Bergvesenet

Postboks 3021, N-7441 Trondheim

Rapportarkivet

Innlegging av nye rapporter ved: Børre

Bergvesenet rapport nr	Intern Journal nr	Internt arkiv nr	Rapport lokalisering	Gradering
5209				

Kommer fra arkiv	Ekstern rapport nr	Oversendt fra	Fortrolig inntil	Fortrolig fra dato:

Tittel

A report on the Examination of Samples Submitted by Mr. Jan Bida, Terra Swede A.B.

Forfatter	Dato	År	Bedrift (oppdragsgiver og/eller oppdragstaker)
Hitec ORE PROCESSING INC. Ontario, Canada	04.03	1986	Terra Swede A.B.

Kommune	Fylke	Bergdistrikt	1: 50 000 kartblad	1: 250 000 kartblad
Bindal	Nordland	Nordlandske	18252	Mosjøen

Fagområde	Dokument type	Forekomster (forekomst, gruvefelt, undersøkelsesfelt)
Kjemiske analyser		

Råstoffgruppe	Råstofftype
Malm/metall	Au

Sammendrag, innholdsfortegnelse eller innholdsbeskrivelse

Analyse av gullinnhold i prøver.

Hitec ORE PROCESSING INC.

6535 MILLCREEK DRIVE, UNIT 44, MISSISSAUGA, ONTARIO, CANADA L5N 2M2 TEL: (416) 826-8085

March 4, 1986

Terra Swede A.B.
P.O. Box 19030
Bromna, Sweden
161-19 Bromna

Attention: Mr. Jan Bida

Dear Jan:

Please find enclosed the report on the three samples we looked at. The samples we examined were:

I A combination of samples 85L003B and 85L010B.

II A combination of samples 85L002B and 85L007B.

III A combination of samples 85F002B, 85F005B, 85F006B and 85F008B.

For these samples, the head grade was as follows:

I 0.947 g/tonne

II 1.557 g/tonne

III 6.579 g/tonne

I have also enclosed the Invoice for the work and hope it meets with your satisfaction.

Yours truly,

HITEC ORE PROCESSING INC.

Graham C. Dickson
Vice President of
Research and Development

INVOICE

March 4, 1986

Terra Swede A.B.
P.O. Box 19030
Bromna, Swedén
161-19 Bromna

Attention: Mr. Jan Bida

SAMPLE I	
3 Bottle Leach Tests @ $300.00 each	$900.00
SAMPLE II	
3 Bottle Leach Tests @ $300.00 each	900.00
SAMPLE III	
3 Bottle Leach Tests @ $300.00 each	900.00
1 Report	400.00
Courier Charges for Analysis dated 31.1.86	22.95
TOTAL	$3,122.95

1213 Bida

Hitec ORE PROCESSING INC.

Hitec ORE PROCESSING INC.

6535 MILLCREEK DRIVE, UNIT 44, MISSISSAUGA, ONTARIO, CANADA L5N 2M2 TEL: (416) 826-8085

January 30, 1986

Terra Swede A.B.
P.O. Box 19030
Bromna, Sweden
161-19 Bromna

Attn: Mr. Jan Bida

Dear Mr. Bida:

Please find enclosed a copy of the Assay Results for the 24 samples we received on January 15, 1986.

As per our conversation of today, I have also enclosed an estimate of the costs of the follow-up work on three samples.

I. A combination of all F type samples.

II. A combination of 2B(L) and 10B(L).

III. 3B(L).

I expect the work to be completed by February 14th and I will call you on or before that date.

Yours truly,

HITEC ORE PROCESSING INC.

Graham C. Dickson
Vice President
Research and Development

Encl.

TERRA SWEDE A.B.

COST ESTIMATE FOR

FOLLOW-UP WORK

1. Bottle Leach Tests		
9 tests @ $300.00/ea.		$2,700.00
2. Size Fraction Analysis		
3 tests @ $300.00/ea.		900.00
	TOTAL	$3,600.00

GCD:cm

January 30, 1986

Hitec ORE PROCESSING INC.

6535 MILLCREEK DRIVE, UNIT 44, MISSISSAUGA, ONTARIO, CANADA L5N 2M2 TEL: (416) 826-8085

INVOICE

January 27, 1986

Terra Swede A.B.
P.O. Box 19030
Bromna, Sweden
161-19 Bromna

Attn: Mr. Jan Bida

Fire Assays	
144 assays for Au @ $8.50/ea.	$1,224.00
Sample Preparation	
24 samples @ $14.00/sample +	96.00
0.50¢/lb.	666.20
Smelting	
none	0
	$1,986.20

Goddances

4012 / 215 7.3

Terra Swede A.B.
P.O. Box 19030
Bromna, Sweden
161-19 Bromna

Attn: Mr. Jan Bida

R E S U L T S

Sample I.D.	Wt. Kg.		Au g/tonne (ppm)
85L002B	14.4		2.662
3B	40.2		0.579
5B	20.9		0.031
7B	28.8		0.089
9B	5.2		0.534
10B	28.6		2.932
Weighted Mean	138.1	@	1.097
85F002B	43.7		8.923
5B	38.2		4.008
6B	44.1		9.297
8B	35.5		3.083
Weighted Mean	161.5	@	6.580
85N001B	11.4		0.027
2B	15.9		0.031
3B	17.3		nd
4B	8.4		0.134
4B (na)	3.4		0.010
5B	43.6		0.014
6B	47.3		nd
7B	33.0		nd
8B	5.9		nd
11B	26.4		nd
12B	28.4		nd
13B	27.0		0.497
14B	15.5		0.014
15B	22.5		0.024
Weighted Mean	306.0	@	0.055
Total Weighted Mean	605.6	@	2.032

Jan. 27/86

A report on the Examination of Samples
Submitted by Mr. Jan Bida, Terra Swede A.B.

Submitted to: Mr. Jan Bida

Submitted by: Hitec Ore Processing Inc.

March 3, 1986

EXECUTIVE SUMMARY

The following is an overview describing testwork carried out by Hitec Ore Processing Inc.'s laboratories in Mississauga, Ontario. The work was carried out at the request of Mr. Jan Bida. The testwork was carried out on three samples from a Norwegian property.

Laboratory testing showed that:

- The recoveries were less than 70% when the material was crushed to 1/8" minus.
- Maximum recovery was achieved around 30 hours into cyanidation.
- Grinding the material produce recoveries in excess of 80%, the leach time remaining the same.

It is clear that further testwork is required to determine more exactly the grinding versus recovery relationship.

I INTRODUCTION

The work described in this report was undertaken by Hitec Ore Processing Inc., at the request of Mr. Jan Bida. In particular, the work was carried out to assess the applicability of tank leach processing of the material.

To assess the applicability of the various leaching processes it is necessary to produce detailed information on the amounts and rates of recovery of the precious metals at different grind/crush sizes.

The following tests were conducted:

1. Fire Assay of each sample.
2. Bottle Leach Test at various particle sizes.
3. Size Fraction Analyses.

The method of tests 2. and 3. are described in Appendix I.

The following sections describe the results of these analyses, our conclusions and recommendations.

II SAMPLE EXAMINATION

The three (3) samples were made up from the 24 samples previously received, as follows:

I 85L003B + 85L010B

II 85L002B + 85L007B

III 85F002B, 85F005B, 85F006B and 85F008B

The values in the samples were:

I 0.947 g/tonne

II 1.557 g/tonne

III 6.579 g/tonne

III TEST RESULTS

Bottle Leach Tests

The results of the bottle leach tests are discussed below for each sample. The silver recovery is given as 0 because the recovery was not monitored, the silver values being of no economic importance.

SAMPLE I

The results from the tests are given in Tables 1, 2, 3, 4, 5 and 6 and are shown in Figures 1, 2 and 3.

% Recovered

At -3/16", -1/8" and pulverized, the recoveries were 40%, 69% and 83% respectively.

Rate of Recovery

The majority, if not all, of the % recovery occurred within the first 30 hours of cyanidation.

Cyanide Consumption

At the 30 hour mark the cyanide consumption (shown in Tables 2, 4 and 6) was around 1.5 lbs. of sodium cyanide per short ton of ore.

TABLE 1

Sample L3+L10 3/16

Test No. 1 NaCN conc. lb/ston 2.058

Time in Hrs	% GOLD Recovered	% SILVER Recovered
0.17	0.00	0.00
0.33	4.77	0.00
0.67	12.53	0.00
1.00	12.84	0.00
2.00	15.06	0.00
3.00	21.15	0.00
4.00	24.52	0.00
5.00	27.00	0.00
7.00	27.62	0.00
23.00	33.02	0.00
25.00	33.76	0.00
27.00	34.50	0.00
29.00	35.24	0.00
31.00	38.84	0.00
47.00	39.65	0.00

TABLE 2

Sample L3+L10

3/16

Time in Hrs	pH	Cyanide Consumed lbs/s.ton
1.00	11.65	0.12
3.00	11.45	0.24
7.00	10.45	0.71
23.00	11.20	1.41
47.00	10.60	2.12

TABLE 3

Sample L3+L10 -1/8

Test No. 2 NaCN conc. lb/ston 2.058

Time in Hrs	% GOLD Recovered	% SILVER Recovered
0.17	11.23	0.00
0.33	14.88	0.00
0.67	24.24	0.00
1.00	27.07	0.00
2.00	42.32	0.00
3.00	46.70	0.00
4.00	51.17	0.00
5.00	54.59	0.00
7.00	59.20	0.00
23.00	63.89	0.00
25.00	65.29	0.00
27.00	66.70	0.00
29.00	71.47	0.00
31.00	72.96	0.00
47.00	68.83	0.00

TABLE 4

Sample L3+L10 -1/8

Time in Hrs	pH	Cyanide Consumed lbs/s.ton
1.00	11.65	0.12
3.00	11.45	0.27
7.00	10.45	0.67
23.00	11.40	1.33
47.00	10.40	2.16

TABLE 5

Sample L3+L10 PULVERIZED

Test No. 3 NaCN conc. lb/ston 2.058

Time in Hrs	% GOLD Recovered	% SILVER Recovered
0.17	7.83	0.00
0.33	29.27	0.00
0.67	35.59	0.00
1.00	52.11	0.00
2.00	61.20	0.00
3.00	68.24	0.00
4.00	65.36	0.00
5.00	78.03	0.00
7.00	79.79	0.00
23.00	83.79	0.00
25.00	83.37	0.00
27.00	76.18	0.00
29.00	79.96	0.00
31.00	81.55	0.00
47.00	83.15	0.00

TABLE 6

Sample L3+L10 PULVERIZED

Time in Hrs	pH	Cyanide Consumed lbs/s.ton
1.00	11.60	0.12
3.00	11.40	0.24
7.00	10.40	0.59
23.00	11.30	1.53
47.00	10.40	2.16

Sample No L3+L10.
Test No 1.

——— % of GOLD Leached.
——— % of SILVER Leached.

Size Fraction 3/16.

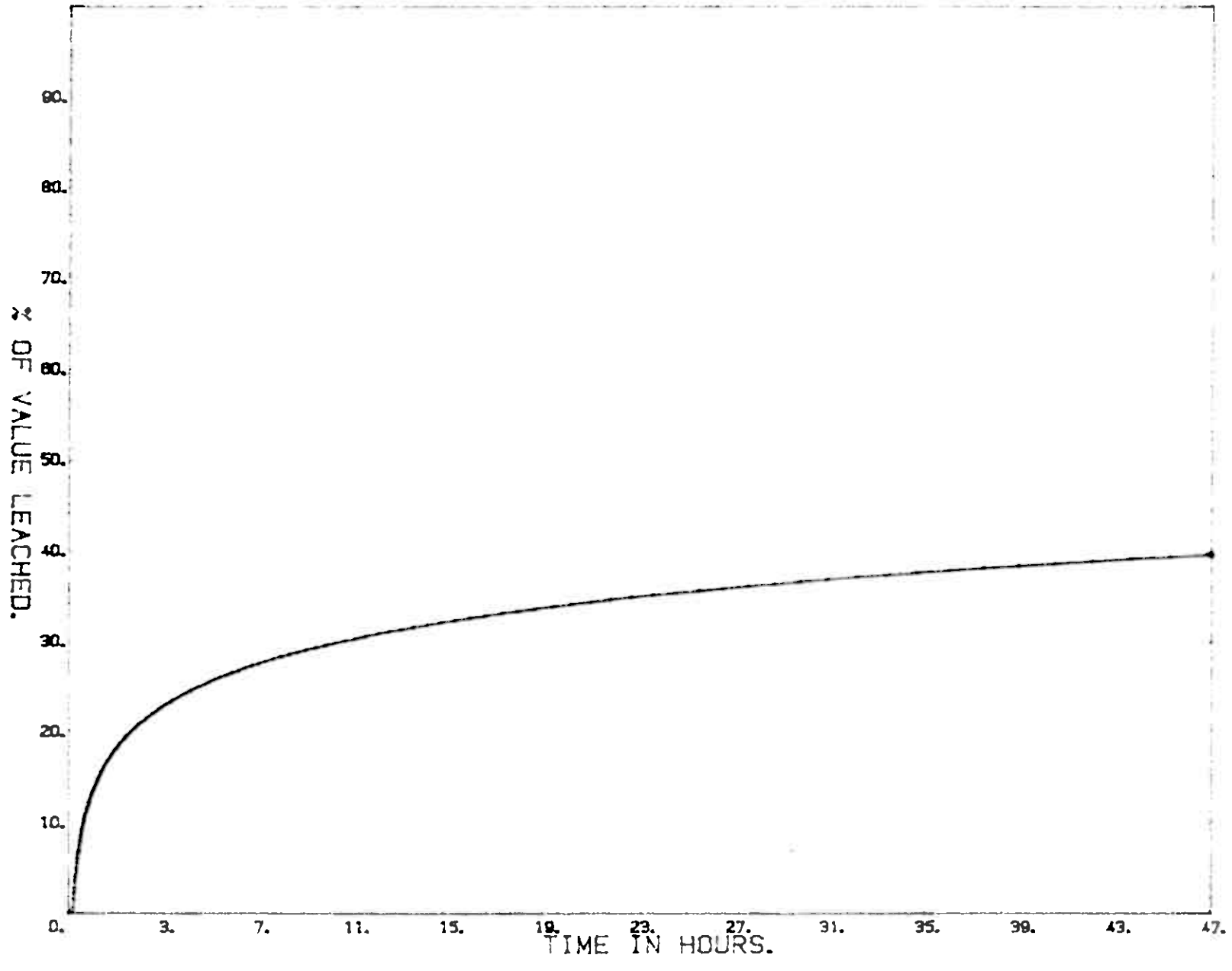

FIGURE 1.

Sample No L3+L10.
Test No 2.

——— % of GOLD Leached.
——— % of SILVER Leached.

Size Fraction -1/8.

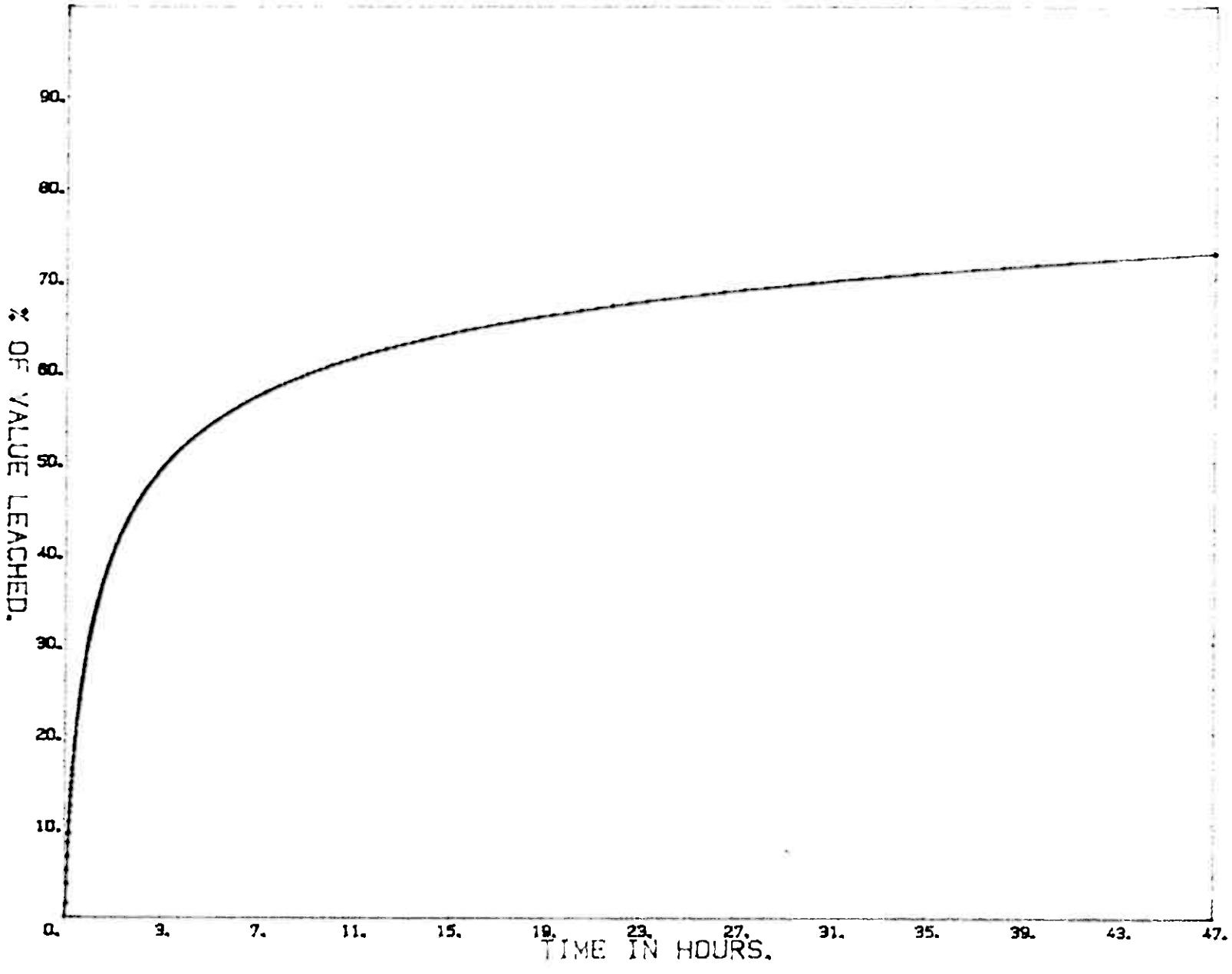

FIGURE 2.

Sample No L3+L10.
Test No 3.

——— % of GOLD Leached.
——— % of SILVER Leached.

Size Fraction PULVERIZED.

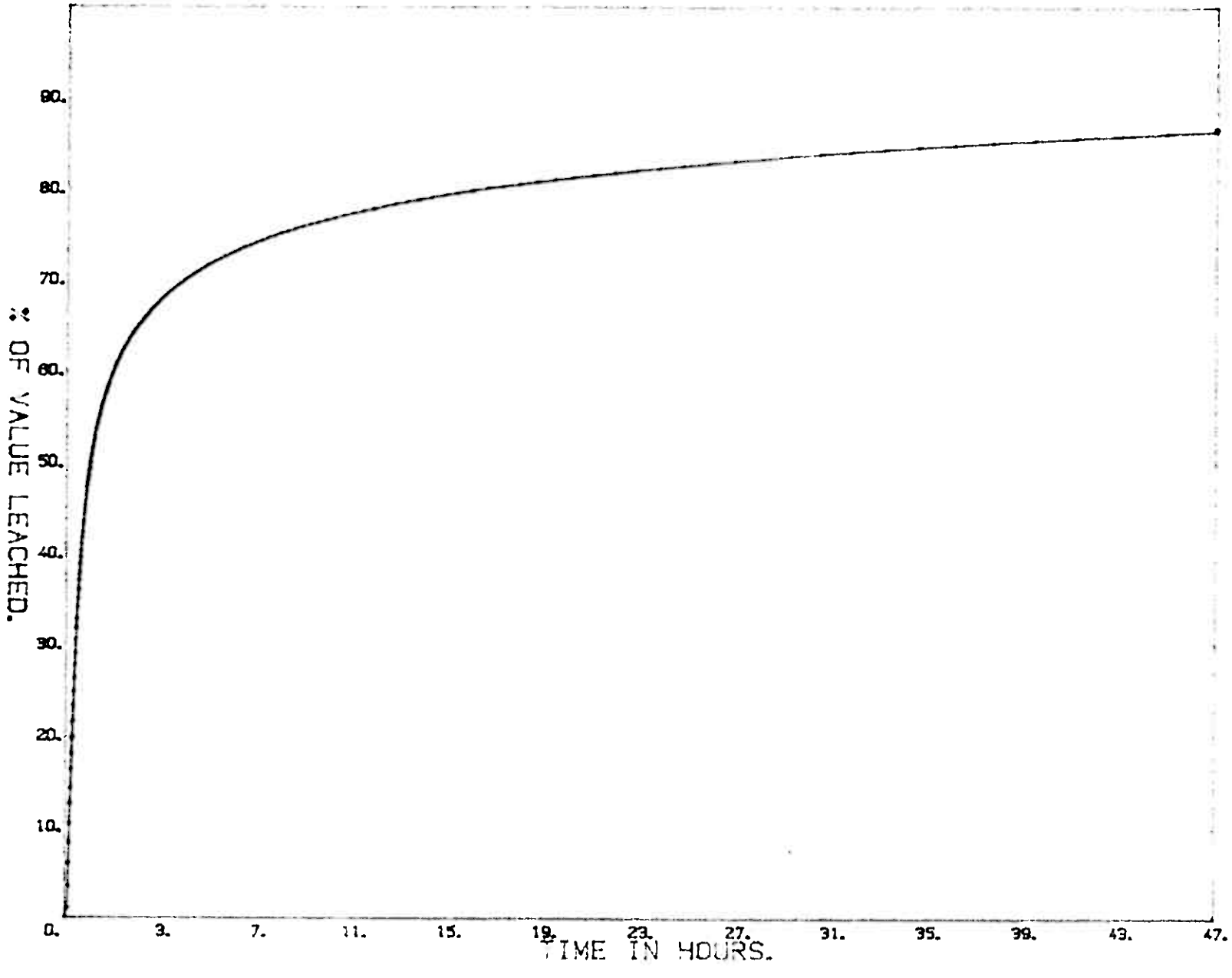

FIGURE 3.

SAMPLE II

The results from the tests are given in Tables 7, 8, 9, 10, 11 and 12 and are shown in Figures 4, 5 and 6.

% Recovered

At -3/16", -1/8" and pulverized, the recoveries were 35%, 70% and 100% respectively.

Rate of Recovery

The majority of the % recovery occurred within the first 30 hours of cyanidation.

Cyanide Consumption

At the 30 hour mark the cyanide consumption (shown in Tables 8, 10 and 12) was around 1.5 lbs. of sodium cyanide per short ton of ore.

TABLE 7

Sample L2+L7 3/16

Test No. 4 NaCN conc. lb/ston 2.058

Time in Hrs	% GOLD Recovered	% SILVER Recovered
0.17	9.48	0.00
0.33	9.72	0.00
0.67	14.70	0.00
1.00	15.05	0.00
2.00	15.41	0.00
3.00	15.76	0.00
4.00	16.12	0.00
5.00	21.22	0.00
7.00	22.64	0.00
23.00	27.88	0.00
25.00	28.49	0.00
27.00	32.90	0.00
29.00	33.62	0.00
31.00	34.33	0.00
47.00	35.04	0.00

TABLE 8

Sample L2+L7 3/16

Time in Hrs	pH	Cyanide Consumed lbs/s.ton
1.00	11.70	0.10
3.00	11.60	0.27
7.00	10.80	0.51
23.00	11.40	1.33
47.00	10.60	2.20

TABLE 9

Sample L2+L7 -1/8"

Test No. 5 NaCN conc. lb/ston 2.058

Time in Hrs	% GOLD Recovered	% SILVER Recovered
0.17	9.90	0.00
0.33	20.04	0.00
0.67	24.49	0.00
1.00	25.09	0.00
2.00	41.52	0.00
3.00	42.51	0.00
4.00	53.39	0.00
5.00	54.63	0.00
7.00	55.87	0.00
23.00	67.00	0.00
25.00	68.49	0.00
27.00	66.01	0.00
29.00	67.40	0.00
31.00	68.78	0.00
47.00	70.17	0.00

TABLE 10

Sample L2+L7 -1/8"

Time in Hrs	pH	Cyanide Consumed lbs/s.ton
1.00	11.65	0.08
3.00	11.45	0.27
7.00	10.50	0.55
23.00	11.50	1.25
47.00	10.60	2.12

TABLE 11

Sample L2+L7 PULVERIZED

Test No. 6 NaCN conc. lb/ston 2.058

Time in Hrs	% GOLD Recovered	% SILVER Recovered
0.17	27.23	0.00
0.33	33.36	0.00
0.67	47.79	0.00
1.00	57.11	0.00
2.00	72.09	0.00
3.00	87.41	0.00
4.00	75.83	0.00
5.00	91.15	0.00
7.00	93.19	0.00
23.00	95.23	0.00
25.00	97.28	0.00
27.00	104.77	0.00
29.00	101.50	0.00
31.00	98.09	0.00
47.00	100.00	0.00

TABLE 12

Sample L2+L7 PULVERIZED

Time in Hrs	pH	Cyanide Consumed lbs/s.ton
1.00	11.60	0.14
3.00	11.50	0.31
7.00	10.50	0.55
23.00	11.10	1.41
47.00	10.30	2.20

Sample No L2+L7.
Test No 4.

——— % of GOLD Leached.
——— % of SILVER Leached.

Size Fraction 3/16.

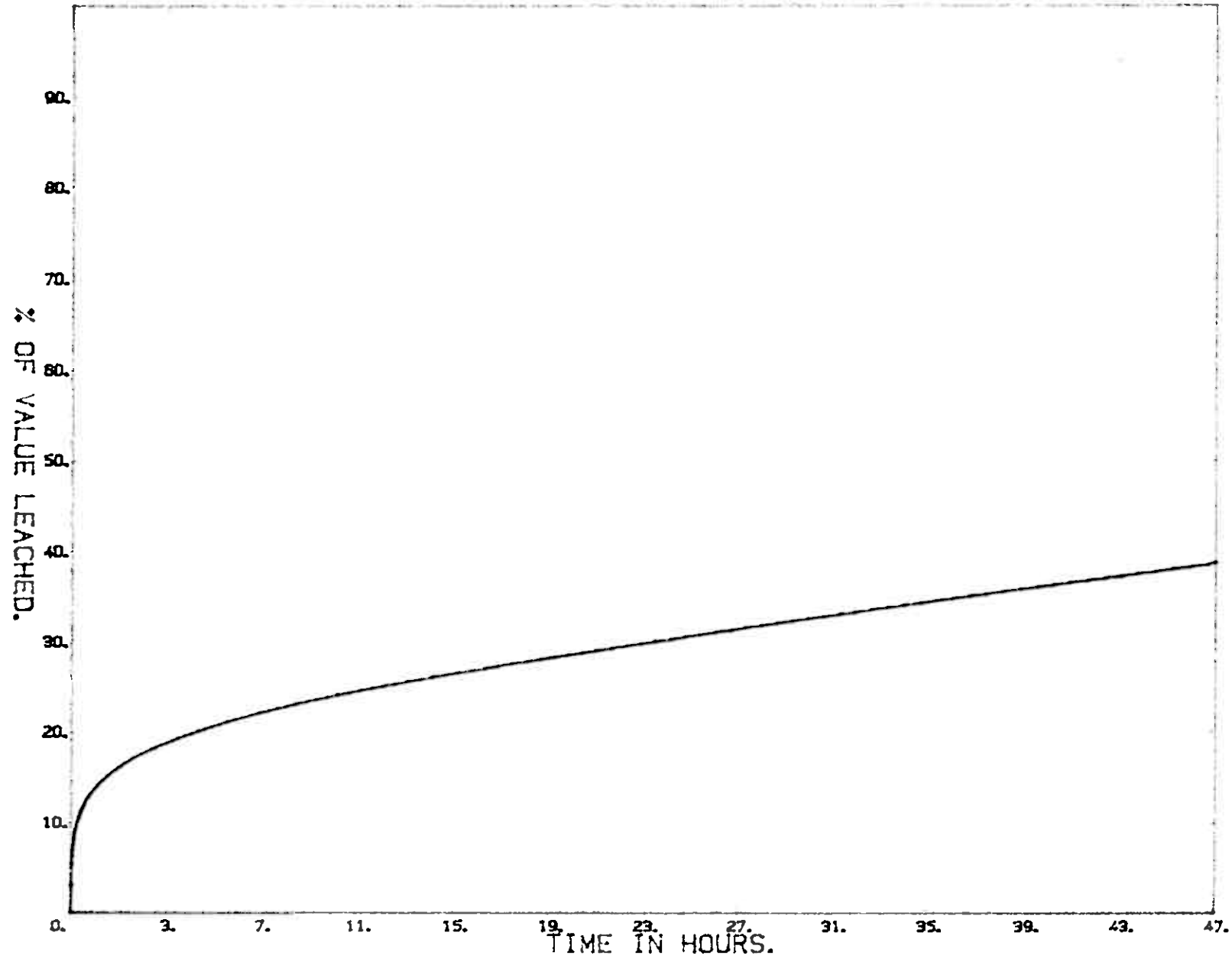

FIGURE 4.

Sample No L2+L7.
Test No 5.

——— % of GOLD Leached.
——— % of SILVER Leached.

Size Fraction -1/8".

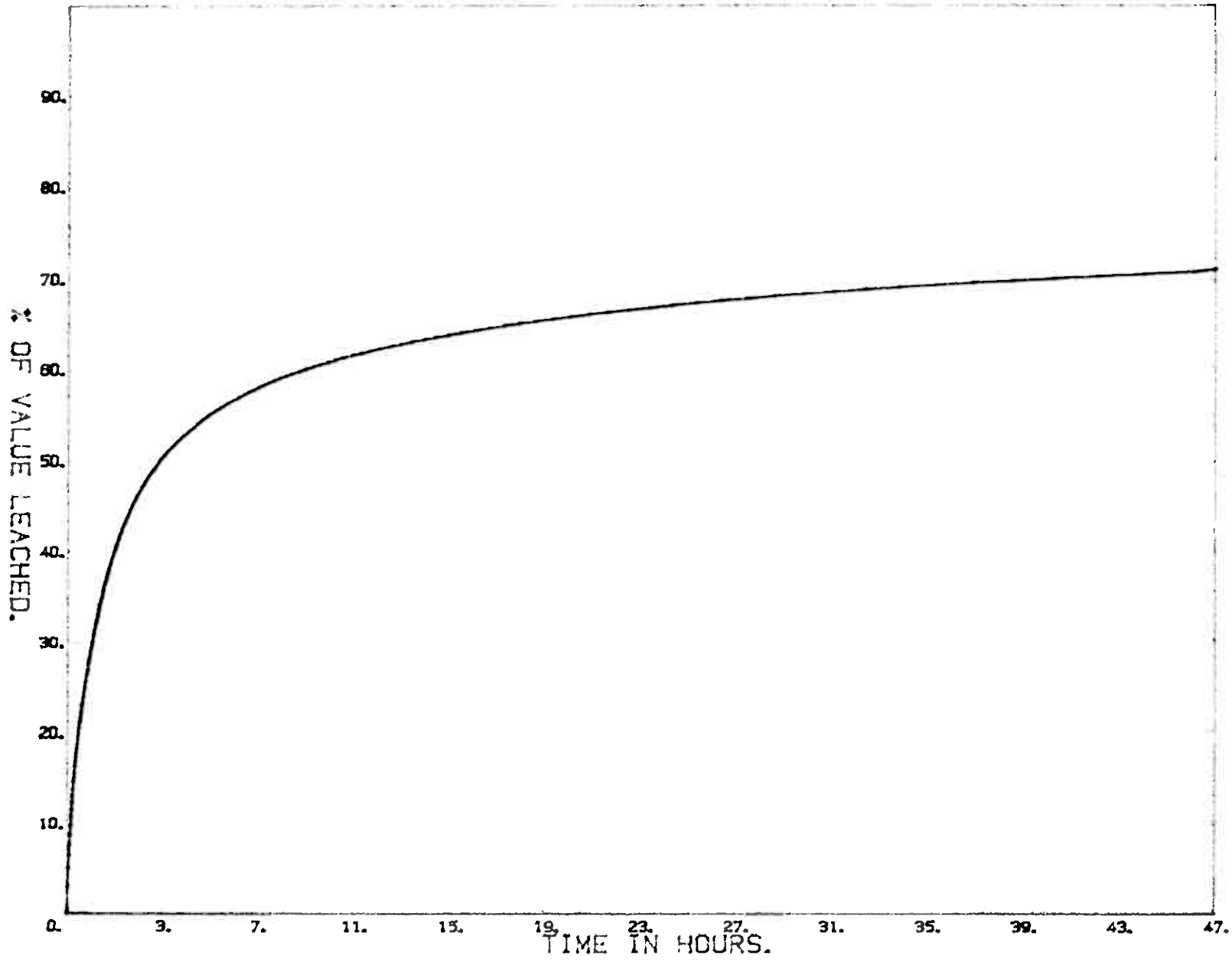

FIGURE 5.

Sample No L2+L7.
Test No 6.

——— % of GOLD Leached.
——— % of SILVER Leached.

Size Fraction PULVERIZED.

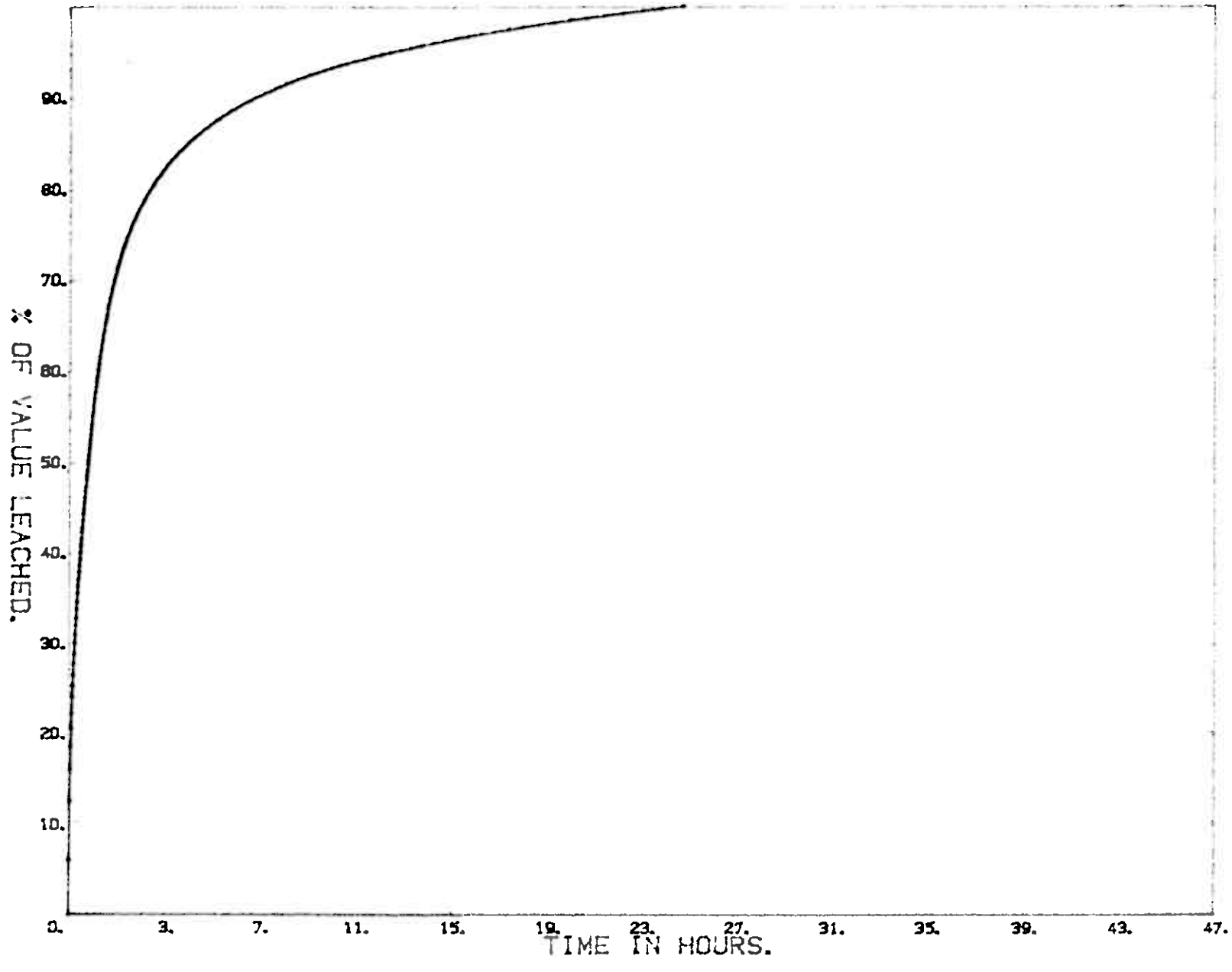

FIGURE 6.

SAMPLE III

The results from the tests are given in Tables, 13, 14, 15, 16, 17 and 18 and are shown in Figures 7, 8 and 9.

% Recovered

At -3/16", -1/8" and pulverized, the recoveries were 37%, 59% and 81% respectively.

Rate of Recovery

The majority of % recovery had occurred after 30 hours into cyanidation.

Cyanide Consumption

At the 30 hour mark the cyanide consumption (shown in Tables 14, 16 and 18) was around 2 lbs. of sodium cyanide per short ton of ore, by titration, however, 2 lbs. per short ton extra had been added at 24 hours to keep the cyanide level up. Therefore, the total consumption at 30 hours was 4 lbs. of sodium cyanide per short ton of ore in each of the three tests.

TABLE 13

Sample F' 3/16"

Test No. 7 NaCN conc. lb/ston 2.058

Time in Hrs	% GOLD Recovered	% SILVER Recovered
0.17	0.00	0.00
0.33	4.52	0.00
0.67	5.99	0.00
1.00	9.76	0.00
2.00	12.26	0.00
3.00	14.81	0.00
4.00	17.42	0.00
5.00	20.54	0.00
7.00	23.28	0.00
24.00	31.05	0.00
32.00	36.28	0.00
47.00	37.11	0.00

TABLE 14

Sample F' 3/16"

Time in Hrs	pH	Cyanide Consumed lbs/s.ton
1.00	11.80	0.16
3.00	11.55	0.29
7.00	10.80	0.71
24.00	10.50	1.88
47.00	10.50	2.12

TABLE 15

Sample F' -1/8"

Test No. 8 NaCN conc. lb/ston 2.058

Time in Hrs	% GOLD Recovered	% SILVER Recovered
0.17	3.50	0.00
0.33	5.34	0.00
0.67	11.08	0.00
1.00	15.20	0.00
2.00	22.93	0.00
3.00	26.28	0.00
4.00	29.36	0.00
5.00	33.89	0.00
7.00	40.28	0.00
24.00	52.06	0.00
32.00	58.85	0.00
47.00	58.78	0.00

TABLE 16

Sample F' -1/8"

Time in Hrs	pH	Cyanide Consumed lbs/s.ton
1.00	11.75	0.20
3.00	11.45	0.37
7.00	10.85	0.63
24.00	10.55	1.92
47.00	10.30	2.55

TABLE 17

Sample F' PULVERIZED

Test No. 9 NaCN conc. lb/ston 2.058

Time in Hrs	% GOLD Recovered	% SILVER Recovered
0.17	5.92	0.00
0.33	13.77	0.00
0.67	18.56	0.00
1.00	24.04	0.00
2.00	37.95	0.00
3.00	49.23	0.00
4.00	56.62	0.00
5.00	56.46	0.00
7.00	60.72	0.00
24.00	74.52	0.00
32.00	82.12	0.00
47.00	80.98	0.00

TABLE 18

Sample F' PULVERIZED

Time in Hrs	pH	Cyanide Consumed lbs/s.ton
1.00	11.60	0.39
3.00	11.25	0.59
7.00	10.65	0.78
24.00	10.50	1.69
47.00	10.30	2.51

Sample No 'F'.
Test No 7.

—— % of GOLD Leached.
—— % of SILVER Leached.

Size Fraction 3/16".

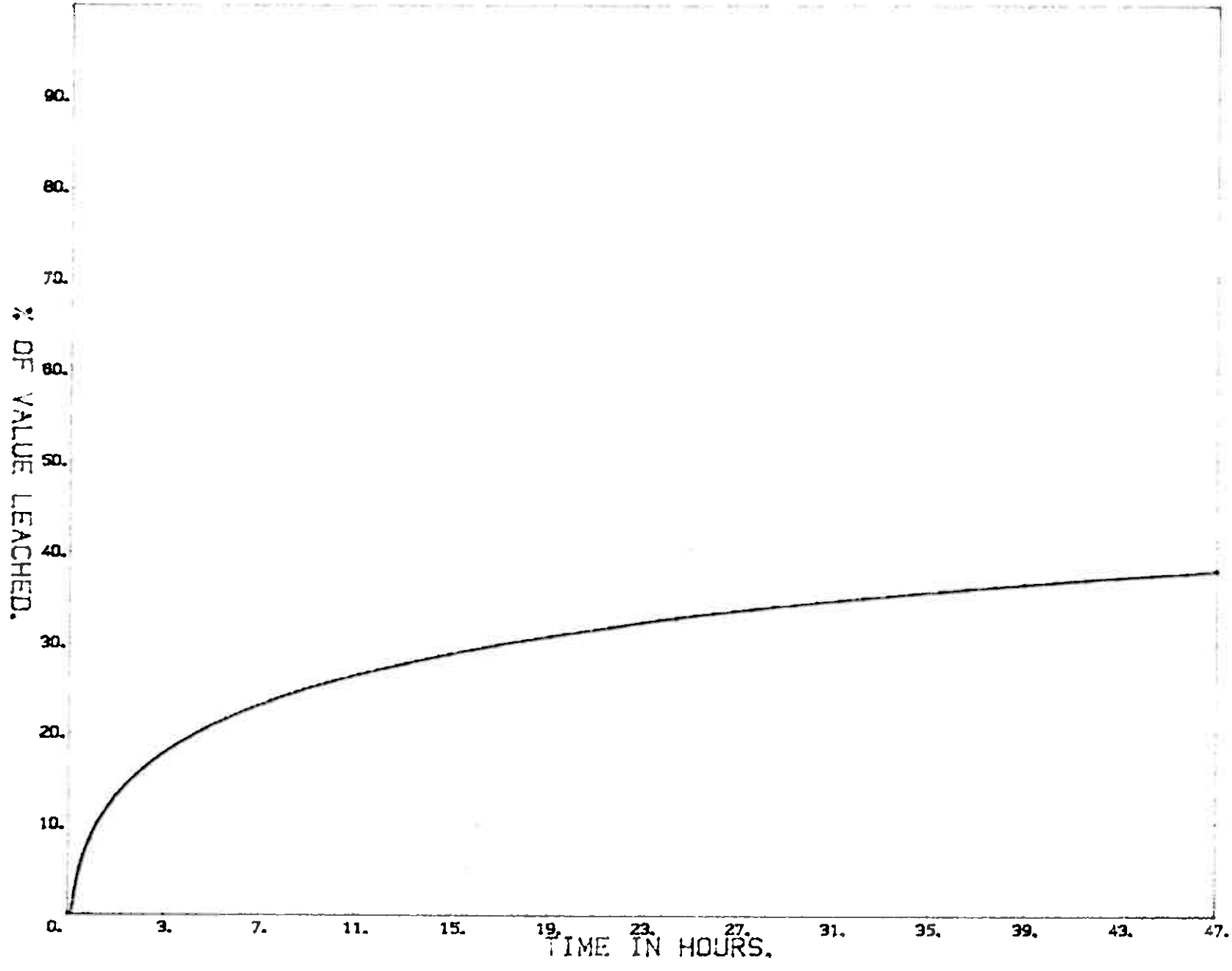

FIGURE 7.

Sample No 'F'.
Test No 8.

——— % of GOLD Leached.
——— % of SILVER Leached.

Size Fraction -1/8".

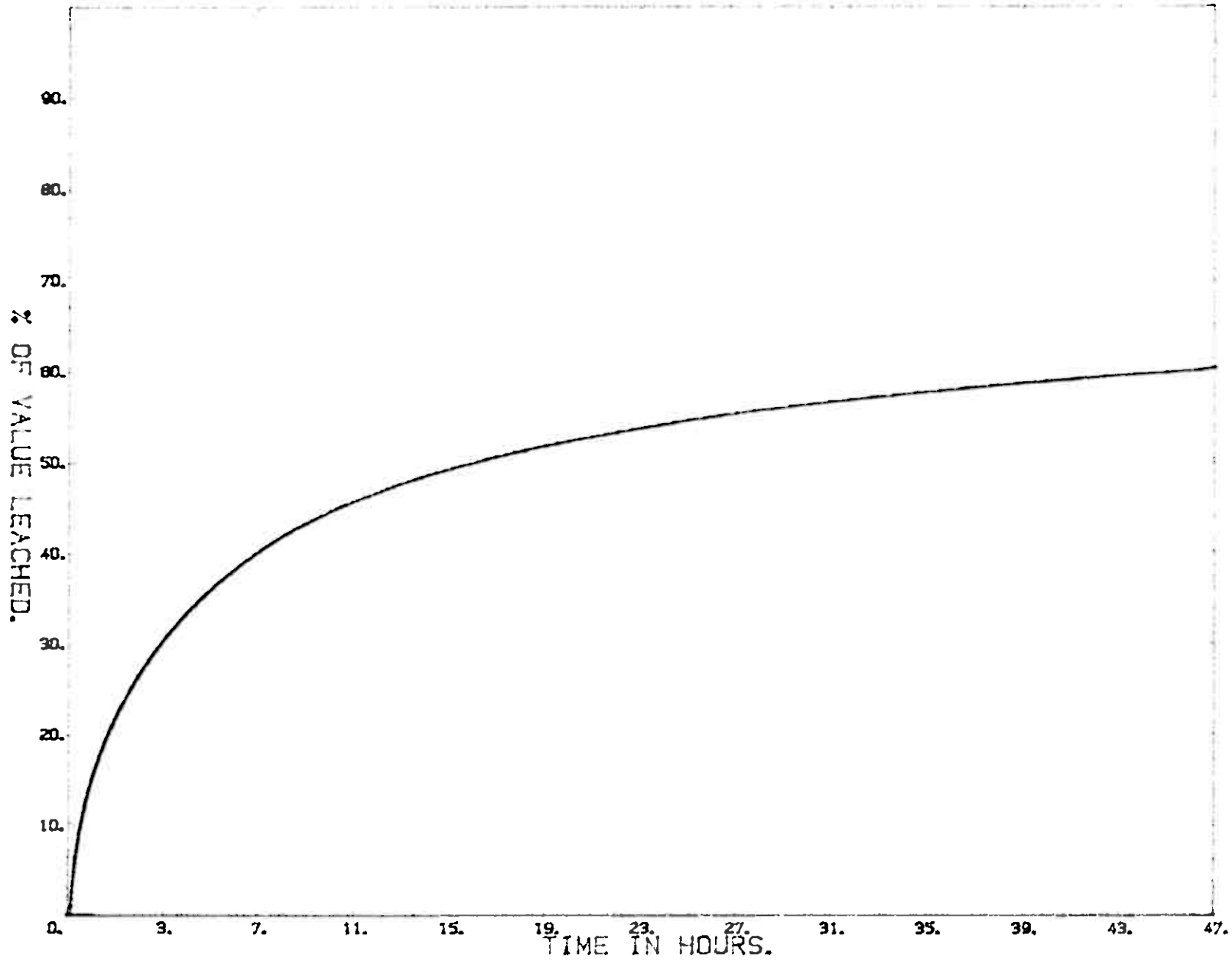

FIGURE 8.

Sample No 'F'.
Test No 9.

——— % of GOLD Leached.
——— % of SILVER Leached.

Size Fraction PULVERIZED.

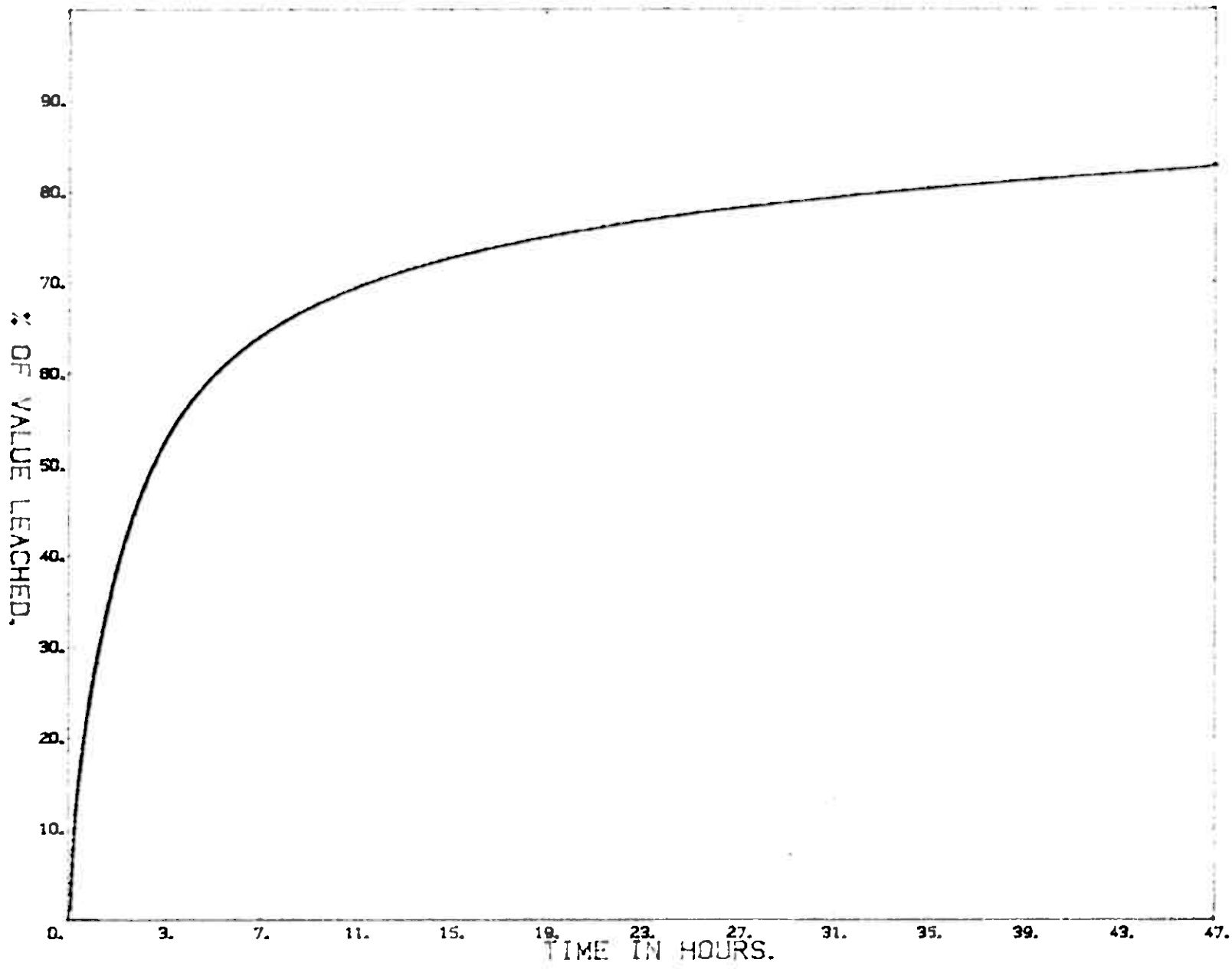

FIGURE 9.

IV CONCLUSIONS

SAMPLE I

1. The optimum size for recovery needs further evaluation, however, fine grinding is required.

2. The optimum recovery achieved on pulverizing was 83%.

3. The recovery occurred over 30 hours.

4. No significant values readsorption was noticed.

5. Sodium cyanide consumption was 1.5 lbs. per short ton of ore.

SAMPLE II

1. The optimum size for recovery needs further evaluation.

2. The optimum recovery achieved was 100% on pulverizing the ore.

3. The recovery occurred over 30 hours.

4. No significant values readsorption was noticed.

5. The sodium cyanide consumption was 1.5 lbs/short ton of ore.

SAMPLE III

1. The optimum size for recovery needs further evaluation.

2. The optimum recovery achieved was 81% on pulverizing the ore.

3. The recovery occurred over 30 hours.

4. No significant values readsorption was noticed.

5. Sodium cyanide consumption was 4 lbs/short ton of ore.

The high cyanide consumption of Sample III could very well be due to the presence of arsenic. Arsenic consumption was not monitored in these tests.

V RECOMMENDATIONS

1. Further work be carried out on all three samples to determine optimum grind sizes.

2. Further work be carried out on Sample III to determine reasons for high cyanide consumption.

APPENDIX I
****

Bottle Leach Test

This test requires that a weighed sample of known size is intimately mixed with the leaching solution for a minimum period of twenty four (24) hours. This is accomplished by weighing the sample into a one (1) gallon, wide-necked bottle, containing a known weight of leaching solution. This bottle is continuously rolled in a horizontal position. Samples are taken every twenty (20) minutes initially and then at progressively longer intervals. When samples are removed, the opportunity is taken to adjust pH, leaching reagent concentration and solution volume as necessary.

Each sample is analyzed for metal concentration, pH and leaching reagent concentration as required. At the end of the test, the solid fraction is assayed for metal value.

The cyanide consumption figures generated by this test are higher than would be expected in the field. This is because the test involves a greater amount of agitation and air exposure than the leachant would receive in the field.

Size Fraction Analysis

For size fraction analysis, the ore is first reduced to approximately minus 3/16" by a jaw crusher. The fractions generated are the ones listed below and are the ones most relevant to the assessment of the "tank farm" applicability.

Table 19

Fraction No.	Size Fraction
1	>4.75
2	4.750-2.36
3	2.360-1.19
4	1.190-0.510
5	0.510-0.212
6	0.212-0.106
7	0.106-0.045
8	<0.045

Each fraction is analysed for metal value and the fractional weight of metal in each fraction calculated.