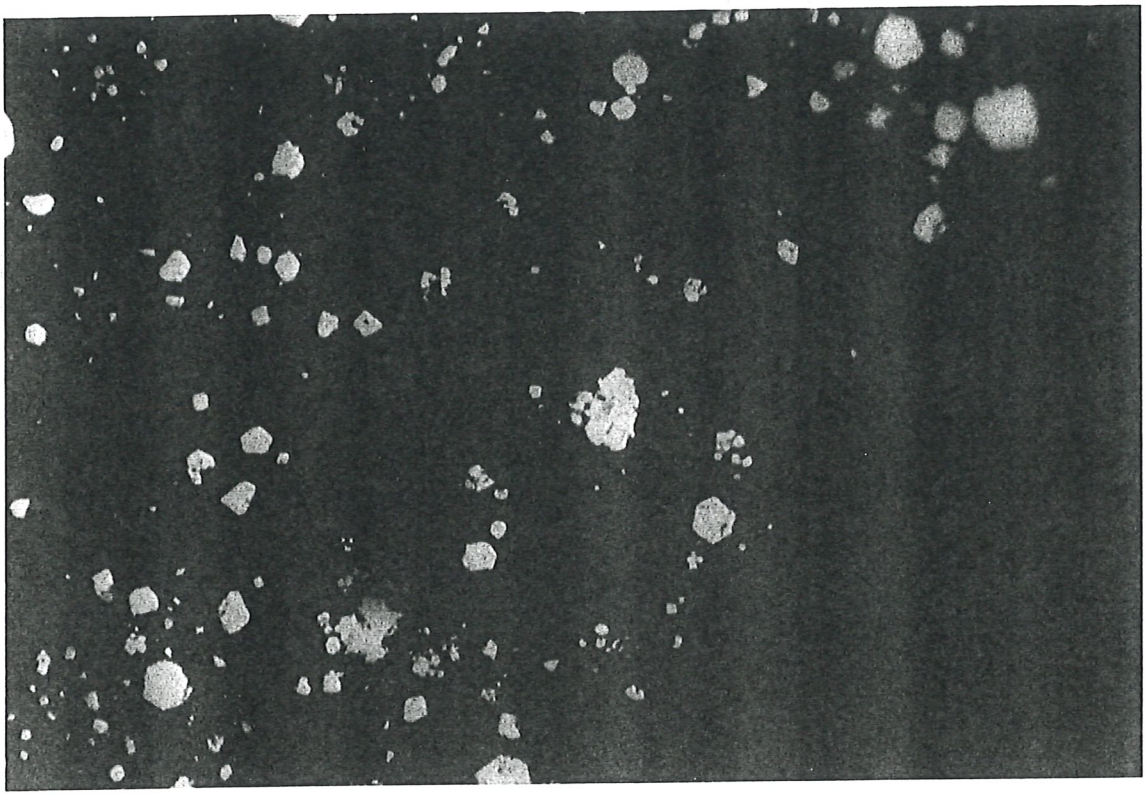
COMP. 1 ELECTRUM COMPOSITE WITH PYRITE. FIELD WIDTH 0.54MM

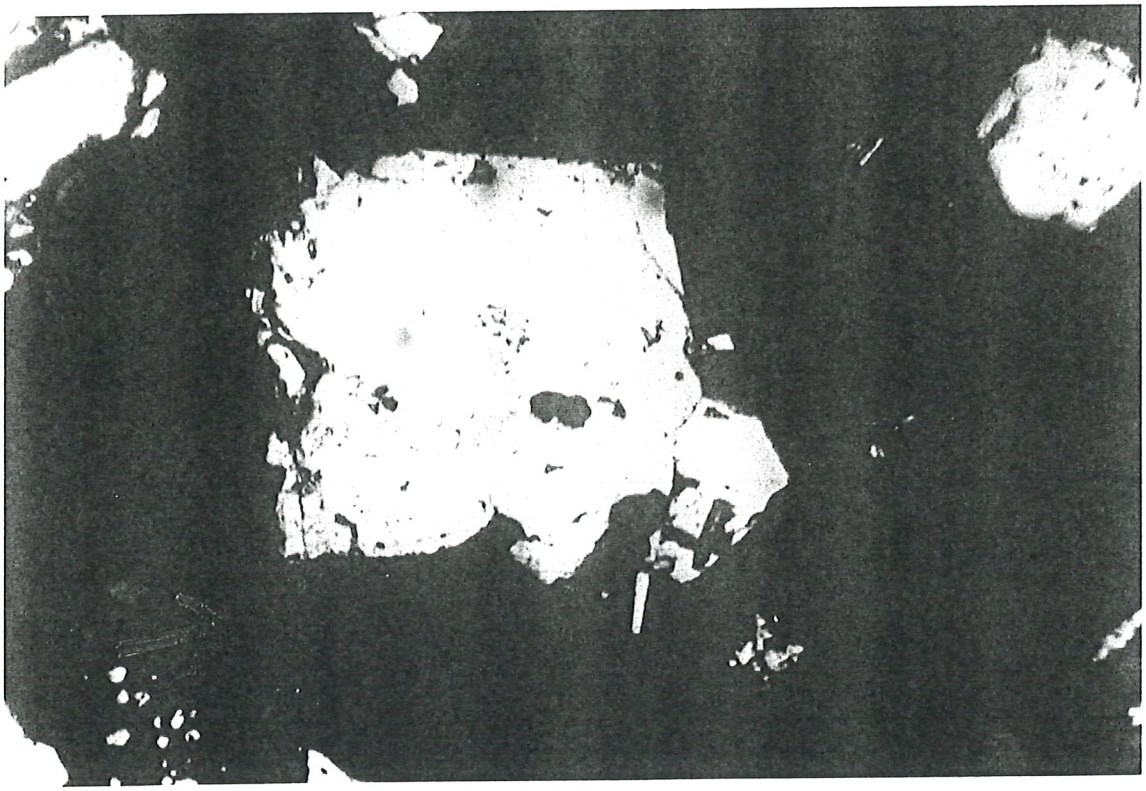




COMP. 2 ELECTRUM IN PYRITE. FIELD WIDTH 0.21MM

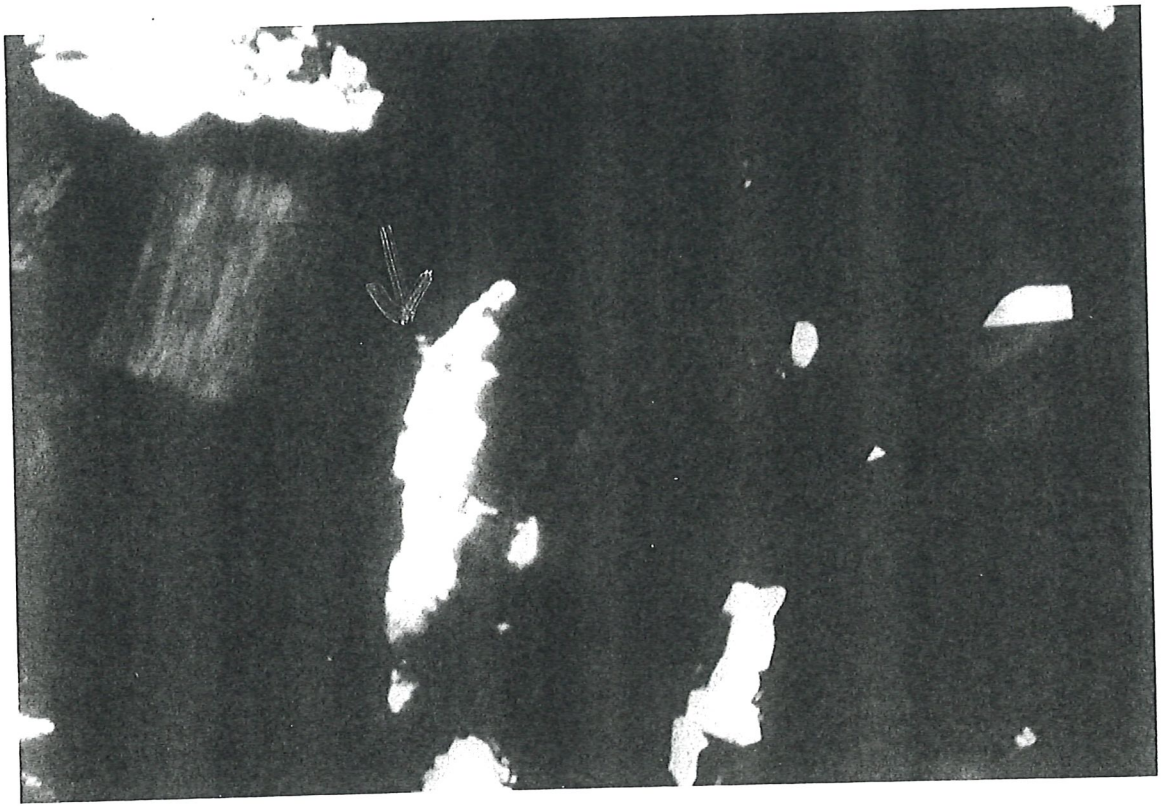
COMP. 2 PYRITE DISSEMINATION IN QUARTZ. FIELD WIDTH 0.54,MM

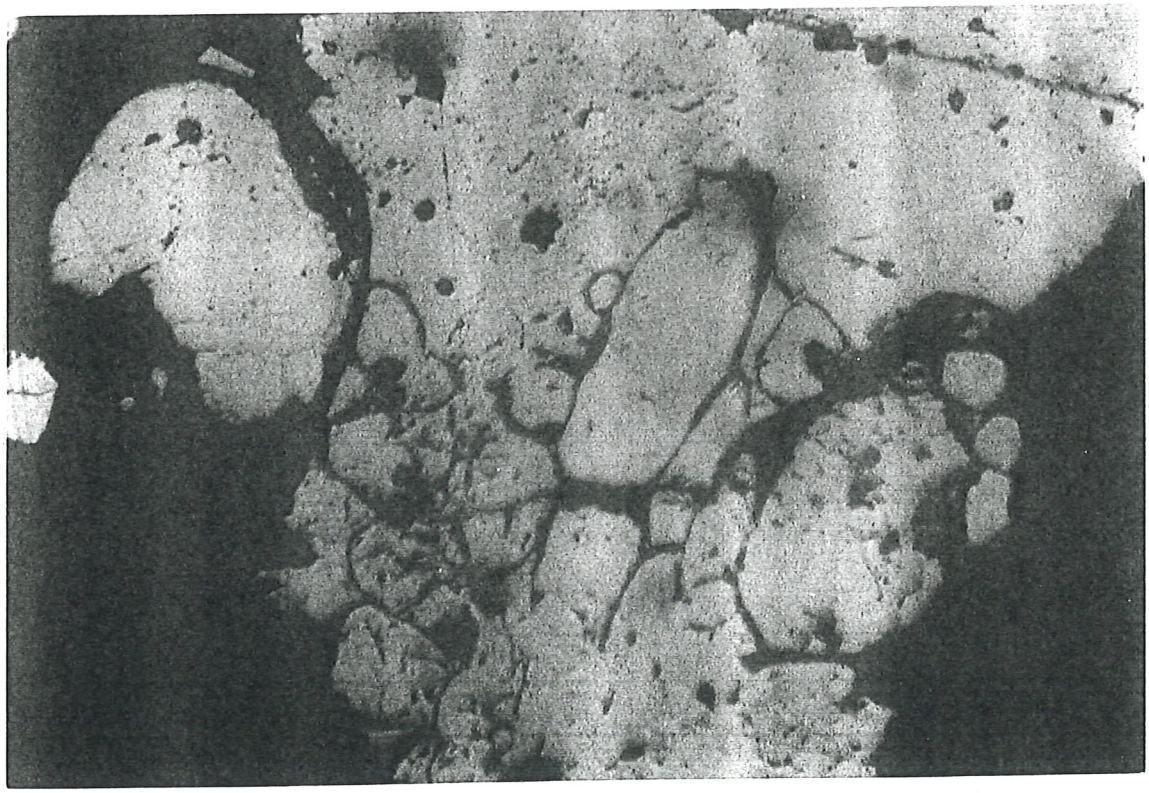




COMP. 2 CARBON (ARROW) ATTACHED TO PYRITE. FIELD WIDTH 0.21MM

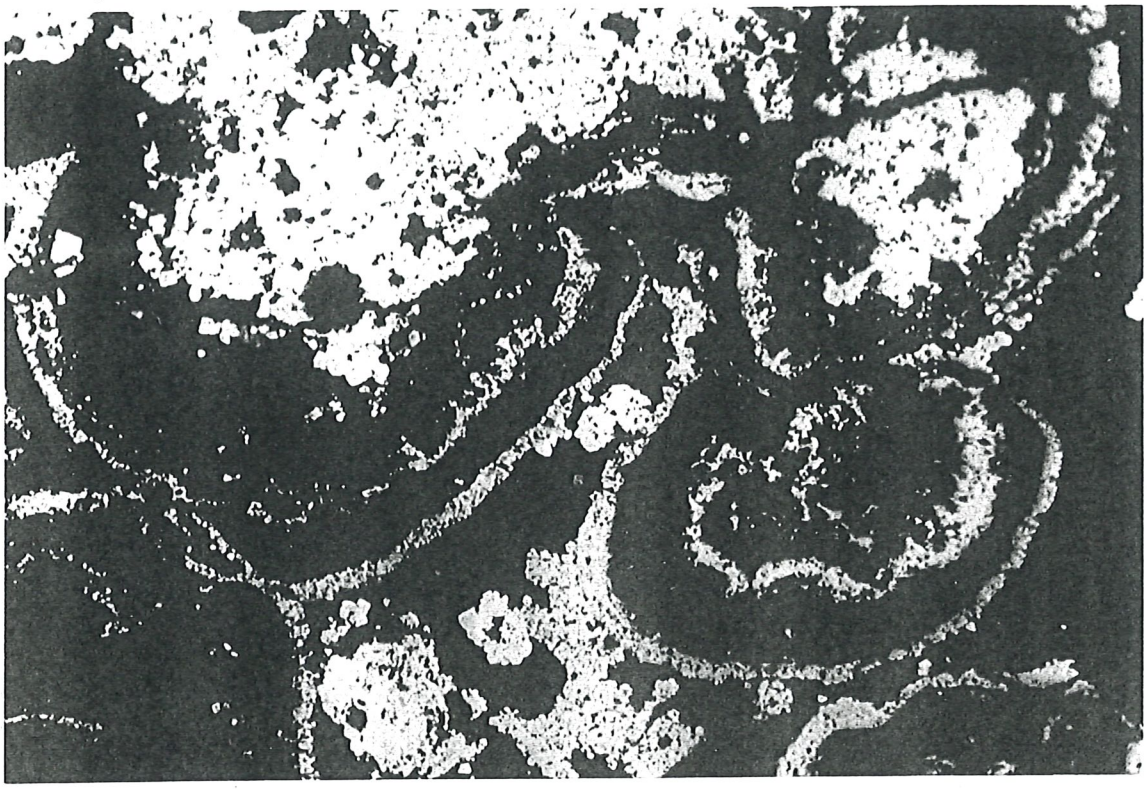
COMP. 2 ELECTRUM WITH MINOR QUARTZ ATTACHED . FIELD WIDTH 0.5MM

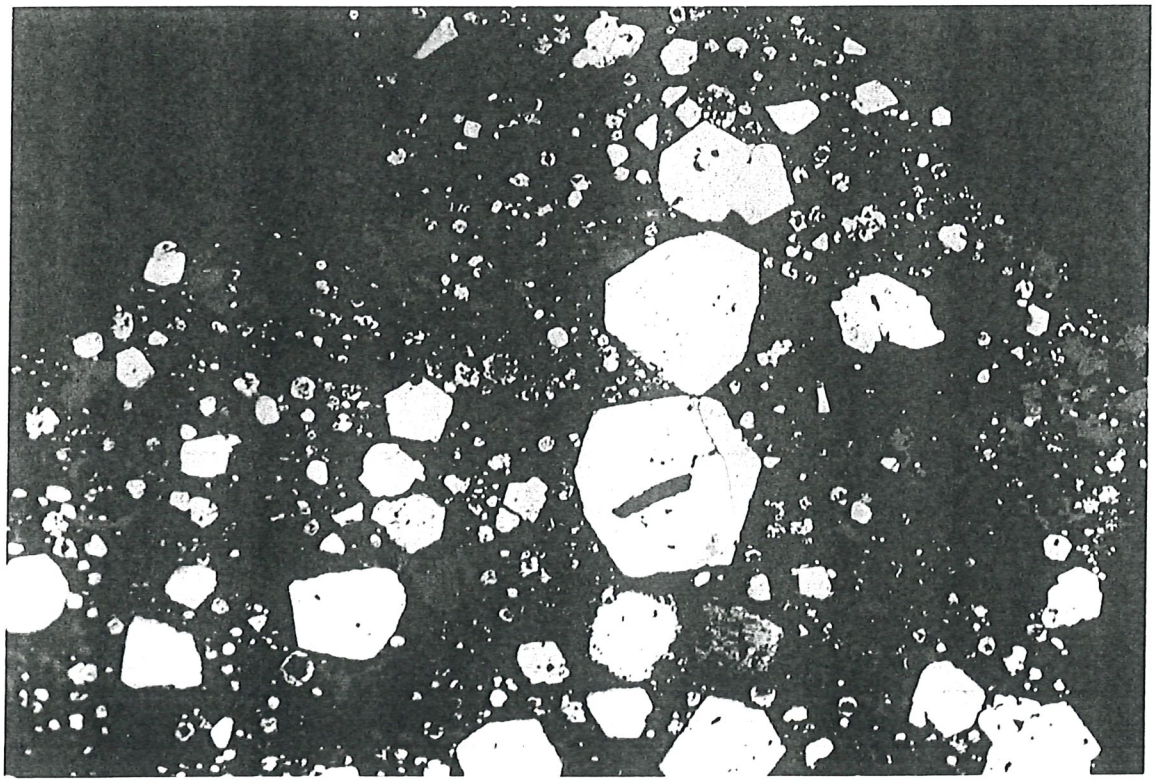




COMP. 3 CARBON "VEINING "PYRITE CLUSTER. FIELD WIDTH 0.21MM

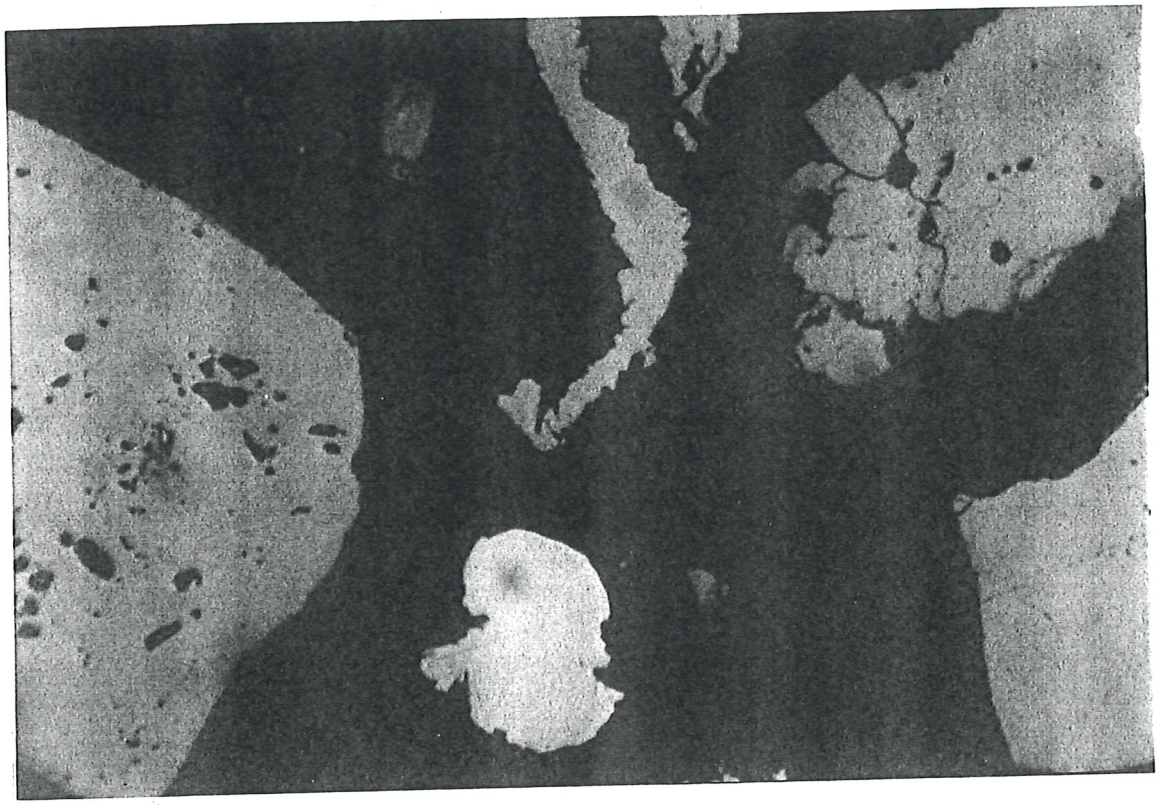
COMP. 3 BOTRYOIDAL SECONDARY PYRITE/MARCASITE. FIELD WIDTH 0.54MM

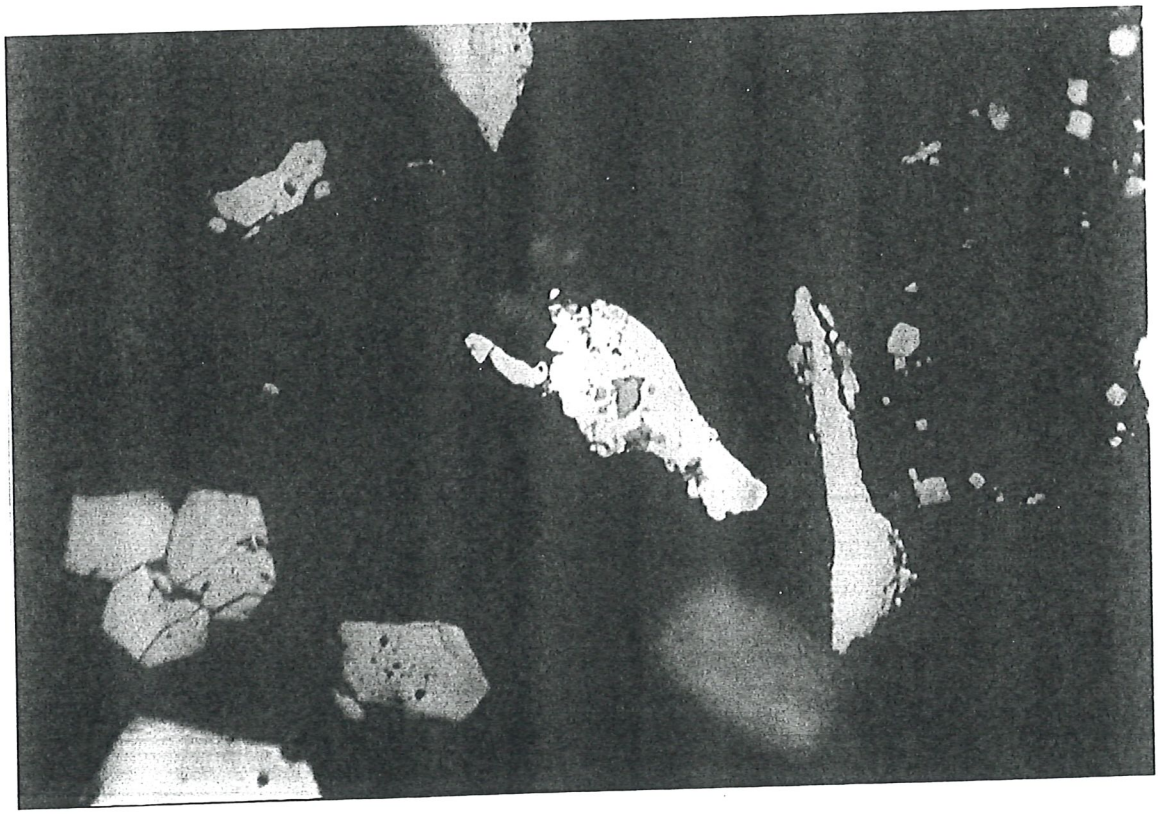




COMP. 3 PYRITES AND RUTILE DISSEMINATED IN QUARTZ, ALSO FINER CARBON. FIELD WIDTH 0.54MM

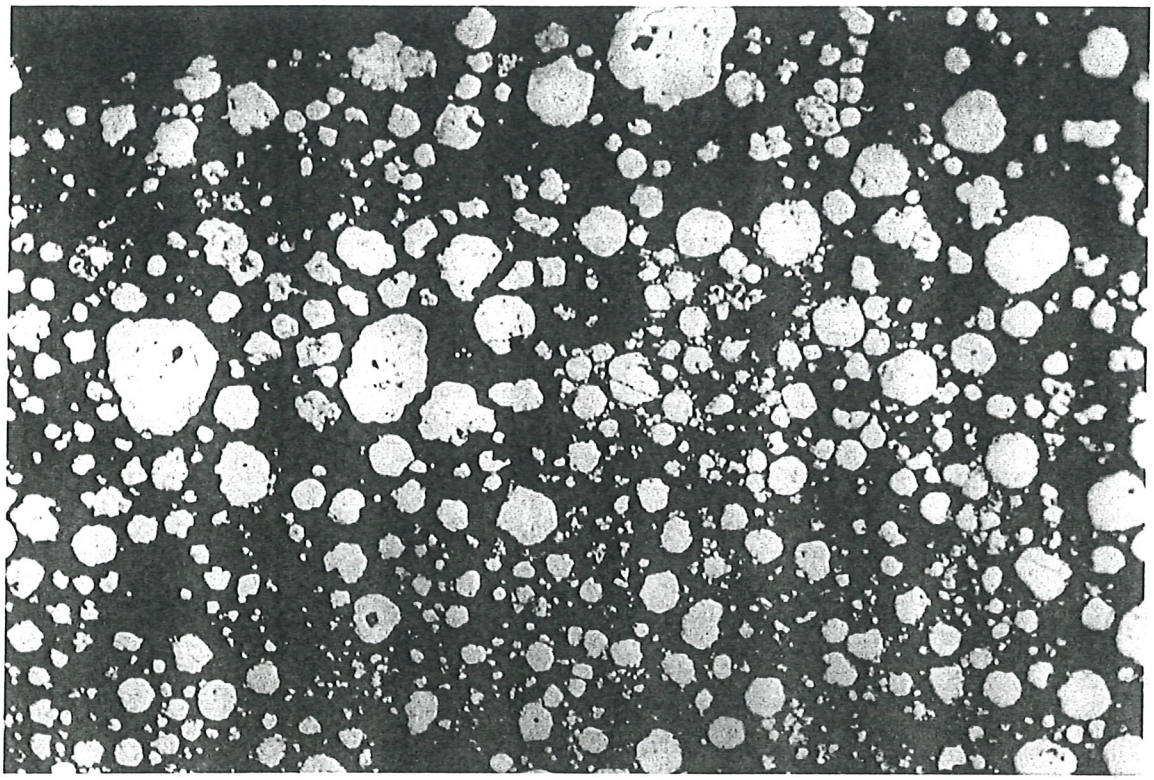
COMP. 3 DISCRETE ELECTRUM. FIELD WIDTH 0.21MM

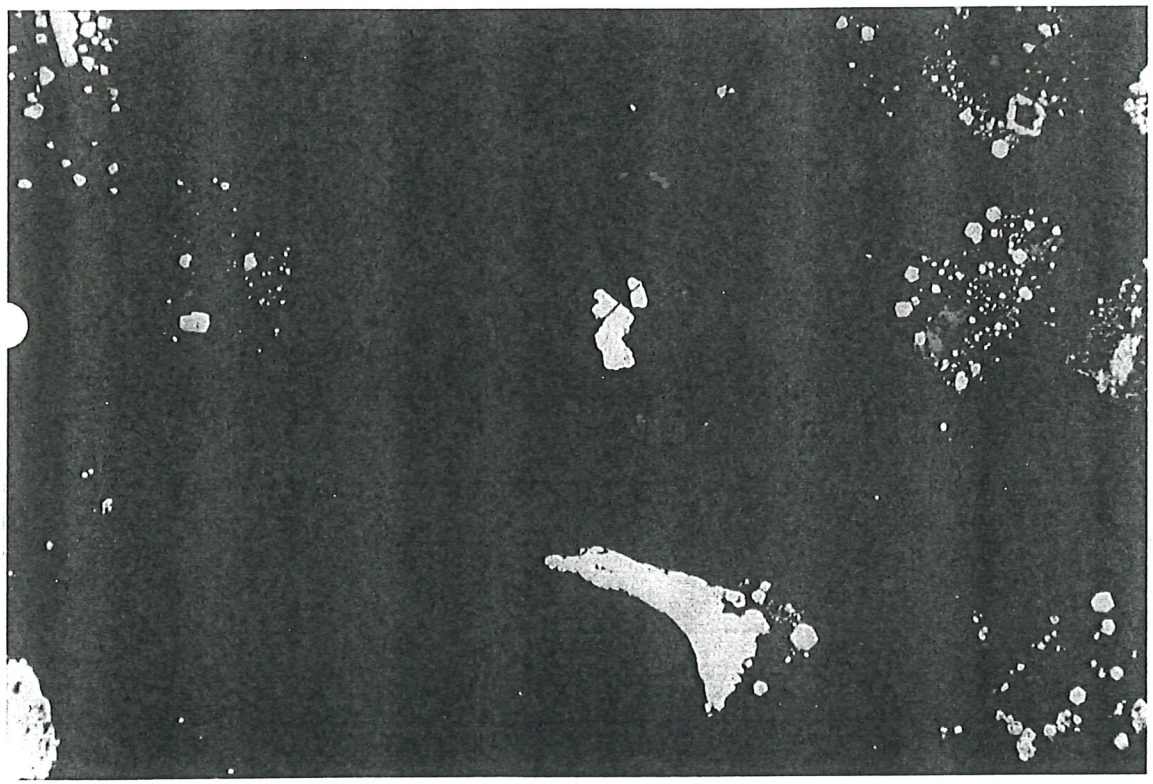




COMP. 3 ARGENTIAN GOLD WITH FINE PYRITE INCLUSIONS. FIELD WIDTH 0.21MM

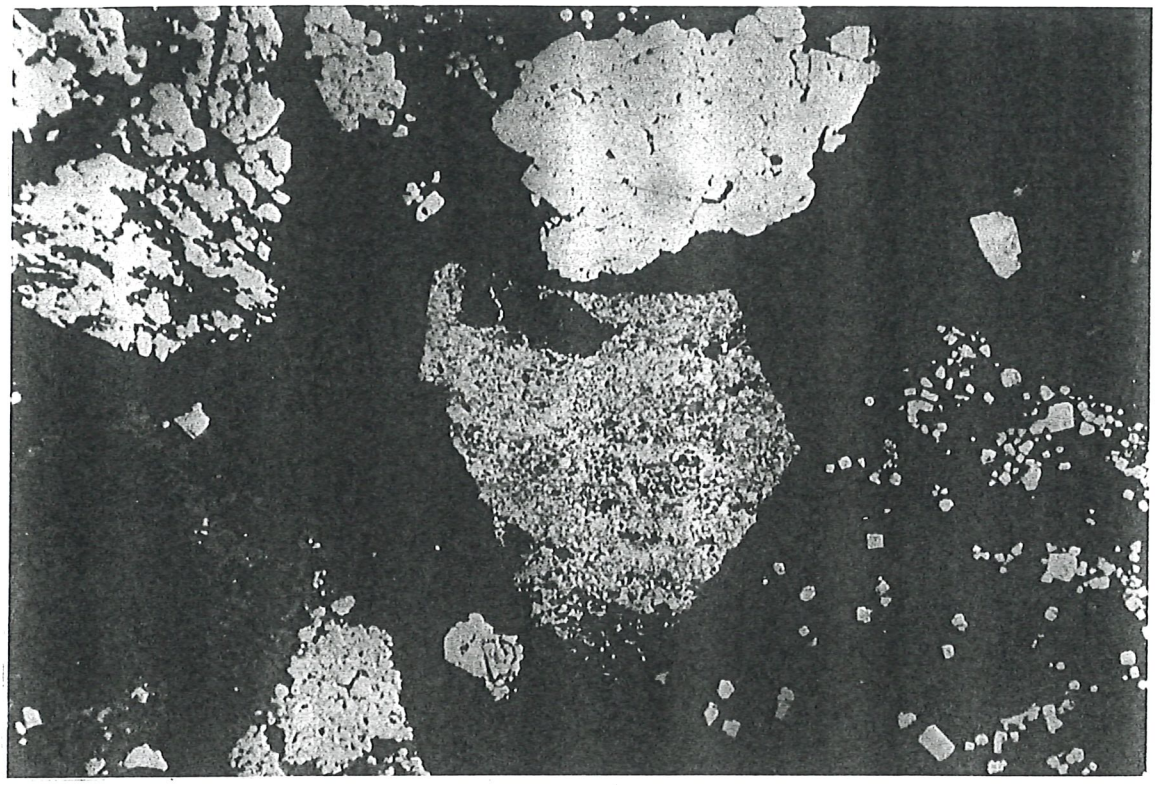
COMP. 4. PYRITE CONCENTRATION IN LEUCOXENE/SILICA. FIELD WIDTH 0.54MM

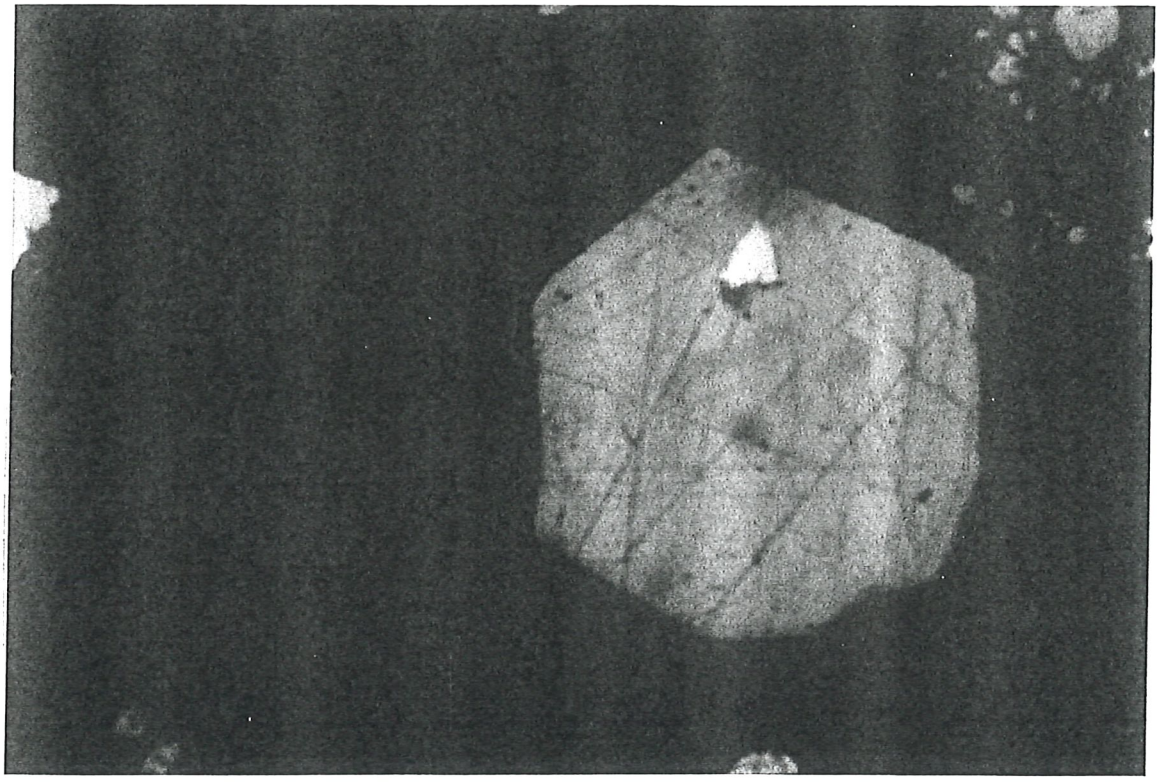




COMP. 4 . ARGENTIAN GOLD WITHIN QUARTZ/APATITE HOST. FIELD WIDTH 2MM

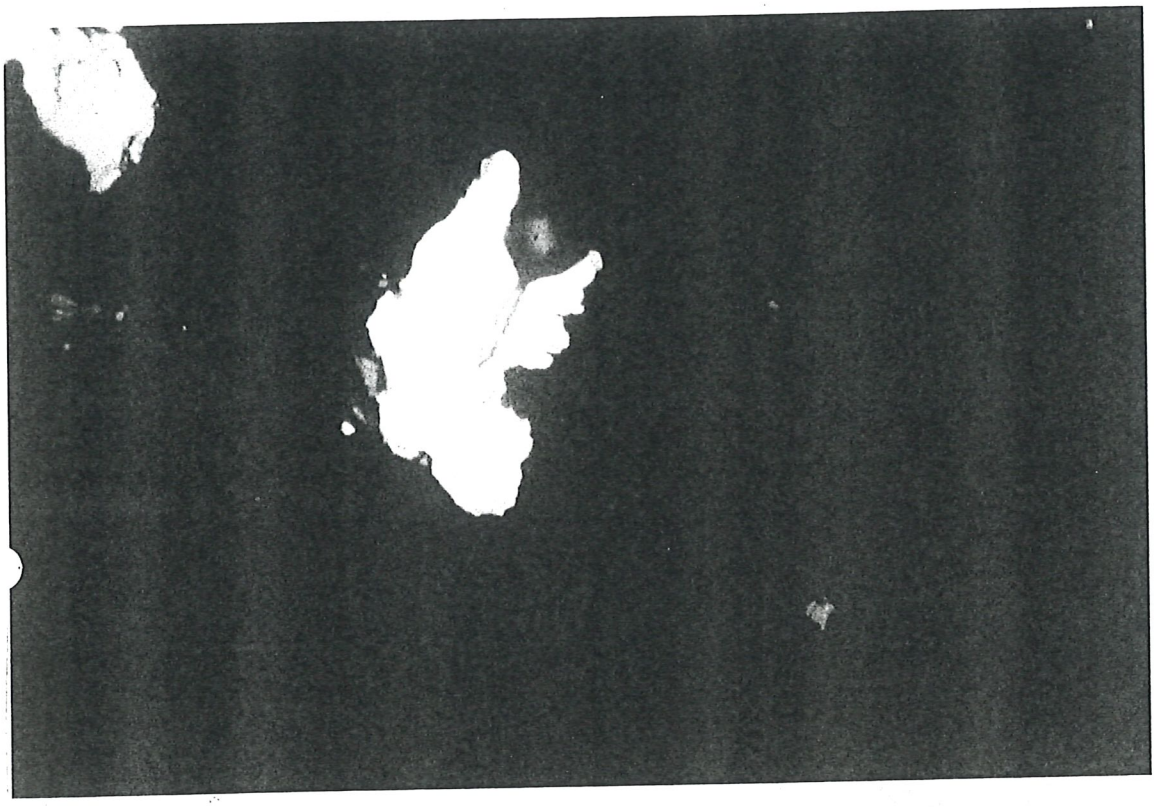
COMP. 4 VARIOUS PYRITE TEXTURES. FIELD WIDTH 2MM

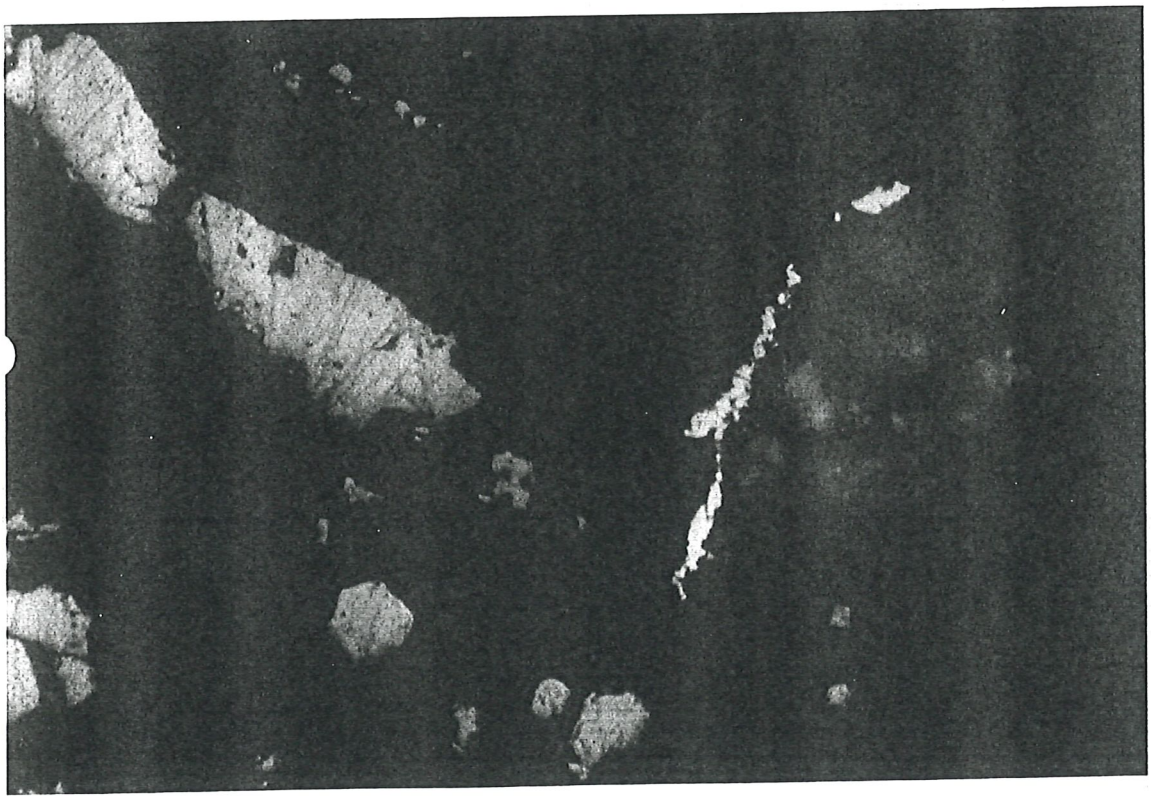




COMP. 4 ARGENTIAN GOLD IN PYRITE. FIELD WIDTH 0.21MM

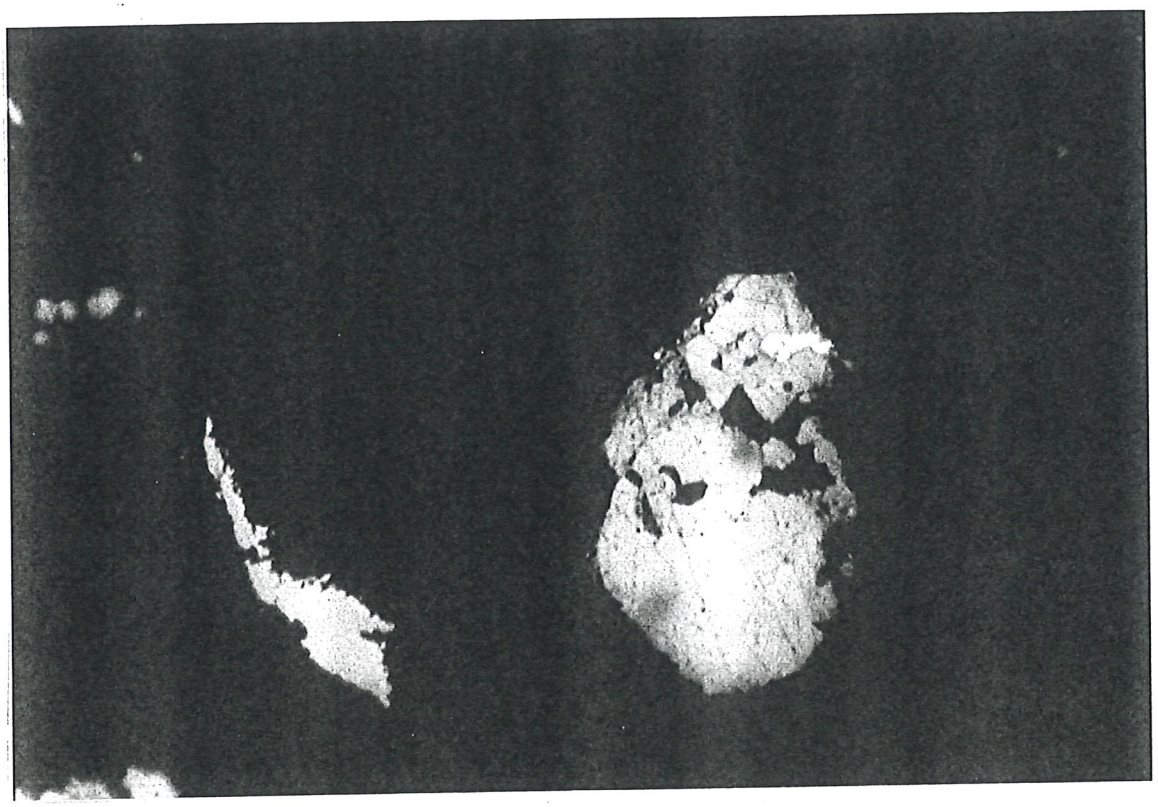
COMP. 4 LIBERATED ELECTRUM. FIELD WIDTH 0.21MM

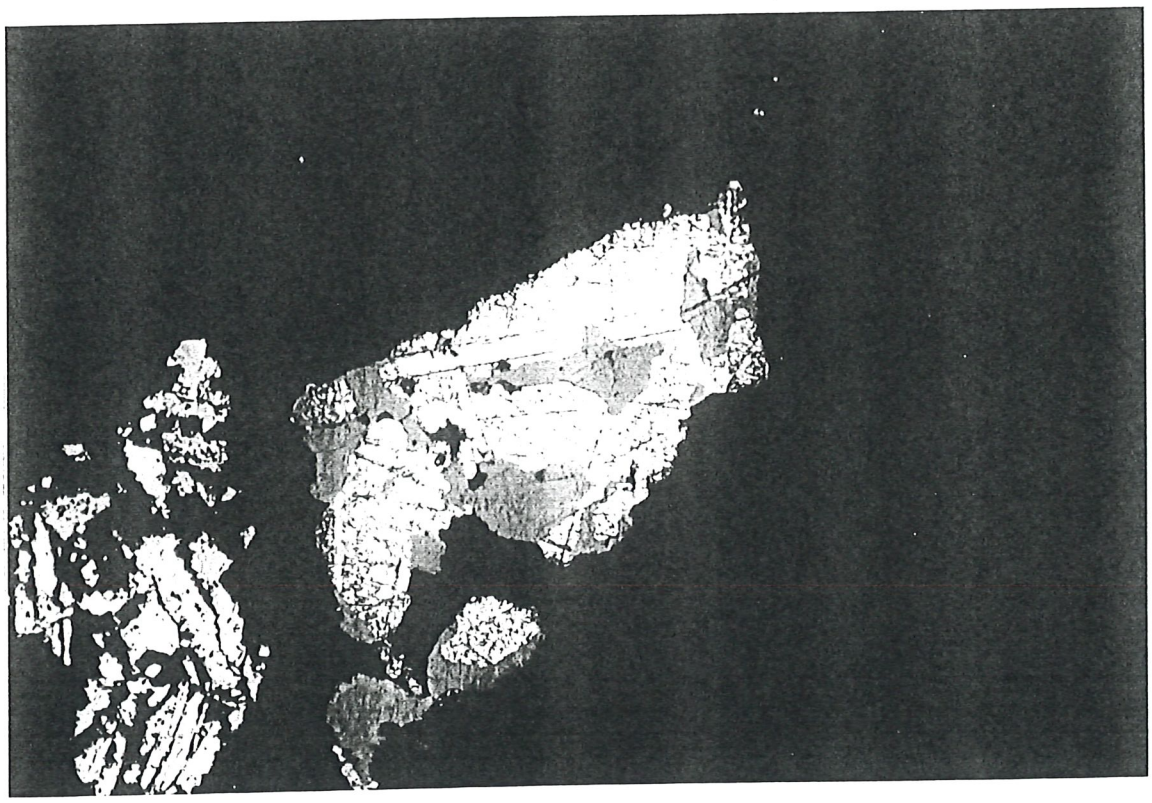




COMP 4. LIBERATED ARGENTIAN GOLD FLAKE.FIELD WIDTH 0.21MM

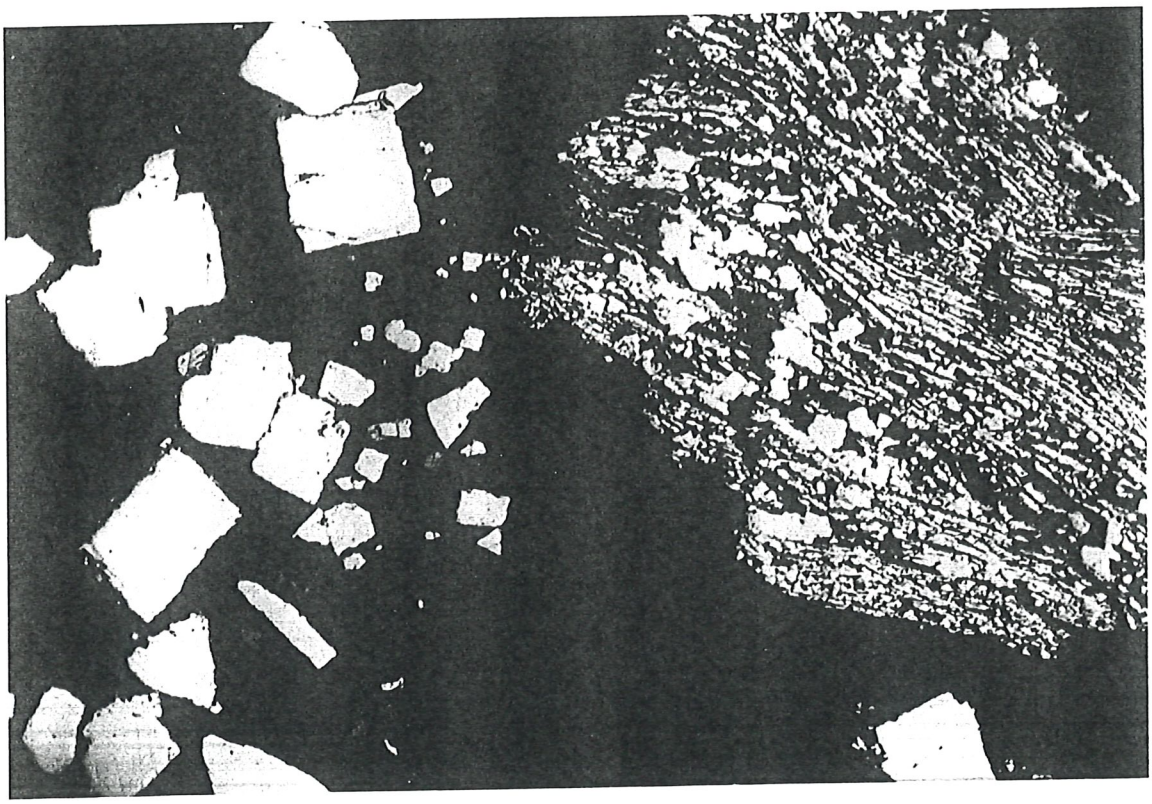
COMP. 4 ELECTRUM IN PYRITE. FIELD WIDTH 0.21MM





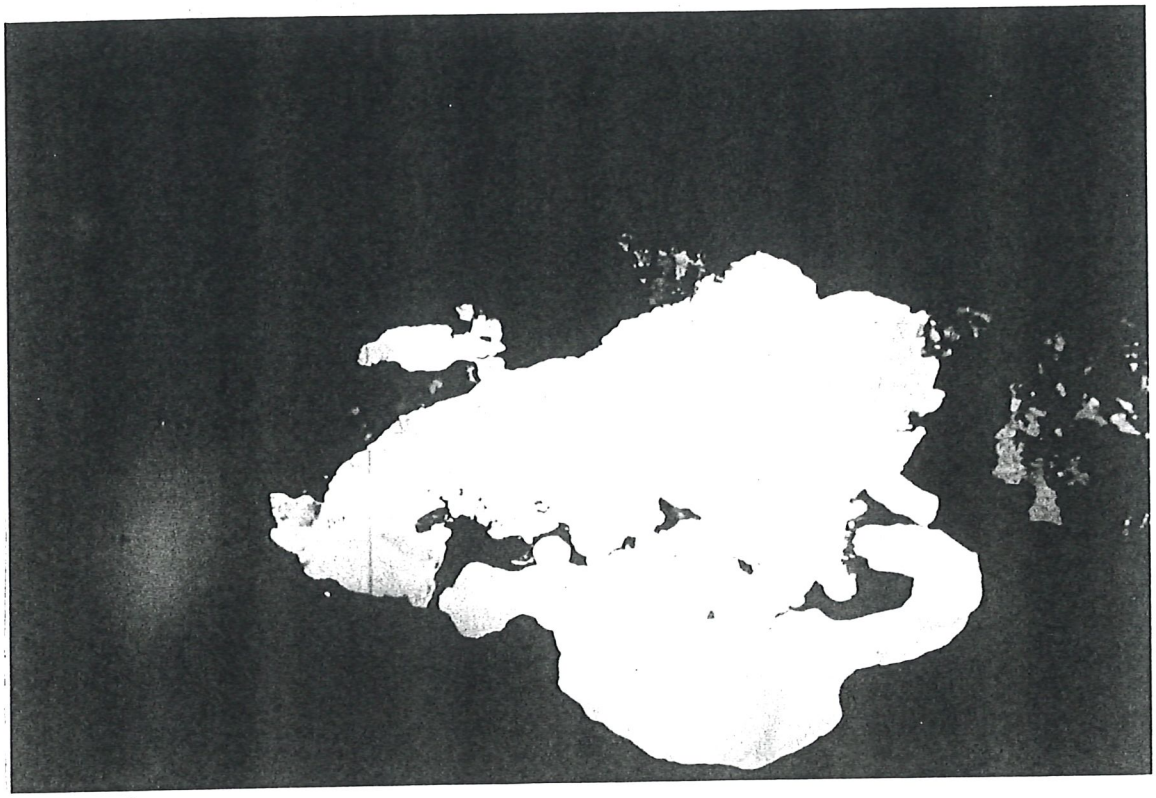
COMP. 5. SILVER /FREIBERGITE INTERGROWTH, ALSO MARCASITE QUARTZ(LEFT) . FIELD WIDTH 0.54MM

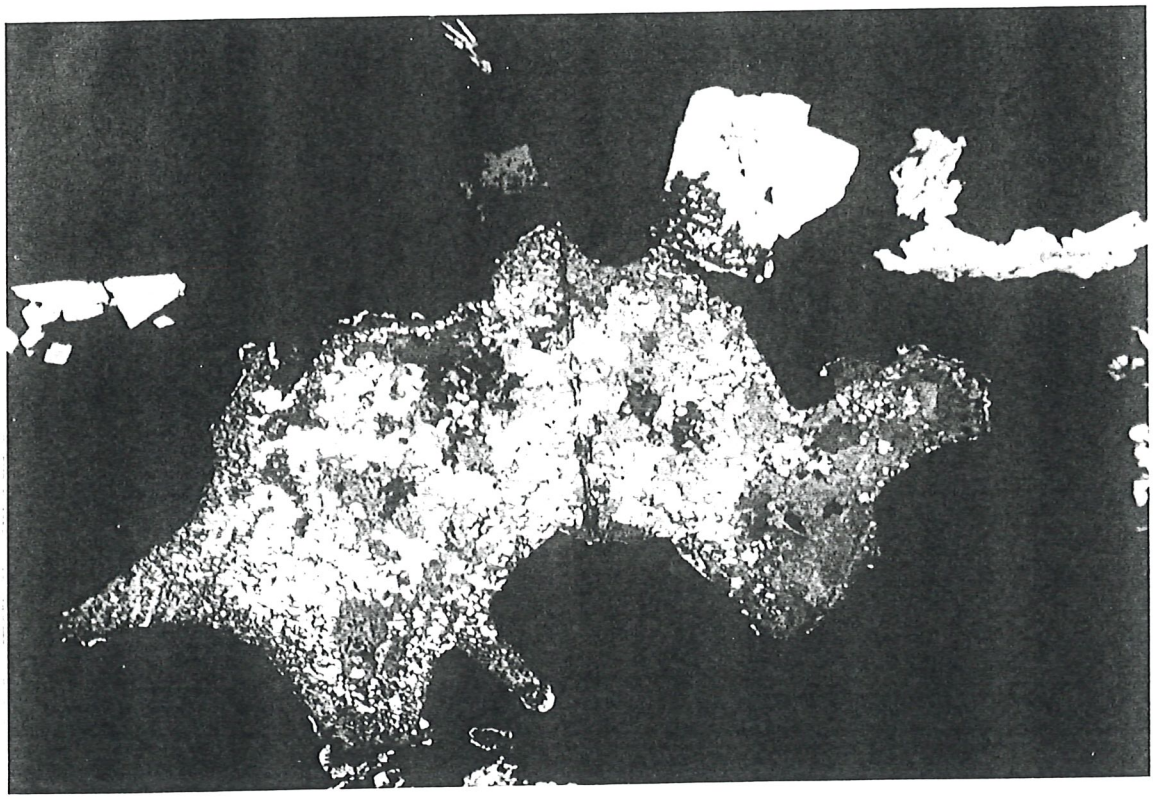
COMP. 5 ARGENTIAN GOLD IN QUARTZ. FIELD WIDTH 0.54MM



COMP. 5 CONTRASTING HABIT OF ISOMETRIC PYRITES IN QUARTZ, AND STRIPS OF MARCASITE. FIELD WIDTH 0.54MM

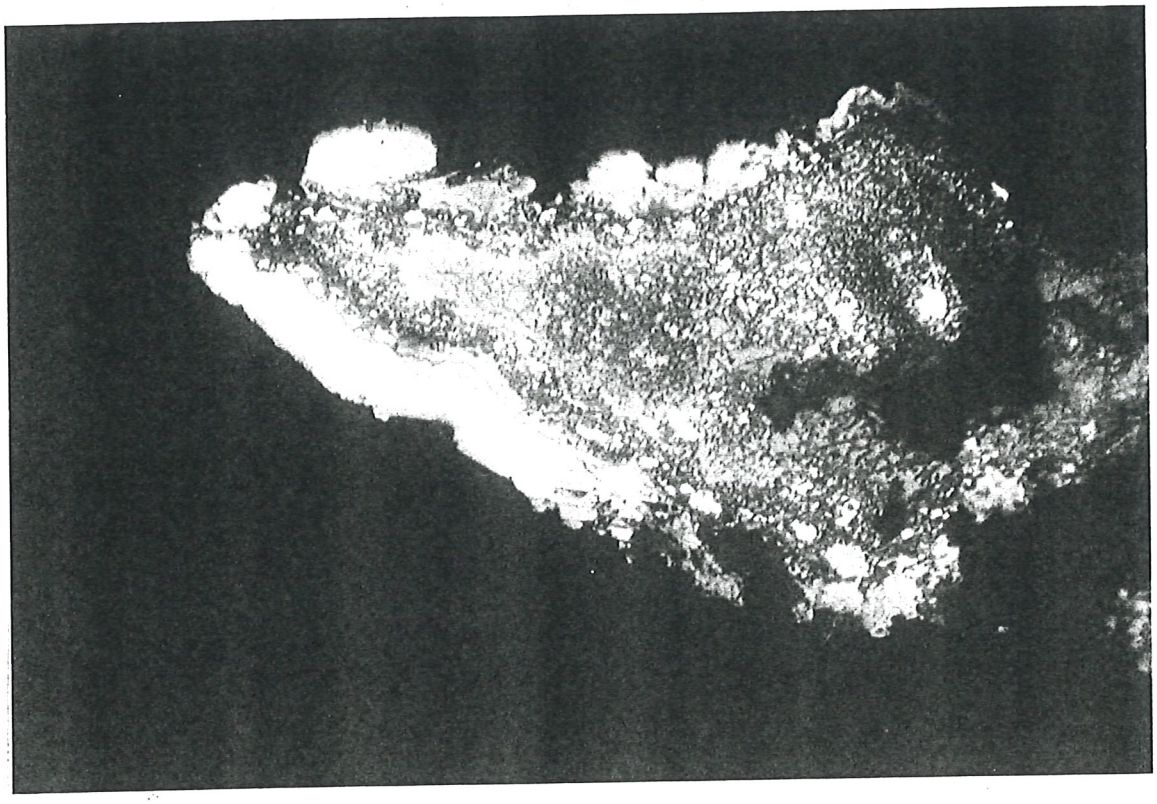
COMP. 5 . ZONED ARGENTIAN GOLD /ELECTRUM.FIELD WIDTH 0.54MM

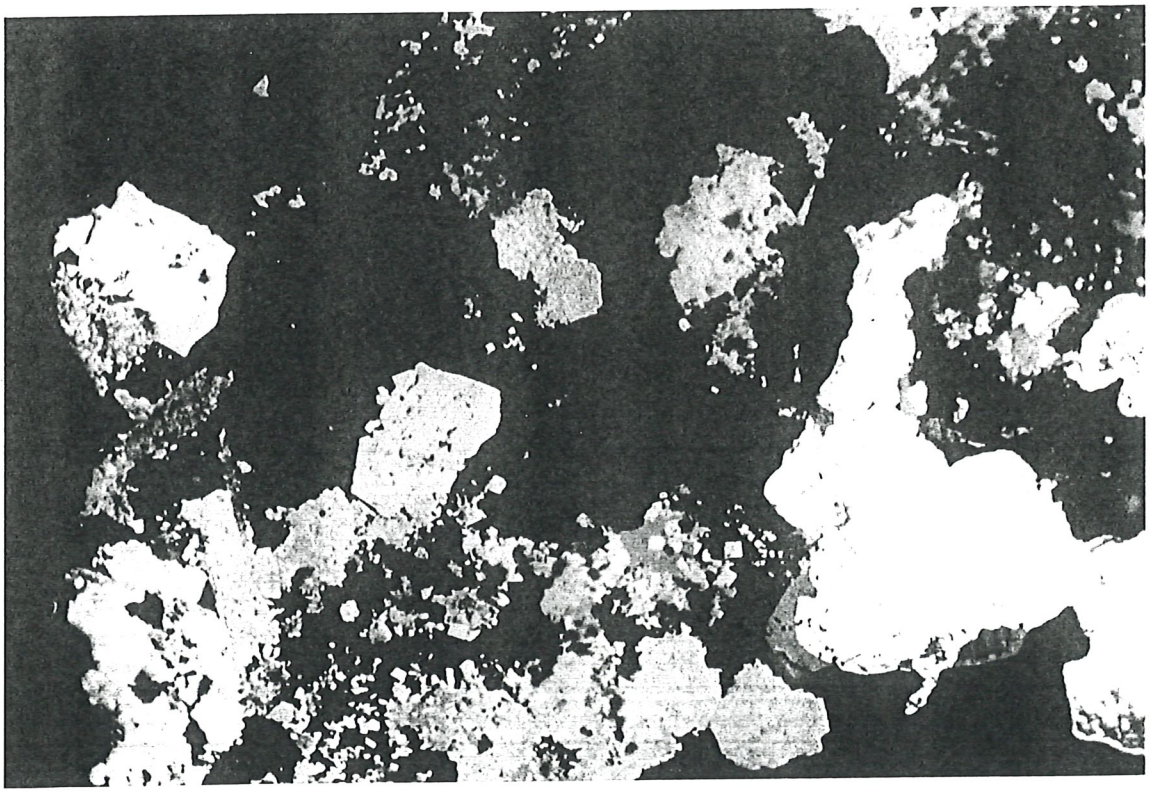




COMP. 5 COMPLEX OF NATIVE SILVER (TARNISHED) AND FREIBERGITE.
FIELD WIDTH 0.54MM

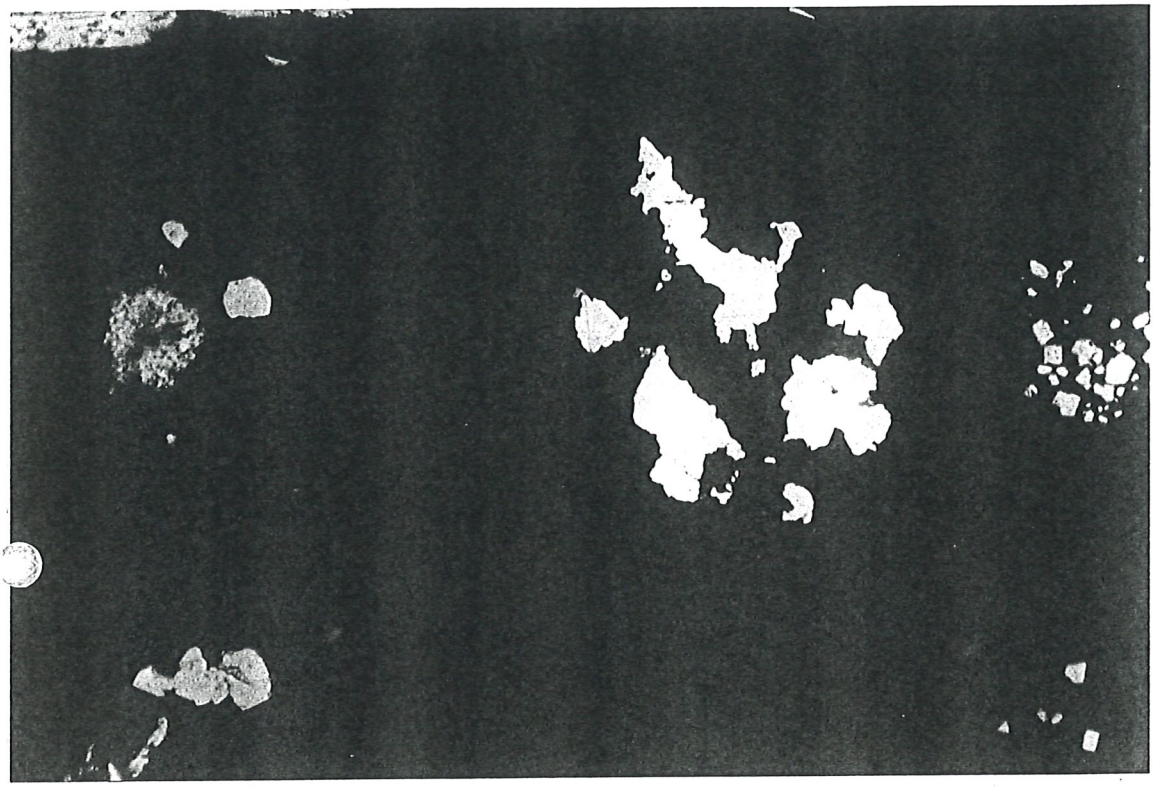
COMP. 5 PART ETCHED BANDED NATIVE SILVER. FIELD WIDTH 0.21MM

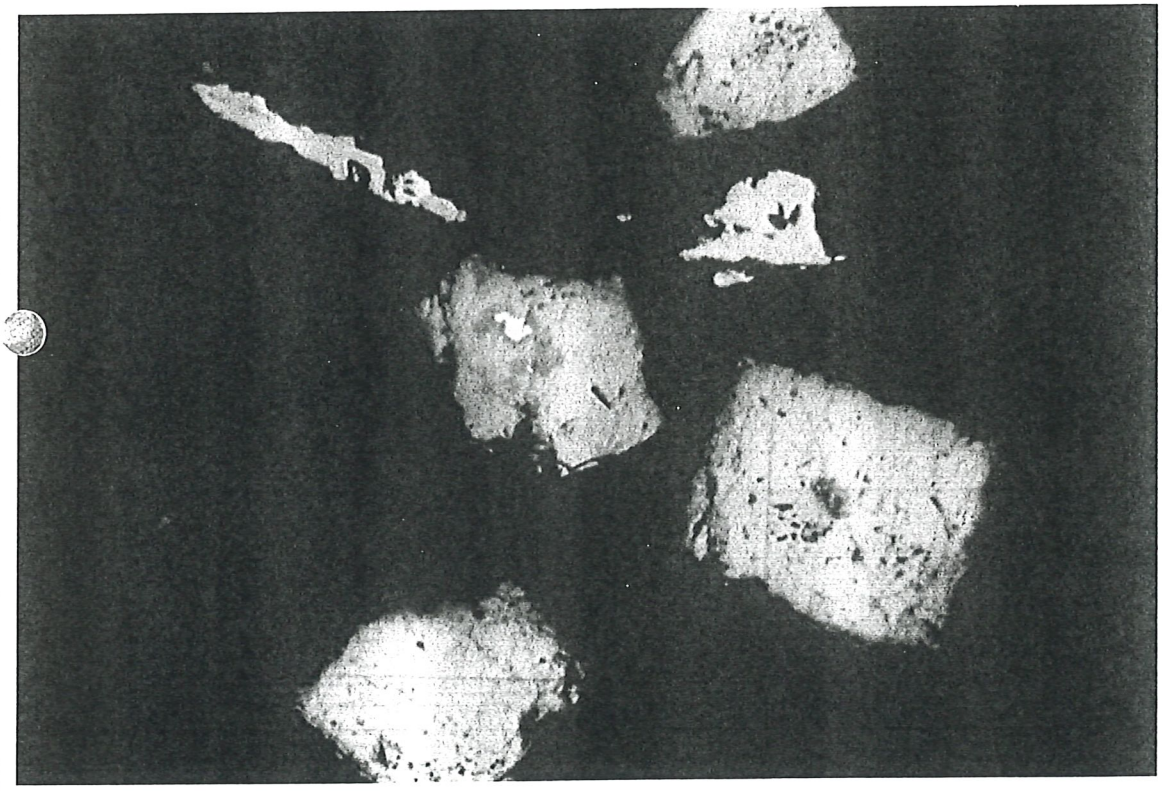




COMP. 5. COARSE COMPOSITE OF ZONED ELECTRUM, MINOR FREIBERGITE , PYRITE, AND QUARTZ. FIELD WIDTH 0.54MM

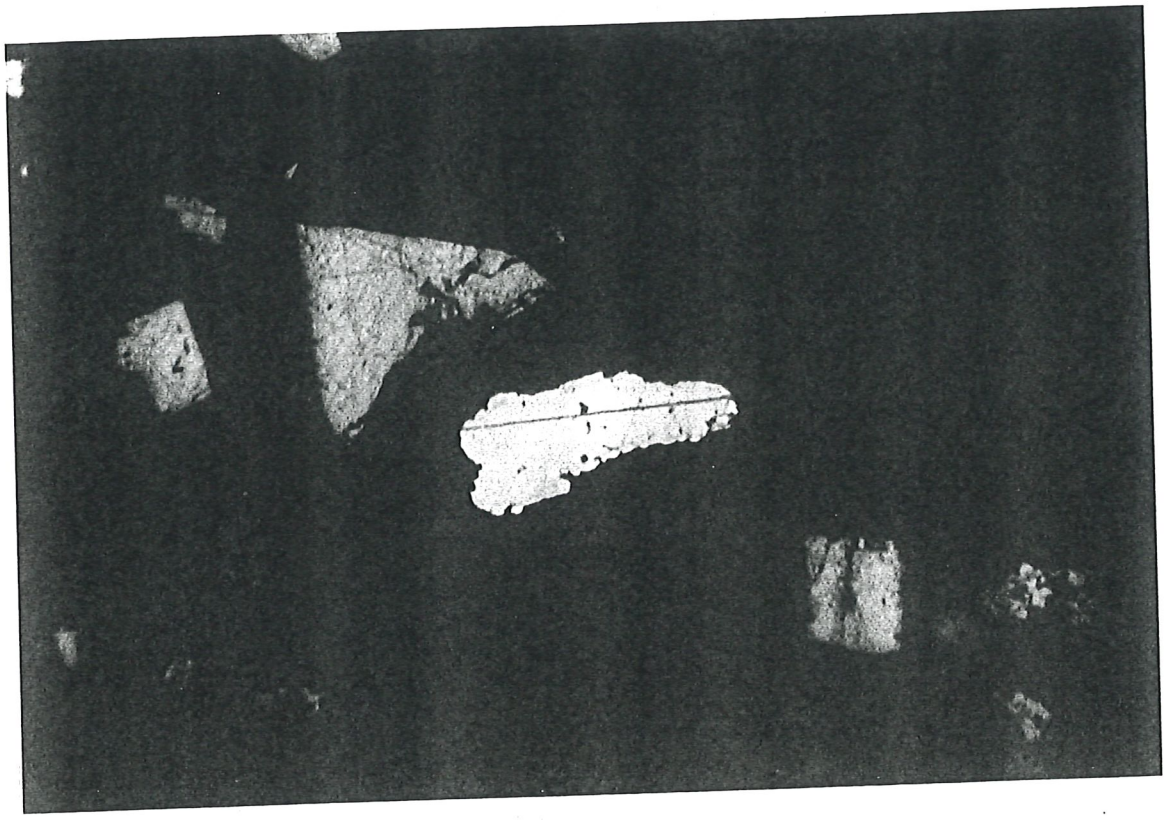
COMP. 5 ELECTRUM CONCENTRATION IN QUARTZ. FIELD WIDTH 1MM

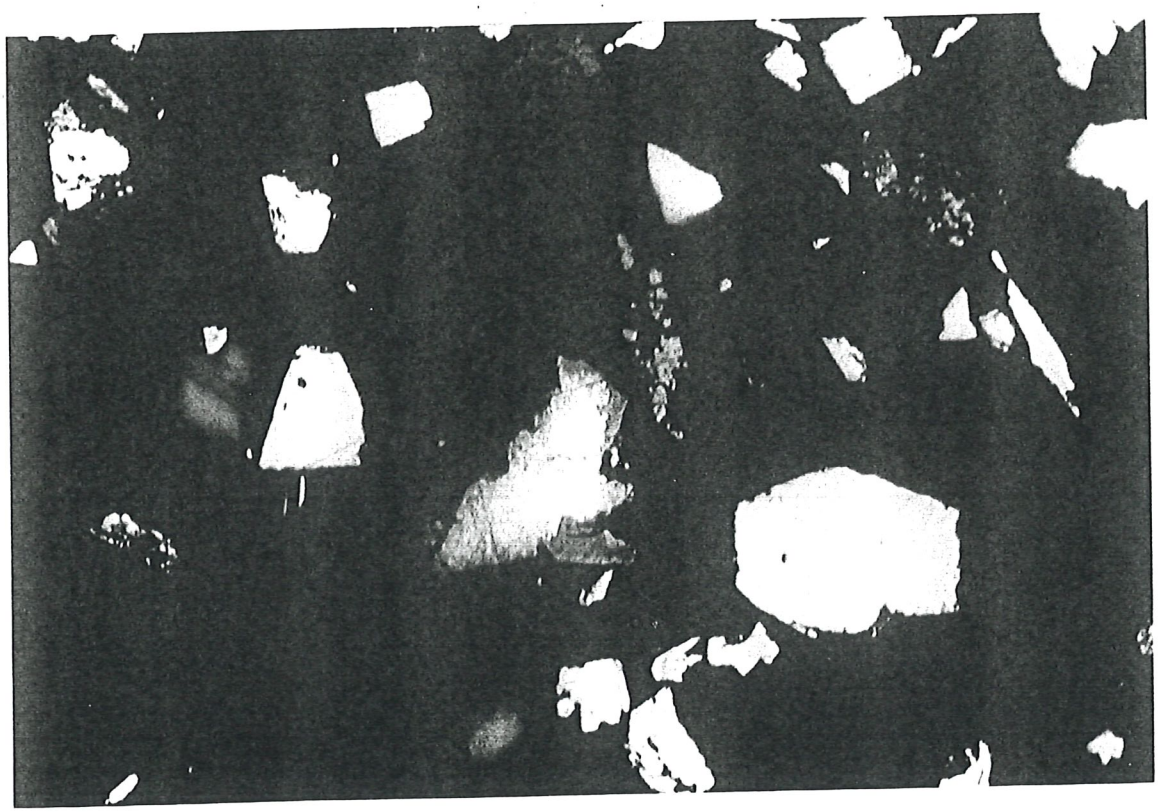




COMP. 5. ELECTRUM AND GALENA IN PYRITE. FIELD WIDTH 0.21MM

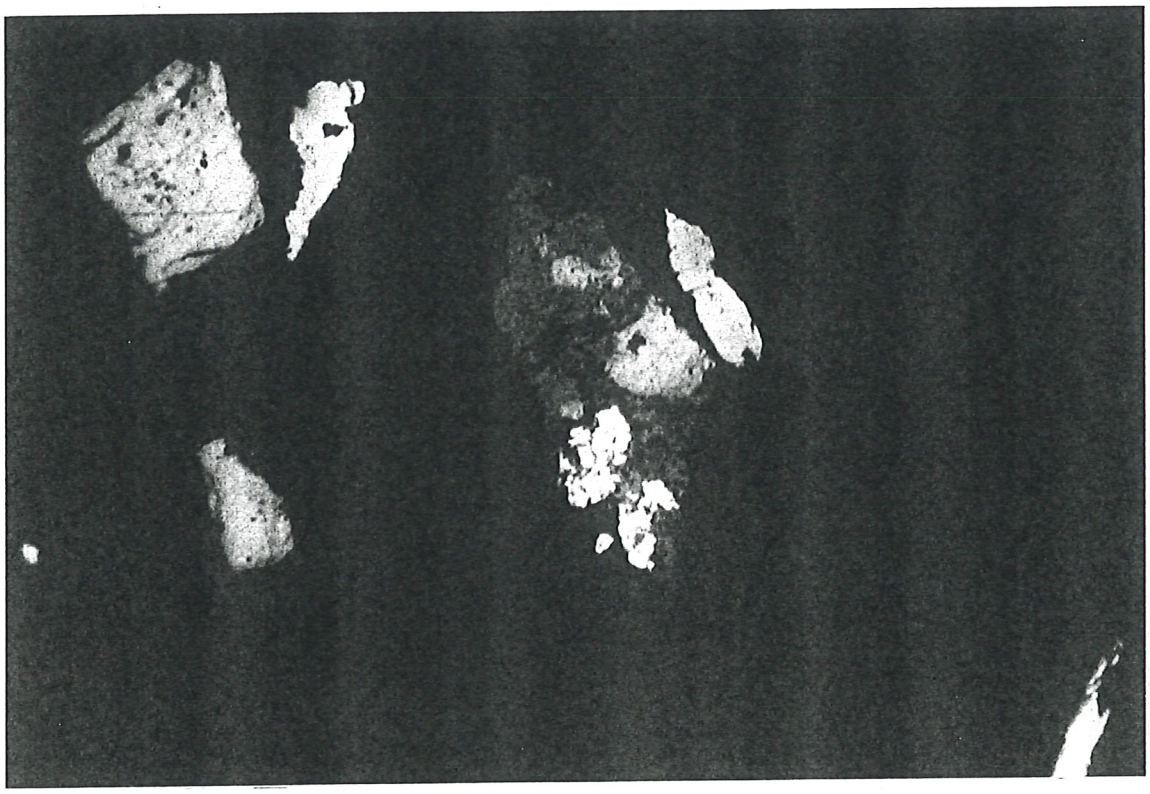
COMP. 5 LIBERATED LOW SILVER GOLD. FIELD WIDTH 0.21MM

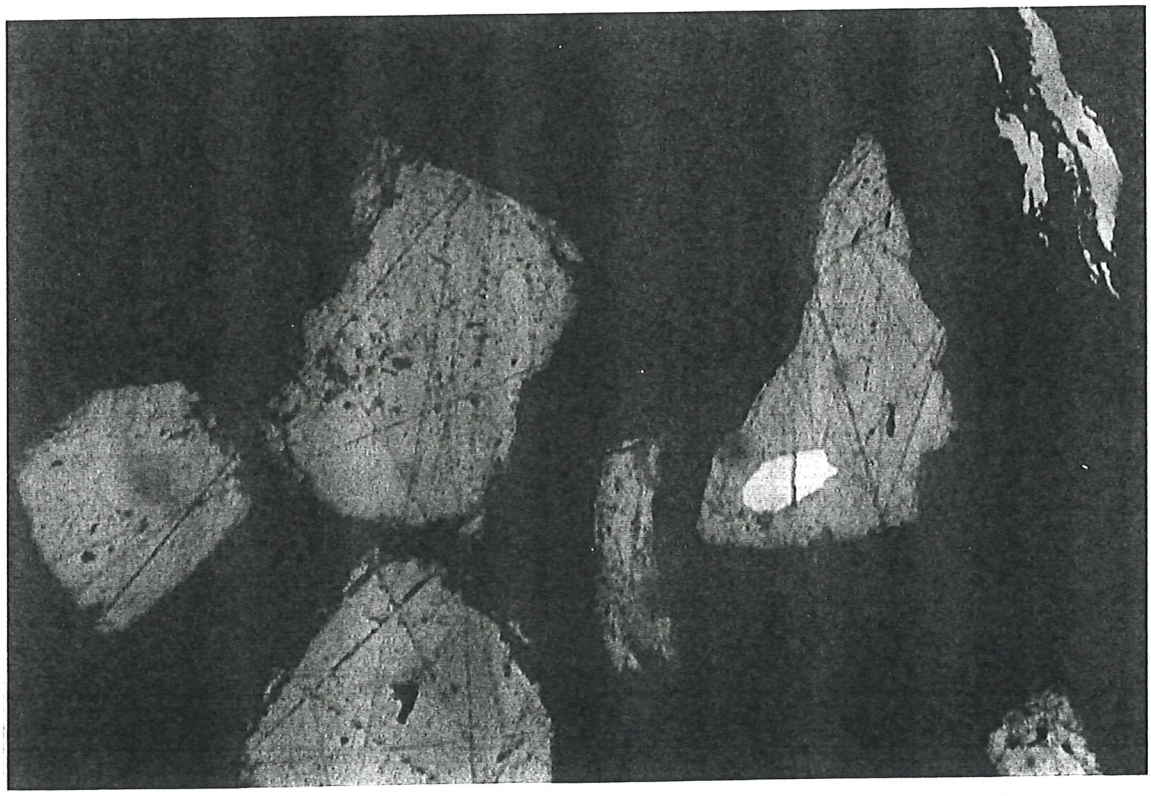




COMP. 5 NATIVE SILVER WITH SUBORDINATE FREIBERGITE> ACANTHITE. FIELD WIDTH 0.54MM

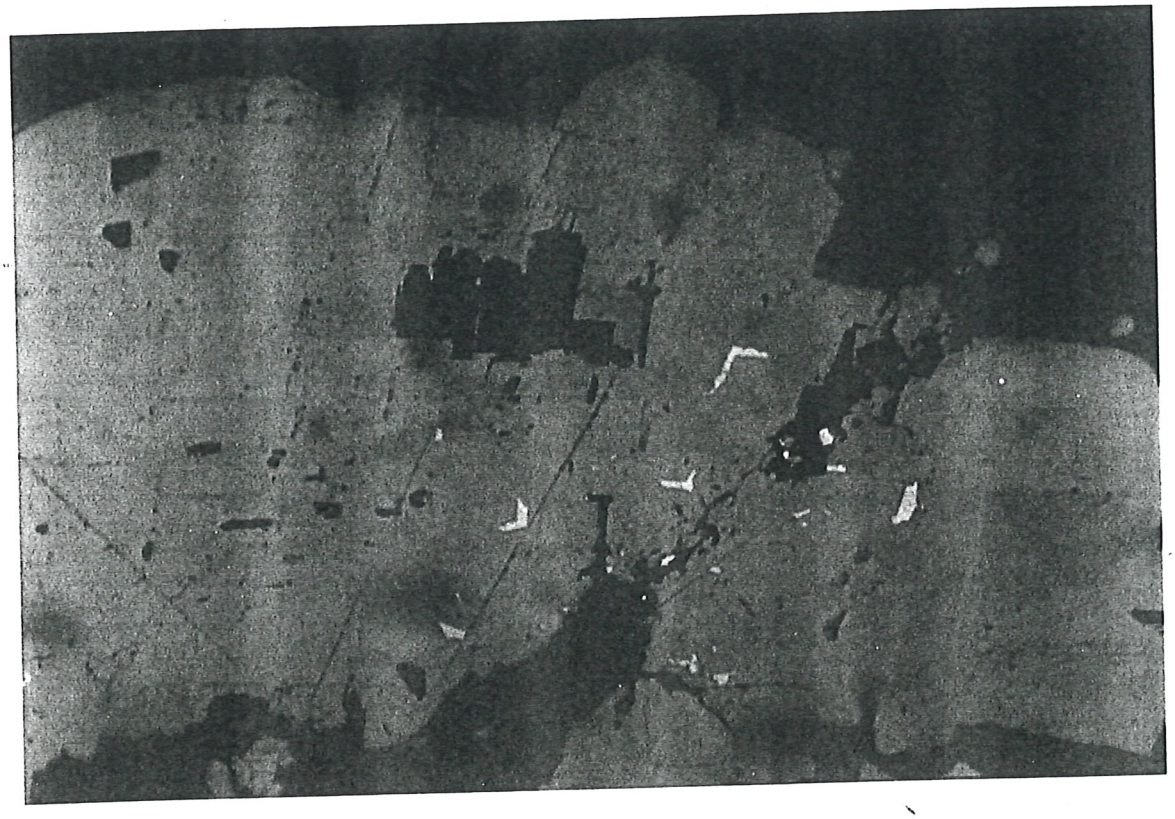
COMP. 5 ELECTRUMS IN FREIBERGITE WITH PYRITE. FIELD WIDTH 0.21MM





COMP. 5 ELECTRUM IN PYRITE. FIELD WIDTH 0.21MM

COMP. 6 CONCENTRATION OF ELECTRUM IN PYRITE MARCASITE. FIELD WIDTH 0.21MM

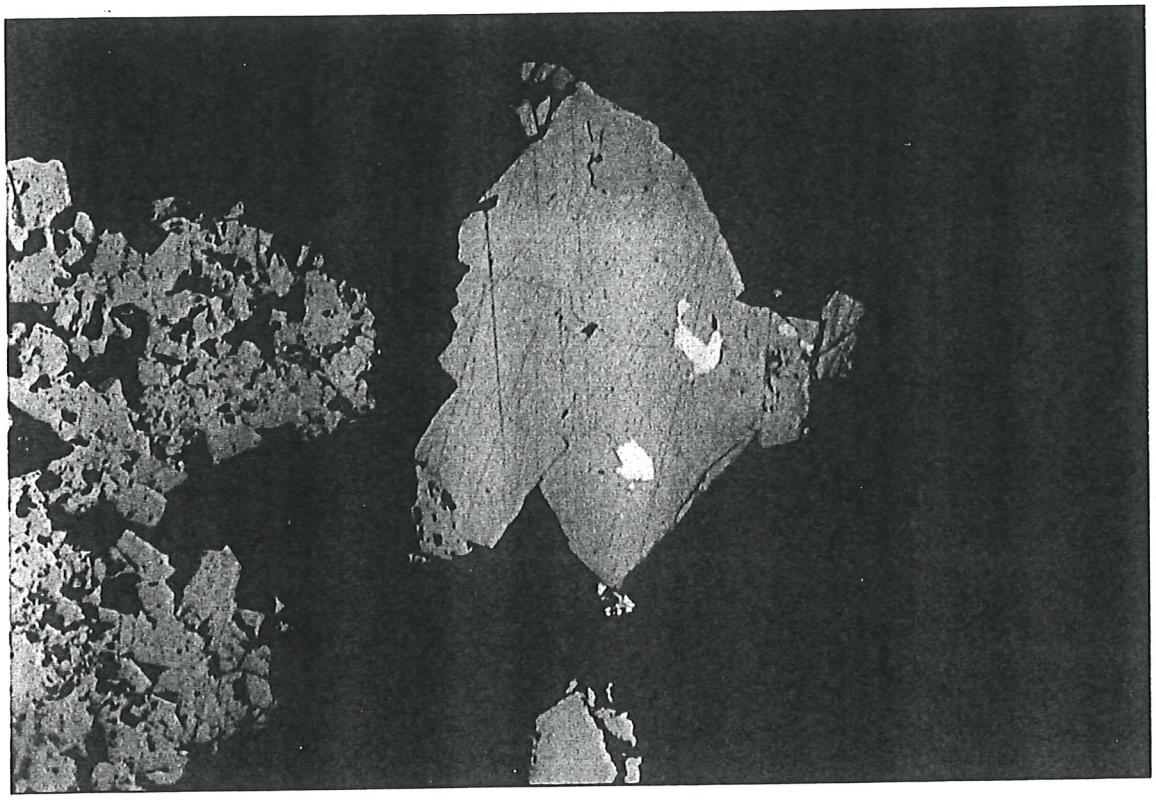


COMP. 6 ELECTRUM ATTACHED TO GOETHITE FIELD WIDTH 0.54MM

COMP. 6 FINE ARGENTIAN GOLD IN GALENA?, IN PYRITE. FIELD WIDTH 0.21MM

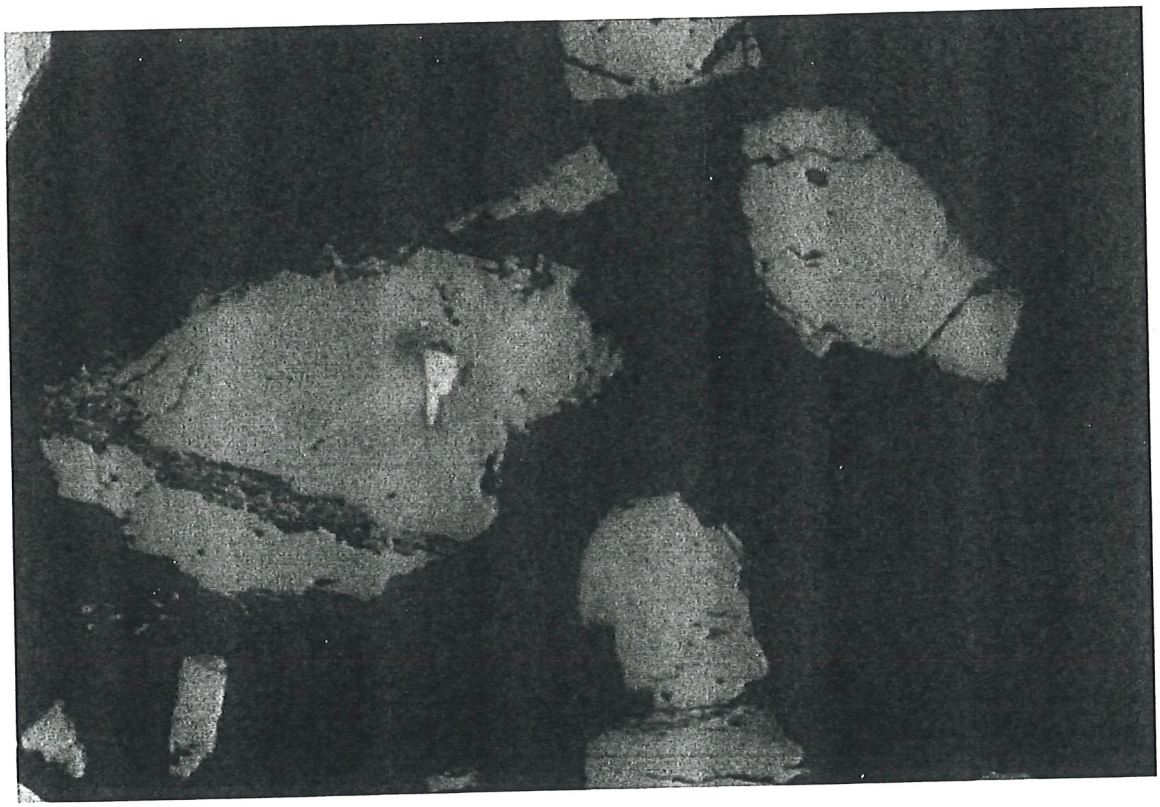
COMP. 6 ELECTRUM IN PYRITE. FIELD WIDTH 0.21MM

COMP. 7 ELECTRUMS IN PYRITE FIELD WIDTH 0.54MM



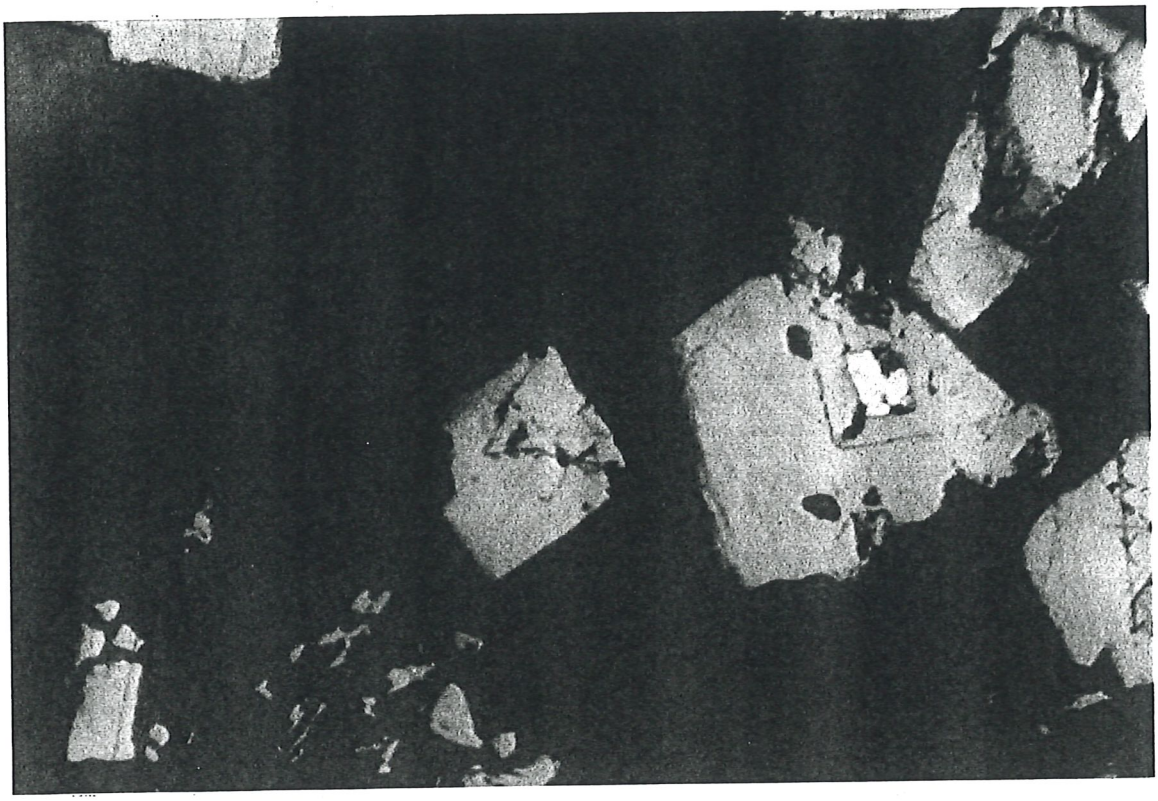
COMP. 7. ARGENTIAN GOLD IN PYRITE. FIELD WIDTH 0.21MM

COMP. 7 ELECTRUMS IN PYRITE/GANGUE. FIELD WIDTH 0.21MM



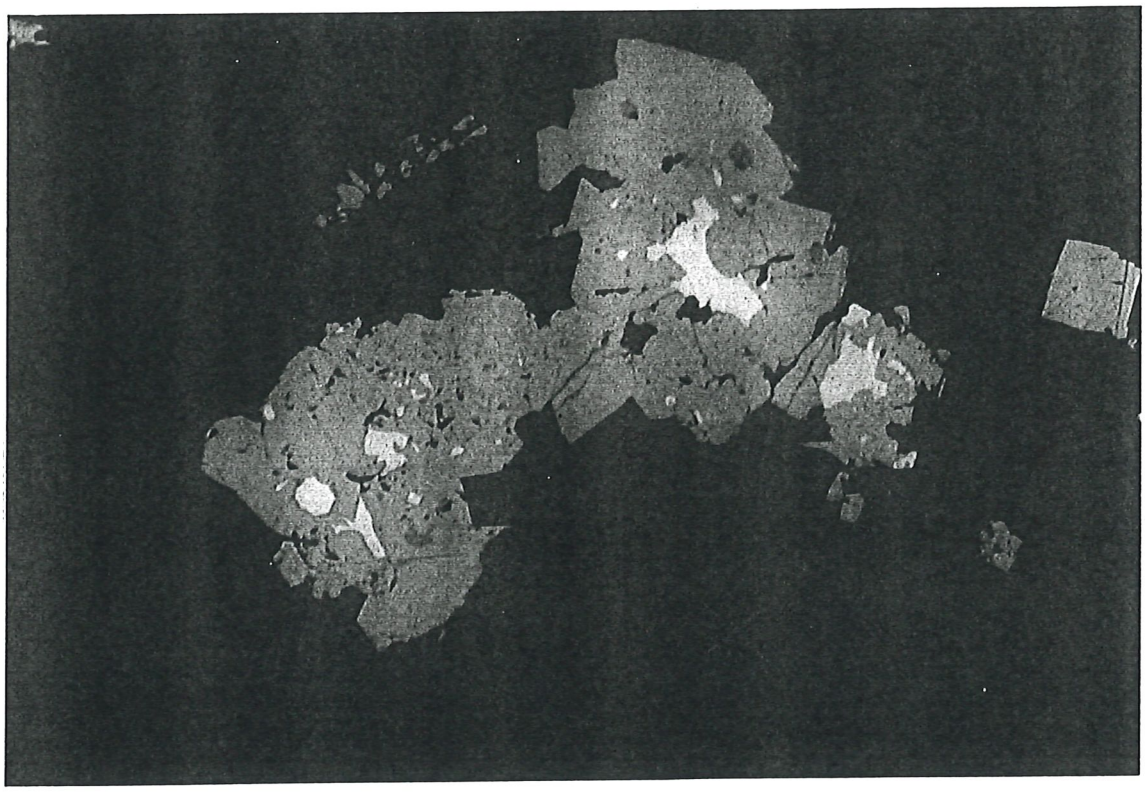
COMP. 7. ARGENTIAN GOLD IN MARCASITE. FIELD WIDTH 0.21MM

COMP. 7. ARGENTIAN GOLD IN PYRITE. FIELD WIDTH 0.21MM



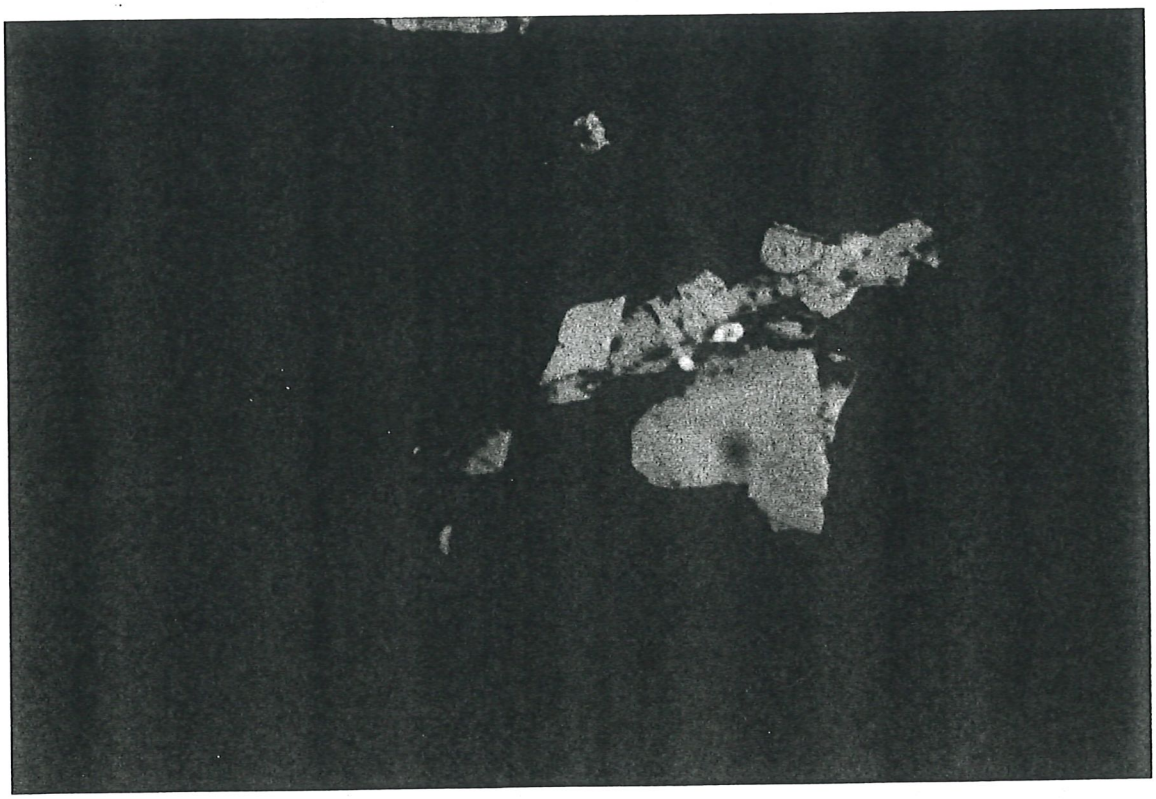
COMP. 7 ARGENTIAN GOLDS IN PYRITE. FIELD WIDTH 0.21MM

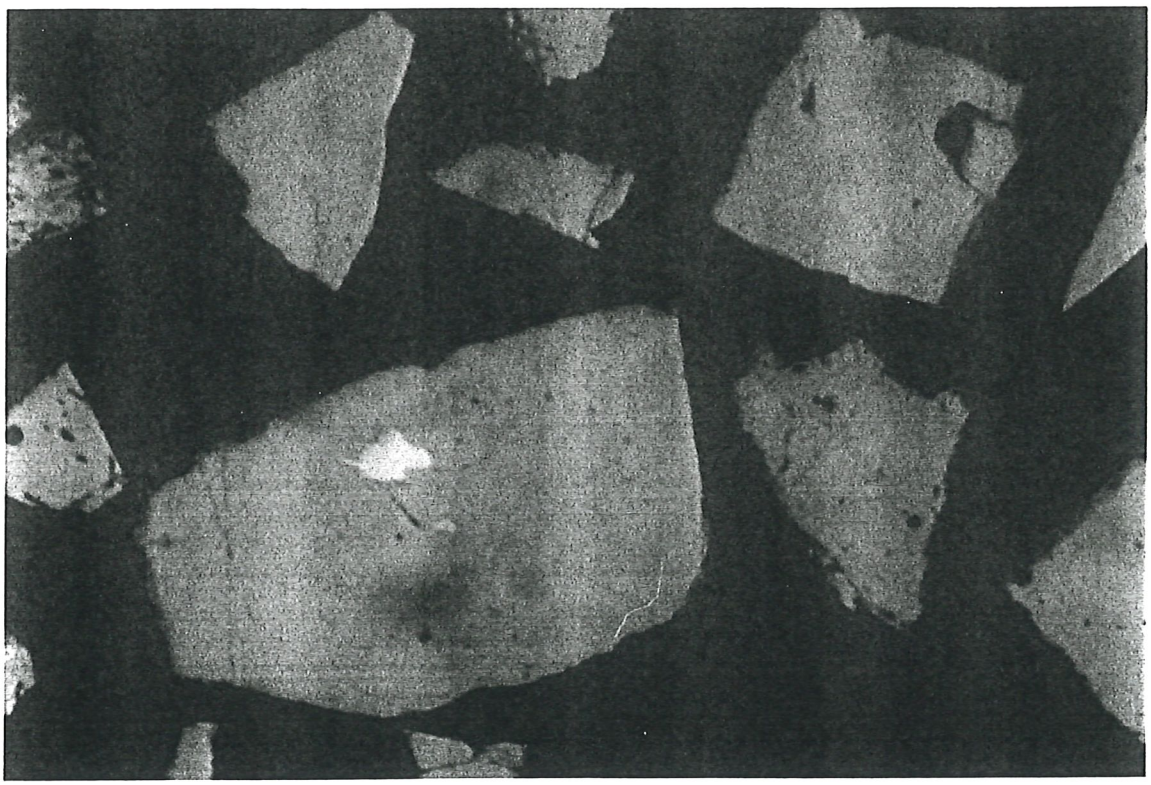
COMP. 8 CONTRASTING MARCASITE AND PYRITE TEXTURES. FIELD WIDTH 0.54MM



COMP. 8 ARGENTIAN GOLD CLUSTER IN PYRITE. FIELD WIDTH 0.54MM

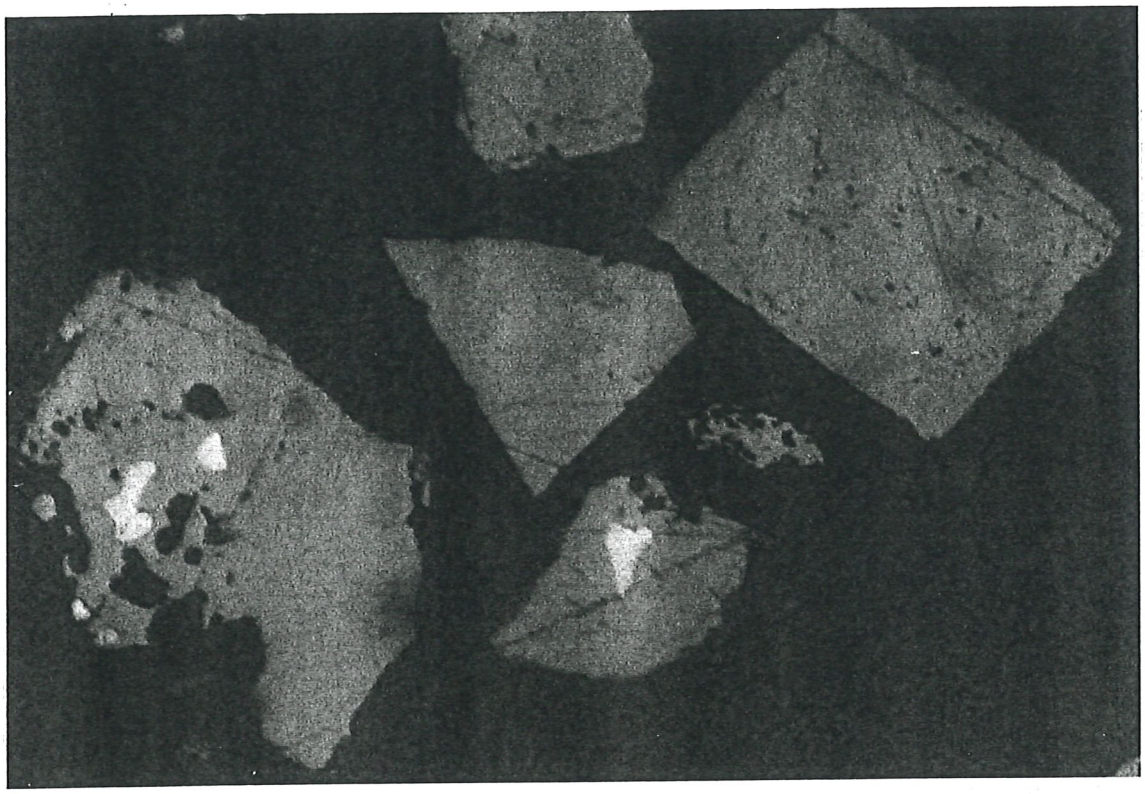
COMP. 8 ARGENTIAN GOLDS IN MARCASITE. FIELD WIDTH 0.21MM





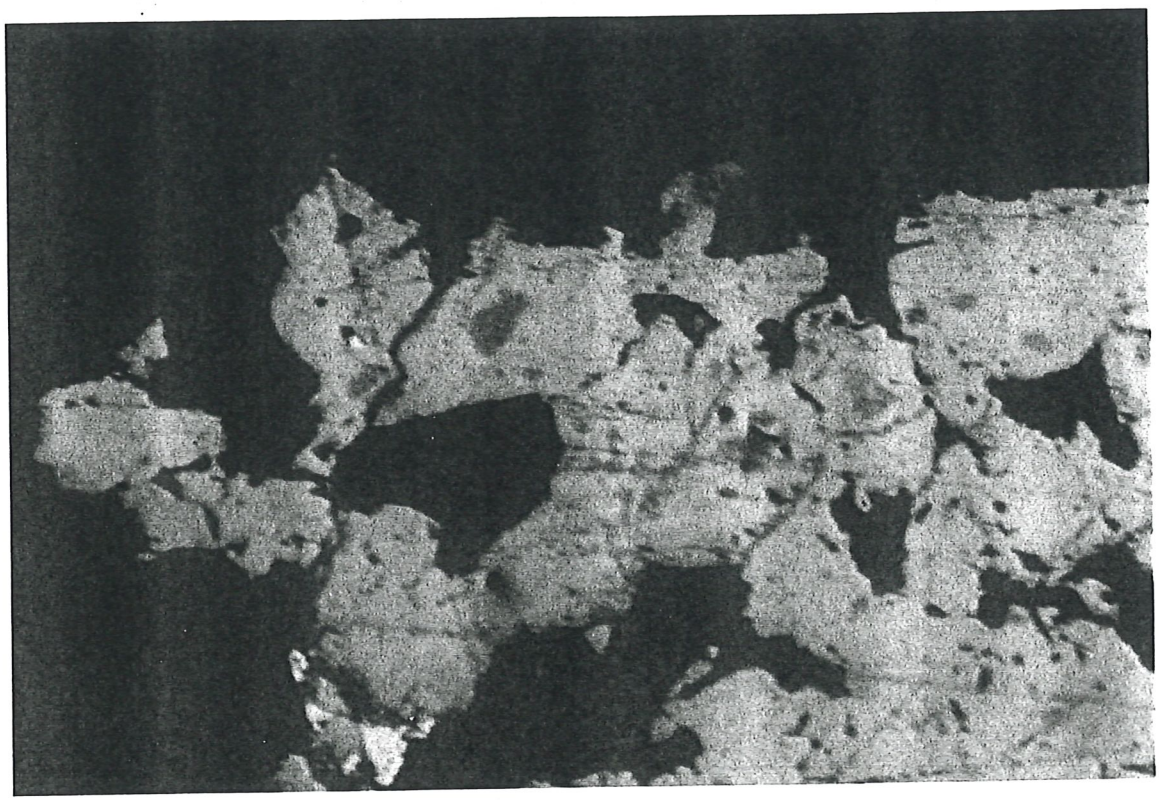
COMP. 8 ARGENTIAN GOLD IN PYRITE. FIELD WIDTH 0.21MM

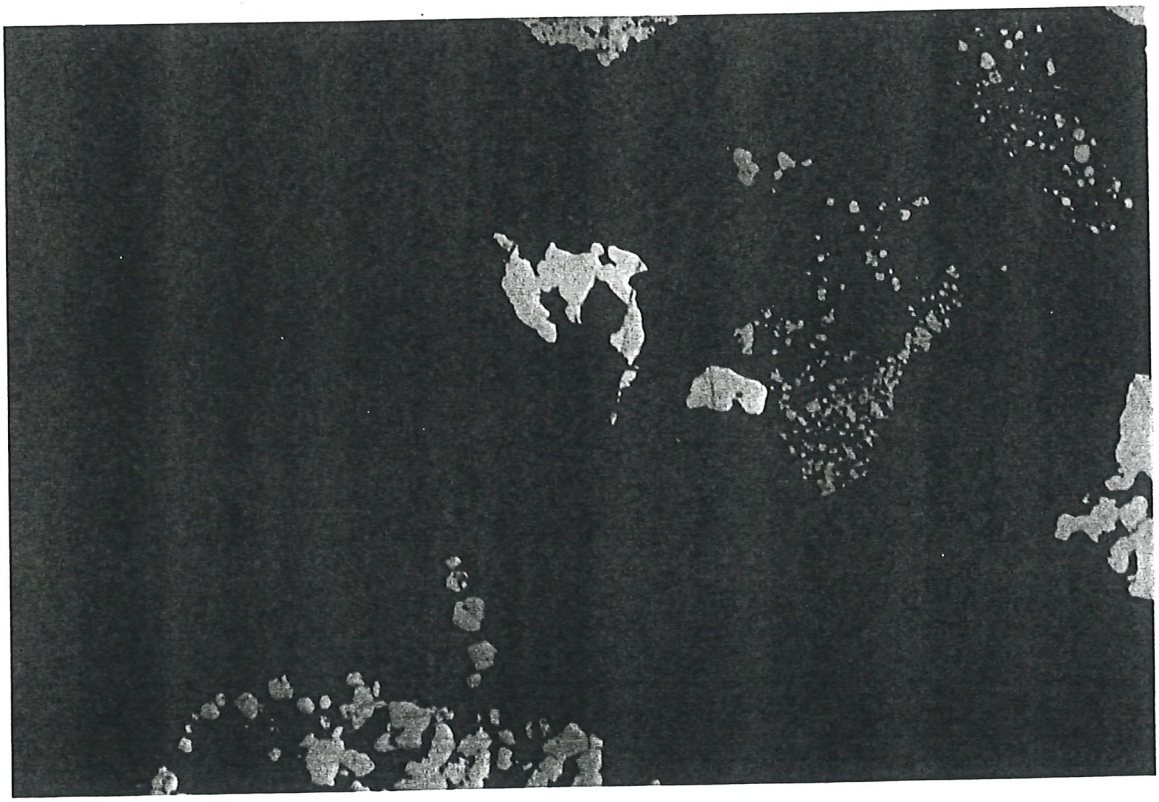
COMP 8. ARGENTIAN GOLDS IN TWO PYRITES. FIELD WIDTH 0.21MM



HG COMP A. ARGENTIAN GOLDS IN PYRITE. FIELD WIDTH 0.21MM

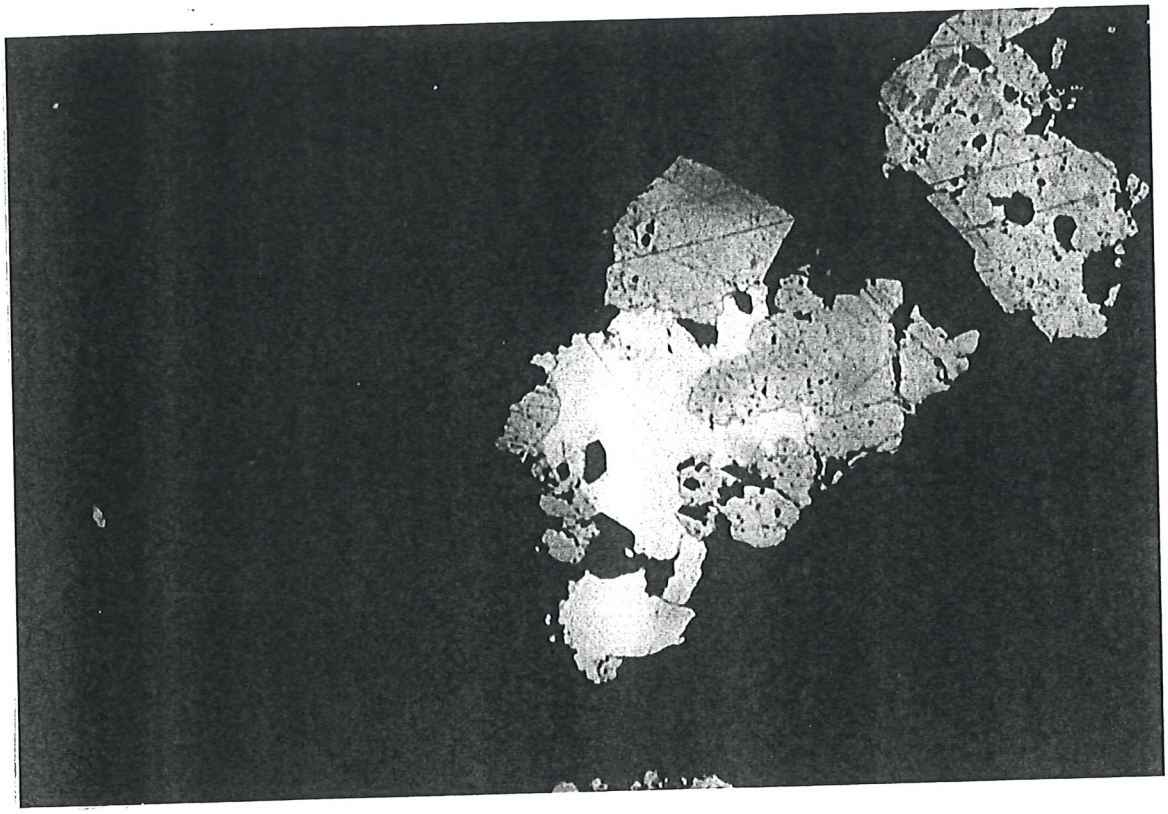
HG COMP A ARGENTIAN GOLDS THROUGH COARSE PYRITE> QUARTZ, ALSO CONTAINING ?GALENA. FIELD WIDTH 0.21MM

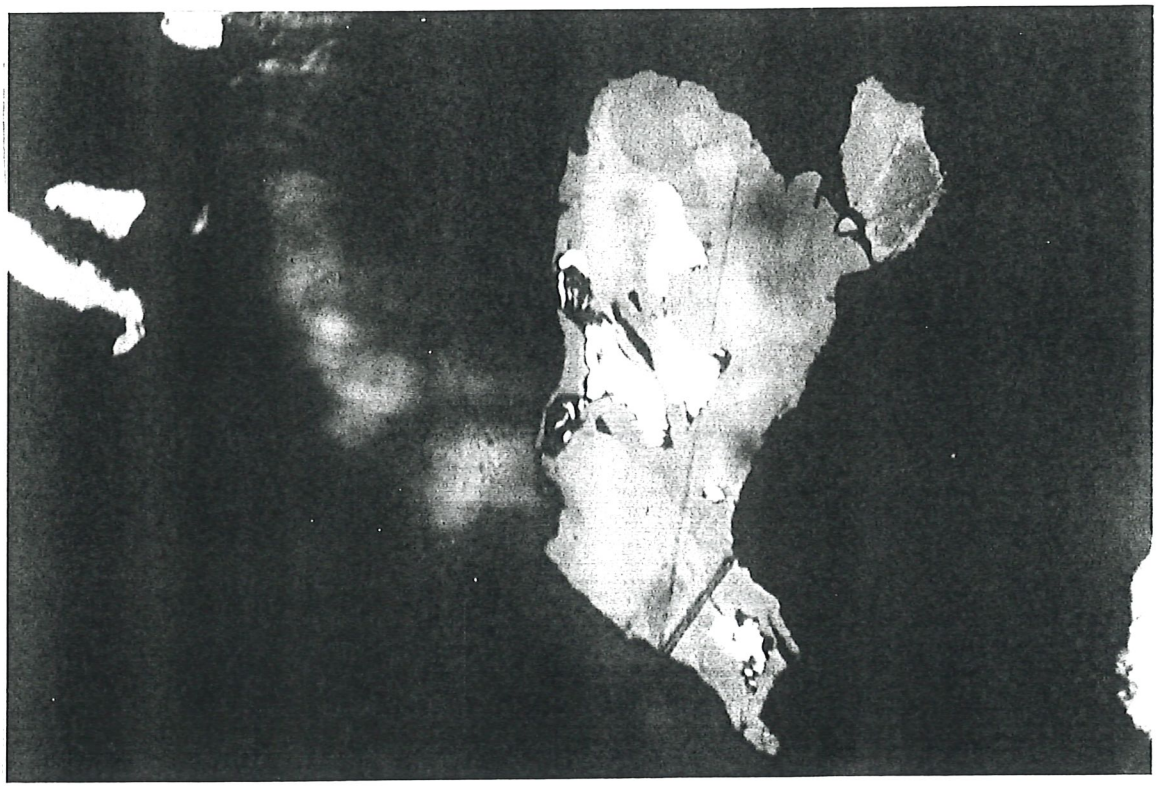




HG COMP. A FREE IRREGULAR ARGENTIAN GOLD. FIELD WIDTH 1MM

HG COMP. A COMPLEX OF ARGENTIAN GOLD/PYRITE AND QUARTZ FIELD WIDTH 1MM



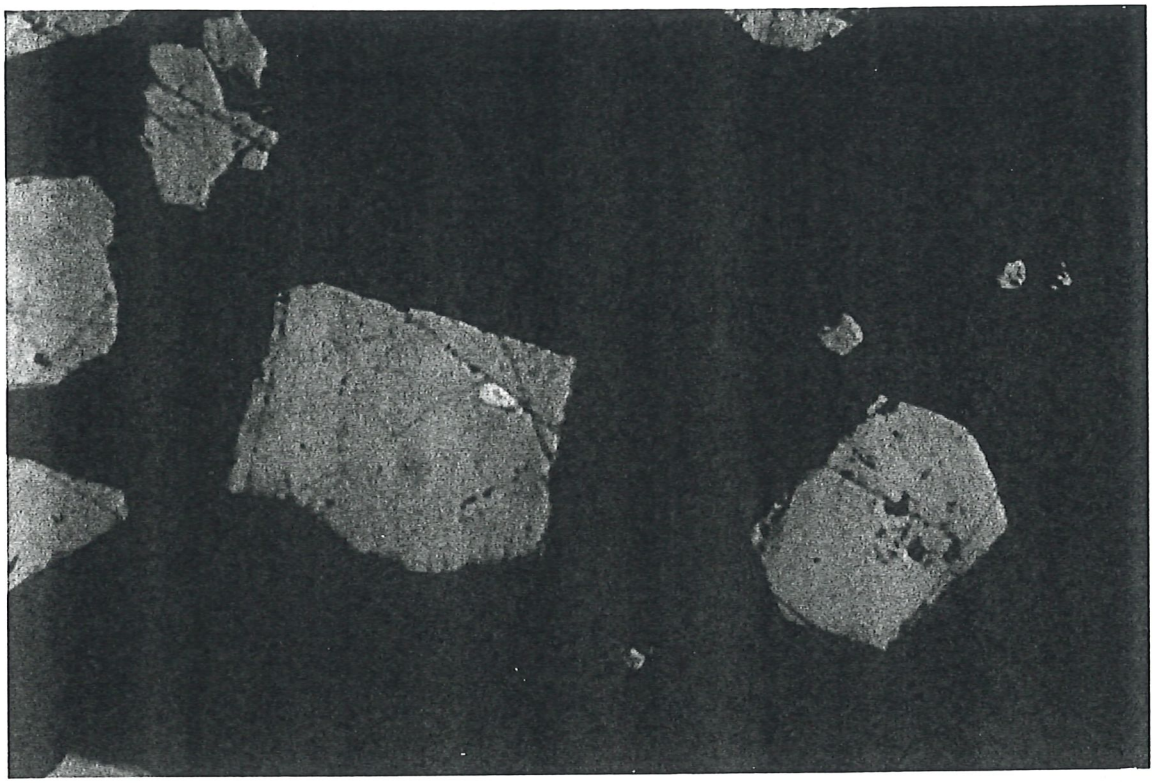


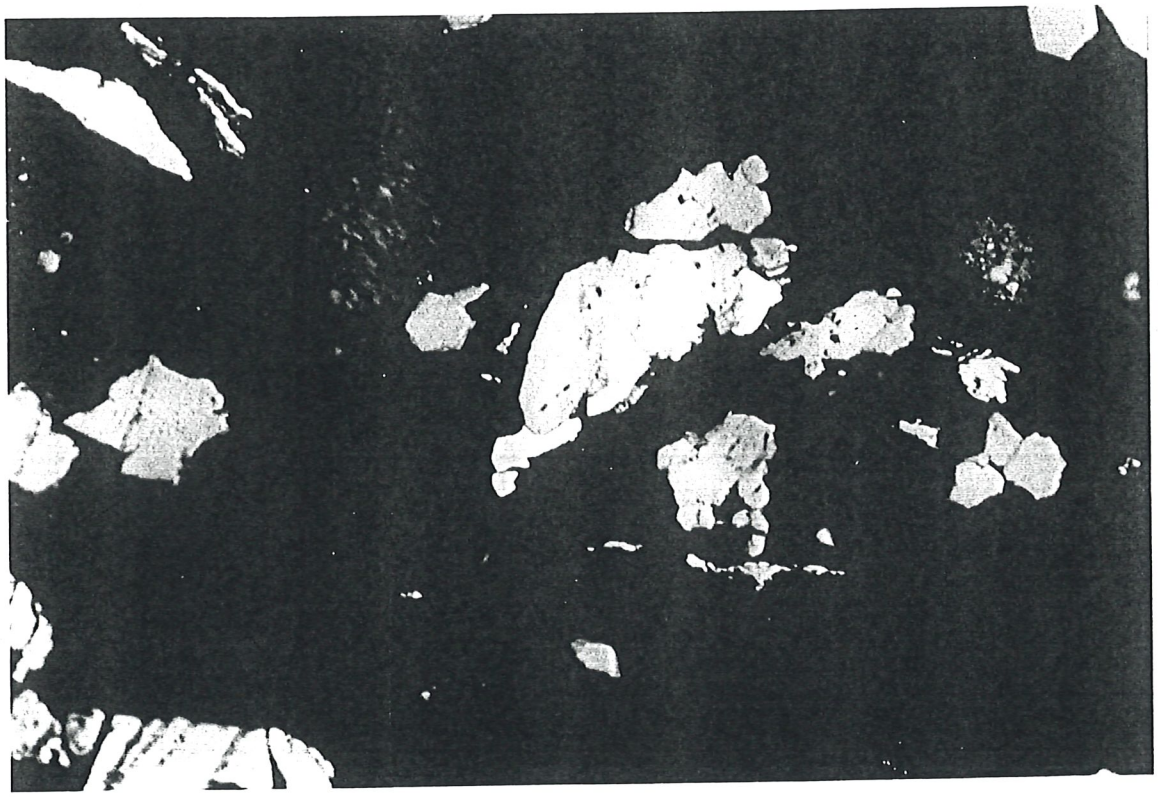
HG COMP. A ELECTRUMS IN AN ACANTHITE NAUMANNITE COMPLEX. FIELD WIDTH 0.21MM

HG COMP. A ELONGATE ELECTRUM WITH PYRITE INCLUSIONS. FIELD WIDTH 0.21MM

HG COMP. A. ELECTRUM/QUARTZ COMPOSITE WITH PYRITE INCLUDED. FIELD WIDTH 0.21MM

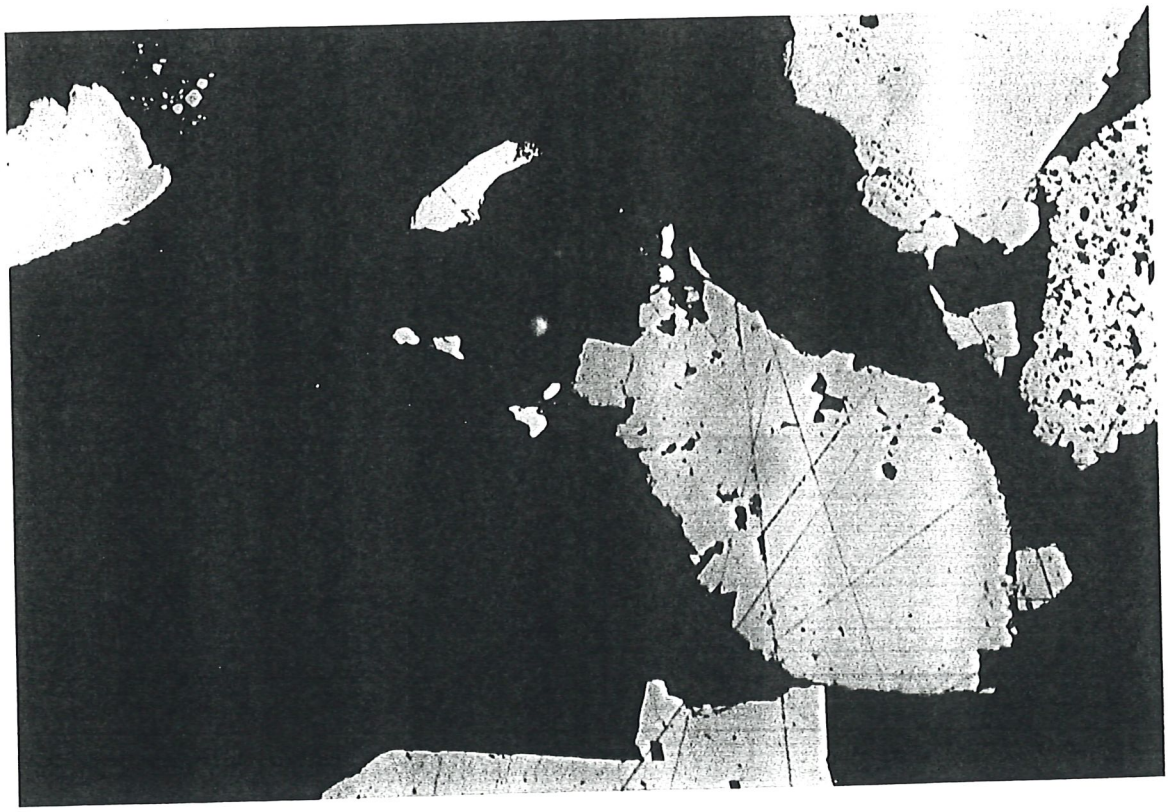
HG COMP. A. ARGENTIAN GOLD IN PYRITE. FIELD WIDTH 0.21MM





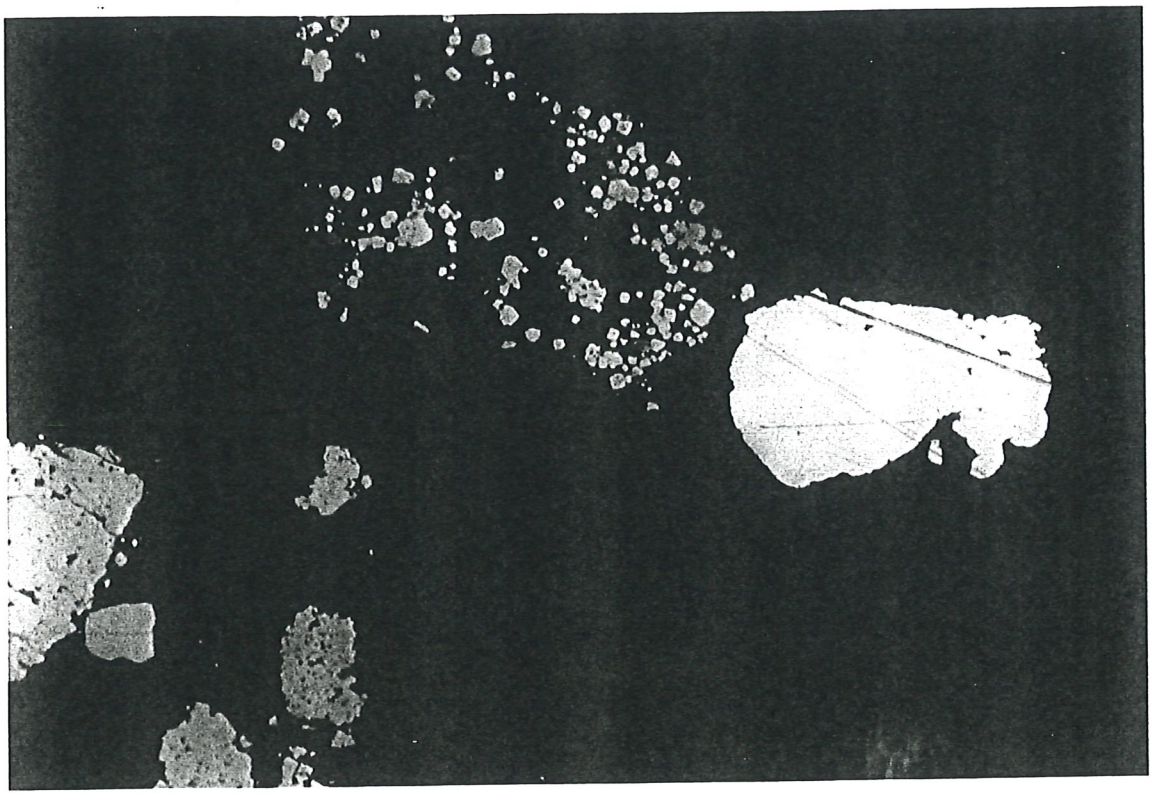
HG COMP. A . ELECTRUM/PYRITE COMPOSITE. FIELD WIDTH 0.54MM

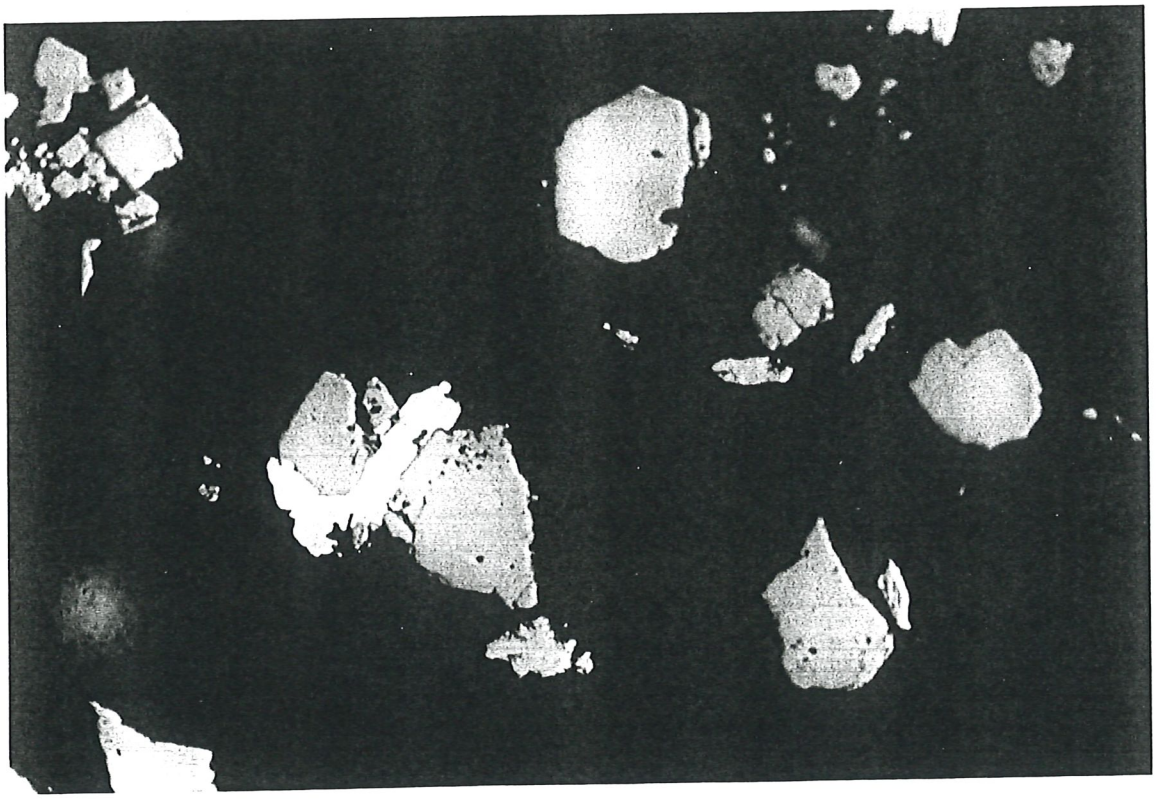
HG COMP. A. ELECTRUM IN ARSENOPYRITE. FIELD WIDTH 0.21MM



HG COMP. B. ELECTRUM IN QUARTZ, ATTACHED TO PYRITE FIELD WIDTH 0.54MM

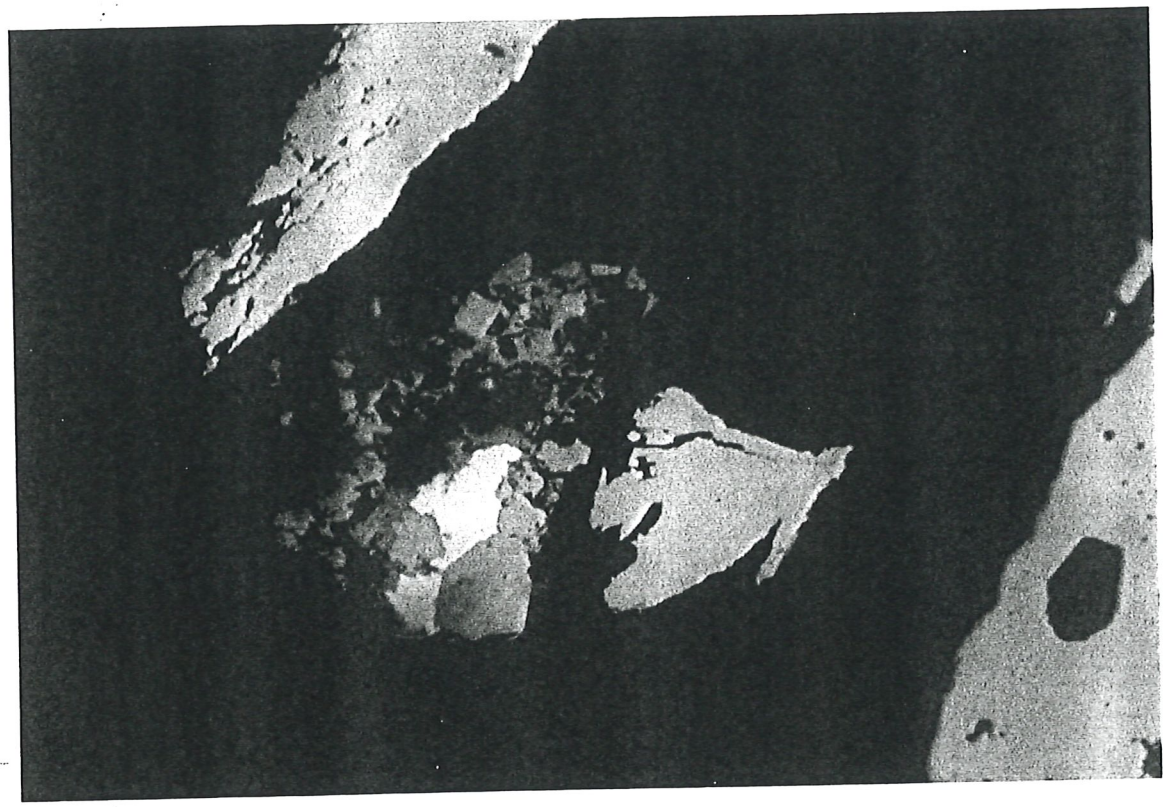
HG COMP. B. FREE ARGENTIAN GOLD. FIELD WIDTH 2MM





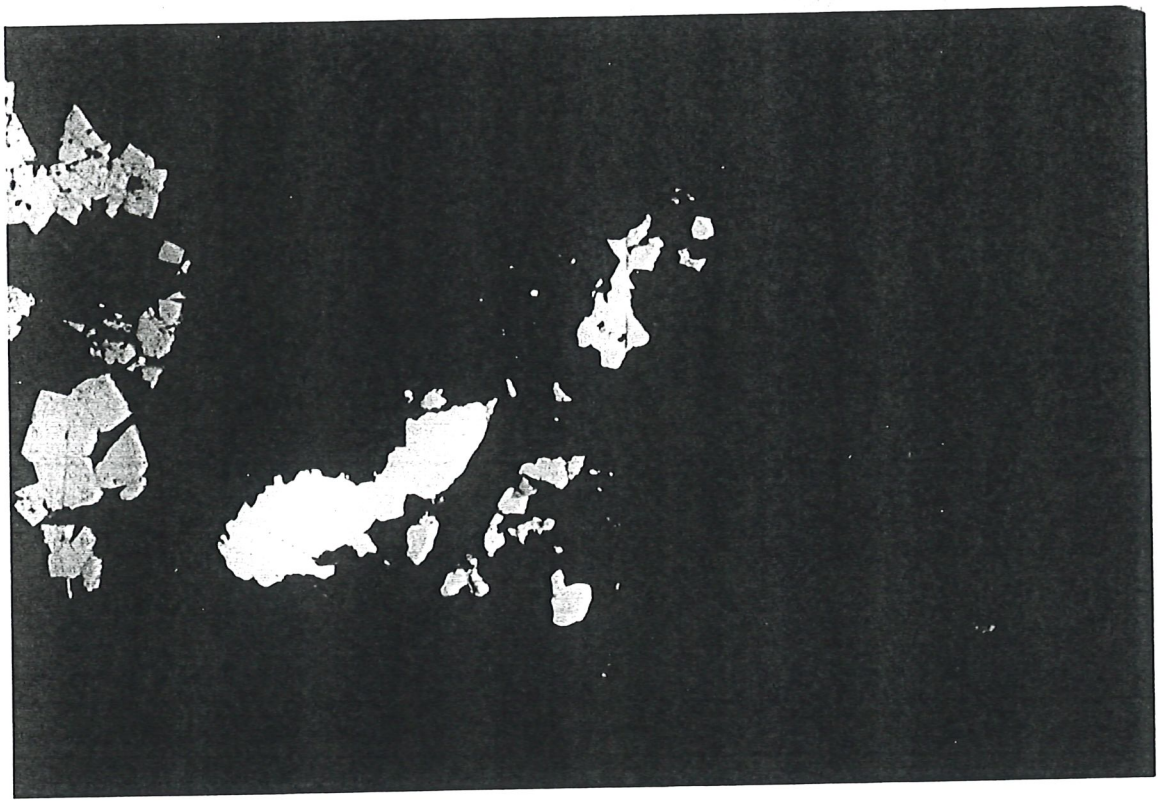
HG COMP. B ELECTRUM PYRITE COMPOSITE FIELD WIDTH 0.54MM

HG COMP. B. COMPOSITE OF ELECTRUM, CHALCOPYRITE, PYRITE AND QUARTZ. FIELD WIDTH 0.21MM



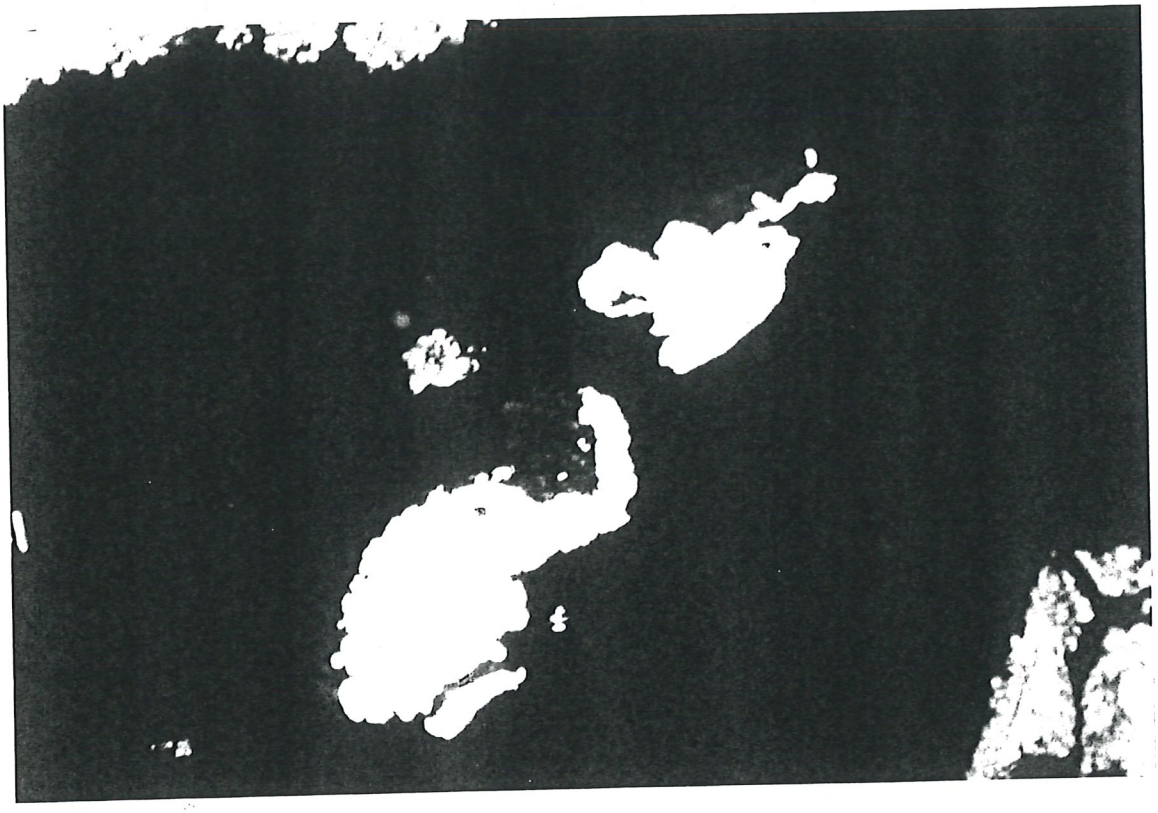
HG COMP. B LIBERATED HACKLY ELECTRUM. FIELD WIDTH 0.21MM

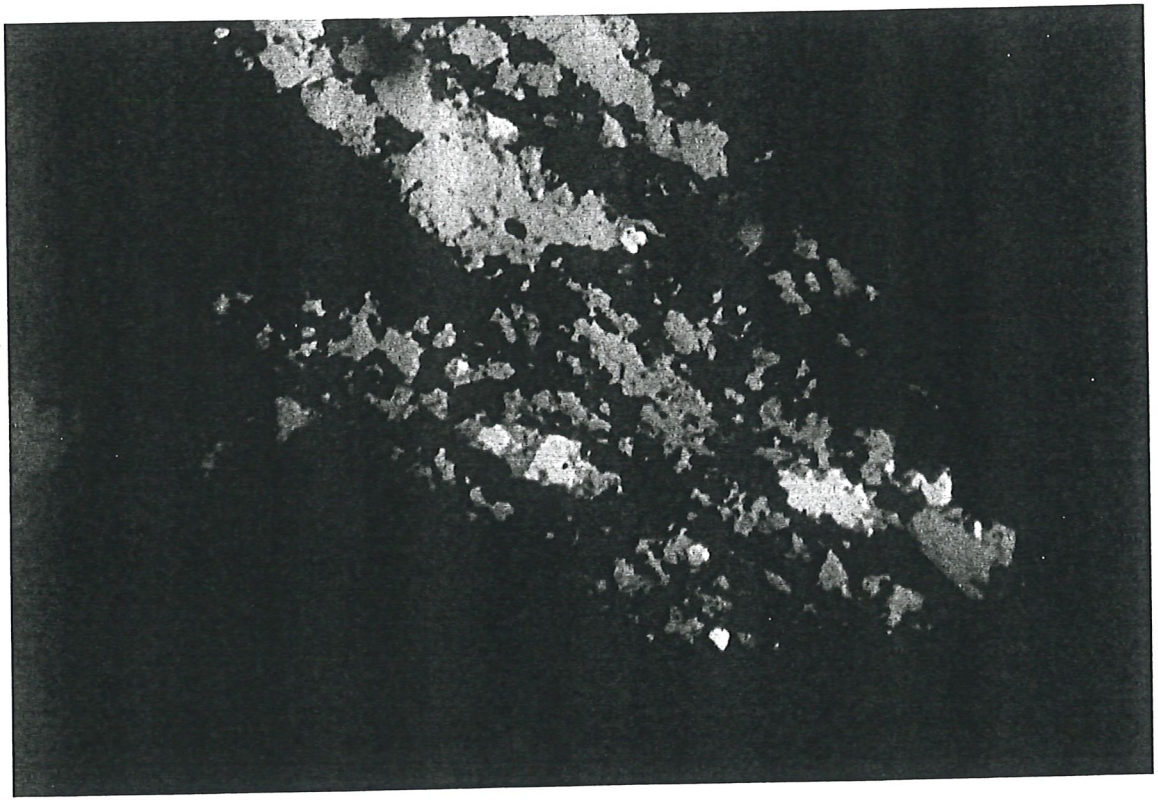
HG COMP. B. IRREGULAR ELECTRUM IN QUARTZ. FIELD WIDTH 0.21



HG COMP. B. ELECTRUM CONC. IN QUARTZ. FIELD WIDTH 1MM

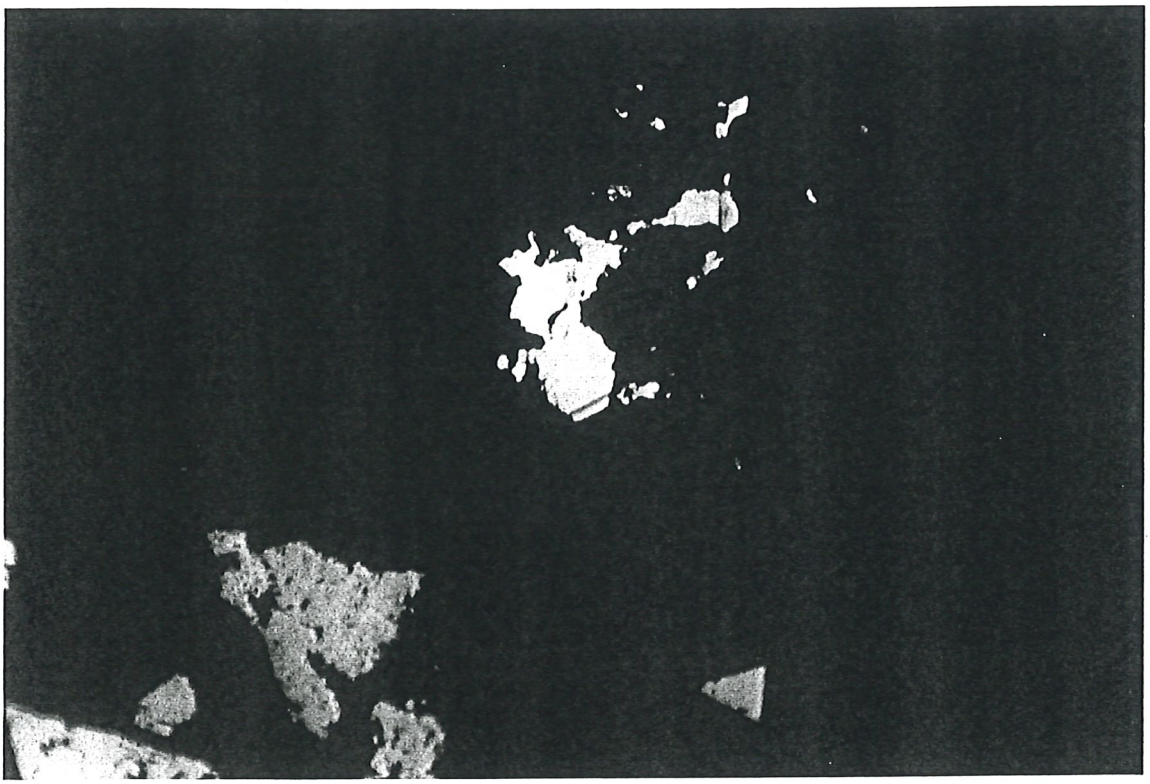
HG COMP. C FREE ELECTRUM FIELD WIDTH 0.54MM

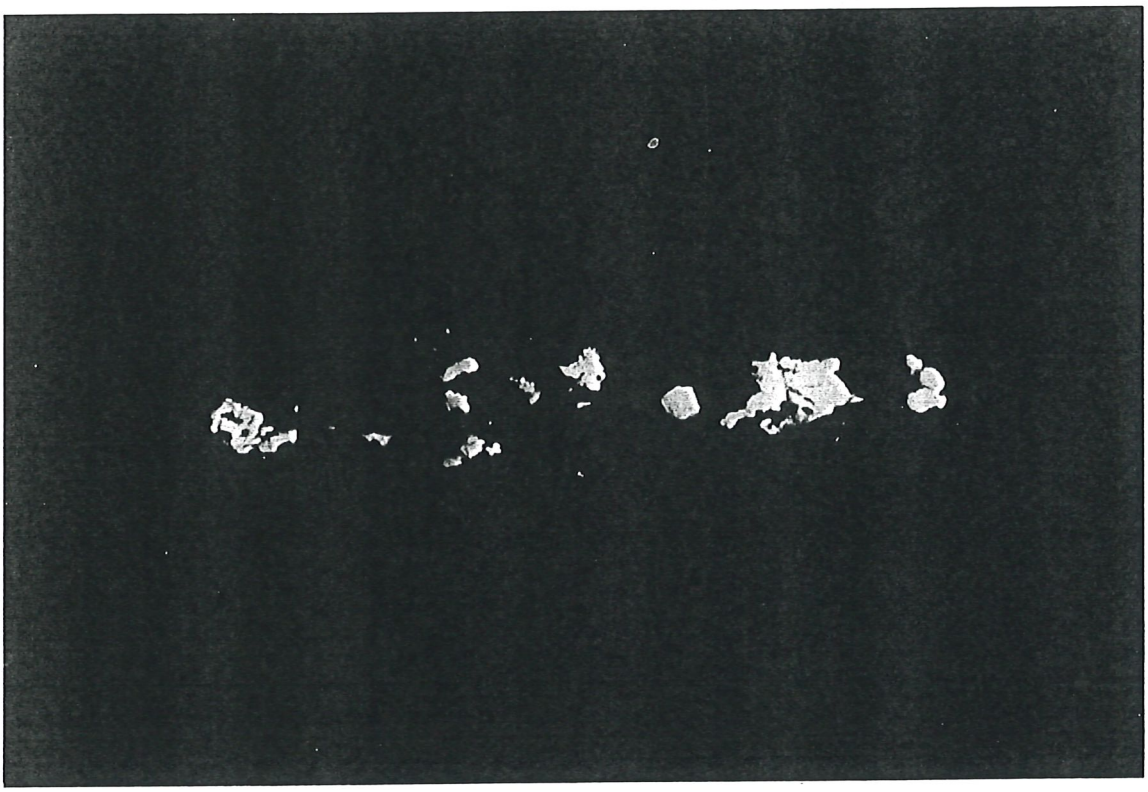




HG COMP. C ELECTRUM AND FREIBERGITE IN PYRITE QUARTZ. FIELD WIDTH 0.21MM

HG COMP. C ELECTRUM IN COARSE QUARTZ. FIELD WIDTH 1MM





HT COMP. C ELECTRUM CONC. IN LINEAR QUARTZ . FIELD WIDTH 2MM

HG COMP. C FINE ELECTRUM IN PYRITE, ALSO CONTAINING SPHALERITE. FIELD WIDTH 0.21MM

APPENDIX IV

BOND ROD MILL WORK INDEX DETERMINATIONS

DETAILS AND RESULTS

BOND ROD MILL CLOSED CIRCUIT GRINDABILITY : 1180 MICROMETERS

SAMPLE IDENTITY	**COMPOSITE 2 : 309 DEPOSIT - 98TRCD748 (179 - 188m)**
CLIENT	HOMESTAKE EXPLORATION (PLUTONIC RESOURCES LTD)
PROJECT No	A 6573 : TWIN HILLS GOLD PROJECT
DATE	JANUARY 1999

PERIOD	REVS OF MILL	WT OF 1250 mls (g)	WT OF NEW FEED (g)	WT OF O/SIZE (g)*	WT OF U/SIZE (g)*	NET WT OF U/SIZE (g)*	NET WT OF U/SIZE PER REV (g)	CIRC'TING LOAD (%)	WT OF FRESH FEED ADDED TO NEXT CYCLE (g)	WT OF U/SIZE IN FEED TO NEXT CYCLE (g)
1	100	2123.4	2123.4	1700.6	422.8	273.2	2.732	402	422.8	29.8
2	376	2123.4	422.8	1226.7	896.7	866.9	2.306	137	896.7	63.2
3	433	2123.4	896.7	1062.5	1060.9	997.7	2.304	100	1060.9	74.8
4	428	2123.4	1060.9	887.6	1235.8	1161.0	2.713	72	1235.8	87.1
5	359	2123.4	1235.8	1061.7	1061.7	974.6	2.715	100	1061.7	74.8
6	363	2123.4	1061.7	1061.7	1061.7	986.9	2.719	100	1061.7	74.8

Note : * = Ex grinding mill

PRODUCT IN THE FEED	**7.05 (%)**
BULK DENSITY	**1.6987 t/m^3**
IDEAL POTENTIAL PRODUCT	**1061.7 (g)**
AVERAGE EQUILIBRIUM CIRC LOAD	**100 (%)**
AVERAGE PRODUCT	**2.717 (g/rev)**
80 % PASSING FEED SIZE	**10694 (µm)**
80 % PASSING PRODUCT SIZE	**930 (µm)**

BOND ROD MILL WORK INDEX (Kilowatt hours / dry tonne) : 31.1

BOND ROD MILL GRINDABILITY TEST FEED AND PRODUCT SIZINGS

COMPOSITE 2 : 309 DEPOSIT - 98TRCD748 (179 - 188m)

FEED TO PERIOD No. 1			
Size (mm)	Weight (g)	Retained (%)	Passing (%)
11.200	131.4	12.46	87.54
10.000	188.6	17.89	69.65
8.000	192.5	18.26	51.39
6.700	100.7	9.55	41.84
5.600	87.1	8.26	33.58
4.000	103.5	9.82	23.76
2.800	71.3	6.76	17.00
2.000	50.7	4.81	12.19
1.180	54.2	5.14	7.05
-1.180	74.3	7.05	
TOTAL	1054.3	100.0	
F 80 (µm) :	10694		

EQUILIBRIUM PRODUCTS			
Size (mm)	Weight (g)	Retained (%)	Passing (%)
1.000	175.1	16.49	83.51
0.850	80.1	7.54	75.96
0.710	106.4	10.02	65.94
0.600	88.9	8.37	57.57
0.500	70.0	6.59	50.97
-0.500	541.2	50.97	
TOTAL	1061.7	100.0	
P 80 (µm) :	930		

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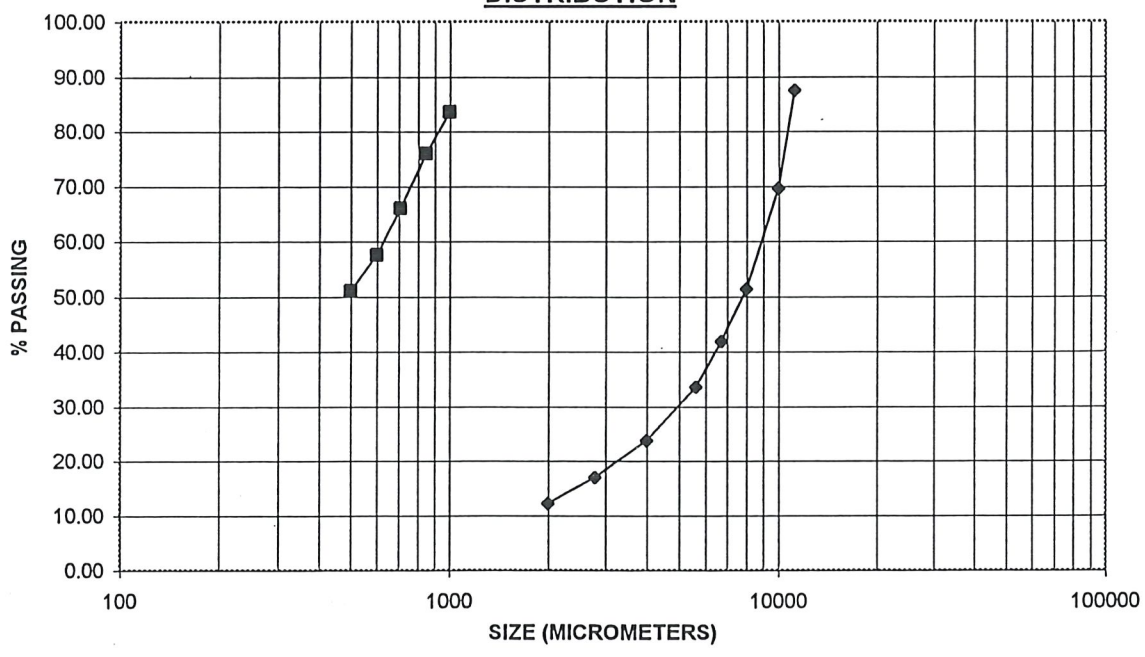
BOND ROD MILL GRINDABILITY : FEED & PRODUCT SIZE DISTRIBUTION



BOND ROD MILL CLOSED CIRCUIT GRINDABILITY : 1180 MICROMETERS

SAMPLE IDENTITY	**COMPOSITE 3 : 309 DEPOSIT - 98TRCD748 (191 - 229m)**
CLIENT	HOMESTAKE EXPLORATION (PLUTONIC RESOURCES LTD)
PROJECT No	A 6573 : TWIN HILLS GOLD PROJECT
DATE	JANUARY 1999

PERIOD	REVS OF MILL	WT OF 1250 mls (g)	WT OF NEW FEED (g)	WT OF O/SIZE (g)*	WT OF U/SIZE (g)*	NET WT OF U/SIZE (g)*	NET WT OF U/SIZE PER REV (g)	CIRC'TING LOAD (%)	WT OF FRESH FEED ADDED TO NEXT CYCLE (g)	WT OF U/SIZE IN FEED TO NEXT CYCLE (g)
1	100	2125.4	2125.4	1704.5	420.9	259.1	2.591	405	420.9	32.0
2	397	2125.4	420.9	1230.9	894.5	862.5	2.172	138	894.5	68.1
3	458	2125.4	894.5	961.6	1163.8	1095.7	2.392	83	1163.8	88.6
4	407	2125.4	1163.8	1042.3	1083.1	994.5	2.443	96	1083.1	82.5
5	401	2125.4	1083.1	1062.7	1062.7	980.2	2.444	100	1062.7	80.9
6	402	2125.4	1062.7	1062.7	1062.7	981.8	2.442	100	1062.7	80.9

Note : * = Ex grinding mill

PRODUCT IN THE FEED	7.61 (%)
BULK DENSITY	1.7003 t/m^3
IDEAL POTENTIAL PRODUCT	1062.7 (g)
AVERAGE EQUILIBRIUM CIRC LOAD	100 (%)
AVERAGE PRODUCT	2.443 (g/rev)
80 % PASSING FEED SIZE	10358 (µm)
80 % PASSING PRODUCT SIZE	866 (µm)

BOND ROD MILL WORK INDEX (Kilowatt hours / dry tonne) : 31.8

BOND ROD MILL GRINDABILITY TEST FEED AND PRODUCT SIZINGS

COMPOSITE 3 : 309 DEPOSIT - 98TRCD748 (191 - 229m)

FEED TO PERIOD No. 1			
Size (mm)	Weight (g)	Retained (%)	Passing (%)
11.200	66.6	6.77	93.23
10.000	185.5	18.86	74.37
8.000	188.0	19.11	55.27
6.700	92.4	9.39	45.87
5.600	86.1	8.75	37.12
4.000	108.0	10.98	26.14
2.800	76.2	7.75	18.40
2.000	53.1	5.40	13.00
1.180	53.0	5.39	7.61
-1.180	74.9	7.61	
TOTAL	983.8	100.0	

F 80 (μm) : 10358

EQUILIBRIUM PRODUCTS			
Size (mm)	Weight (g)	Retained (%)	Passing (%)
1.000	141.6	13.32	86.68
0.850	79.4	7.47	79.20
0.710	110.0	10.35	68.85
0.600	89.5	8.42	60.43
0.500	70.0	6.59	53.84
-0.500	572.2	53.84	
TOTAL	1062.7	100.0	

P 80 (μm) : 866

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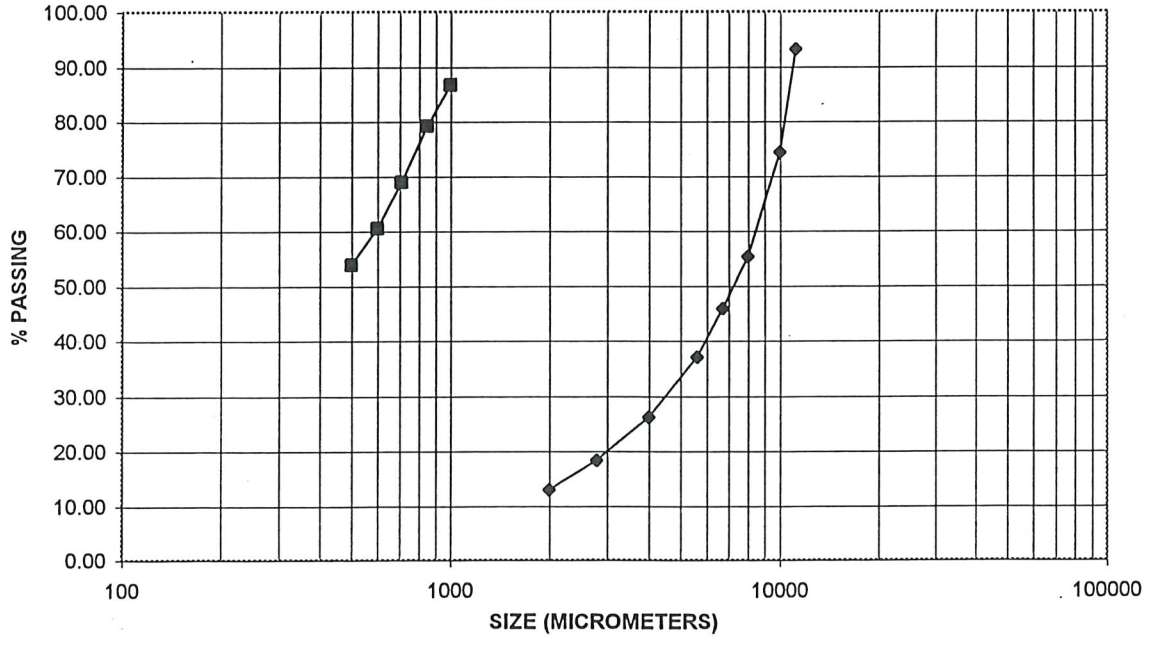
BOND ROD MILL GRINDABILITY : FEED & PRODUCT SIZE DISTRIBUTION



BOND ROD MILL CLOSED CIRCUIT GRINDABILITY : 1180 MICROMETERS

SAMPLE IDENTITY	COMPOSITE 7 : LONE SISTER DEPOSIT - 98LRCD134 (116 - 125m)
CLIENT	HOMESTAKE EXPLORATION (PLUTONIC RESOURCES LTD)
PROJECT No	A 6573 : TWIN HILLS GOLD PROJECT
DATE	JANUARY 1999

PERIOD	REVS OF MILL	WT OF 1250 mls (g)	WT OF NEW FEED (g)	WT OF O/SIZE (g)*	WT OF U/SIZE (g)*	NET WT OF U/SIZE (g)*	NET WT OF U/SIZE PER REV (g)	CIRC'TING LOAD (%)	WT OF FRESH FEED ADDED TO NEXT CYCLE (g)	WT OF U/SIZE IN FEED TO NEXT CYCLE (g)
1	100	2060.6	2060.6	1594.2	466.4	288.5	2.885	342	466.4	40.3
2	342	2060.6	466.4	1213.3	847.3	807.0	2.360	143	847.3	73.2
3	406	2060.6	847.3	861.5	1199.1	1125.9	2.773	72	1199.1	103.5
4	334	2060.6	1199.1	1017.9	1042.7	939.2	2.812	98	1042.7	90.0
5	334	2060.6	1042.7	1078.9	981.7	891.7	2.670	110	981.7	84.8
6	354	2060.6	981.7	1030.3	1030.3	945.5	2.671	100	1030.3	89.0
7	352	2060.6	1030.3	1030.3	1030.3	941.3	2.674	100	1030.3	89.0

Note : * = Ex grinding mill

PRODUCT IN THE FEED	8.63	(%)
BULK DENSITY	1.6485	t/m^3
IDEAL POTENTIAL PRODUCT	1030.3	(g)
AVERAGE EQUILIBRIUM CIRC LOAD	100	(%)
AVERAGE PRODUCT	2.673	(g/rev)
80 % PASSING FEED SIZE	10359	(µm)
80 % PASSING PRODUCT SIZE	853	(µm)

BOND ROD MILL WORK INDEX (Kilowatt hours / dry tonne) : 29.7

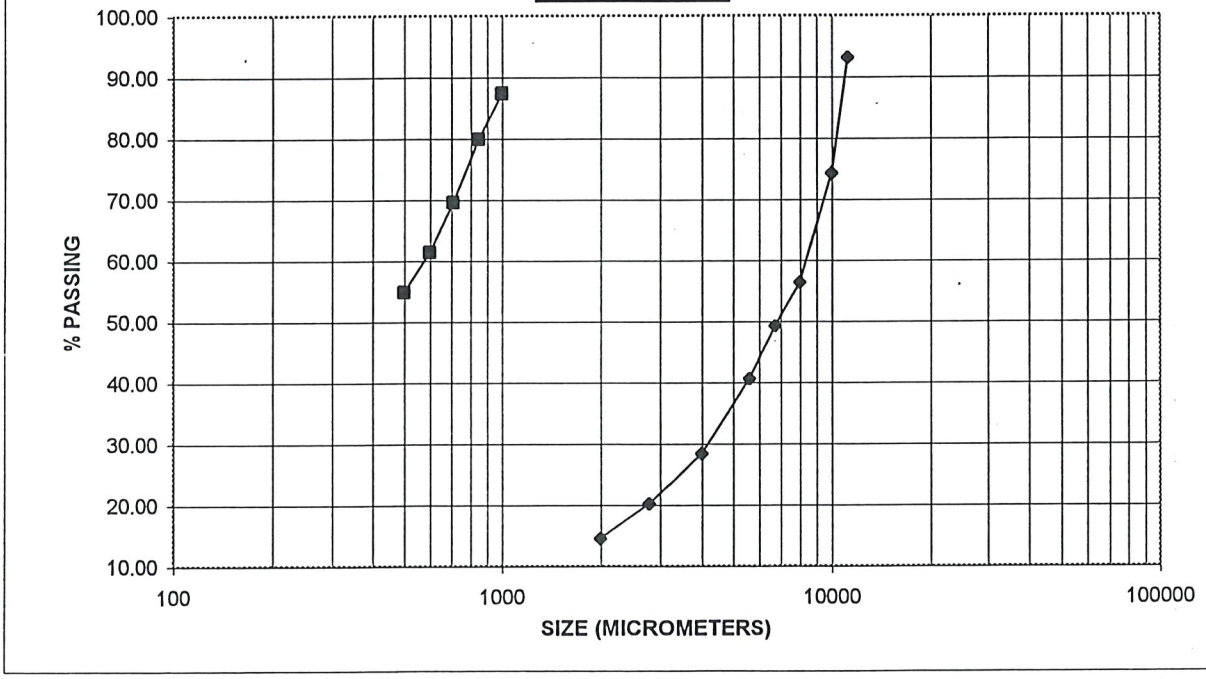
BOND ROD MILL GRINDABILITY TEST FEED AND PRODUCT SIZINGS

COMPOSITE 7 : LONE SISTER DEPOSIT - 98LRCD134 (116 - 125m)

FEED TO PERIOD No. 1			
Size (mm)	Weight (g)	Retained (%)	Passing (%)
11.200	76.7	6.79	93.21
10.000	212.9	18.85	74.35
8.000	202.3	17.92	56.44
6.700	81.0	7.17	49.26
5.600	96.9	8.58	40.68
4.000	137.9	12.21	28.47
2.800	93.6	8.29	20.18
2.000	63.3	5.61	14.58
1.180	67.1	5.94	8.63
-1.180	97.5	8.63	
TOTAL	1129.2	100.0	
F 80 (µm) :		10359	

EQUILIBRIUM PRODUCTS			
Size (mm)	Weight (g)	Retained (%)	Passing (%)
1.000	130.1	12.63	87.37
0.850	77.4	7.51	79.86
0.710	105.8	10.27	69.59
0.600	84.8	8.23	61.36
0.500	67.2	6.52	54.84
-0.500	565.0	54.84	
TOTAL	1030.3	100.0	
P 80 (µm) :		853	

BOND ROD MILL GRINDABILITY : FEED & PRODUCT SIZE DISTRIBUTION



BOND ROD MILL CLOSED CIRCUIT GRINDABILITY : 1180 MICROMETERS

SAMPLE IDENTITY	COMPOSITE 8 : LONE SISTER DEPOSIT - 98LRCD134 (126 - 135m)
CLIENT	HOMESTAKE EXPLORATION (PLUTONIC RESOURCES LTD)
PROJECT No	A 6573 : TWIN HILLS GOLD PROJECT
DATE	JANUARY 1999

PERIOD	REVS OF MILL	WT OF 1250 mls (g)	WT OF NEW FEED (g)	WT OF O/SIZE (g)*	WT OF U/SIZE (g)*	NET WT OF U/SIZE (g)*	NET WT OF U/SIZE PER REV (g)	CIRC'TING LOAD (%)	WT OF FRESH FEED ADDED TO NEXT CYCLE (g)	WT OF U/SIZE IN FEED TO NEXT CYCLE (g)
1	100	2114.4	2114.4	1646.7	467.7	297.7	2.977	352	467.7	37.6
2	342	2114.4	467.7	1280.2	834.2	796.6	2.329	153	834.2	67.1
3	425	2114.4	834.2	917.4	1197.0	1129.9	2.659	77	1197.0	96.2
4	362	2114.4	1197.0	1036.0	1078.4	982.2	2.713	96	1078.4	86.7
5	358	2114.4	1078.4	1090.2	1024.2	937.5	2.619	106	1024.2	82.3
6	372	2114.4	1024.2	1057.2	1057.2	974.9	2.621	100	1057.2	85.0
7	371	2114.4	1057.2	1057.2	1057.2	972.2	2.621	100	1057.2	85.0

Note : * = Ex grinding mill

PRODUCT IN THE FEED	8.04 (%)
BULK DENSITY	1.6915 t/m^3
IDEAL POTENTIAL PRODUCT	1057.2 (g)
AVERAGE EQUILIBRIUM CIRC LOAD	100 (%)
AVERAGE PRODUCT	2.621 (g/rev)
80 % PASSING FEED SIZE	10535 (µm)
80 % PASSING PRODUCT SIZE	800 (µm)

BOND ROD MILL WORK INDEX (Kilowatt hours / dry tonne) : 28.7

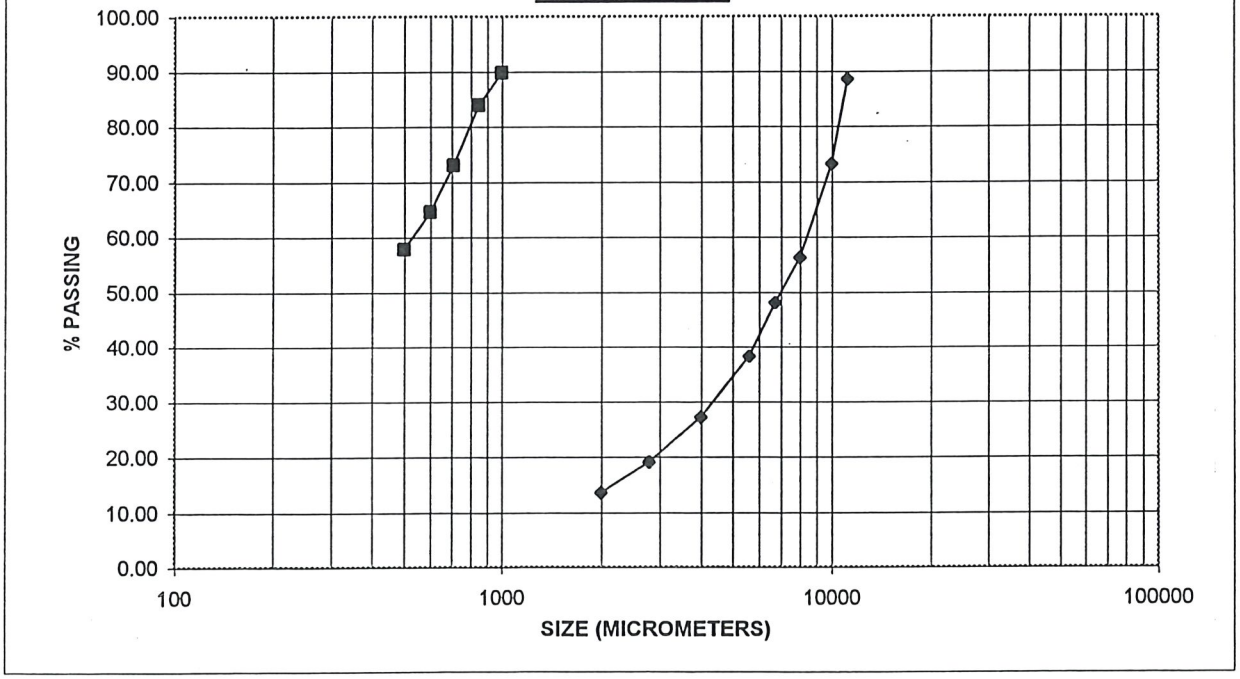
BOND ROD MILL GRINDABILITY TEST FEED AND PRODUCT SIZINGS

COMPOSITE 8 : LONE SISTER DEPOSIT - 98LRCD134 (126 - 135m)

FEED TO PERIOD No. 1			
Size (mm)	Weight (g)	Retained (%)	Passing (%)
11.200	98.6	11.49	88.51
10.000	131.8	15.35	73.16
8.000	144.8	16.87	56.29
6.700	70.5	8.21	48.08
5.600	84.0	9.79	38.29
4.000	95.3	11.10	27.19
2.800	70.1	8.17	19.02
2.000	46.4	5.41	13.62
1.180	47.9	5.58	8.04
-1.180	69.0	8.04	
TOTAL	858.4	100.0	
F 80 (µm) :		10535	

EQUILIBRIUM PRODUCTS			
Size (mm)	Weight (g)	Retained (%)	Passing (%)
1.000	109.2	10.33	89.67
0.850	61.3	5.80	83.87
0.710	115.5	10.93	72.95
0.600	88.3	8.35	64.60
0.500	71.5	6.76	57.83
-0.500	611.4	57.83	
TOTAL	1057.2	100.0	
P 80 (µm) :		800	

BOND ROD MILL GRINDABILITY : FEED & PRODUCT SIZE DISTRIBUTION



APPENDIX V

BOND BALL MILL WORK INDEX DETERMINATIONS

DETAILS AND RESULTS

BOND BALL MILL CLOSED CIRCUIT GRINDABILITY : 106 MICROMETERS

SAMPLE IDENTITY	COMPOSITE 2 : 309 DEPOSIT - 98TRCD748 (179 - 188m)
CLIENT	HOMESTAKE EXPLORATION (PLUTONIC RESOURCES LTD)
PROJECT No	A 6573 : TWIN HILLS GOLD PROJECT
DATE	JANUARY 1999

PERIOD	REVS OF MILL	WT OF 700 mls (g)	WT OF NEW FEED (g)	WT OF O/SIZE (g)*	WT OF U/SIZE (g)*	NET WT OF U/SIZE (g)*	NET WT OF U/SIZE PER REV (g)	CIRC'TING LOAD (%)	WT OF FRESH FEED ADDED TO NEXT CYCLE (g)	WT OF U/SIZE IN FEED TO NEXT CYCLE (g)
1	200	1175.8	1175.8	1058.1	117.7	102.7	0.5134	899	117.7	1.5
2	653	1175.8	117.7	826.2	349.6	348.1	0.5331	236	349.6	4.5
3	622	1175.8	349.6	800.0	375.8	371.3	0.5970	213	375.8	4.8
4	555	1175.8	375.8	839.9	335.9	331.1	0.5966	250	335.9	4.3
5	556	1175.8	335.9	789.6	386.2	381.9	0.6869	204	386.2	4.9
6	482	1175.8	386.2	839.9	335.9	331.0	0.6867	250	335.9	4.3
7	483	1175.8	335.9	839.9	335.9	331.6	0.6866	250	335.9	4.3

Note : * = Ex grinding mill

PRODUCT IN THE FEED	1.28 (%)
BULK DENSITY	1.6797 t/m^3
IDEAL POTENTIAL PRODUCT	335.9 (g)
AVERAGE EQUILIBRIUM CIRC LOAD	250 (%)
AVERAGE PRODUCT	0.687 (g/rev)
80 % PASSING FEED SIZE	2615 (µm)
80 % PASSING PRODUCT SIZE	88 (µm)

BOND BALL MILL WORK INDEX (Kilowatt hours / dry tonne) : 26.3

BOND BALL MILL GRINDABILITY TEST FEED AND PRODUCT SIZINGS

COMPOSITE 2 : 309 DEPOSIT - 98TRCD748 (179 - 188m)

FEED TO PERIOD No. 1			
Size (mm)	Weight (g)	Retained (%)	Passing (%)
2.800	60.5	12.47	87.53
2.000	158.2	32.60	54.94
1.400	89.3	18.40	36.53
1.000	63.2	13.02	23.51
0.600	55.7	11.48	12.03
0.300	38.6	7.95	4.08
0.150	11.7	2.41	1.67
0.106	1.9	0.39	1.28
-0.106	6.2	1.28	
TOTAL	485.3		
F 80 (µm) :	2615		

EQUILIBRIUM PRODUCTS			
Size (mm)	Weight (g)	Retained (%)	Passing (%)
0.090	63.7	18.96	81.04
0.075	31.5	9.38	71.66
0.063	28.0	8.34	63.32
0.045	42.9	12.77	50.55
-0.045	169.8	50.55	
TOTAL	335.9	100.00	
P 80 (µm) :	88		

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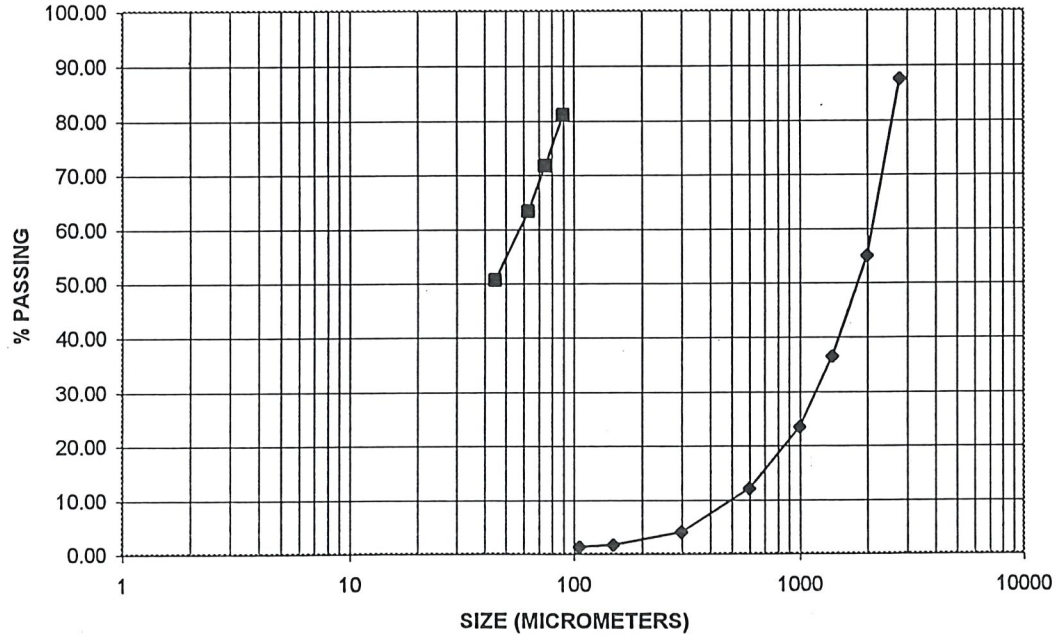
BOND BALL MILL GRINDABILITY : FEED & PRODUCT SIZE DISTRIBUTION



BOND BALL MILL CLOSED CIRCUIT GRINDABILITY : 106 MICROMETERS

SAMPLE IDENTITY	COMPOSITE 3 : 309 DEPOSIT - 98TRCD748 (191 - 229m)
CLIENT	HOMESTAKE EXPLORATION (PLUTONIC RESOURCES LTD)
PROJECT No	A 6573 : TWIN HILLS GOLD PROJECT
DATE	JANUARY 1999

PERIOD	REVS OF MILL	WT OF 700 mls (g)	WT OF NEW FEED (g)	WT OF O/SIZE (g)*	WT OF U/SIZE (g)*	NET WT OF U/SIZE (g)*	NET WT OF U/SIZE PER REV (g)	CIRC'TING LOAD (%)	WT OF FRESH FEED ADDED TO NEXT CYCLE (g)	WT OF U/SIZE IN FEED TO NEXT CYCLE (g)
1	200	1162.6	1162.6	1042.0	120.6	103.2	0.5158	864	120.6	1.8
2	640	1162.6	120.6	799.1	363.5	361.7	0.5651	220	363.5	5.5
3	578	1162.6	363.5	795.1	367.5	362.0	0.6264	216	367.5	5.5
4	522	1162.6	367.5	811.3	351.3	345.8	0.6624	231	351.3	5.3
5	493	1162.6	351.3	830.4	332.2	326.9	0.6631	250	332.2	5.0
6	493	1162.6	332.2	830.4	332.2	327.2	0.6637	250	332.2	5.0

Note : * = Ex grinding mill

PRODUCT IN THE FEED	1.50 (%)
BULK DENSITY	1.6609 t/m^3
IDEAL POTENTIAL PRODUCT	332.2 (g)
AVERAGE EQUILIBRIUM CIRC LOAD	250 (%)
AVERAGE PRODUCT	0.663 (g/rev)
80 % PASSING FEED SIZE	2574 (µm)
80 % PASSING PRODUCT SIZE	86 (µm)

BOND BALL MILL WORK INDEX (Kilowatt hours / dry tonne) : 26.7

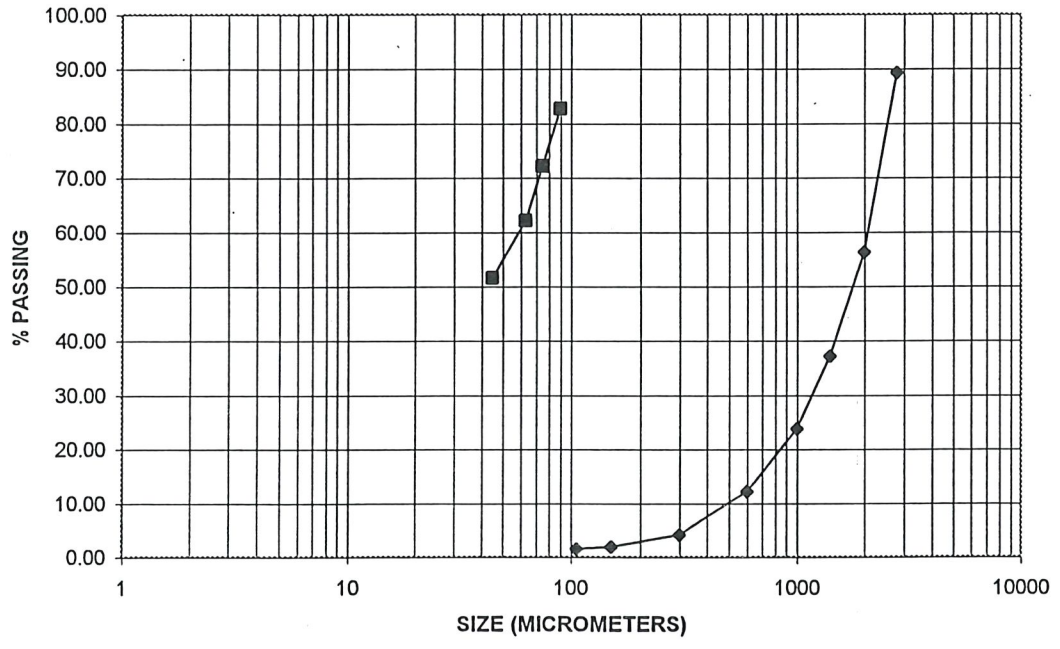
BOND BALL MILL GRINDABILITY TEST FEED AND PRODUCT SIZINGS

COMPOSITE 3 : 309 DEPOSIT - 98TRCD748 (191 - 229m)

FEED TO PERIOD No. 1			
Size (mm)	Weight (g)	Retained (%)	Passing (%)
2.800	36.3	10.68	89.32
2.000	112.1	32.99	56.33
1.400	65.0	19.13	37.20
1.000	45.3	13.33	23.87
0.600	39.8	11.71	12.15
0.300	27.1	7.98	4.18
0.150	7.9	2.32	1.85
0.106	1.2	0.35	1.50
-0.106	5.1	1.50	
TOTAL	339.8		
F 80 (µm) :	2574		

EQUILIBRIUM PRODUCTS			
Size (mm)	Weight (g)	Retained (%)	Passing (%)
0.090	57.3	17.25	82.75
0.075	35.2	10.60	72.16
0.063	33.3	10.02	62.13
0.045	35.3	10.63	51.51
-0.045	171.1	51.51	
TOTAL	332.2	100.00	
P 80 (µm) :	86		

BOND BALL MILL GRINDABILITY : FEED & PRODUCT SIZE DISTRIBUTION



BOND BALL MILL CLOSED CIRCUIT GRINDABILITY : 106 MICROMETERS

SAMPLE IDENTITY	COMPOSITE 7 : LONE SISTER DEPOSIT - 98LRCD134 (116 - 125m)
CLIENT	HOMESTAKE EXPLORATION (PLUTONIC RESOURCES LTD)
PROJECT No	A 6573 : TWIN HILLS GOLD PROJECT
DATE	JANUARY 1999

PERIOD	REVS OF MILL	WT OF 700 mls (g)	WT OF NEW FEED (g)	WT OF O/SIZE (g)*	WT OF U/SIZE (g)*	NET WT OF U/SIZE (g)*	NET WT OF U/SIZE PER REV (g)	CIRC'TING LOAD (%)	WT OF FRESH FEED ADDED TO NEXT CYCLE (g)	WT OF U/SIZE IN FEED TO NEXT CYCLE (g)
1	200	1172.8	1172.8	1033.3	139.5	114.9	0.5747	741	139.5	2.9
2	578	1172.8	139.5	808.9	363.9	361.0	0.6245	222	363.9	7.6
3	524	1172.8	363.9	822.4	350.4	342.8	0.6542	235	350.4	7.3
4	501	1172.8	350.4	789.0	383.8	376.5	0.7514	206	383.8	8.0
5	435	1172.8	383.8	837.7	335.1	327.1	0.7519	250	335.1	7.0
6	436	1172.8	335.1	837.7	335.1	328.1	0.7525	250	335.1	7.0

Note : * = Ex grinding mill

PRODUCT IN THE FEED	2.09 (%)
BULK DENSITY	1.6754 t/m^3
IDEAL POTENTIAL PRODUCT	335.1 (g)
AVERAGE EQUILIBRIUM CIRC LOAD	250 (%)
AVERAGE PRODUCT	0.752 (g/rev)
80 % PASSING FEED SIZE	2580 (µm)
80 % PASSING PRODUCT SIZE	86 (µm)

BOND BALL MILL WORK INDEX (Kilowatt hours / dry tonne) : 24.0

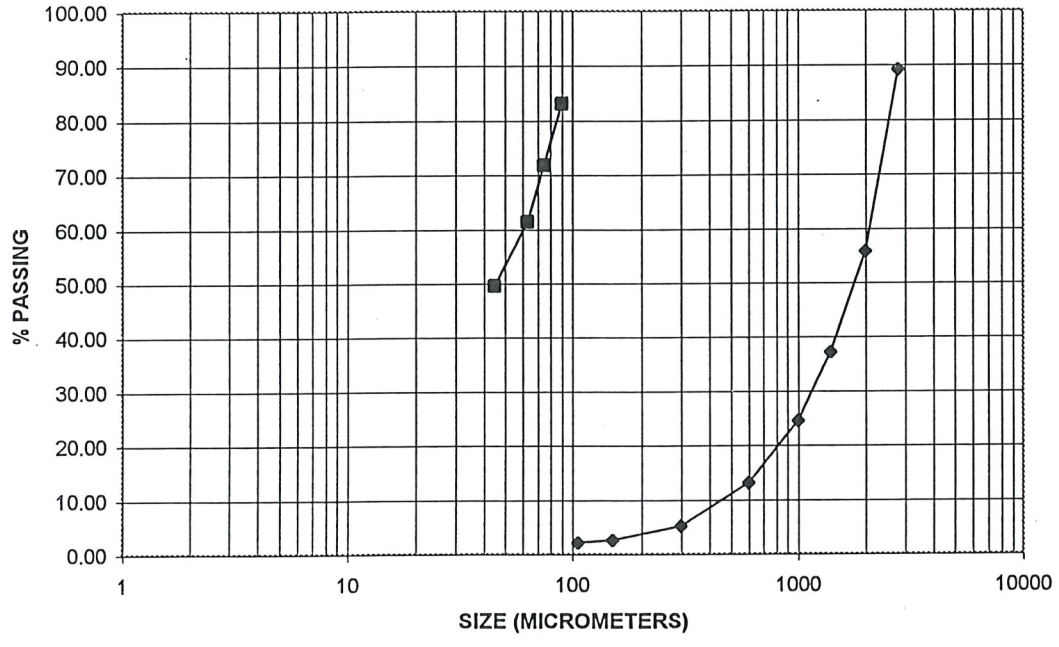
BOND BALL MILL GRINDABILITY TEST FEED AND PRODUCT SIZINGS

COMPOSITE 7 : LONE SISTER DEPOSIT - 98LRCD134 (116 - 125m)

FEED TO PERIOD No. 1			
Size (mm)	Weight (g)	Retained (%)	Passing (%)
2.800	50.7	10.83	89.17
2.000	155.9	33.31	55.85
1.400	87.4	18.68	37.18
1.000	59.1	12.63	24.55
0.600	53.1	11.35	13.21
0.300	37.4	7.99	5.21
0.150	12.2	2.61	2.61
0.106	2.4	0.51	2.09
-0.106	9.8	2.09	
TOTAL	468.0		
F 80 (µm) :	2580		

EQUILIBRIUM PRODUCTS			
Size (mm)	Weight (g)	Retained (%)	Passing (%)
0.090	56.9	16.98	83.02
0.075	37.5	11.19	71.83
0.063	35.2	10.50	61.32
0.045	39.5	11.79	49.54
-0.045	166.0	49.54	
TOTAL	335.1	100.00	
P 80 (µm) :	86		

BOND BALL MILL GRINDABILITY : FEED & PRODUCT SIZE DISTRIBUTION



BOND BALL MILL CLOSED CIRCUIT GRINDABILITY : 106 MICROMETERS

SAMPLE IDENTITY	COMPOSITE 8 : LONE SISTER DEPOSIT - 98LRCD134 (126 - 135m)
CLIENT	HOMESTAKE EXPLORATION (PLUTONIC RESOURCES LTD)
PROJECT No	A 6573 : TWIN HILLS GOLD PROJECT
DATE	JANUARY 1999

PERIOD	REVS OF MILL	WT OF 700 mls (g)	WT OF NEW FEED (g)	WT OF O/SIZE (g)*	WT OF U/SIZE (g)*	NET WT OF U/SIZE (g)*	NET WT OF U/SIZE PER REV (g)	CIRC'TING LOAD (%)	WT OF FRESH FEED ADDED TO NEXT CYCLE (g)	WT OF U/SIZE IN FEED TO NEXT CYCLE (g)
1	200	1193.1	1193.1	1054.5	138.6	112.5	0.5624	761	138.6	3.0
2	601	1193.1	138.6	820.2	372.9	369.9	0.6154	220	372.9	8.2
3	541	1193.1	372.9	808.3	384.8	376.6	0.6962	210	384.8	8.4
4	478	1193.1	384.8	852.2	340.9	332.5	0.6956	250	340.9	7.5
5	479	1193.1	340.9	821.4	371.7	364.2	0.7604	221	371.7	8.1
6	438	1193.1	371.7	852.2	340.9	332.8	0.7597	250	340.9	7.5
7	439	1193.1	340.9	852.2	340.9	333.4	0.7595	250	340.9	7.5

Note : * = Ex grinding mill

PRODUCT IN THE FEED	2.19 (%)
BULK DENSITY	1.7044 t/m^3
IDEAL POTENTIAL PRODUCT	340.9
AVERAGE EQUILIBRIUM CIRC LOAD	167 (%)
AVERAGE PRODUCT	0.506 (g/rev)
80 % PASSING FEED SIZE	2637 (µm)
80 % PASSING PRODUCT SIZE	90 (µm)

BOND BALL MILL WORK INDEX (Kilowatt hours / dry tonne) : 34.2

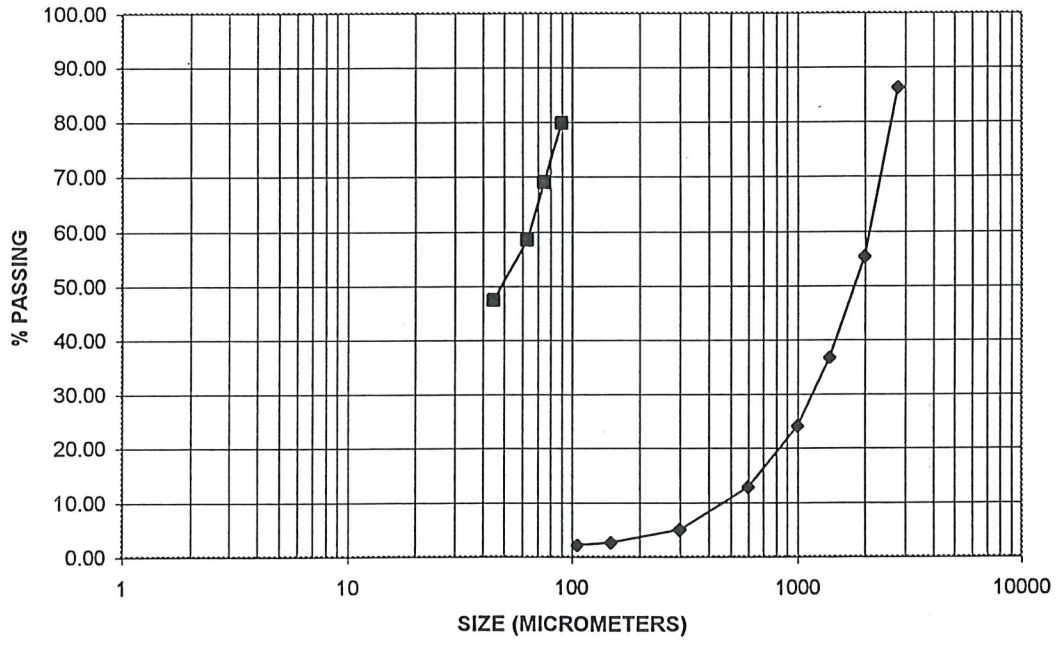
BOND BALL MILL GRINDABILITY TEST FEED AND PRODUCT SIZINGS

COMPOSITE 8 : LONE SISTER DEPOSIT - 98LRCD134 (126 - 135m)

FEED TO PERIOD No. 1			
Size (mm)	Weight (g)	Retained (%)	Passing (%)
2.800	95.2	13.72	86.28
2.000	214.7	30.93	55.35
1.400	129.1	18.60	36.75
1.000	88.0	12.68	24.07
0.600	78.5	11.31	12.76
0.300	53.7	7.74	5.03
0.150	16.6	2.39	2.64
0.106	3.1	0.45	2.19
-0.106	15.2	2.19	
TOTAL	694.1		
F 80 (µm) :	2637		

EQUILIBRIUM PRODUCTS			
Size (mm)	Weight (g)	Retained (%)	Passing (%)
0.090	69.1	20.27	79.73
0.075	36.9	10.82	68.91
0.063	35.6	10.44	58.46
0.045	37.9	11.12	47.35
-0.045	161.4	47.35	
TOTAL	340.9	100.00	
P 80 (µm) :	90		

BOND BALL MILL GRINDABILITY : FEED & PRODUCT SIZE DISTRIBUTION



APPENDIX VI

DIRECT CYANIDATION TIME LEACH TESTWORK

DETAILS AND RESULTS

PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - 309 DEPOSIT
CLIENT	HOMESTAKE : PLUTONIC RESOURCES LTD
TEST No	HS 4081
SAMPLE	**COMPOSITE 1 : 98TRCD748 (171 - 175m)**
GRIND	P 80 : 75 µm
WATER	PERTH TAP WATER
DATE	FEBRUARY 1999

DIRECT CYANIDATION TIME LEACH TESTWORK

TIME (Hours)	ADDITIONS				SOLUTION DATA				Extraction
	Ore (g)	Water (g)	NaCN (g)	Lime (g)	Oxygen (ppm)	pH	NaCN (%)	Au (ppm)	Au (%)
	3000.0	4500.0			3.1	6.9			
0			4.50	0.65	7.4	10.4	0.100	0.00	0.00
2			0.00	0.00	7.9	10.3	0.088	1.26	30.34
4			0.00	0.00	7.8	10.2	0.083	1.50	36.12
8			0.00	0.00	7.7	10.2	0.075	1.66	39.97
24			0.00	0.00	8.1	10.2	0.058	1.88	45.26
48			0.00	0.00	8.0	10.2	0.043	1.98	47.67

GOLD EXTRACTION CALCULATIONS

Product	Quantity	Assay (ppm)	Total (µg)	Dist'n (%)
Solids (g)	3000.0	3.26	9780	52.33
Solution (mls)	4500.0	1.98	8910	47.67
Total			18690	100.00
Calculated Head		6.23		
Assay Head		4.80 / 6.20		

COMMENTS :

1. NaCN addition : 1.50 (Kg/t)
2. NaCN consumption : 0.82 (Kg/t)
3. Lime consumption : 0.22 (Kg/t)
4. Perth tap water used : 1.000 (SG)
5. Grind Size P 80 : 75 (µm)
6. Leach test conducted in mechanically stirred, baffled agitation vat leach.
7. Evaporation losses made up prior to sampling at each period.

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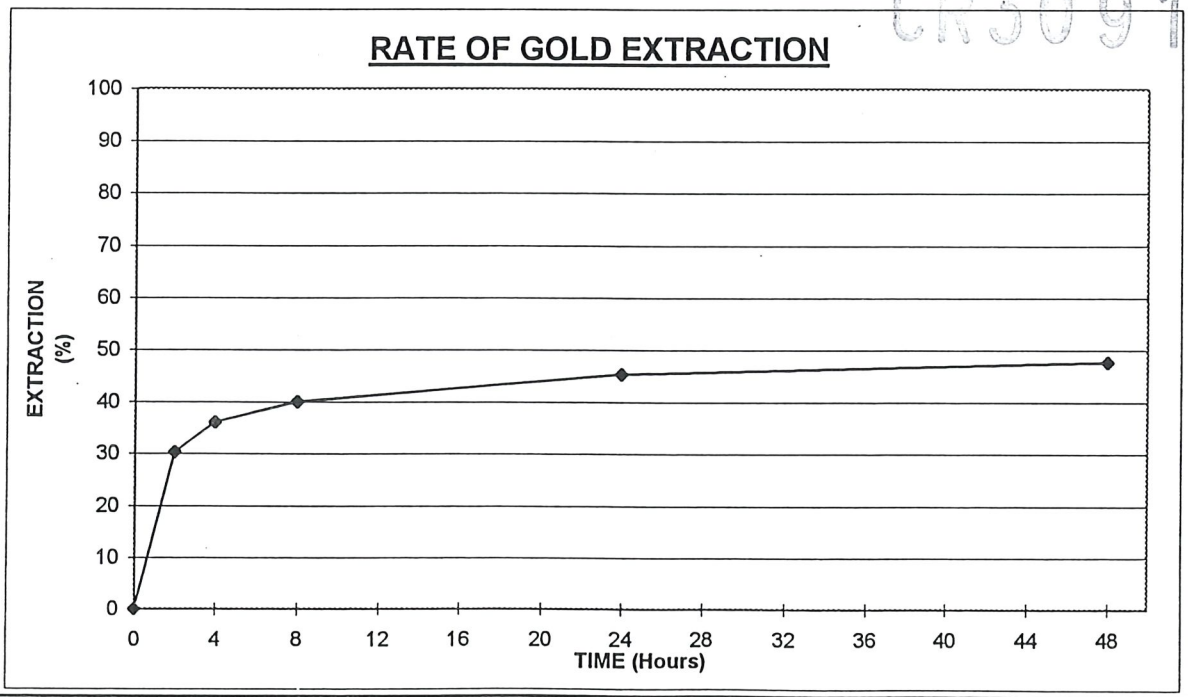
RATE OF GOLD EXTRACTION



PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - 309 DEPOSIT
CLIENT	HOMESTAKE : PLUTONIC RESOURCES LTD
TEST No	HS 4082
SAMPLE	**COMPOSITE 2 : 98TRCD748 (179 - 189m)**
GRIND	P 80 : 75 µm
WATER	PERTH TAP WATER
DATE	FEBRUARY 1999

DIRECT CYANIDATION TIME LEACH TESTWORK

TIME	ADDITIONS				SOLUTION DATA				Extraction
(Hours)	Ore (g)	Water (g)	NaCN (g)	Lime (g)	Oxygen (ppm)	pH	NaCN (%)	Au (ppm)	Au (%)
	3000.0	4500.0			2.4	6.4			
0			4.50	0.90	6.4	10.4	0.100	0.00	0.00
2			0.00	0.00	6.8	10.2	0.088	0.10	6.61
4			0.00	0.00	7.1	10.1	0.088	0.12	7.93
8			0.00	0.00	7.4	10.1	0.083	0.13	8.59
24			0.00	0.00	8.0	10.0	0.065	0.14	9.25
48			0.00	0.00	7.9	10.0	0.043	0.14	9.25

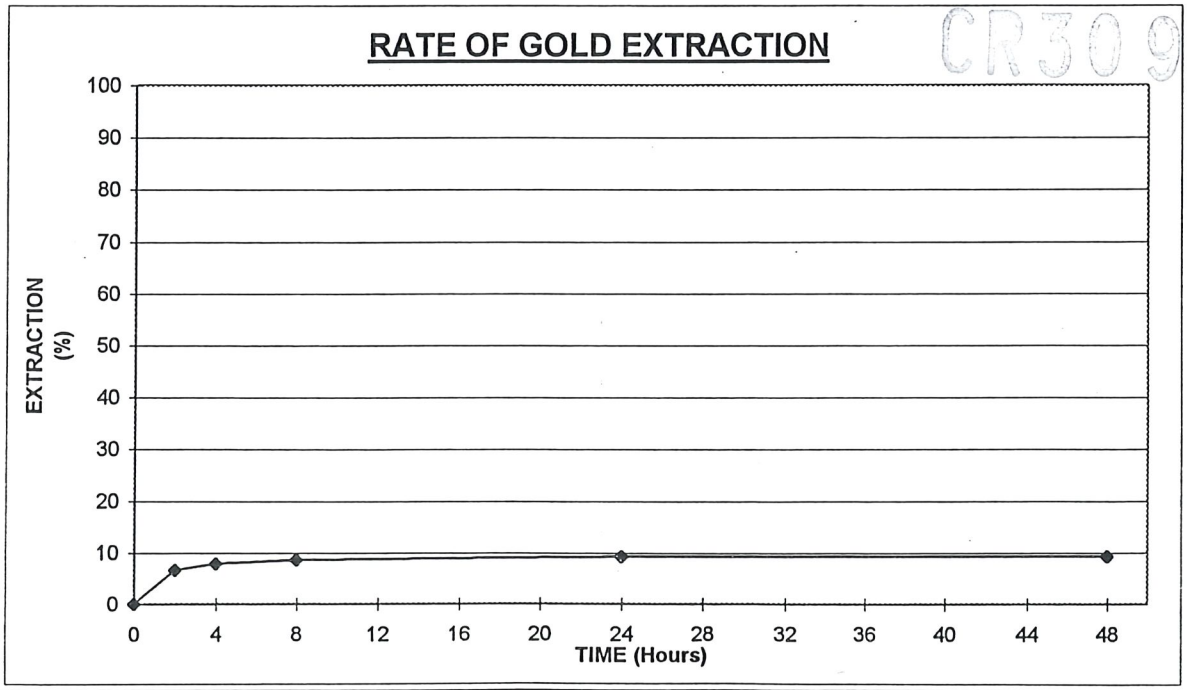
GOLD EXTRACTION CALCULATIONS

Product	Quantity	Assay (ppm)	Total (µg)	Dist'n (%)
Solids (g)	3000.0	2.06	6180	90.75
Solution (mls)	4500.0	0.14	630	9.25
Total			6810	100.00
Calculated Head		2.27		
Assay Head		2.98 / 2.52		

COMMENTS :

1. NaCN addition : 1.50 (Kg/t)
2. NaCN consumption : 0.81 (Kg/t)
3. Lime consumption : 0.30 (Kg/t)
4. Perth tap water used : 1.000 (SG)
5. Grind Size P 80 : 75 (µm)
6. Leach test conducted in mechanically stirred, baffled agitation vat leach.
7. Evaporation losses made up prior to sampling at each period.

RATE OF GOLD EXTRACTION



PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - 309 DEPOSIT
CLIENT	HOMESTAKE : PLUTONIC RESOURCES LTD
TEST No	HS 4083
SAMPLE	**COMPOSITE 3 : 98TRCD748 (191 - 230m)**
GRIND	P 80 : 75 µm
WATER	PERTH TAP WATER
DATE	FEBRUARY 1999

DIRECT CYANIDATION TIME LEACH TESTWORK

TIME (Hours)	ADDITIONS				SOLUTION DATA				Extraction
	Ore (g)	Water (g)	NaCN (g)	Lime (g)	Oxygen (ppm)	pH	NaCN (%)	Au (ppm)	Au (%)
	3000.0	4500.0			2.0	6.7			
0			4.50	0.90	6.8	10.4	0.100	0.00	0.00
2			0.00	0.00	7.3	10.3	0.088	0.06	3.70
4			0.00	0.00	7.4	10.2	0.085	0.08	4.94
8			0.00	0.00	7.3	10.2	0.080	0.09	5.56
24			0.00	0.00	7.9	10.2	0.065	0.12	7.41
48			0.00	0.00	7.8	10.1	0.040	0.14	8.64

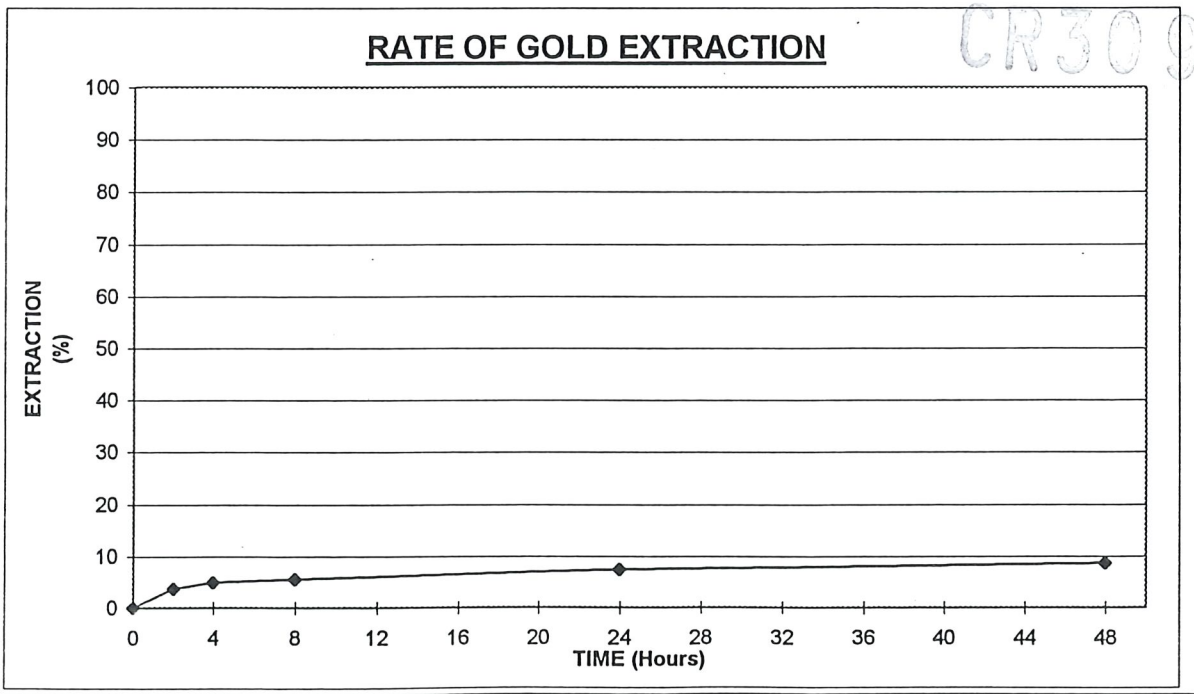
GOLD EXTRACTION CALCULATIONS

Product	Quantity	Assay (ppm)	Total (µg)	Dist'n (%)
Solids (g)	3000.0	2.22	6660	91.36
Solution (mls)	4500.0	0.14	630	8.64
Total			7290	100.00
Calculated Head		2.43		
Assay Head		2.30 / 2.18		

COMMENTS :

1. NaCN addition : 1.50 (Kg/t)
2. NaCN consumption : 0.86 (Kg/t)
3. Lime consumption : 0.30 (Kg/t)
4. Perth tap water used : 1.000 (SG)
5. Grind Size P 80 : 75 (µm)
6. Leach test conducted in mechanically stirred, baffled agitation vat leach.
7. Evaporation losses made up prior to sampling at each period.

RATE OF GOLD EXTRACTION



PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - 309 DEPOSIT
CLIENT	HOMESTAKE : PLUTONIC RESOURCES LTD
TEST No	HS 4084
SAMPLE	**COMPOSITE 4 : TRCD698 (167 - 178m)**
GRIND	P 80 : 75 µm
WATER	PERTH TAP WATER
DATE	FEBRUARY 1999

DIRECT CYANIDATION TIME LEACH TESTWORK

TIME	ADDITIONS				SOLUTION DATA				Extraction
(Hours)	Ore (g)	Water (g)	NaCN (g)	Lime (g)	Oxygen (ppm)	pH	NaCN (%)	Au (ppm)	Au (%)
	3000.0	4500.0			3.5	5.9			
0			4.50	0.90	6.8	10.3	0.100	0.00	0.00
2			0.00	0.00	7.5	10.2	0.090	3.42	55.82
4			0.00	0.00	7.1	10.1	0.088	3.90	63.66
8			0.00	0.00	7.4	10.1	0.080	3.98	64.96
24			0.00	0.00	8.0	10.1	0.063	4.02	65.61
48			0.00	0.00	7.8	10.0	0.045	4.10	66.92

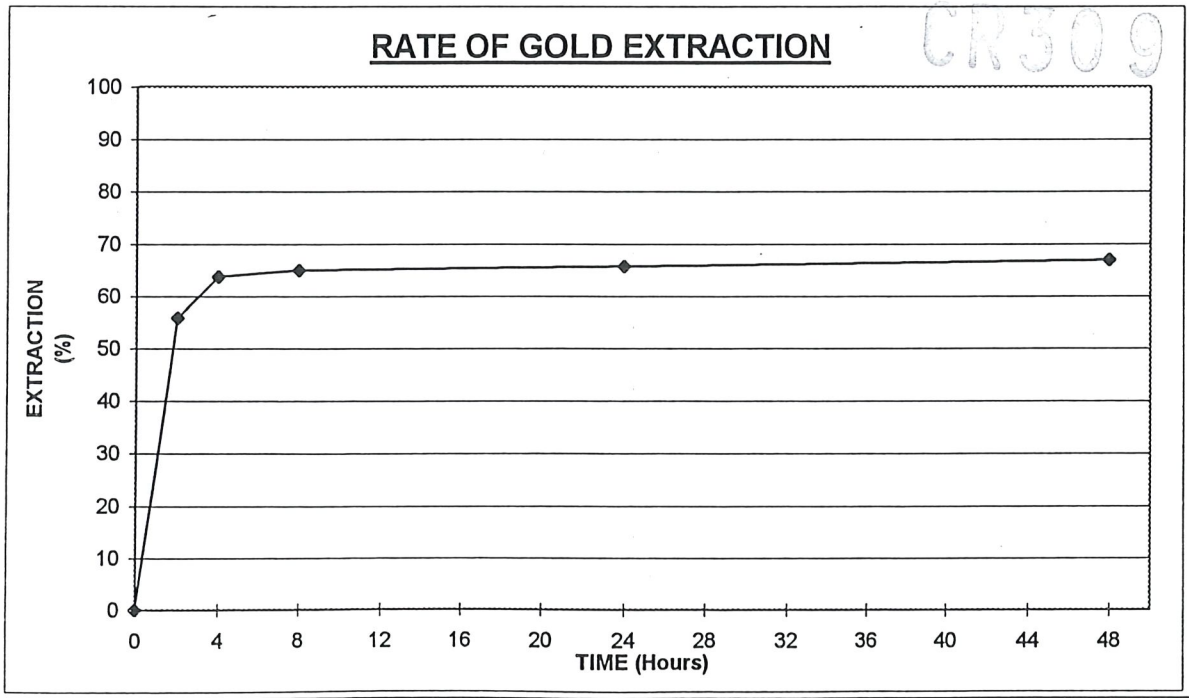
GOLD EXTRACTION CALCULATIONS

Product	Quantity	Assay (ppm)	Total (µg)	Dist'n (%)
Solids (g)	3000.0	3.04	9120	33.08
Solution (mls)	4500.0	4.10	18450	66.92
Total			27570	100.00
Calculated Head		9.19		
Assay Head		12.2 / 8.38		

COMMENTS :

1. NaCN addition : 1.50 (Kg/t)
2. NaCN consumption : 0.79 (Kg/t)
3. Lime consumption : 0.30 (Kg/t)
4. Perth tap water used : 1.000 (SG)
5. Grind Size P 80 : 75 (µm)
6. Leach test conducted in mechanically stirred, baffled agitation vat leach.
7. Evaporation losses made up prior to sampling at each period.

RATE OF GOLD EXTRACTION



PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - 309 DEPOSIT
CLIENT	HOMESTAKE : PLUTONIC RESOURCES LTD
TEST No	HS 4089
SAMPLE	**COMPOSITE HIGH GRADE A : 98TRCD748 (172 - 174m)**
GRIND	P 80 : 75 µm
WATER	PERTH TAP WATER
DATE	FEBRUARY 1999

DIRECT CYANIDATION TIME LEACH TESTWORK

TIME	ADDITIONS				SOLUTION DATA				Extraction
(Hours)	Ore (g)	Water (g)	NaCN (g)	Lime (g)	Oxygen (ppm)	pH	NaCN (%)	Au (ppm)	Au (%)
	1000.0	1500.0			4.6	7.3			
0			1.50	0.31	7.2	10.5	0.100	0.00	0.00
2			0.00	0.00	7.7	10.2	0.088	3.44	38.11
4			0.00	0.00	7.8	10.1	0.088	4.38	48.52
8			0.00	0.00	7.6	10.0	0.075	5.02	55.61
24			0.78	0.00	7.4	9.9	0.048	5.12	56.72
48			0.00	0.00	7.8	9.9	0.083	5.24	58.05

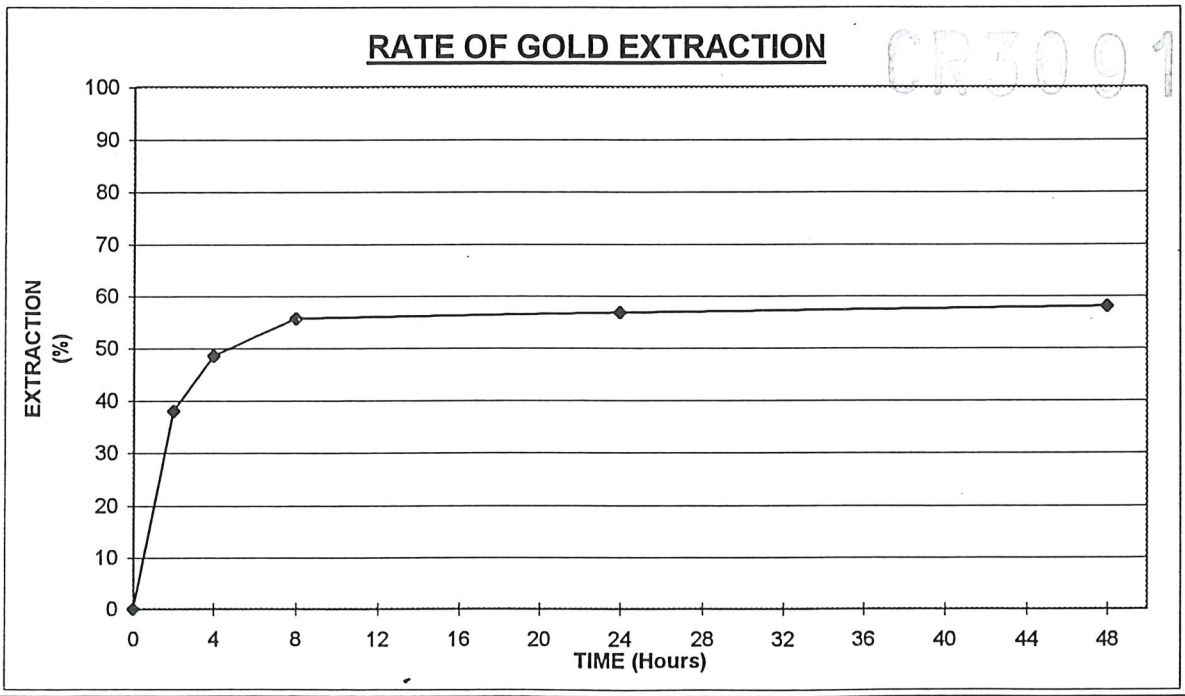
GOLD EXTRACTION CALCULATIONS

Product	Quantity	Assay (ppm)	Total (µg)	Dist'n (%)
Solids (g)	1000.0	5.68	5680	41.95
Solution (mls)	1500.0	5.24	7860	58.05
Total			13540	100.00
Calculated Head		13.54		
Assay Head		12.1/14.0		

COMMENTS :

1. NaCN addition : 2.28 (Kg/t)
2. NaCN consumption : 1.06 (Kg/t)
3. Lime consumption : 0.31 (Kg/t)
4. Perth tap water used : 1.000 (SG)
5. Grind Size P 80 : 75 (µm)
6. Leach test conducted in mechanically stirred, baffled agitation vat leach.
7. Evaporation losses made up prior to sampling at each period.

RATE OF GOLD EXTRACTION



PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - 309 DEPOSIT
CLIENT	HOMESTAKE : PLUTONIC RESOURCES LTD
TEST No	HS 4090
SAMPLE	**COMPOSITE HIGH GRADE B : TRCD698 (168 - 171m)**
GRIND	P 80 : 75 µm
WATER	PERTH TAP WATER
DATE	FEBRUARY 1999

DIRECT CYANIDATION TIME LEACH TESTWORK

TIME	ADDITIONS				SOLUTION DATA				Extraction
(Hours)	Ore (g)	Water (g)	NaCN (g)	Lime (g)	Oxygen (ppm)	pH	NaCN (%)	Au (ppm)	Au (%)
	1000.0	1500.0			4.7	7.0			
0			1.50	0.25	7.8	10.4	0.100	0.0	0.00
2			0.00	0.00	7.8	10.2	0.093	16.3	70.87
4			0.00	0.00	7.5	10.1	0.088	18.4	80.00
8			0.00	0.00	8.0	10.0	0.088	19.4	84.35
24			0.00	0.00	7.7	9.9	0.063	19.6	85.22
48			0.00	0.00	7.9	9.8	0.055	19.8	86.09

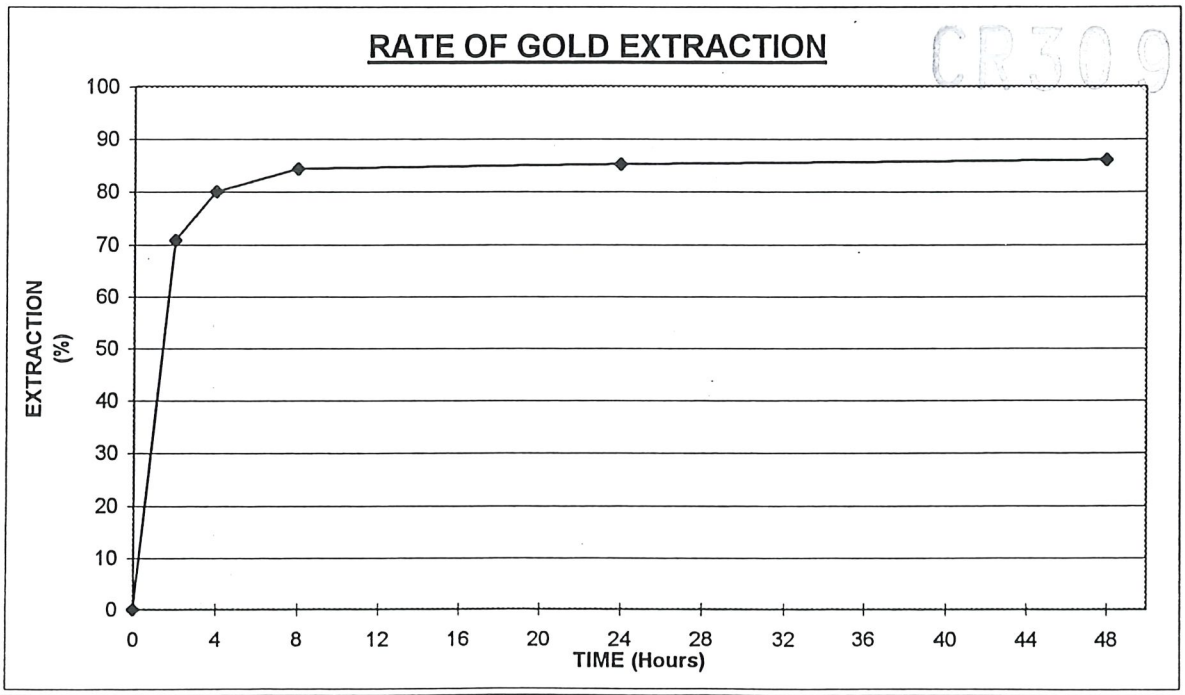
GOLD EXTRACTION CALCULATIONS

Product	Quantity	Assay (ppm)	Total (µg)	Dist'n (%)
Solids (g)	1000.0	4.80	4800	13.91
Solution (mls)	1500.0	19.8	29700	86.09
Total			34500	100.00
Calculated Head		34.5		
Assay Head		36.6/35.6		

COMMENTS :

1. NaCN addition : 1.50 (Kg/t)
2. NaCN consumption : 0.60 (Kg/t)
3. Lime consumption : 0.25 (Kg/t)
4. Perth tap water used : 1.000 (SG)
5. Grind Size P 80 : 75 (µm)
6. Leach test conducted in mechanically stirred, baffled agitation vat leach.
7. Evaporation losses made up prior to sampling at each period.

RATE OF GOLD EXTRACTION



PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - LONE SISTER DEPOSIT
CLIENT	HOMESTAKE : PLUTONIC RESOURCES LTD
TEST No	HS 4085
SAMPLE	**COMPOSITE 5 : 98LRCD134 (71.3 - 86m)**
GRIND	P 80 : 75 µm
WATER	PERTH TAP WATER
DATE	FEBRUARY 1999

DIRECT CYANIDATION TIME LEACH TESTWORK

TIME	ADDITIONS				SOLUTION DATA				Extraction
(Hours)	Ore (g)	Water (g)	NaCN (g)	Lime (g)	Oxygen (ppm)	pH	NaCN (%)	Au (ppm)	Au (%)
	3000.0	4500.0			2.7	6.6			
0			4.50	0.90	7.1	10.2	0.100	0.00	0.00
2			0.00	0.00	7.5	10.2	0.080	3.34	58.19
4			0.00	0.00	7.2	10.1	0.078	4.26	74.22
8			0.00	0.00	7.3	10.1	0.073	4.58	79.79
24			2.93	0.00	7.9	10.1	0.035	4.96	86.41
48			0.00	0.00	7.6	10.0	0.085	5.00	87.11

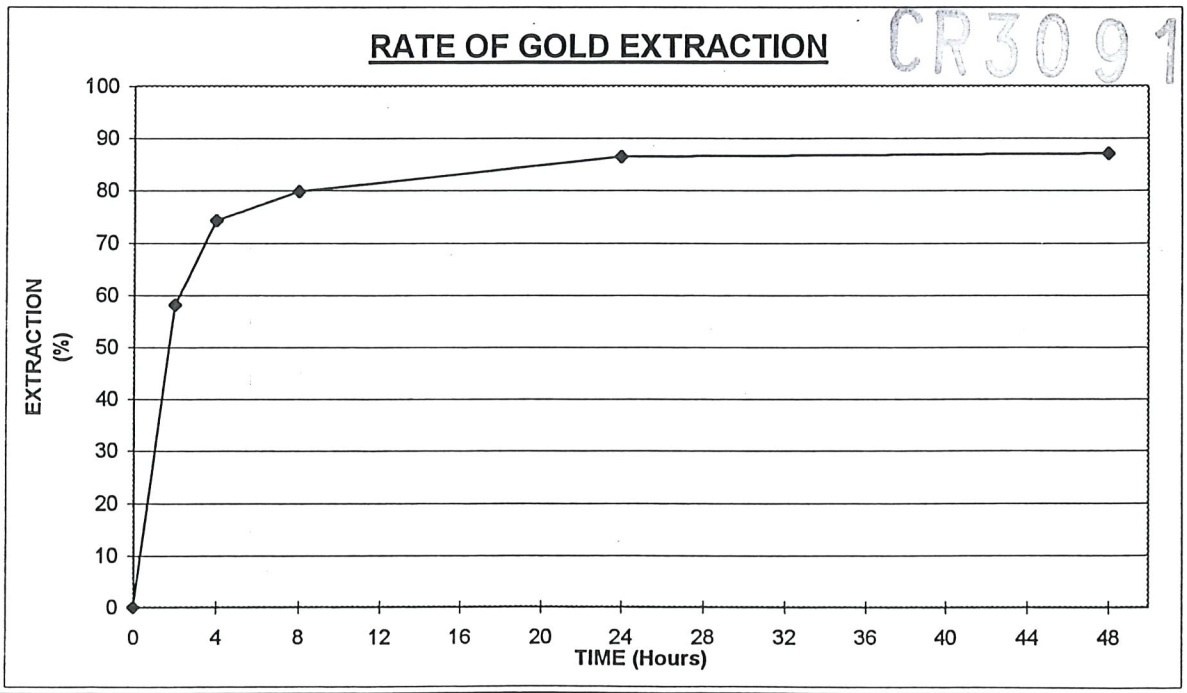
GOLD EXTRACTION CALCULATIONS

Product	Quantity	Assay (ppm)	Total (µg)	Dist'n (%)
Solids (g)	3000.0	1.11	3330	12.89
Solution (mls)	4500.0	5.00	22500	87.11
Total			25830	100.00
Calculated Head		8.61		
Assay Head		8.16 / 7.02		

COMMENTS :

1. NaCN addition : 2.48 (Kg/t)
2. NaCN consumption : 1.22 (Kg/t)
3. Lime consumption : 0.30 (Kg/t)
4. Perth tap water used : 1.000 (SG)
5. Grind Size P 80 : 75 (µm)
6. Leach test conducted in mechanically stirred, baffled agitation vat leach.
7. Evaporation losses made up prior to sampling at each period.

RATE OF GOLD EXTRACTION



PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - LONE SISTER DEPOSIT
CLIENT	HOMESTAKE : PLUTONIC RESOURCES LTD
TEST No	HS 4086
SAMPLE	**COMPOSITE 6 : 98LRCD134 (108 - 114m)**
GRIND	P 80 : 75 µm
WATER	PERTH TAP WATER
DATE	FEBRUARY 1999

DIRECT CYANIDATION TIME LEACH TESTWORK

TIME (Hours)	ADDITIONS				SOLUTION DATA				Extraction
	Ore (g)	Water (g)	NaCN (g)	Lime (g)	Oxygen (ppm)	pH	NaCN (%)	Au (ppm)	Au (%)
	3000.0	4500.0			4.1	6.7			
0			4.50	0.90	6.8	10.2	0.100	0.00	0.00
2			0.00	0.00	7.1	10.2	0.083	0.74	65.91
4			0.00	0.00	7.2	10.1	0.080	0.82	73.04
8			0.00	0.00	7.4	10.0	0.075	0.86	76.60
24			0.00	0.00	7.9	10.0	0.058	0.90	80.17
48			0.00	0.00	7.8	10.0	0.040	0.92	81.95

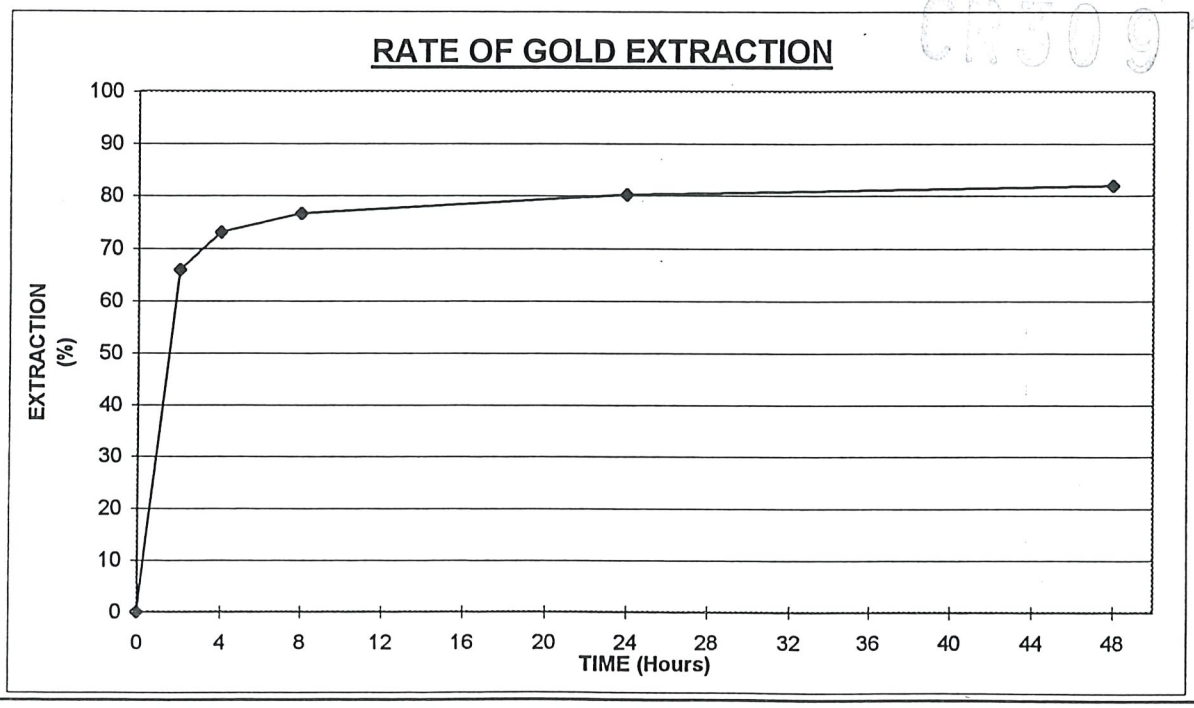
GOLD EXTRACTION CALCULATIONS

Product	Quantity	Assay (ppm)	Total (µg)	Dist'n (%)
Solids (g)	3000.0	0.304	912	18.05
Solution (mls)	4500.0	0.92	4140	81.95
Total			5052	100.00
Calculated Head		1.68		
Assay Head		1.35 / 1.43		

COMMENTS :

1. NaCN addition : 1.50 (Kg/t)
2. NaCN consumption : 0.86 (Kg/t)
3. Lime consumption : 0.30 (Kg/t)
4. Perth tap water used : 1.000 (SG)
5. Grind Size P 80 : 75 (µm)
6. Leach test conducted in mechanically stirred, baffled agitation vat leach.
7. Evaporation losses made up prior to sampling at each period.

RATE OF GOLD EXTRACTION



PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - LONE SISTER DEPOSIT
CLIENT	HOMESTAKE : PLUTONIC RESOURCES LTD
TEST No	HS 4087
SAMPLE	**COMPOSITE 7 : 98LRCD134 (116 - 126m)**
GRIND	P 80 : 75 µm
WATER	PERTH TAP WATER
DATE	FEBRUARY 1999

DIRECT CYANIDATION TIME LEACH TESTWORK

TIME (Hours)	ADDITIONS				SOLUTION DATA				Extraction
	Ore (g)	Water (g)	NaCN (g)	Lime (g)	Oxygen (ppm)	pH	NaCN (%)	Au (ppm)	Au (%)
	3000.0	4500.0			2.1	6.5			
0			4.50	0.90	4.2	10.2	0.100	0.00	0.00
2			0.00	0.00	4.5	10.1	0.083	0.86	47.74
4			0.00	0.00	6.8	10.1	0.080	1.16	64.40
8			0.00	0.00	7.2	10.0	0.070	1.32	73.28
24			0.00	0.00	8.0	10.0	0.058	1.42	78.83
48			0.00	0.00	7.8	10.0	0.038	1.48	82.16

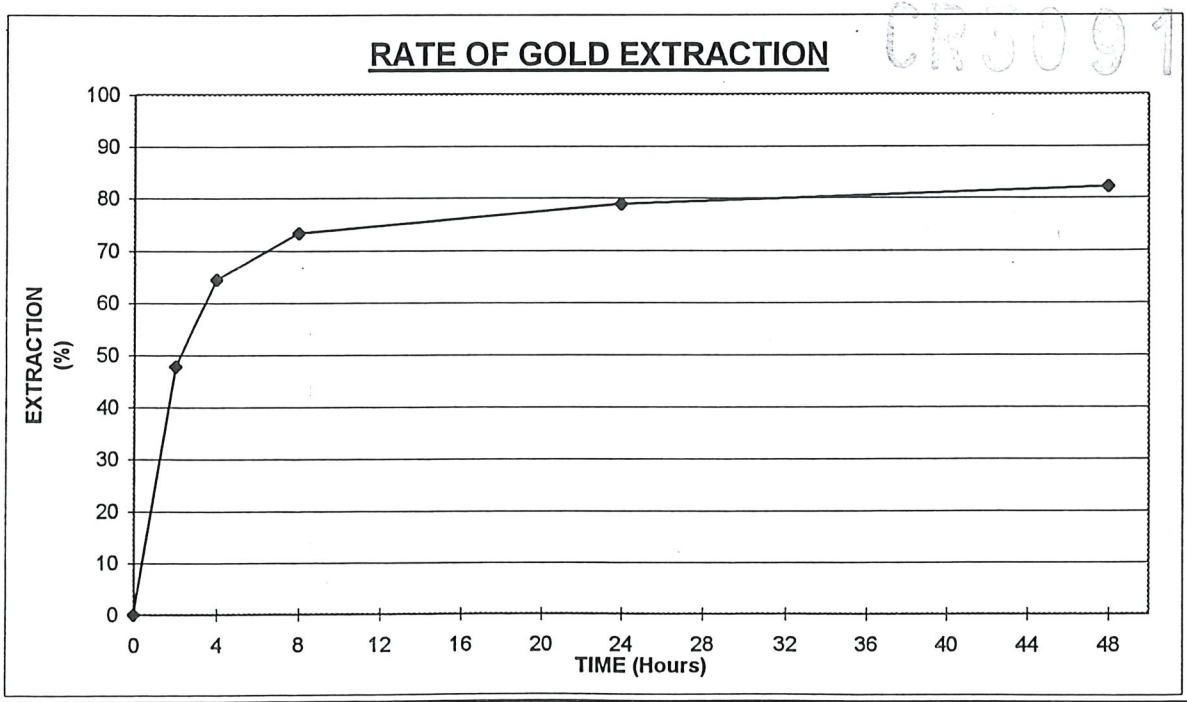
GOLD EXTRACTION CALCULATIONS

Product	Quantity	Assay (ppm)	Total (µg)	Dist'n (%)
Solids (g)	3000.0	0.482	1446	17.84
Solution (mls)	4500.0	1.48	6660	82.16
Total			8106	100.00
Calculated Head		2.70		
Assay Head		2.44 / 2.12		

COMMENTS :

1. NaCN addition : 1.50 (Kg/t)
2. NaCN consumption : 0.89 (Kg/t)
3. Lime consumption : 0.30 (Kg/t)
4. Perth tap water used : 1.000 (SG)
5. Grind Size P 80 : 75 (µm)
6. Leach test conducted in mechanically stirred, baffled agitation vat leach.
7. Evaporation losses made up prior to sampling at each period.

RATE OF GOLD EXTRACTION



PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - LONE SISTER DEPOSIT
CLIENT	HOMESTAKE : PLUTONIC RESOURCES LTD
TEST No	HS 4088
SAMPLE	**COMPOSITE 8 : 98LRCD134 (126 - 136m)**
GRIND	P 80 : 75 µm
WATER	PERTH TAP WATER
DATE	FEBRUARY 1999

DIRECT CYANIDATION TIME LEACH TESTWORK

TIME (Hours)	ADDITIONS				SOLUTION DATA				Extraction
	Ore (g)	Water (g)	NaCN (g)	Lime (g)	Oxygen (ppm)	pH	NaCN (%)	Au (ppm)	Au (%)
	3000.0	4500.0			3.5	6.5			
0			4.50	0.90	6.8	10.3	0.100	0.00	0.00
2			0.00	0.00	7.5	10.2	0.085	0.94	60.72
4			0.00	0.00	7.2	10.1	0.083	1.06	68.48
8			0.00	0.00	7.3	10.1	0.075	1.10	71.06
24			0.00	0.00	8.0	10.0	0.058	1.16	74.94
48			0.00	0.00	7.8	10.0	0.035	1.20	77.52

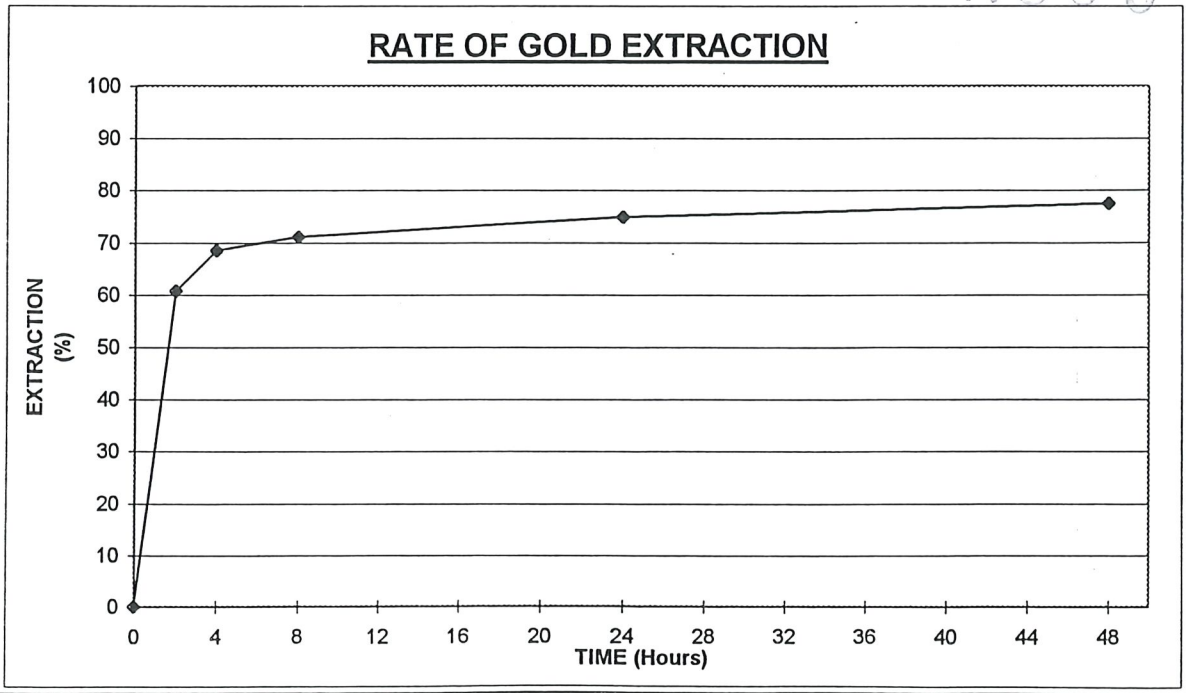
GOLD EXTRACTION CALCULATIONS

Product	Quantity	Assay (ppm)	Total (µg)	Dist'n (%)
Solids (g)	3000.0	0.522	1566	22.48
Solution (mls)	4500.0	1.20	5400	77.52
Total			6966	100.00
Calculated Head		2.32		
Assay Head		2.24 / 2.08		

COMMENTS :

1. NaCN addition : 1.50 (Kg/t)
2. NaCN consumption : 0.93 (Kg/t)
3. Lime consumption : 0.30 (Kg/t)
4. Perth tap water used : 1.000 (SG)
5. Grind Size P 80 : 75 (µm)
6. Leach test conducted in mechanically stirred, baffled agitation vat leach.
7. Evaporation losses made up prior to sampling at each period.

RATE OF GOLD EXTRACTION



PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - LONE SISTER DEPOSIT
CLIENT	HOMESTAKE : PLUTONIC RESOURCES LTD
TEST No	HS 4091
SAMPLE	**COMPOSITE HIGH GRADE C : 98LRCD134 (71.3-72m + 78-79m + 79-80m)**
GRIND	P 80 : 75 µm
WATER	PERTH TAP WATER
DATE	FEBRUARY 1999

DIRECT CYANIDATION TIME LEACH TESTWORK

TIME	ADDITIONS				SOLUTION DATA				Extraction
(Hours)	Ore (g)	Water (g)	NaCN (g)	Lime (g)	Oxygen (ppm)	pH	NaCN (%)	Au (ppm)	Au (%)
	1000.0	1500.0			3.0	6.5			
0			1.50	0.25	7.6	10.2	0.100	0.00	0.00
2			0.00	0.00	8.1	10.0	0.078	12.50	65.88
4			0.00	0.00	7.7	9.9	0.078	15.10	79.59
8			0.00	0.00	7.7	9.9	0.070	17.01	89.65
24			0.00	0.00	7.9	9.8	0.055	18.00	94.87
48			0.00	0.00	7.8	9.7	0.038	18.10	95.40

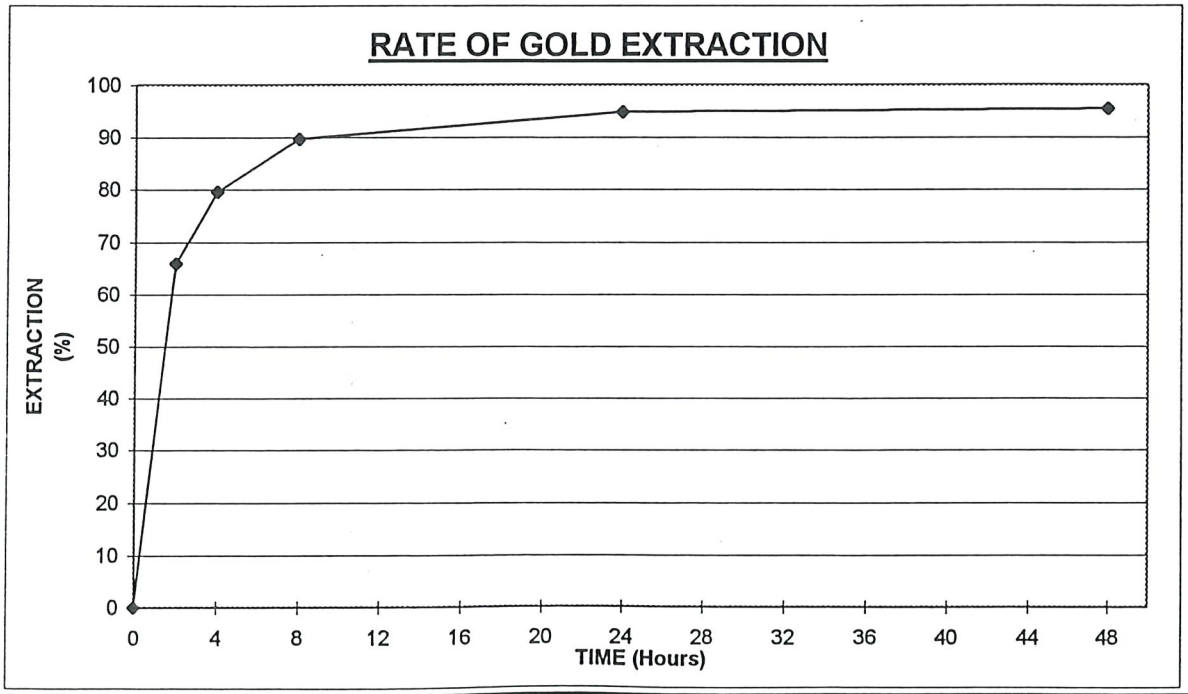
GOLD EXTRACTION CALCULATIONS

Product	Quantity	Assay (ppm)	Total (µg)	Dist'n (%)
Solids (g)	1000.0	1.31	1310	4.60
Solution (mls)	1500.0	18.10	27150	95.40
Total			28460	100.00
Calculated Head		28.5		
Assay Head		26.0/26.4		

COMMENTS :

1. NaCN addition : 1.50 (Kg/t)
2. NaCN consumption : 0.85 (Kg/t)
3. Lime consumption : 0.25 (Kg/t)
4. Perth tap water used : 1.000 (SG)
5. Grind Size P 80 : 75 (µm)
6. Leach test conducted in mechanically stirred, baffled agitation vat leach.
7. Evaporation losses made up prior to sampling at each period.

RATE OF GOLD EXTRACTION



APPENDIX VII

GRAVITY SEPARATION/CYANIDATION TIME LEACH TESTWORK

DETAILS AND RESULTS

PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - 309 DEPOSIT
CLIENT	HOMESTAKE : PLUTONIC RESOURCES LTD
TEST No	HS 4070
SAMPLE	**COMPOSITE 1 : 98TRCD748 (171 - 175m)**
GRIND	P 80 : 75 µm
WATER	PERTH TAP WATER
DATE	FEBRUARY 1999

GRAVITY SEPARATION / CYANIDATION TIME LEACH TESTWORK

TIME	ADDITIONS				SOLUTION DATA					EXTRACTION (%)	
(Hours)	Ore (g)	Water (g)	NaCN (g)	Lime (g)	Oxygen (ppm)	pH	NaCN (%)	Lime CaO (%)	Au (ppm)	Liquor Au	Total Au
	3000.0	4500.0			6.0	7.0					
0			4.50	1.00	6.8	10.5	0.100		0.00	0.00	48.27
2			0.00	0.00	7.5	10.4	0.088		0.32	6.59	54.86
4			0.00	0.00	7.2	10.3	0.088		0.34	7.00	55.27
8			0.00	0.00	7.4	10.2	0.080		0.38	7.82	56.09
24			0.00	0.00	7.8	10.2	0.058		0.44	9.06	57.33
48			0.00	0.00	7.6	10.2	0.038		0.50	10.29	58.56

GOLD EXTRACTION CALCULATIONS

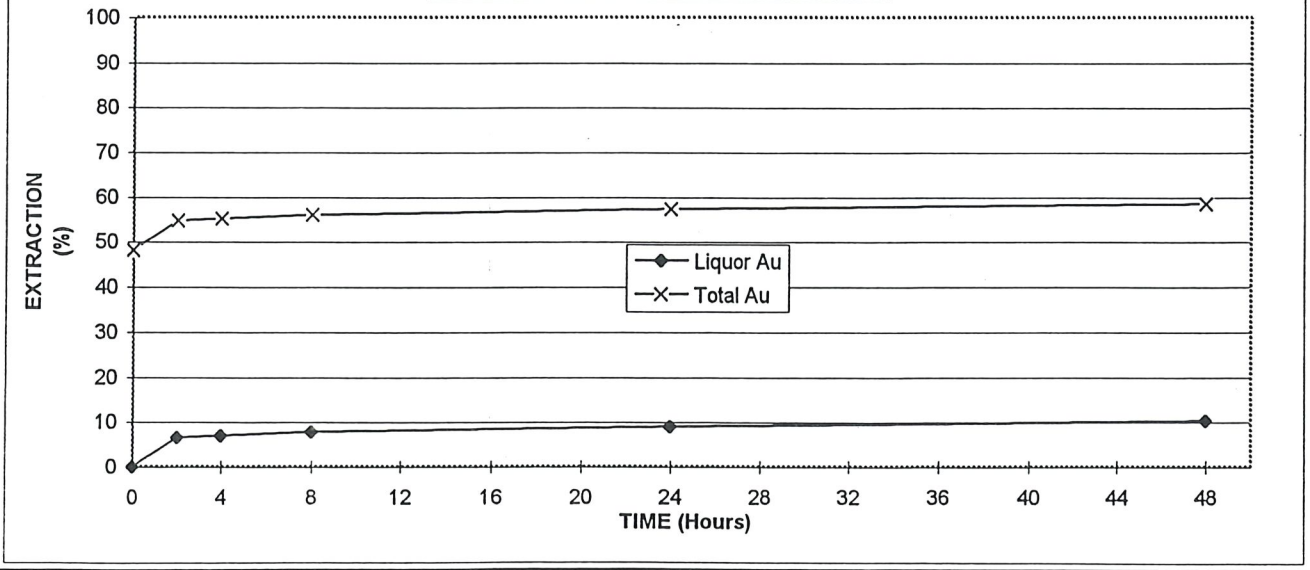
Product	Quantity	Assay (ppm)	Total (µg)	Dist'n (%)
Solids (g)	3000.0	3.02	9060	41.44
Solution (mls)	4500.0	0.50	2250	10.29
Gravity Gold			10555	48.27
Total Extraction				58.56
Total			21865	100.00
Calculated Head		7.29		
Assay Head		4.80/6.20		

COMMENTS :

1. NaCN addition : 1.50 (Kg/t)
2. NaCN consumption : 0.89 (Kg/t)
3. Lime consumption : 0.33 (Kg/t)
4. Perth tap water used : 1.000 (SG)
5. Grind Size P 80 : 75 (µm)
6. Leach test conducted in mechanically stirred, baffled agitation leaching vessel.
7. Evaporation losses made up prior to sampling at each period.

CR30910E

RATE OF GOLD EXTRACTION



PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - 309 DEPOSIT
CLIENT	HOMESTAKE : PLUTONIC RESOURCES LTD
TEST No	HS 4071
SAMPLE	**COMPOSITE 2 : 98TRCD748 (179 - 189m)**
GRIND	P 80 : 75 µm
WATER	PERTH TAP WATER
DATE	FEBRUARY 1999

GRAVITY SEPARATION / CYANIDATION TIME LEACH TESTWORK

TIME	ADDITIONS				SOLUTION DATA					EXTRACTION (%)	
(Hours)	Ore (g)	Water (g)	NaCN (g)	Lime (g)	Oxygen (ppm)	pH	NaCN (%)	Lime CaO (%)	Au (ppm)	Liquor Au	Total Au
	3000.0	4500.0			5.8	6.9					
0			4.50	1.00	6.6	10.4	0.100		0.00	0.00	27.73
2			0.00	0.00	7.3	10.3	0.090		0.06	3.23	30.96
4			0.00	0.00	7.2	10.2	0.085		0.07	3.77	31.50
8			0.00	0.00	7.4	10.2	0.085		0.07	3.77	31.50
24			0.00	0.00	7.8	10.1	0.075		0.07	3.77	31.50
48			0.00	0.00	7.4	10.1	0.053		0.07	3.77	31.50

GOLD EXTRACTION CALCULATIONS

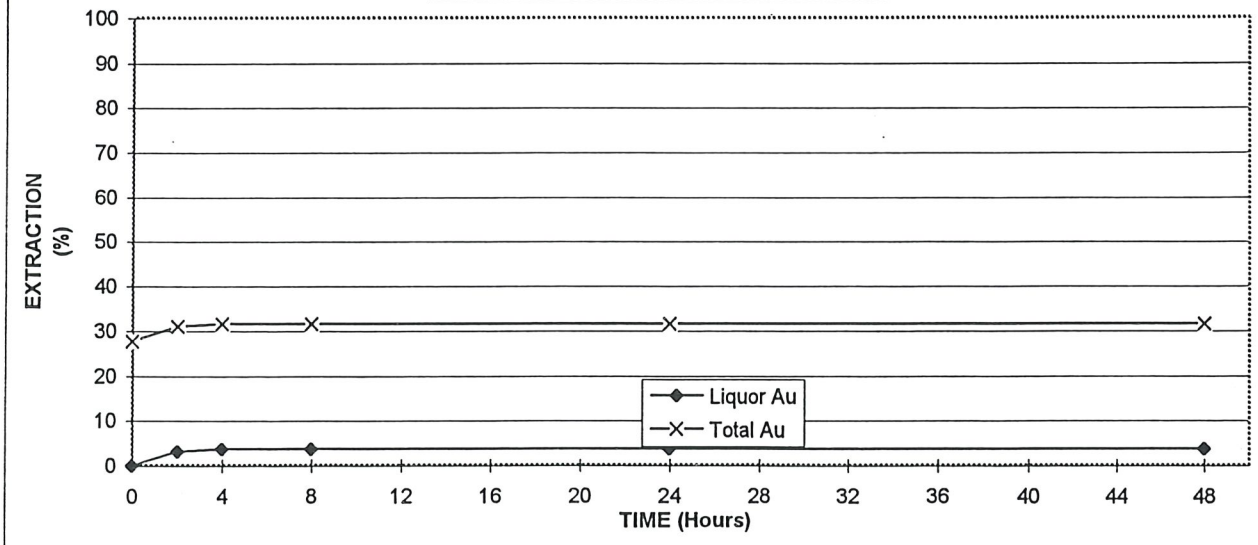
Product	Quantity	Assay (ppm)	Total (µg)	Dist'n (%)
Solids (g)	3000.0	1.91	5730	68.50
Solution (mls)	4500.0	0.07	315	3.77
Gravity Gold			2320	27.73
Total Extraction				31.50
Total			8365	100.00
Calculated Head		2.79		
Assay Head		2.98/2.52		

COMMENTS :

1. NaCN addition : 1.50 (Kg/t)
2. NaCN consumption : 0.67 (Kg/t)
3. Lime consumption : 0.33 (Kg/t)
4. Perth tap water used : 1.000 (SG)
5. Grind Size P 80 : 75 (µm)
6. Leach test conducted in mechanically stirred, baffled agitation leaching vessel.
7. Evaporation losses made up prior to sampling at each period.

CR30910E

RATE OF GOLD EXTRACTION



PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - 309 DEPOSIT
CLIENT	HOMESTAKE : PLUTONIC RESOURCES LTD
TEST No	HS 4072
SAMPLE	**COMPOSITE 3 : 98TRCD748 (191 - 230m)**
GRIND	P 80 : 75 µm
WATER	PERTH TAP WATER
DATE	FEBRUARY 1999

GRAVITY SEPARATION / CYANIDATION TIME LEACH TESTWORK

TIME	ADDITIONS				SOLUTION DATA					EXTRACTION (%)	
(Hours)	Ore (g)	Water (g)	NaCN (g)	Lime (g)	Oxygen (ppm)	pH	NaCN (%)	Lime CaO (%)	Au (ppm)	Liquor Au	Total Au
	3000.0	4500.0			6.6	7.4					
0			4.50	1.00	6.7	10.4	0.100		0.00	0.00	42.48
2			0.00	0.00	7.4	10.4	0.090		0.02	1.20	43.68
4			0.00	0.00	7.2	10.3	0.090		0.04	2.40	44.87
8			0.00	0.00	7.5	10.2	0.085		0.04	2.40	44.87
24			0.00	0.00	7.8	10.2	0.078		0.04	2.40	44.87
48			0.00	0.00	7.5	10.1	0.063		0.04	2.40	44.87

GOLD EXTRACTION CALCULATIONS

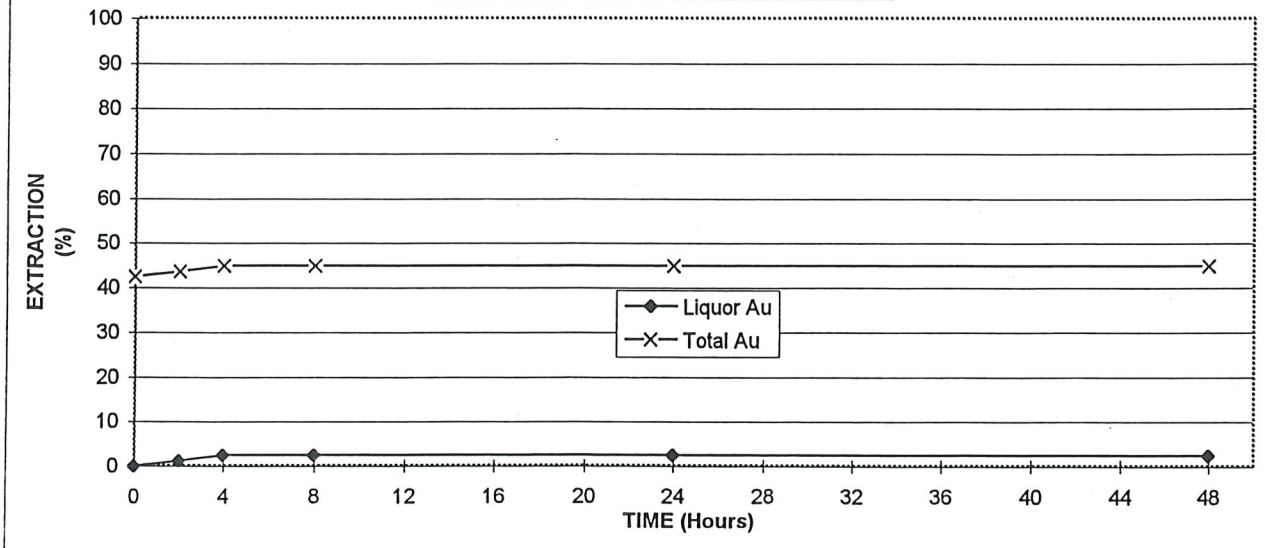
Product	Quantity	Assay (ppm)	Total (µg)	Dist'n (%)
Solids (g)	3000.0	1.38	4140	55.13
Solution (mls)	4500.0	0.04	180	2.40
Gravity Gold			3190	42.48
Total Extraction				44.87
Total			7510	100.00
Calculated Head		2.50		
Assay Head		2.30/2.18		

COMMENTS :

1. NaCN addition : 1.50 (Kg/t)
2. NaCN consumption : 0.53 (Kg/t)
3. Lime consumption : 0.33 (Kg/t)
4. Perth tap water used : 1.000 (SG)
5. Grind Size P 80 : 75 (µm)
6. Leach test conducted in mechanically stirred, baffled agitation leaching vessel.
7. Evaporation losses made up prior to sampling at each period.

CR30910E

RATE OF GOLD EXTRACTION



PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - 309 DEPOSIT
CLIENT	HOMESTAKE : PLUTONIC RESOURCES LTD
TEST No	HS 4073
SAMPLE	**COMPOSITE 4 : TRCD698 (167 - 178m)**
GRIND	P 80 : 75 µm
WATER	PERTH TAP WATER
DATE	FEBRUARY 1999

GRAVITY SEPARATION / CYANIDATION TIME LEACH TESTWORK

TIME	ADDITIONS				SOLUTION DATA					EXTRACTION (%)	
(Hours)	Ore (g)	Water (g)	NaCN (g)	Lime (g)	Oxygen (ppm)	pH	NaCN (%)	Lime CaO (%)	Au (ppm)	Liquor Au	Total Au
	3000.0	4500.0			6.2	6.9					
0			4.50	1.00	6.7	10.4	0.100		0.00	0.00	46.13
2			0.00	0.00	7.2	10.3	0.088		1.70	29.42	75.54
4			0.00	0.00	7.4	10.2	0.083		1.82	31.49	77.62
8			0.00	0.00	7.2	10.2	0.083		1.84	31.84	77.97
24			0.00	0.00	7.4	10.2	0.073		1.84	31.84	77.97
48			0.00	0.00	7.1	10.1	0.053		1.84	31.84	77.97

GOLD EXTRACTION CALCULATIONS

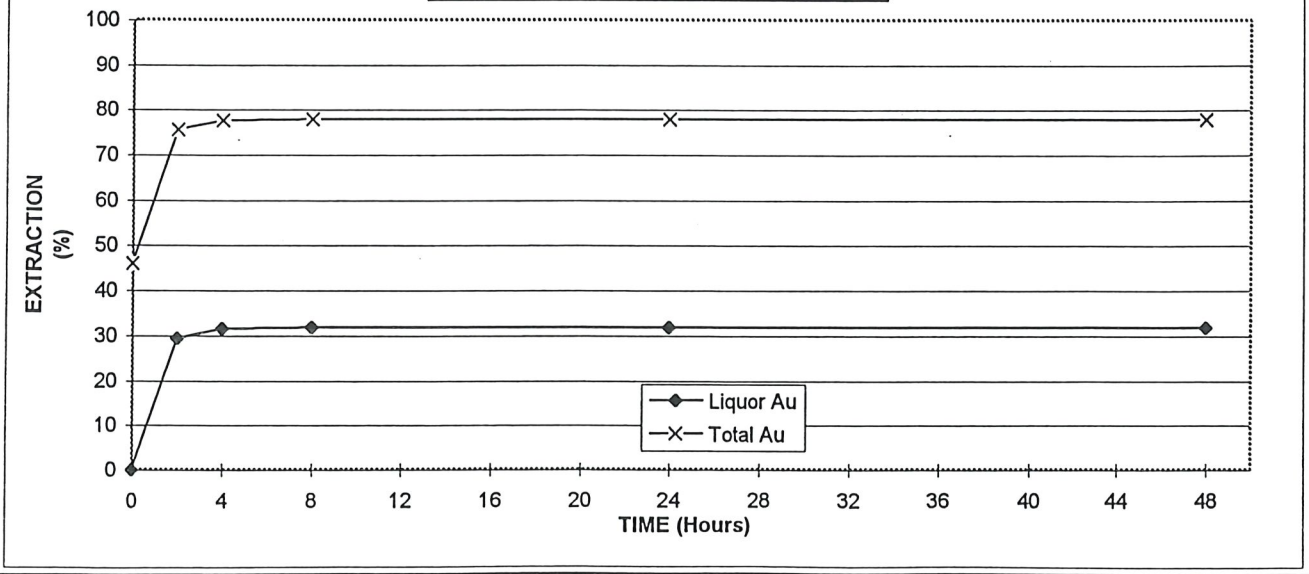
Product	Quantity	Assay (ppm)	Total (µg)	Dist'n (%)
Solids (g)	3000.0	1.91	5730	22.03
Solution (mls)	4500.0	1.84	8280	31.84
Gravity Gold			11995	46.13
Total Extraction				77.97
Total			26005	100.00
Calculated Head		8.67		
Assay Head		12.2/8.38		

COMMENTS :

1. NaCN addition : 1.50 (Kg/t)
2. NaCN consumption : 0.67 (Kg/t)
3. Lime consumption : 0.33 (Kg/t)
4. Perth tap water used : 1.000 (SG)
5. Grind Size P 80 : 75 (µm)
6. Leach test conducted in mechanically stirred, baffled agitation leaching vessel.
7. Evaporation losses made up prior to sampling at each period.

CR30910E

RATE OF GOLD EXTRACTION



PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - 309 DEPOSIT
CLIENT	HOMESTAKE : PLUTONIC RESOURCES LTD
TEST No	HS 4078
SAMPLE	**COMPOSITE HIGH GRADE A : 98TRCD748 (172 - 174m)**
GRIND	P 80 : 75 µm
WATER	PERTH TAP WATER
DATE	FEBRUARY 1999

GRAVITY SEPARATION / CYANIDATION TIME LEACH TESTWORK

TIME	ADDITIONS				SOLUTION DATA					EXTRACTION (%)	
(Hours)	Ore (g)	Water (g)	NaCN (g)	Lime (g)	Oxygen (ppm)	pH	NaCN (%)	Lime CaO (%)	Au (ppm)	Liquor Au	Total Au
	1000.0	1500.0			6.8	7.4					
0			1.50	0.41	7.2	10.4	0.100		0.00	0.00	49.34
2			0.00	0.00	7.6	10.4	0.092		1.86	20.48	69.82
4			0.00	0.00	7.7	10.3	0.090		2.01	22.14	71.48
8			0.00	0.00	7.4	10.2	0.088		2.11	23.24	72.58
24			0.00	0.00	7.8	10.1	0.070		2.19	24.12	73.46
48			0.00	0.00	7.5	10.0	0.058		2.20	24.23	73.57

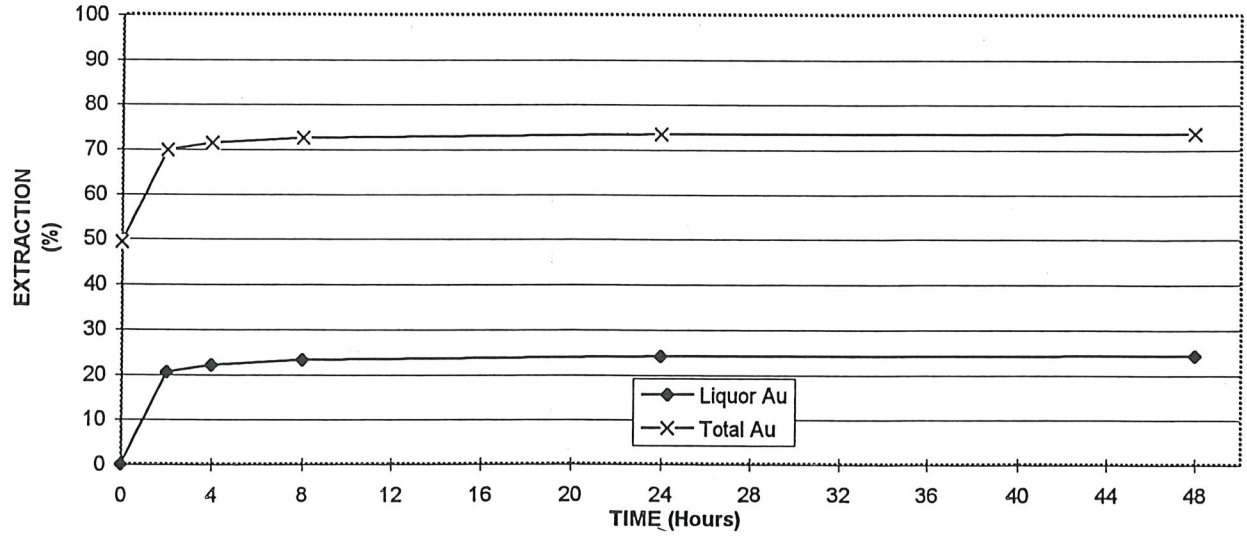
GOLD EXTRACTION CALCULATIONS

Product	Quantity	Assay (ppm)	Total (µg)	Dist'n (%)
Solids (g)	1000.0	3.60	3600	26.43
Solution (mls)	1500.0	2.20	3300	24.23
Gravity Gold			6720	49.34
Total Extraction				73.57
Total			13620	100.00
Calculated Head		13.6		
Assay Head		12.1/14.0		

COMMENTS :

1. NaCN addition : 1.50 (Kg/t)
2. NaCN consumption : 0.54 (Kg/t)
3. Lime consumption : 0.41 (Kg/t)
4. Perth tap water used : 1.000 (SG)
5. Grind Size P 80 : 75 (µm)
6. Leach test conducted in mechanically stirred, baffled agitation leaching vessel.
7. Evaporation losses made up prior to sampling at each period.

RATE OF GOLD EXTRACTION



PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - 309 DEPOSIT
CLIENT	HOMESTAKE : PLUTONIC RESOURCES LTD
TEST No	HS 4079
SAMPLE	**COMPOSITE HIGH GRADE B : TRCD698 (168 - 171m)**
GRIND	P 80 : 75 µm
WATER	PERTH TAP WATER
DATE	FEBRUARY 1999

GRAVITY SEPARATION / CYANIDATION TIME LEACH TESTWORK

TIME	ADDITIONS				SOLUTION DATA					EXTRACTION (%)	
(Hours)	Ore (g)	Water (g)	NaCN (g)	Lime (g)	Oxygen (ppm)	pH	NaCN (%)	Lime CaO (%)	Au (ppm)	Liquor Au	Total Au
	1000.0	1500.0			6.7	7.3					
0			1.50	0.41	7.4	10.4	0.100		0.00	0.00	43.92
2			0.00	0.00	7.6	10.4	0.097		7.96	38.76	82.68
4			0.00	0.00	7.8	10.3	0.092		8.68	42.27	86.19
8			0.00	0.00	7.8	10.2	0.092		8.88	43.24	87.16
24			0.00	0.00	8.1	10.1	0.080		9.16	44.60	88.52
48			0.00	0.00	8.0	9.9	0.063		9.17	44.65	88.57

GOLD EXTRACTION CALCULATIONS

Product	Quantity	Assay (ppm)	Total (µg)	Dist'n (%)
Solids (g)	1000.0	3.52	3520	11.43
Solution (mls)	1500.0	9.17	13755	44.65
Gravity Gold			13530	43.92
Total Extraction				88.57
Total			30805	100.00
Calculated Head		30.8		
Assay Head		36.6/35.6		

COMMENTS :

1. NaCN addition : 1.50 (Kg/t)
2. NaCN consumption : 0.47 (Kg/t)
3. Lime consumption : 0.41 (Kg/t)
4. Perth tap water used : 1.000 (SG)
5. Grind Size P 80 : 75 (µm)
6. Leach test conducted in mechanically stirred, baffled agitation leaching vessel.
7. Evaporation losses made up prior to sampling at each period.

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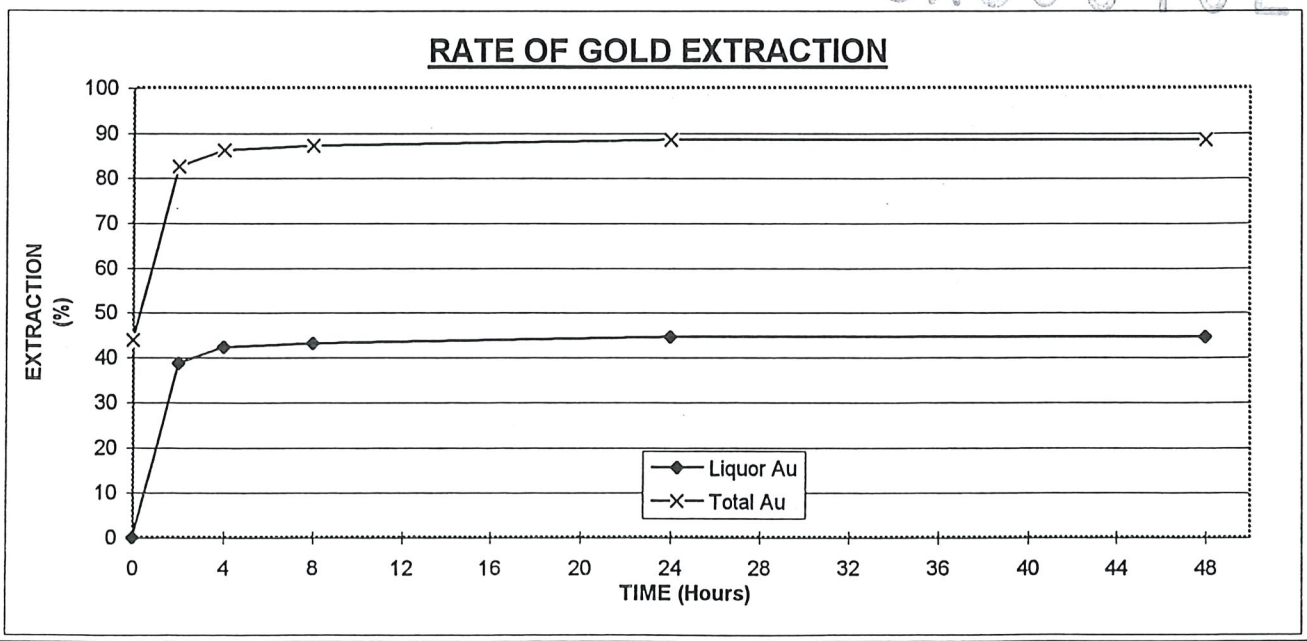
RATE OF GOLD EXTRACTION



PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - LONE SISTER DEPOSIT
CLIENT	HOMESTAKE : PLUTONIC RESOURCES LTD
TEST No	HS 4074
SAMPLE	**COMPOSITE 5 : 98LRCD134 (71.3 - 86m)**
GRIND	P 80 : 75 µm
WATER	PERTH TAP WATER
DATE	FEBRUARY 1999

GRAVITY SEPARATION / CYANIDATION TIME LEACH TESTWORK

TIME	ADDITIONS				SOLUTION DATA					EXTRACTION (%)	
(Hours)	Ore (g)	Water (g)	NaCN (g)	Lime (g)	Oxygen (ppm)	pH	NaCN (%)	Lime CaO (%)	Au (ppm)	Liquor Au	Total Au
	3000.0	4500.0			6.1	7.3					
0			4.50	1.00	6.4	10.4	0.100		0.00	0.00	12.18
2			0.00	0.00	6.9	10.3	0.083		1.80	34.87	47.05
4			0.00	0.00	7.0	10.2	0.078		2.56	49.59	61.77
8			0.00	0.00	7.2	10.2	0.070		2.99	57.92	70.10
24			0.00	0.00	7.6	10.1	0.053		3.68	71.29	83.47
48			0.00	0.00	7.4	10.1	0.033		3.86	74.77	86.96

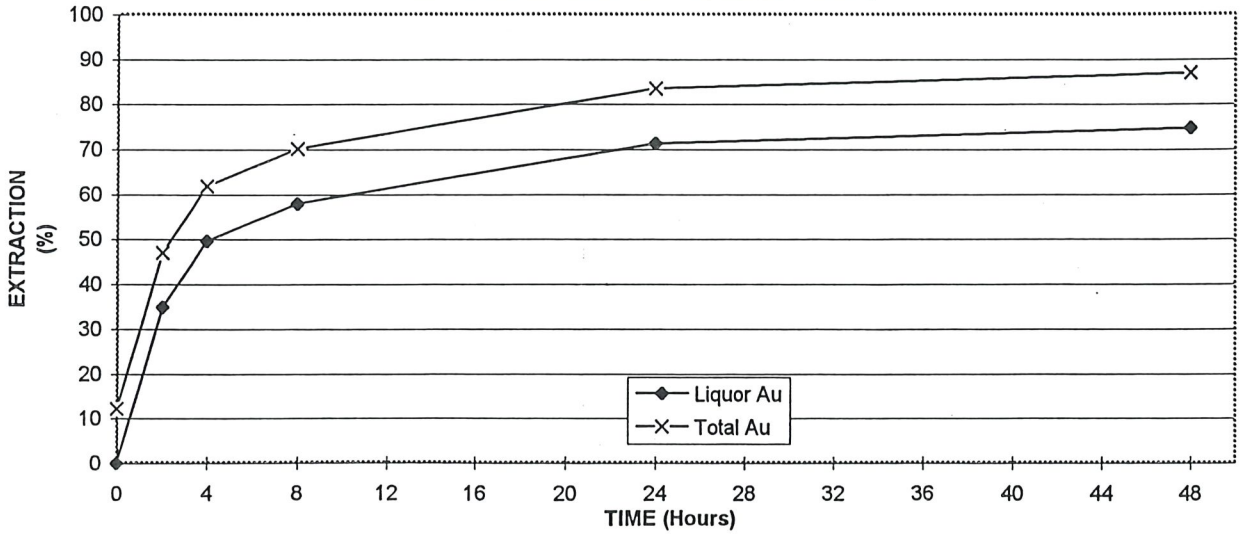
GOLD EXTRACTION CALCULATIONS

Product	Quantity	Assay (ppm)	Total (µg)	Dist'n (%)
Solids (g)	3000.0	1.01	3030	13.04
Solution (mls)	4500.0	3.86	17370	74.77
Gravity Gold			2830	12.18
Total Extraction				86.96
Total			23230	100.00
Calculated Head		7.74		
Assay Head		8.16/7.02		

COMMENTS :

1. NaCN addition : 1.50 (Kg/t)
2. NaCN consumption : 0.96 (Kg/t)
3. Lime consumption : 0.33 (Kg/t)
4. Perth tap water used : 1.000 (SG)
5. Grind Size P 80 : 75 (µm)
6. Leach test conducted in mechanically stirred, baffled agitation leaching vessel.
7. Evaporation losses made up prior to sampling at each period.

RATE OF GOLD EXTRACTION



PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - LONE SISTER DEPOSIT
CLIENT	HOMESTAKE : PLUTONIC RESOURCES LTD
TEST No	HS 4075
SAMPLE	**COMPOSITE 6 : 98LRCD134 (108 - 114m)**
GRIND	P 80 : 75 µm
WATER	PERTH TAP WATER
DATE	FEBRUARY 1999

GRAVITY SEPARATION / CYANIDATION TIME LEACH TESTWORK

TIME	ADDITIONS				SOLUTION DATA					EXTRACTION (%)	
(Hours)	Ore (g)	Water (g)	NaCN (g)	Lime (g)	Oxygen (ppm)	pH	NaCN (%)	Lime CaO (%)	Au (ppm)	Liquor Au	Total Au
	3000.0	4500.0			6.7	7.2					
0			4.50	1.00	7.1	10.3	0.100		0.00	0.00	15.41
2			0.00	0.00	7.8	10.2	0.083		0.48	44.39	59.80
4			0.00	0.00	7.4	10.1	0.083		0.52	48.09	63.50
8			0.00	0.00	7.5	10.0	0.080		0.56	51.79	67.20
24			0.00	0.00	7.9	10.0	0.070		0.64	59.19	74.60
48			0.00	0.00	7.6	9.9	0.063		0.70	64.73	80.15

GOLD EXTRACTION CALCULATIONS

Product	Quantity	Assay (ppm)	Total (µg)	Dist'n (%)
Solids (g)	3000.0	0.322	966	19.85
Solution (mls)	4500.0	0.70	3150	64.73
Gravity Gold			750	15.41
Total Extraction				80.15
Total			4866	100.00
Calculated Head		1.62		
Assay Head		1.35/1.43		

COMMENTS :

1. NaCN addition : 1.50 (Kg/t)
2. NaCN consumption : 0.54 (Kg/t)
3. Lime consumption : 0.33 (Kg/t)
4. Perth tap water used : 1.000 (SG)
5. Grind Size P 80 : 75 (µm)
6. Leach test conducted in mechanically stirred, baffled agitation leaching vessel.
7. Evaporation losses made up prior to sampling at each period.

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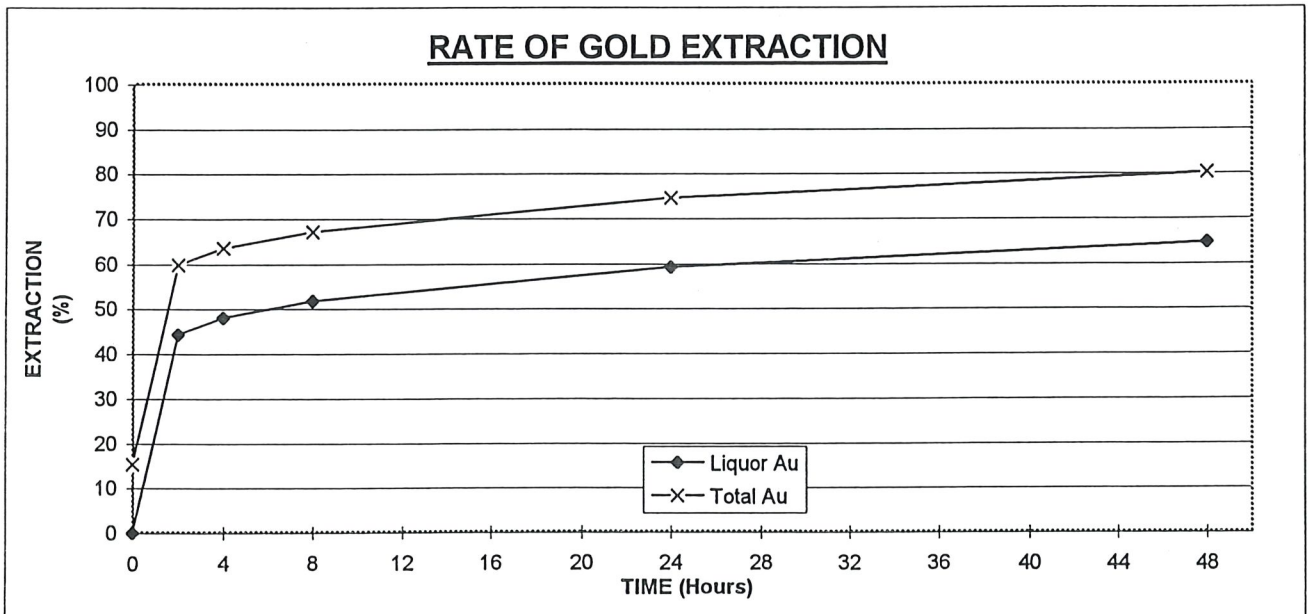
RATE OF GOLD EXTRACTION



PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - LONE SISTER DEPOSIT
CLIENT	HOMESTAKE : PLUTONIC RESOURCES LTD
TEST No	HS 4076
SAMPLE	**COMPOSITE 7 : 98LRCD134 (116 - 126m)**
GRIND	P 80 : 75 µm
WATER	PERTH TAP WATER
DATE	FEBRUARY 1999

GRAVITY SEPARATION / CYANIDATION TIME LEACH TESTWORK

TIME	ADDITIONS				SOLUTION DATA					EXTRACTION (%)	
(Hours)	Ore (g)	Water (g)	NaCN (g)	Lime (g)	Oxygen (ppm)	pH	NaCN (%)	Lime CaO (%)	Au (ppm)	Liquor Au	Total Au
	3000.0	4500.0			6.2	7.1					
0			4.50	1.00	6.8	10.3	0.100		0.00	0.00	19.40
2			0.00	0.00	7.7	10.2	0.088		0.86	51.42	70.82
4			0.00	0.00	7.4	10.1	0.085		0.92	55.01	74.41
8			0.00	0.00	7.6	10.0	0.083		0.96	57.40	76.80
24			0.00	0.00	7.9	10.0	0.078		1.02	60.99	80.39
48			0.00	0.00	7.7	10.0	0.060		1.04	62.18	81.58

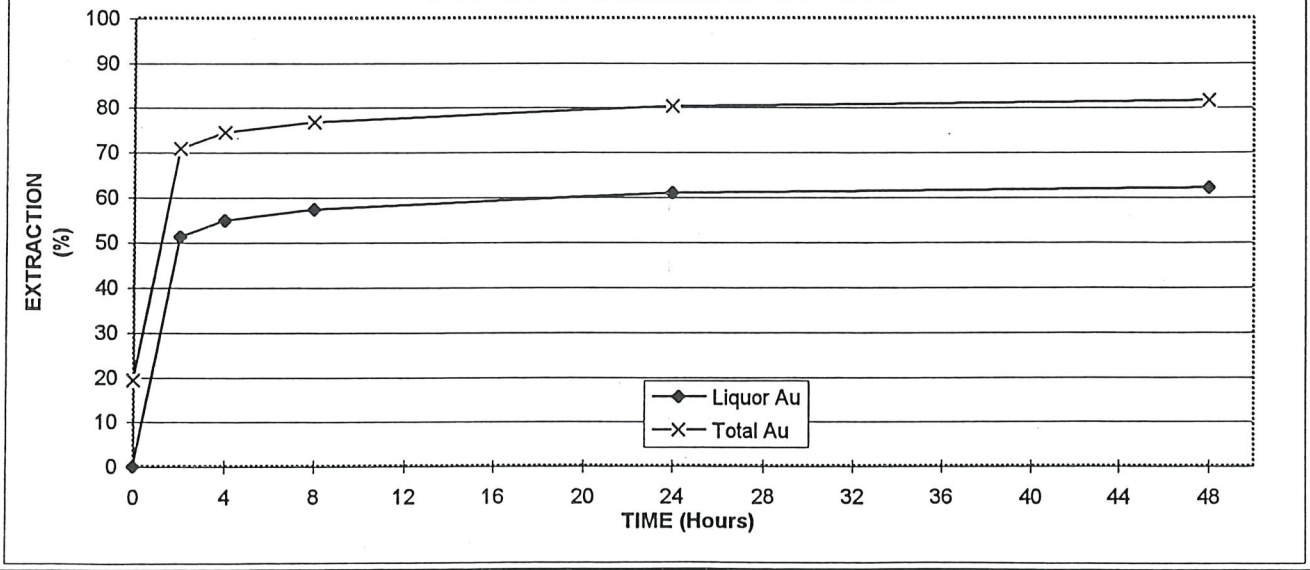
GOLD EXTRACTION CALCULATIONS

Product	Quantity	Assay (ppm)	Total (µg)	Dist'n (%)
Solids (g)	3000.0	0.462	1386	18.42
Solution (mls)	4500.0	1.04	4680	62.18
Gravity Gold			1460	19.40
Total Extraction				81.58
Total			7526	100.00
Calculated Head		2.51		
Assay Head		2.44/2.12		

COMMENTS :

1. NaCN addition : 1.50 (Kg/t)
2. NaCN consumption : 0.57 (Kg/t)
3. Lime consumption : 0.33 (Kg/t)
4. Perth tap water used : 1.000 (SG)
5. Grind Size P 80 : 75 (µm)
6. Leach test conducted in mechanically stirred, baffled agitation leaching vessel.
7. Evaporation losses made up prior to sampling at each period.

RATE OF GOLD EXTRACTION



PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - LONE SISTER DEPOSIT
CLIENT	HOMESTAKE : PLUTONIC RESOURCES LTD
TEST No	HS 4077
SAMPLE	**COMPOSITE 8 : 98LRCD134 (126 - 136m)**
GRIND	P 80 : 75 µm
WATER	PERTH TAP WATER
DATE	FEBRUARY 1999

GRAVITY SEPARATION / CYANIDATION TIME LEACH TESTWORK

TIME	ADDITIONS				SOLUTION DATA					EXTRACTION (%)	
(Hours)	Ore (g)	Water (g)	NaCN (g)	Lime (g)	Oxygen (ppm)	pH	NaCN (%)	Lime CaO (%)	Au (ppm)	Liquor Au	Total Au
	3000.0	4500.0			5.8	7.1					
0			4.50	1.00	6.7	10.3	0.100		0.00	0.00	5.59
2			0.00	0.00	7.4	10.2	0.092		0.92	57.55	63.14
4			0.00	0.00	7.2	10.0	0.088		0.98	61.30	66.89
8			0.00	0.00	7.3	10.0	0.080		1.04	65.05	70.64
24			0.00	0.00	7.8	10.0	0.073		1.14	71.31	76.90
48			0.00	0.00	7.5	9.9	0.068		1.16	72.56	78.15

GOLD EXTRACTION CALCULATIONS

Product	Quantity	Assay (ppm)	Total (µg)	Dist'n (%)
Solids (g)	3000.0	0.524	1572	21.85
Solution (mls)	4500.0	1.16	5220	72.56
Gravity Gold			402	5.59
Total Extraction				78.15
Total			7194	100.00
Calculated Head		2.40		
Assay Head		2.24/2.08		

COMMENTS :

1. NaCN addition : 1.50 (Kg/t)
2. NaCN consumption : 0.46 (Kg/t)
3. Lime consumption : 0.33 (Kg/t)
4. Perth tap water used : 1.000 (SG)
5. Grind Size P 80 : 75 (µm)
6. Leach test conducted in mechanically stirred, baffled agitation leaching vessel.
7. Evaporation losses made up prior to sampling at each period.

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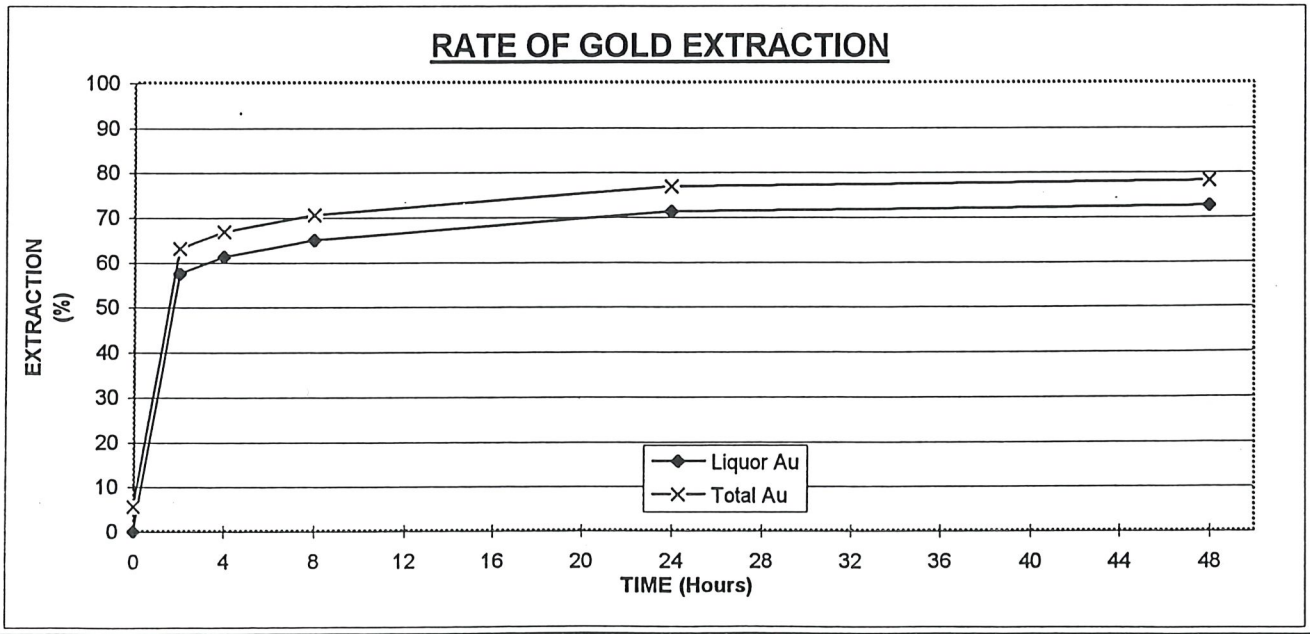
RATE OF GOLD EXTRACTION



PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - LONE SISTER DEPOSIT
CLIENT	HOMESTAKE : PLUTONIC RESOURCES LTD
TEST No	HS 4080
SAMPLE	**COMPOSITE HIGH GRADE C : 98LRCD134 (71.3-72m + 78-79m + 79-80m)**
GRIND	P 80 : 75 µm
WATER	PERTH TAP WATER
DATE	FEBRUARY 1999

GRAVITY SEPARATION / CYANIDATION TIME LEACH TESTWORK

TIME	ADDITIONS				SOLUTION DATA					EXTRACTION (%)	
(Hours)	Ore (g)	Water (g)	NaCN (g)	Lime (g)	Oxygen (ppm)	pH	NaCN (%)	Lime CaO (%)	Au (ppm)	Liquor Au	Total Au
	1000.0	1500.0			5.8	7.0					
0			1.50	0.41	6.9	10.4	0.100		0.00	0.00	20.61
2			0.00	0.00	7.9	10.2	0.088		9.34	50.65	71.26
4			0.00	0.00	7.6	10.1	0.080		11.4	61.82	82.43
8			0.00	0.00	7.8	10.0	0.078		12.7	68.87	89.48
24			0.00	0.00	8.2	9.9	0.065		13.6	73.75	94.36
48			0.00	0.00	8.2	9.9	0.050		13.8	74.84	95.44

GOLD EXTRACTION CALCULATIONS

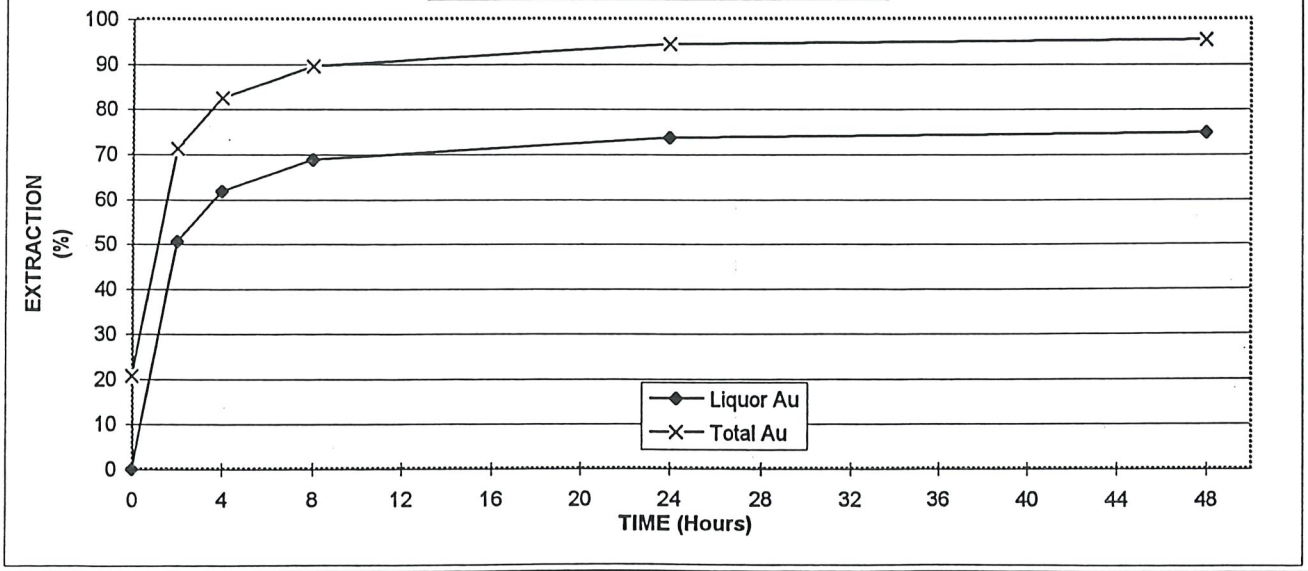
Product	Quantity	Assay (ppm)	Total (µg)	Dist'n (%)
Solids (g)	1000.0	1.26	1260	4.56
Solution (mls)	1500.0	13.8	20700	74.84
Gravity Gold			5700	20.61
Total Extraction				95.44
Total			27660	100.00
Calculated Head		27.7		
Assay Head		26.0/26.4		

COMMENTS :

1. NaCN addition : 1.50 (Kg/t)
2. NaCN consumption : 0.66 (Kg/t)
3. Lime consumption : 0.41 (Kg/t)
4. Perth tap water used : 1.000 (SG)
5. Grind Size P 80 : 75 (µm)
6. Leach test conducted in mechanically stirred, baffled agitation leaching vessel.
7. Evaporation losses made up prior to sampling at each period.

CR30910E

RATE OF GOLD EXTRACTION



APPENDIX VIII

DIAGNOSTIC GOLD ANALYSIS

DETAILS AND RESULTS

PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - 309 DEPOSIT
CLIENT	HOMESTAKE EXPLORATION PLUTONIC RESOURCES LTD
TEST No	HS 4070
SAMPLE	**COMPOSITE 1 : 98TRCD748 (171 - 175m)**
GRIND	P 80 : 75 µm
DATE	FEBRUARY 1999

DIAGNOSTIC GOLD ANALYSIS : MODE OF GOLD DEPLOYMENT

Sample Identification	Grind size P 80 (µm)	Analytical				
		Gravity Gold		Free [Cyanidable] Au (g/t)	Locked In Sulphides Au (g/t)	Silicate Encapsulated Au (g/t)
		(µg)	(g/t)			
COMPOSITE 1 (98TRCD748 : 171 - 175m)	75	10555	3.52	0.75	1.57	1.33

MODE OF GOLD OCCURRENCE

FORM	(g/t)	(%)
Gravity Recoverable	3.52	49.09
Free [Cyanidable]	0.75	10.46
Locked In Sulphides	1.57	21.90
Silicate Encapsulated	1.33	18.55
Total		100.00
Diagnostic Head	7.17	
Assay Head	4.80 / 6.20	

PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - 309 DEPOSIT
CLIENT	HOMESTAKE EXPLORATION PLUTONIC RESOURCES LTD
TEST No	HS 4071
SAMPLE	**COMPOSITE 2 : 98TRCD748 (179 - 189m)**
GRIND	P 80 : 75 µm
DATE	FEBRUARY 1999

DIAGNOSTIC GOLD ANALYSIS : MODE OF GOLD DEPLOYMENT

Sample Identification	Grind size P 80 (µm)	Analytical				
		Gravity Gold		Free [Cyanidable] Au (g/t)	Locked In Sulphides Au (g/t)	Silicate Encapsulated Au (g/t)
		(µg)	(g/t)			
COMPOSITE 2 (98TRCD748 : 179 - 189m)	75	2320	0.77	0.11	0.85	0.94

MODE OF GOLD OCCURRENCE

FORM	(g/t)	(%)
Gravity Recoverable	0.77	28.84
Free [Cyanidable]	0.11	4.12
Locked In Sulphides	0.85	31.84
Silicate Encapsulated	0.94	35.21
Total		100.00
Diagnostic Head	2.67	
Assay Head	2.98 / 2.52	

PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - 309 DEPOSIT
CLIENT	HOMESTAKE EXPLORATION PLUTONIC RESOURCES LTD
TEST No	HS 4072
SAMPLE	COMPOSITE 3 : 98TRCD748 (191 - 230m)
GRIND	P 80 : 75 µm
DATE	FEBRUARY 1999

DIAGNOSTIC GOLD ANALYSIS : MODE OF GOLD DEPLOYMENT

Sample Identification	Grind size P 80 (µm)	Analytical				
		Gravity Gold		Free [Cyanidable] Au (g/t)	Locked In Sulphides Au (g/t)	Silicate Encapsulated Au (g/t)
		(µg)	(g/t)			
COMPOSITE 3 (98TRCD748 : 191 - 230m)	75	3190	1.06	0.06	0.45	1.01

MODE OF GOLD OCCURRENCE

FORM	(g/t)	(%)
Gravity Recoverable	1.06	41.09
Free [Cyanidable]	0.06	2.33
Locked In Sulphides	0.45	17.44
Silicate Encapsulated	1.01	39.15
Total		100.00
Diagnostic Head	2.58	
Assay Head	2.30 / 2.18	

PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - 309 DEPOSIT
CLIENT	HOMESTAKE EXPLORATION PLUTONIC RESOURCES LTD
TEST No	HS 4073
SAMPLE	COMPOSITE 4 : TRCD698 (167 - 178m)
GRIND	P 80 : 75 µm
DATE	FEBRUARY 1999

DIAGNOSTIC GOLD ANALYSIS : MODE OF GOLD DEPLOYMENT

Sample Identification	Grind size P 80 (µm)	Analytical				
		Gravity Gold		Free [Cyanidable] Au (g/t)	Locked In Sulphides Au (g/t)	Silicate Encapsulated Au (g/t)
		(µg)	(g/t)			
COMPOSITE 4 (TRCD698 : 167 - 178m)	75	11995	4.00	2.76	0.95	0.88

MODE OF GOLD OCCURRENCE

FORM	(g/t)	(%)
Gravity Recoverable	4.00	46.57
Free [Cyanidable]	2.76	32.13
Locked In Sulphides	0.95	11.06
Silicate Encapsulated	0.88	10.24
Total		100.00
Diagnostic Head	8.59	
Assay Head	12.2 / 8.38	

PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - 309 DEPOSIT
CLIENT	HOMESTAKE EXPLORATION PLUTONIC RESOURCES LTD
TEST No	HS 4078
SAMPLE	COMPOSITE HIGH GRADE A : 98TRCD748 (172 - 174m)
GRIND	P 80 : 75 µm
DATE	FEBRUARY 1999

DIAGNOSTIC GOLD ANALYSIS : MODE OF GOLD DEPLOYMENT

Sample Identification	Grind size P 80 (µm)	Analytical				
		Gravity Gold		Free [Cyanidable] Au (g/t)	Locked In Sulphides Au (g/t)	Silicate Encapsulated Au (g/t)
		(µg)	(g/t)			
COMPOSITE HIGH GRADE A (98TRCD748 : 172 - 174m)	75	6720	6.72	3.30	1.33	2.18

MODE OF GOLD OCCURRENCE

FORM	(g/t)	(%)
Gravity Recoverable	6.72	49.67
Free [Cyanidable]	3.30	24.39
Locked In Sulphides	1.33	9.83
Silicate Encapsulated	2.18	16.11
Total		100.00
Diagnostic Head	13.5	
Assay Head	12.1 / 14.0	

PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - 309 DEPOSIT
CLIENT	HOMESTAKE EXPLORATION PLUTONIC RESOURCES LTD
TEST No	HS 4079
SAMPLE	COMPOSITE HIGH GRADE B : TRCD698 (168 - 171m)
GRIND	P 80 : 75 µm
DATE	FEBRUARY 1999

DIAGNOSTIC GOLD ANALYSIS : MODE OF GOLD DEPLOYMENT

Sample Identification	Grind size P 80 (µm)	Analytical				
		Gravity Gold		Free [Cyanidable] Au (g/t)	Locked In Sulphides Au (g/t)	Silicate Encapsulated Au (g/t)
		(µg)	(g/t)			
COMPOSITE HIGH GRADE B (TRCD698 : 168 - 171m)	75	13530	13.5	13.8	1.72	1.58

MODE OF GOLD OCCURRENCE

FORM	(g/t)	(%)
Gravity Recoverable	13.50	44.12
Free [Cyanidable]	13.80	45.10
Locked In Sulphides	1.72	5.62
Silicate Encapsulated	1.58	5.16
Total		100.00
Diagnostic Head	30.6	
Assay Head	36.6 / 35.6	

PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - LONE SISTER DEPOSIT
CLIENT	HOMESTAKE EXPLORATION PLUTONIC RESOURCES LTD
TEST No	HS 4074
SAMPLE	**COMPOSITE 5 : 98LRCD134 (71.3 - 86.0m)**
GRIND	P 80 : 75 µm
DATE	FEBRUARY 1999

DIAGNOSTIC GOLD ANALYSIS : MODE OF GOLD DEPLOYMENT

Sample Identification	Grind size P 80 (µm)	Analytical				
		Gravity Gold		Free [Cyanidable] Au (g/t)	Locked In Sulphides Au (g/t)	Silicate Encapsulated Au (g/t)
		(µg)	(g/t)			
COMPOSITE 5 (98LRCD134 : 71.3 - 86.0m)	75	2830	0.94	5.79	1.06	0.03

MODE OF GOLD OCCURRENCE

FORM	(g/t)	(%)
Gravity Recoverable	0.94	12.02
Free [Cyanidable]	5.79	74.04
Locked In Sulphides	1.06	13.55
Silicate Encapsulated	0.03	0.38
Total		100.00
Diagnostic Head	7.82	
Assay Head	8.16 / 7.02	

PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - LONE SISTER DEPOSIT
CLIENT	HOMESTAKE EXPLORATION PLUTONIC RESOURCES LTD
TEST No	HS 4075
SAMPLE	COMPOSITE 6 : 98LRCD134 (108 - 114m)
GRIND	P 80 : 75 µm
DATE	FEBRUARY 1999

DIAGNOSTIC GOLD ANALYSIS : MODE OF GOLD DEPLOYMENT

Sample Identification	Grind size P 80 (µm)	Analytical				
		Gravity Gold		Free [Cyanidable] Au (g/t)	Locked In Sulphides Au (g/t)	Silicate Encapsulated Au (g/t)
		(µg)	(g/t)			
COMPOSITE 6 (98LRCD134 : 108 - 114m)	75	750	0.25	1.05	0.45	0.005

MODE OF GOLD OCCURRENCE

FORM	(g/t)	(%)
Gravity Recoverable	0.25	14.25
Free [Cyanidable]	1.05	59.83
Locked In Sulphides	0.45	25.64
Silicate Encapsulated	0.005	0.28
Total		100.00
Diagnostic Head	1.76	
Assay Head	1.35 / 1.43	

PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - LONE SISTER DEPOSIT
CLIENT	HOMESTAKE EXPLORATION PLUTONIC RESOURCES LTD
TEST No	HS 4076
SAMPLE	**COMPOSITE 7 : 98LRCD134 (116 - 126m)**
GRIND	P 80 : 75 µm
DATE	FEBRUARY 1999

DIAGNOSTIC GOLD ANALYSIS : MODE OF GOLD DEPLOYMENT

Sample Identification	Grind size P 80 (µm)	Analytical				
		Gravity Gold		Free [Cyanidable] Au (g/t)	Locked In Sulphides Au (g/t)	Silicate Encapsulated Au (g/t)
		(µg)	(g/t)			
COMPOSITE 7 (98LRCD134 : 116 - 126m)	75	1460	0.49	1.56	0.47	0.005

MODE OF GOLD OCCURRENCE

FORM	(g/t)	(%)
Gravity Recoverable	0.49	19.41
Free [Cyanidable]	1.56	61.78
Locked In Sulphides	0.47	18.61
Silicate Encapsulated	0.005	0.20
Total		100.00
Diagnostic Head	2.53	
Assay Head	2.44 / 2.12	

PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - LONE SISTER DEPOSIT
CLIENT	HOMESTAKE EXPLORATION PLUTONIC RESOURCES LTD
TEST No	HS 4077
SAMPLE	COMPOSITE 8 : 98LRCD134 (126 - 136m)
GRIND	P 80 : 75 µm
DATE	FEBRUARY 1999

DIAGNOSTIC GOLD ANALYSIS : MODE OF GOLD DEPLOYMENT

Sample Identification	Grind size P 80 (µm)	Analytical				
		Gravity Gold		Free [Cyanidable] Au (g/t)	Locked In Sulphides Au (g/t)	Silicate Encapsulated Au (g/t)
		(µg)	(g/t)			
COMPOSITE 8 (98LRCD134 : 126 - 136m)	75	402	0.13	1.74	0.54	0.005

MODE OF GOLD OCCURRENCE

FORM	(g/t)	(%)
Gravity Recoverable	0.13	5.38
Free [Cyanidable]	1.74	72.05
Locked In Sulphides	0.54	22.36
Silicate Encapsulated	0.005	0.21
Total		100.00
Diagnostic Head	2.42	
Assay Head	2.24 / 2.08	

PROJECT	A 6573 : TWIN HILLS GOLD PROJECT - LONE SISTER DEPOSIT
CLIENT	HOMESTAKE EXPLORATION PLUTONIC RESOURCES LTD
TEST No	HS 4080
SAMPLE	COMPOSITE HIGH GRADE C : 98LRCD134 (71.3-72m + 78-79m + 79-80m)
GRIND	P 80 : 75 µm
DATE	FEBRUARY 1999

DIAGNOSTIC GOLD ANALYSIS : MODE OF GOLD DEPLOYMENT

Sample Identification	Grind size P 80 (µm)	Analytical				
		Gravity Gold		Free [Cyanidable] Au (g/t)	Locked In Sulphides Au (g/t)	Silicate Encapsulated Au (g/t)
		(µg)	(g/t)			
COMPOSITE HIGH GRADE C	75	5700	5.70	20.7	1.29	0.053

MODE OF GOLD OCCURRENCE

FORM	(g/t)	(%)
Gravity Recoverable	5.70	20.55
Free [Cyanidable]	20.70	74.61
Locked In Sulphides	1.29	4.65
Silicate Encapsulated	0.053	0.19
Total		100.00
Diagnostic Head	27.7	
Assay Head	26.0 / 26.4	

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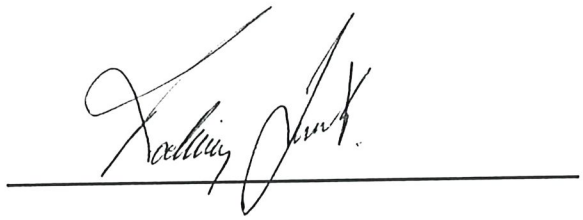

RODNEY J SMITH
MANAGING DIRECTOR