傾向があり，このため実収率，操業率の低下，赤字操業になっている。その改善は極めて困難であり，既存設備の改善と併せて新選鉱場を増設し，実収率向上と硫化鉱の付加価値上昇により対応せざるを得ない。

既存設備の近代化は処理鉱量は 9,056t/月，品位はAu 0.47g/t，Ag 175g/tとする。選鉱実収率は現状より Au 2％，Ag 4％の上昇を前提とする。

工事は

a) 酸化鉱と硫化鉱の混合処理による実収率を上昇を図り，浮選，青化処理系統改善。

b) 各所の計装化，自動化。

c) 事務部門の改善。

である。投資額は6億1200万ペソ（21万1000US$）で，改善効果は処理鉱量t当り4,262 ペソである。人員21名の削減が可能である。

なおＩＲＲは52.7％で，銀建値約10％低下の時51.0％，約10％上昇の時54.4％であり，ARRは63.7％，PBは 1.6年である。

9．2　バロネス選鉱場新プラント増設計画

現バロネス選鉱場に隣接して，鉛一銅一亜鉛優先浮選の新選鉱場（破砕一磨鉱一浮選一脱水）を増設する。計画処理鉱量は，鉱山側の貯鉱，生産制限，選鉱場の貯鉱等を考慮して，150t/日から 200t/日の間に適正量があると考えられるので，両端の2ケースを検討した。品位はAu 0.8g/t，Ag 160g/t，Pb 0.8％，Cu 0.4％，Zn 1.6％を，選鉱実収率は Au 33％，Ag 76％，Pb 73％，Cu 86％，Zn 68％を前提とした。人員21名。

設備は

a) 機械・電気設備

b) 土木・建設

で総額 160億 2,500万ペソ（604万 7,000US$，150t/日）または 176億 2,800万ペソ（665万 1,000US$ペソ，200t/日）であり，処理鉱量t当り 2,762ペソまたは11,006ペソの利益となる。先の既存設備近代化の改善と併せ，バロネス全体の近代化

効果は，8,451ペソまたは12,487ペソとなる。しかし現状の赤字15,799ペソは，7,348ペソまたは3,312 ペソの赤字として残る。この差額は中小鉱山の契約選鉱費の改訂により負担して貰わざるを得ない。

結論としてバロネスでは，近代化計画を実施すると同時に，契約選鉱費は現行の16,500ペソ／ｔを25,000ペソ／ｔに値上げ断行することである。

なお，選鉱場増設に係わるＩＲＲは 150t/日で 6.5%， 200t/日で 9.2%であり，既存設備の近代化と選鉱場増設を合計した場合は，前者で 8.5%，後者で10.7%となる。先述条件に加えて，選鉱場増設は工事期間２年とする。

9．3　各選鉱場に共通する近代化への提言

３選鉱場に共通した近代化としての選鉱実収率の改善，操業コストの低減策，設備稼働率の改善案，保全に関する改善案は，その根底に基本的な方法があり，それらは選鉱場の一部計装化・自動化，保全・修理体制の確立，委託・買取り選鉱方式の全量買取方式への転換である。

計装化・自動化の目的は安定操業である。このため各選鉱要因をコントロールする必要があり，その最適条件把握のため日常のデータの集積が重要である。その連続的データ収集には計装化も必要である。また，同時に，運転員やスタッフの操業管理技術の習慣も重要である。

保全・修理体制の確立は，各所負荷の適正化，各種費用の節減，部品在庫の適量化，結果としての設備稼働率の上昇を目的とする。日常の保安点検から始め，点検チェック・シートによる複数人員でのチェックを提案する。また年間整備計画の導入と整備機器台帳の活用で以後の計画の資料とする。故障検知機器の導入により監視員の負担減，人為的見落し防止等を図る。

委託・買取混合選鉱方式は，時間的，経済的な浪費と作業の複雑性を発生させ，最終的に稼働率低下を招いている。全量買取方式へ切替ることにより，改善と同時に管理選鉱方式の導入が可能になる。方法的には過去の選鉱実収率，試験実収率により買取実収率条件を決定し，毎月の実績を参考に適正条件へと改訂してゆく。これに製錬条件と販売費を含めた鉱石買取方式を決定する。受け入れ鉱石は酸化鉱，硫化鉱，高

品位鉱，低品位鉱および難処理鉱の区分を基本に混合処理する。

事務部門では計画管理方式を提案する。すなわち予実算を基準に，異常の発見とその対応，将来予測を目的とする。また事務作業の簡素化，省力化，迅速化を図るため，パーソナル・コンピューターの導入を提案する。

以上を総括すると，この調査において策定した3選鉱場の近代化計画における投資総額（バロネスが 200t/日　増産計画の場合）は，約 205億 4,300万ペソ(775万 2,000 USドル）となる。3選鉱場合計の生産量（処理鉱量）は現状の月当り 23,218t が　5,200t　増加して月当り 28,413tとなり，処理量増及び近代化の効果によって生産高は現状の月当り約20億ペソが約30％増加して，月当り約26億ペソとなる。

収支改善金額の総計は月当り1億 6,500万ペソとなり，3選鉱場の大幅な収支改善が達成され，同時に3地区の鉱業発展に大きく寄与することになる。

ＣＦＭはメキシコの民間中小鉱山をさらに一層振興・育成させるために，この調査で提案した近代化計画に基づき早急に諸施策を講じ，必要な資金調達を行なって3選鉱場の近代化工事に着手すべきである。

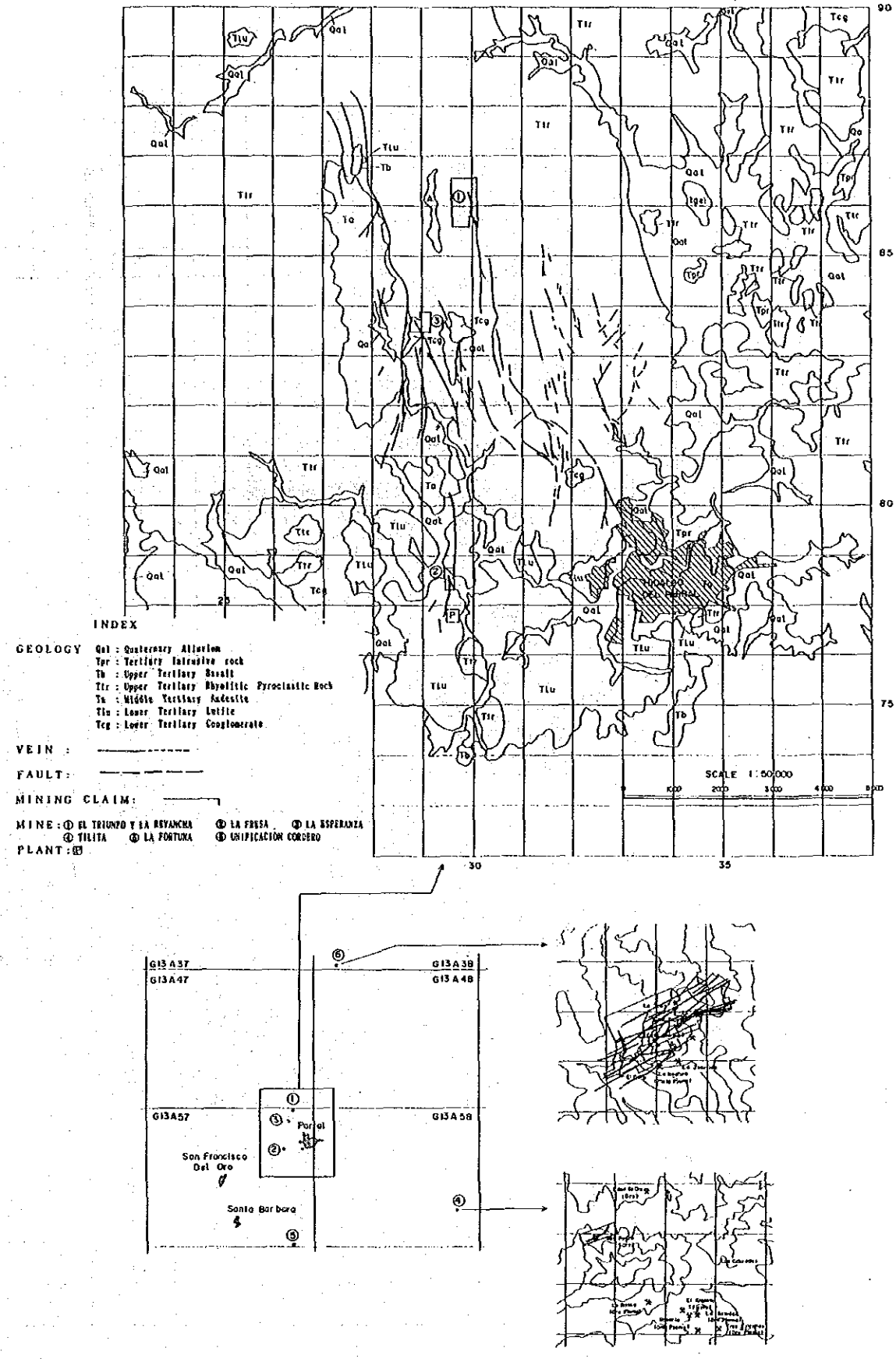


Fig. 3.1.1 Geologic and Vein Map "Parral District"

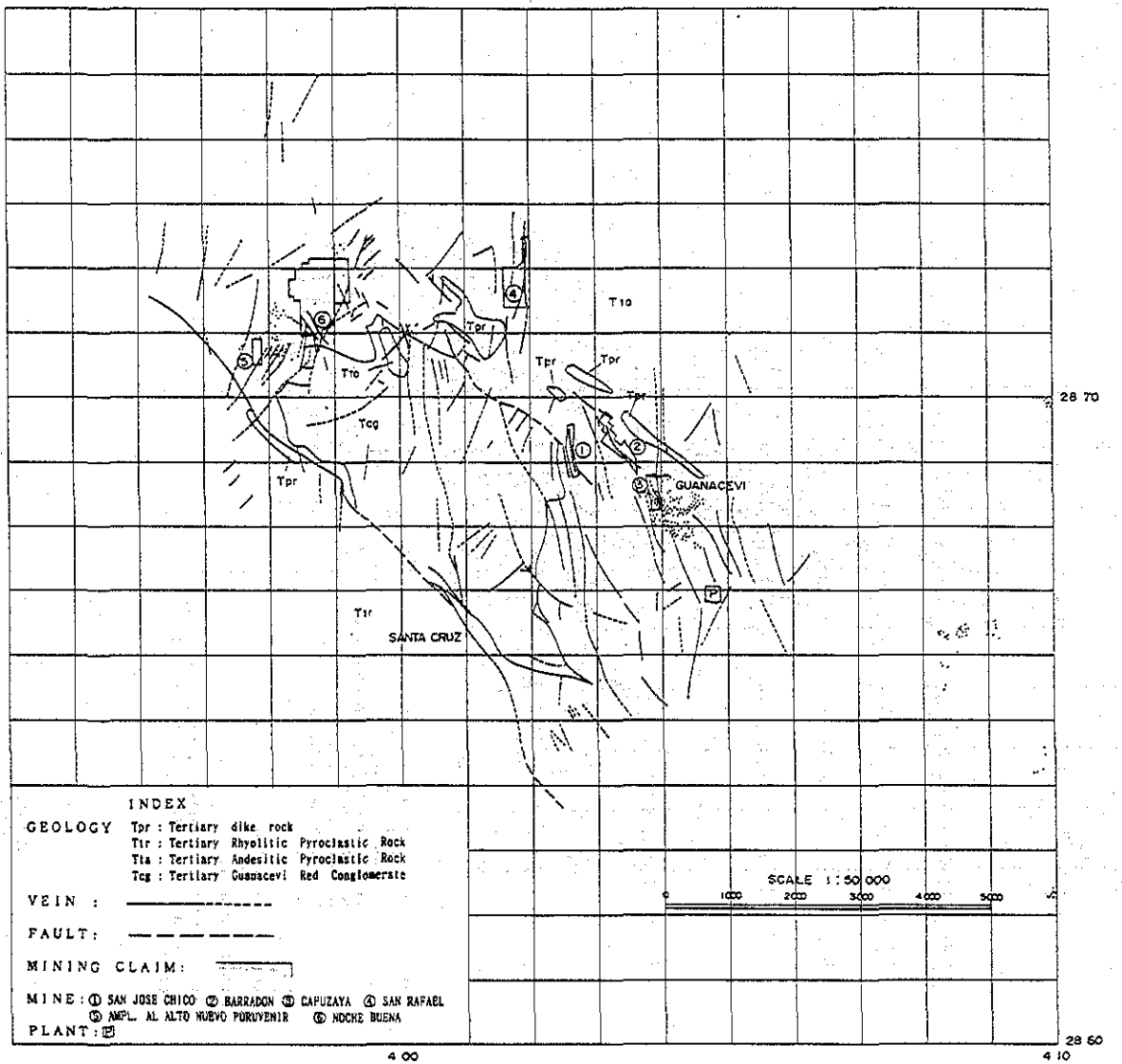


Fig. 3.1.2 Geologic and Vein Map "Guancevi District"

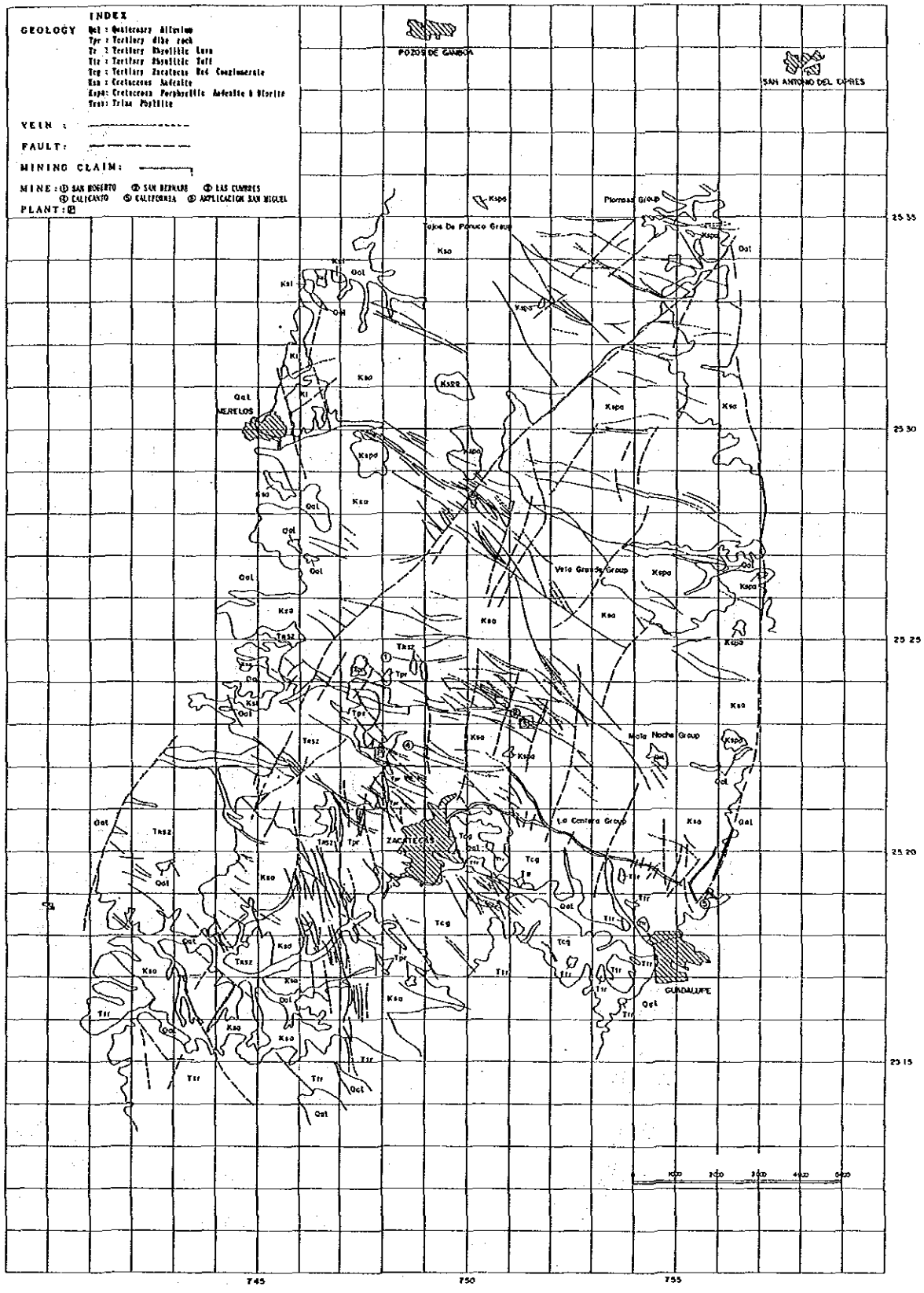


Fig. 3.1.3 Geologic and Vein Map "Barones District"

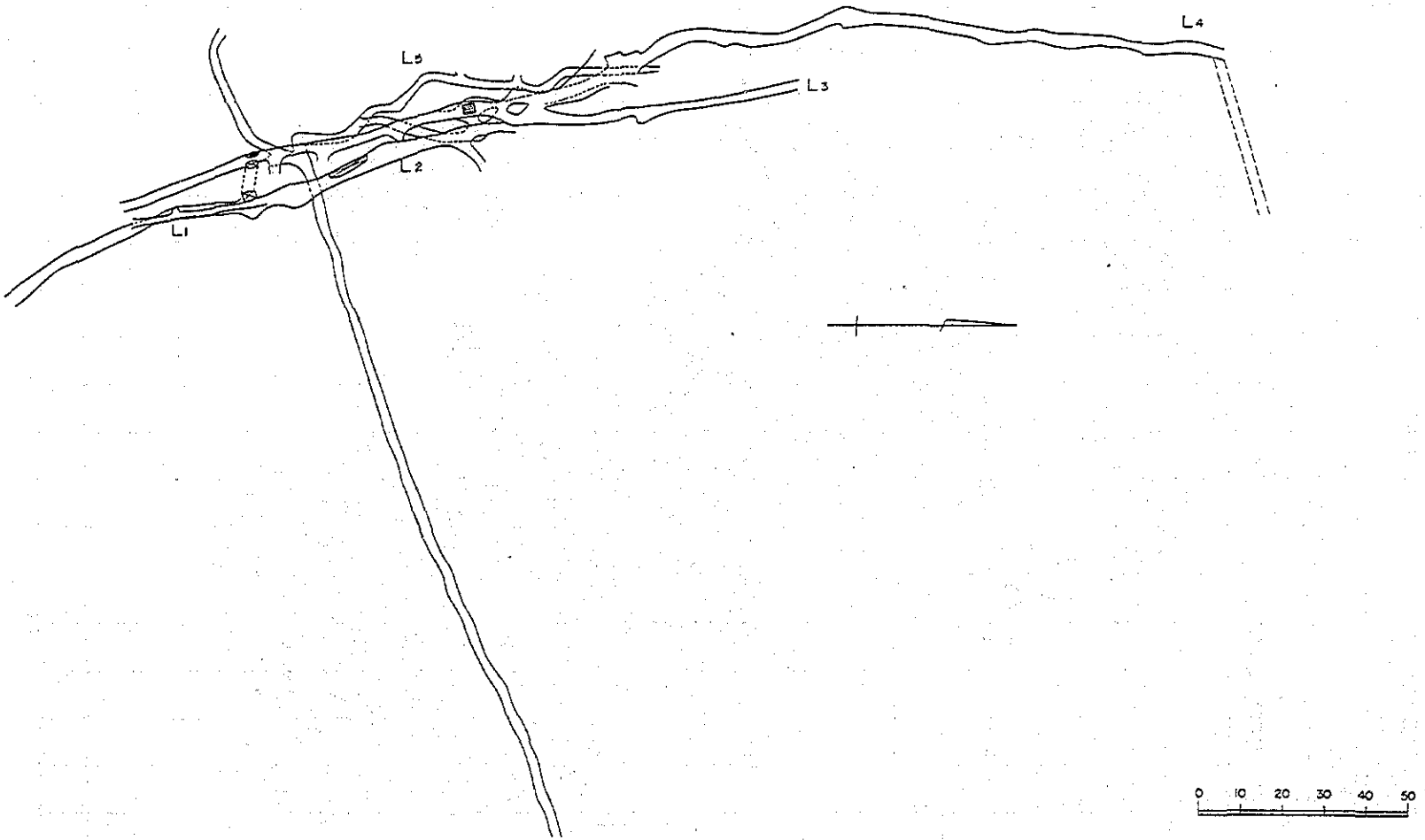


Fig. 3.3.1.a El Triunfo Y La Revancha -Plane-

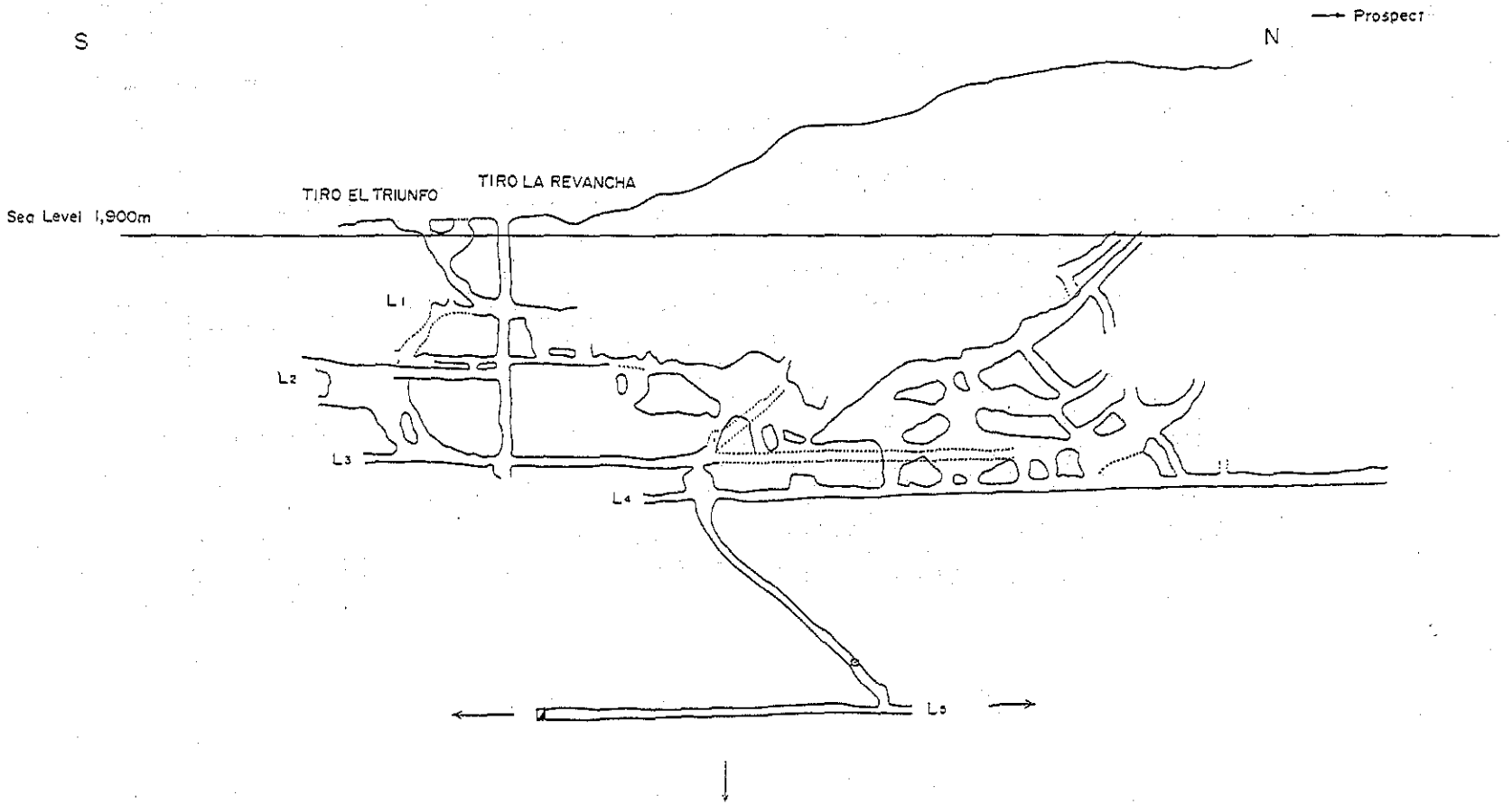


Fig. 3.3.1.b El Triunfo Y La Revancha -Longitudinal Section-

0 10 20 30 40 50

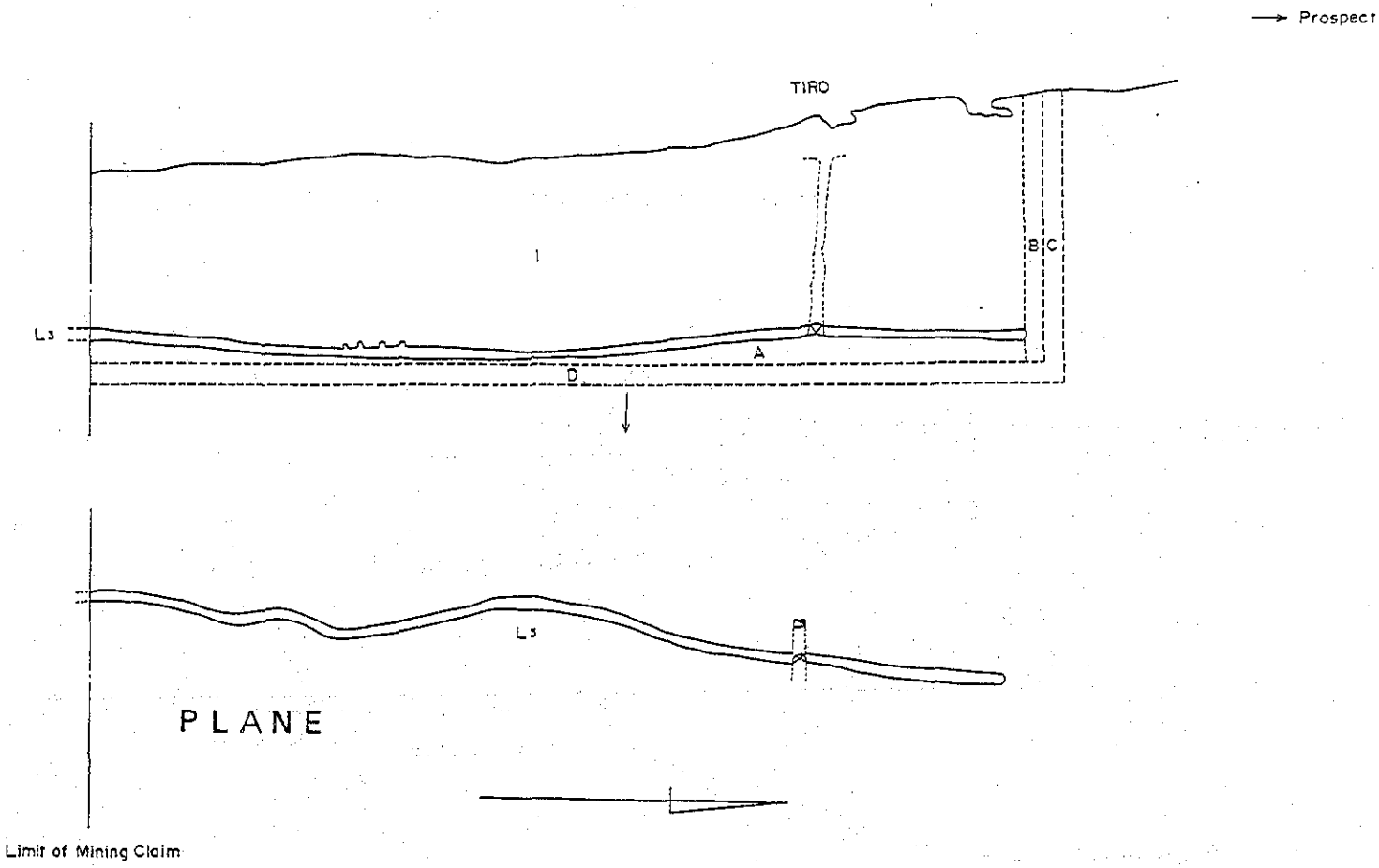


Fig. 3.3.2 La Presa -Plane and Longitudinal Section-

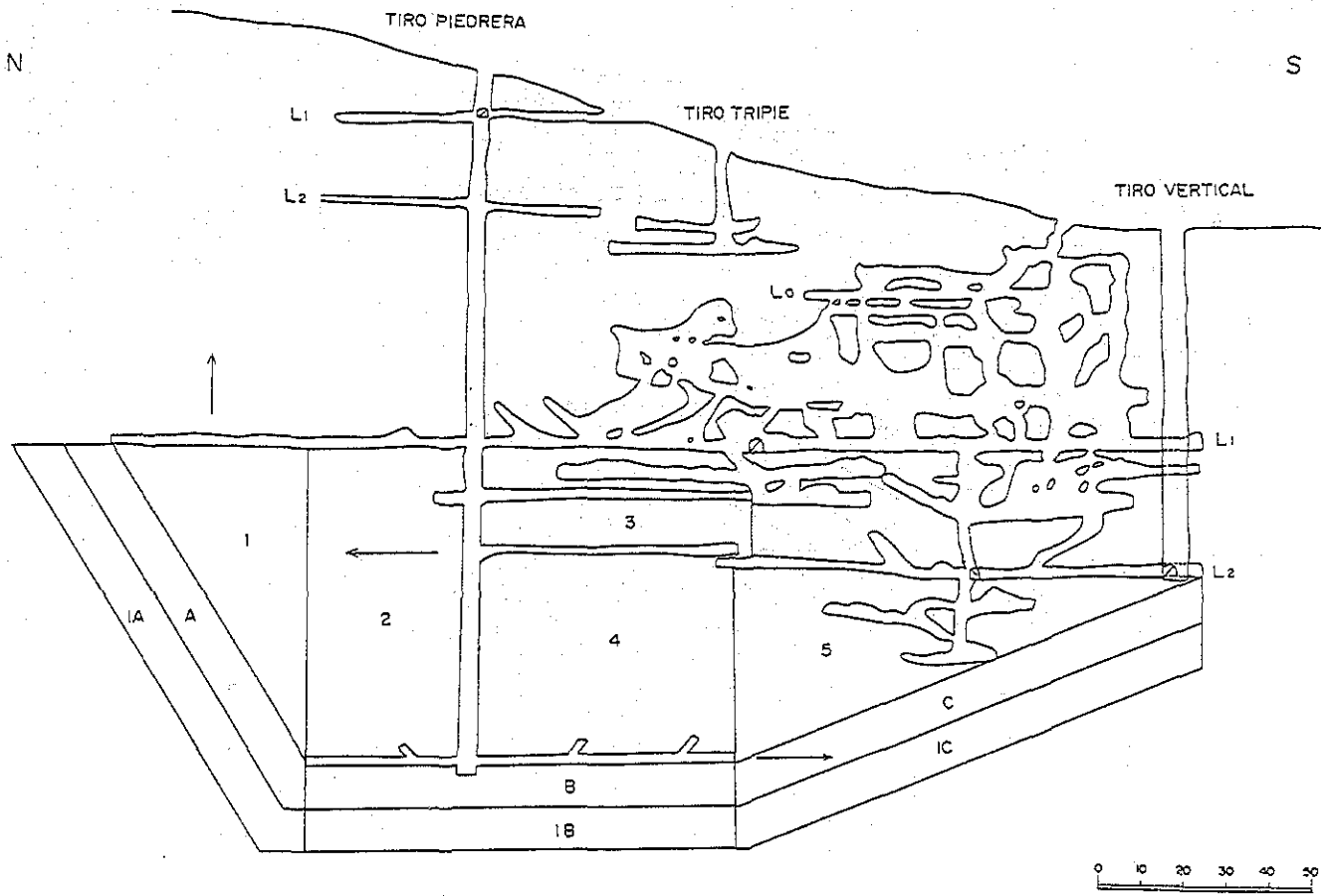
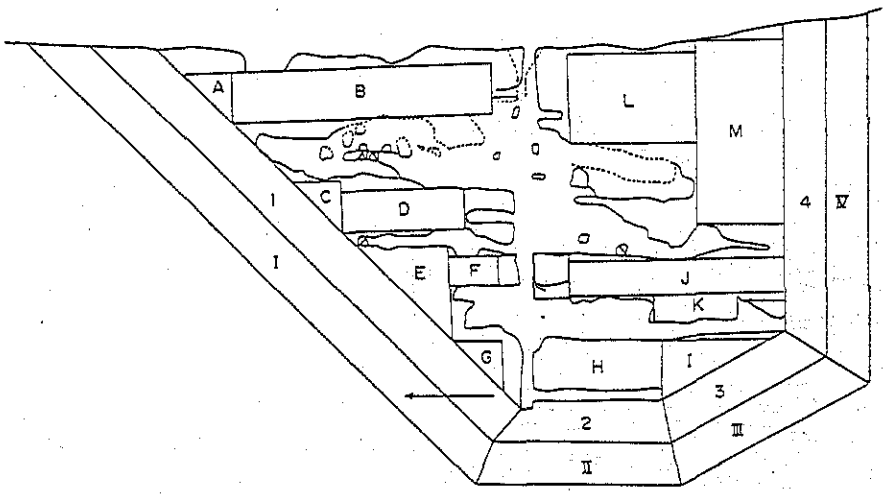
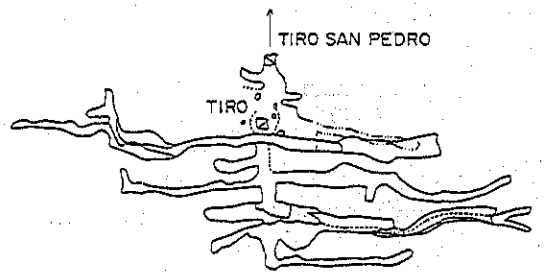


Fig. 3. 3. 3 La Esperanza -Longitudinal Section-





PLANE

Prospect

0 10 20 30 40 50

Fig. 3.3.4 Tilita -Plane and Longitudinal Section-

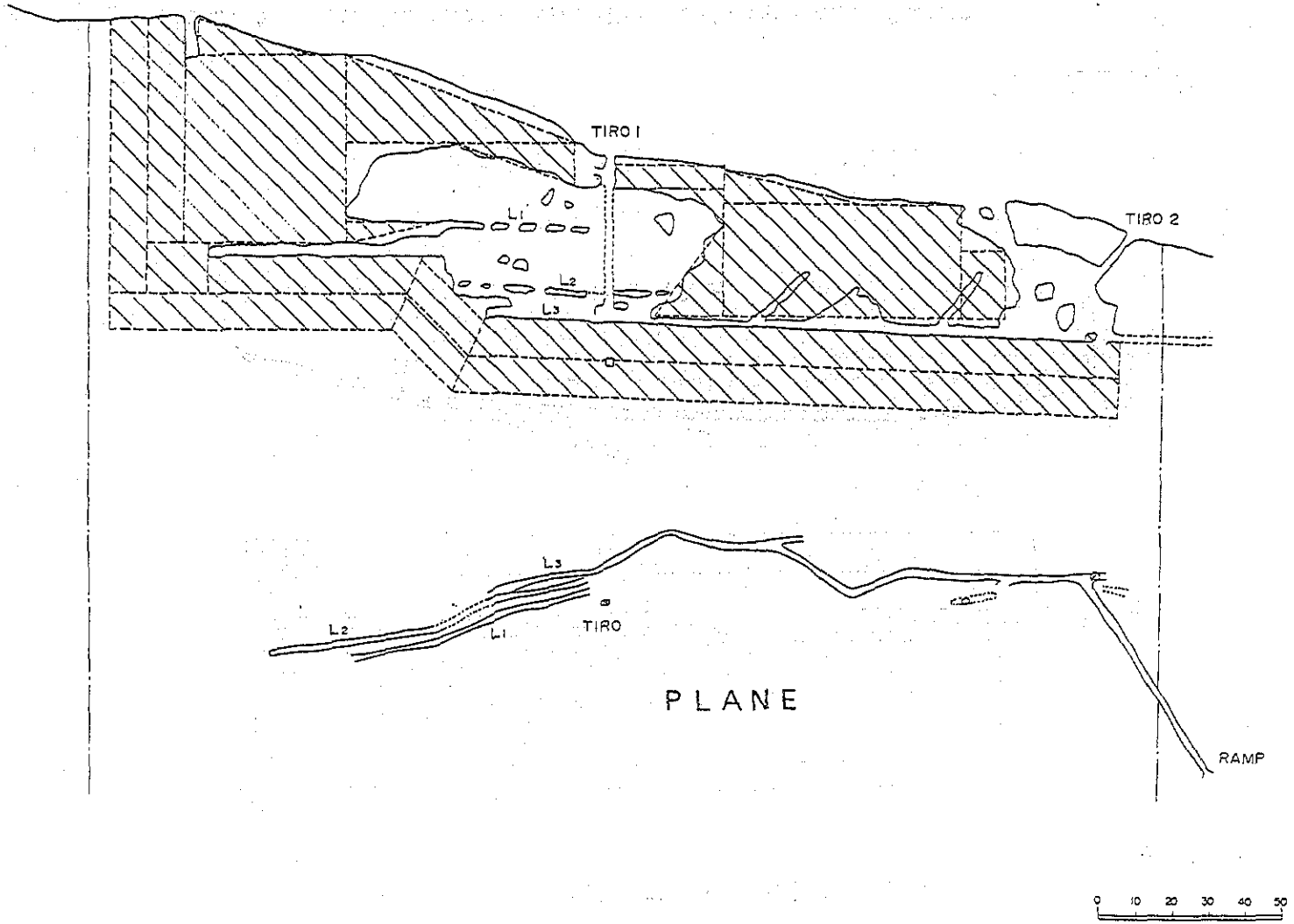
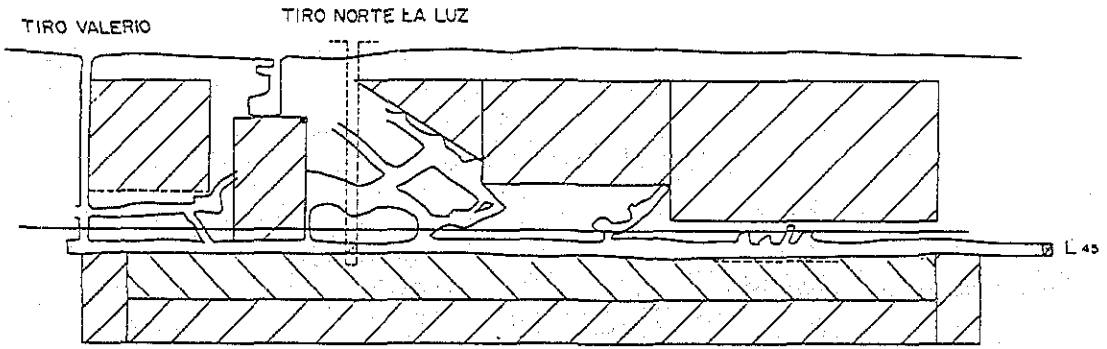
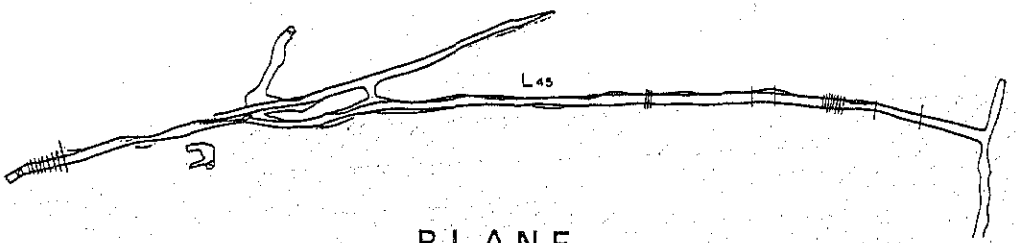


Fig. 3.3.5 La Fortuna -Plane and Longitudinal Section-

LONGITUDINAL SECTION





PLANE

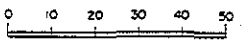
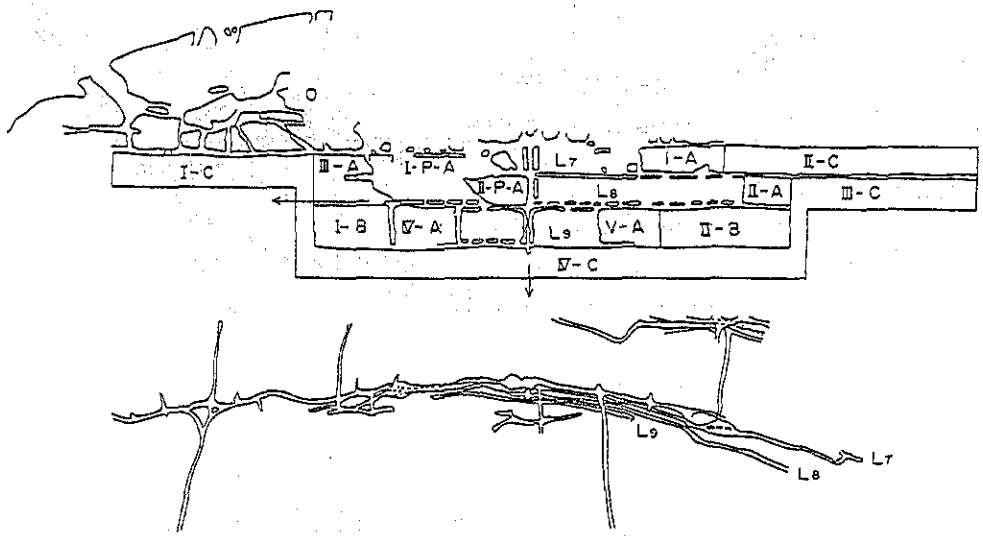


Fig. 3. 3. 6 Unificaction Cordero -Plane and Longitudinal Section-

→ Prospect

LONGITUDINAL SECTION



PLANE

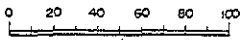


Fig. 3. 3. 7 San Jose Chico -Plane and Longitudinal Section-

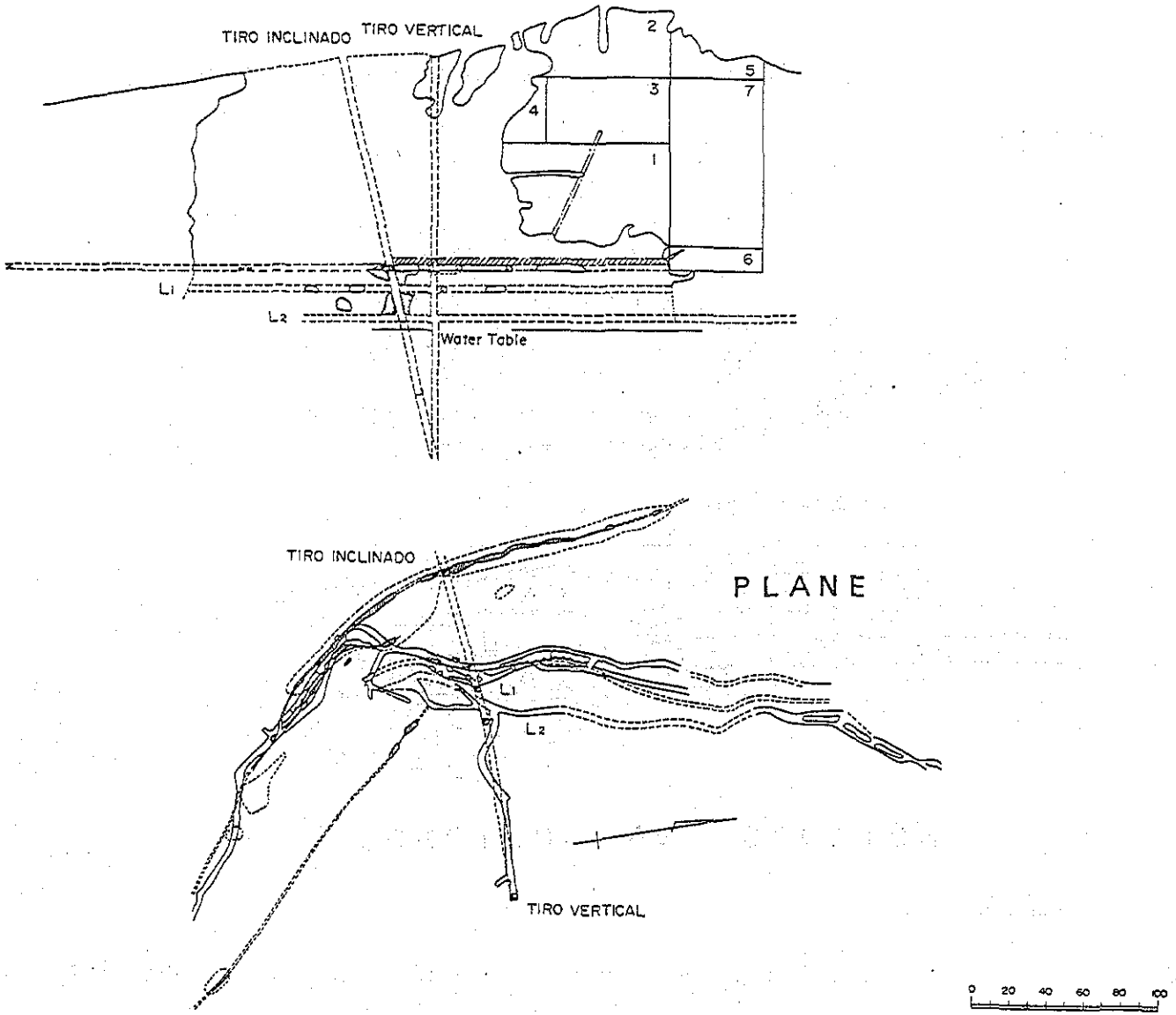


Fig. 3. 3. 8. a Barradon -Plane and Longitudinal Section-

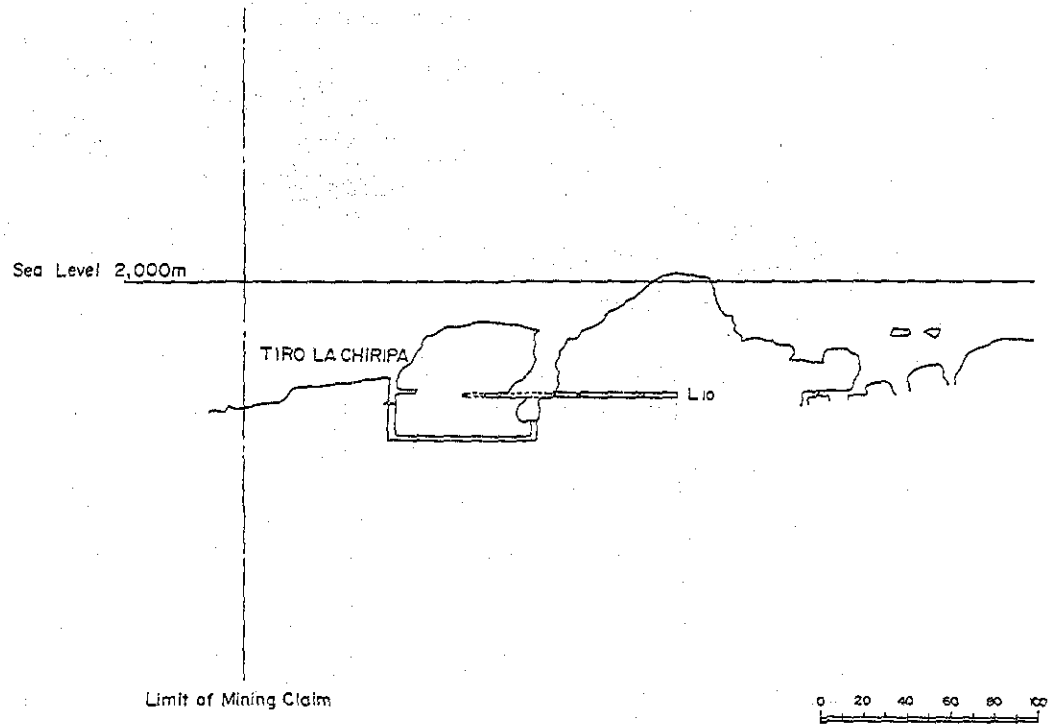


Fig. 3. 3. 8. b Barradon (Chiripa) -Longitudinal Section-

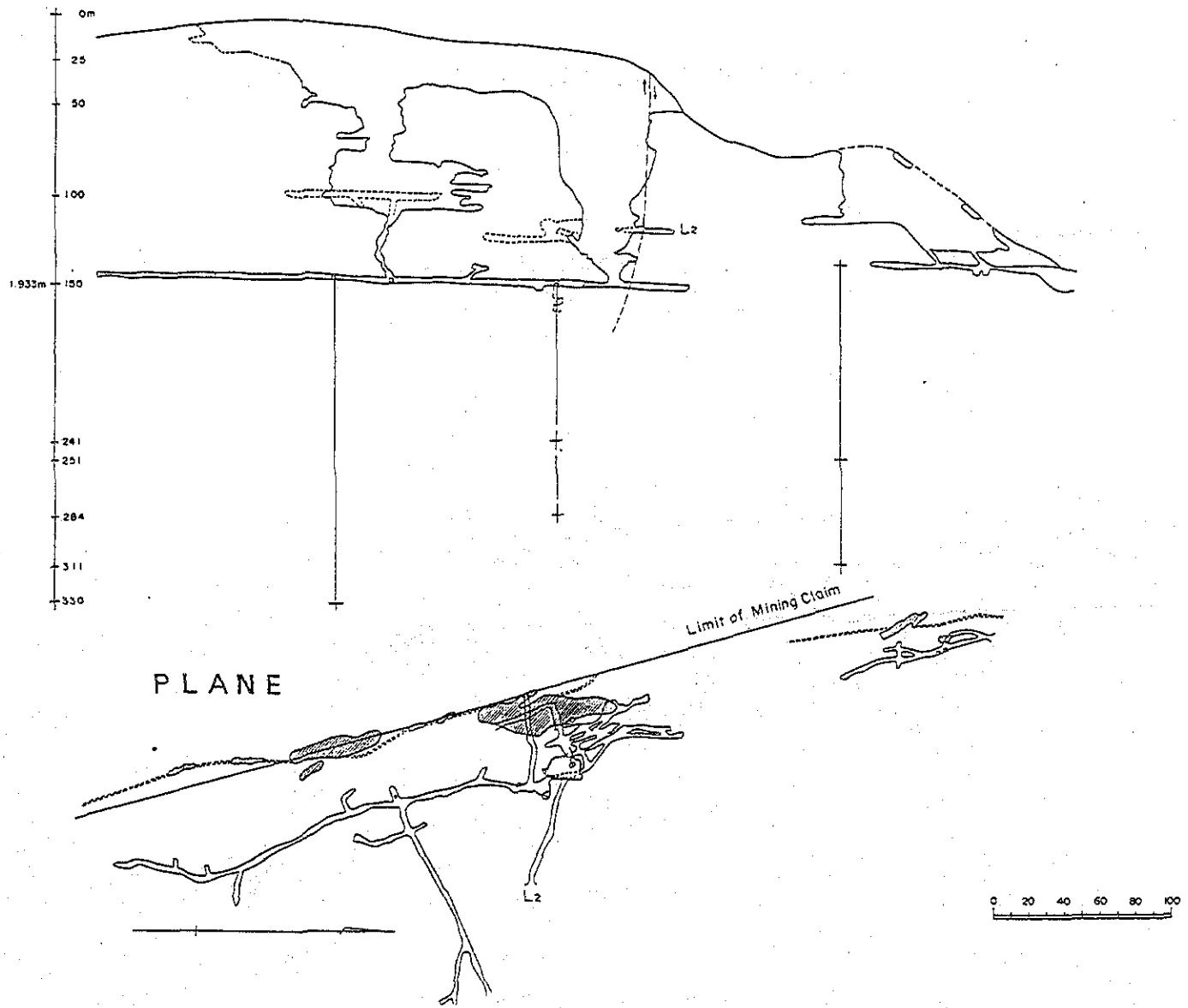


Fig. 3. 3. 9　　Capuzaya -Plane and Longitudinal Section-

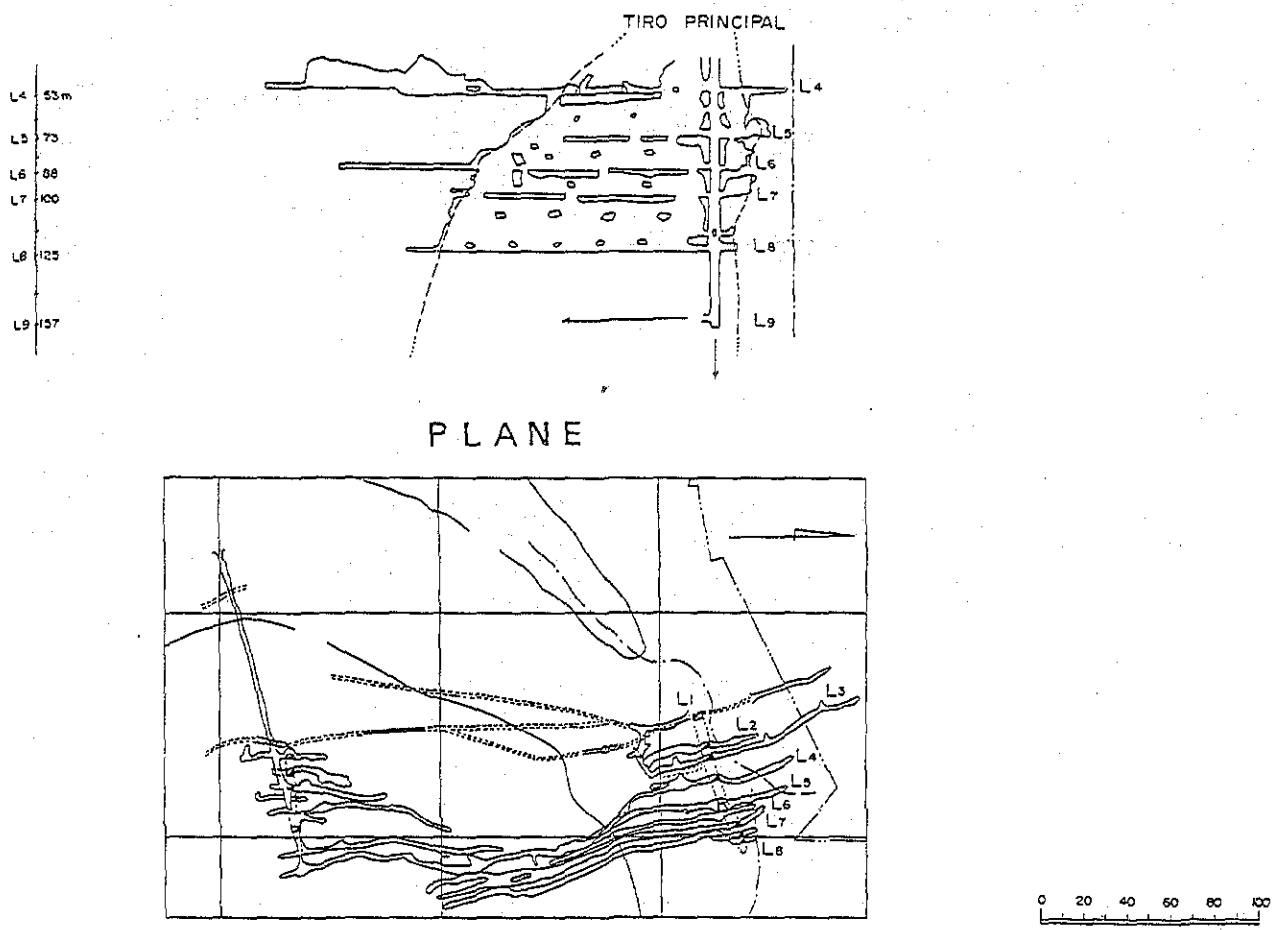


Fig. 3.3.10 San Rafael -Plane and Longitudinal Section-

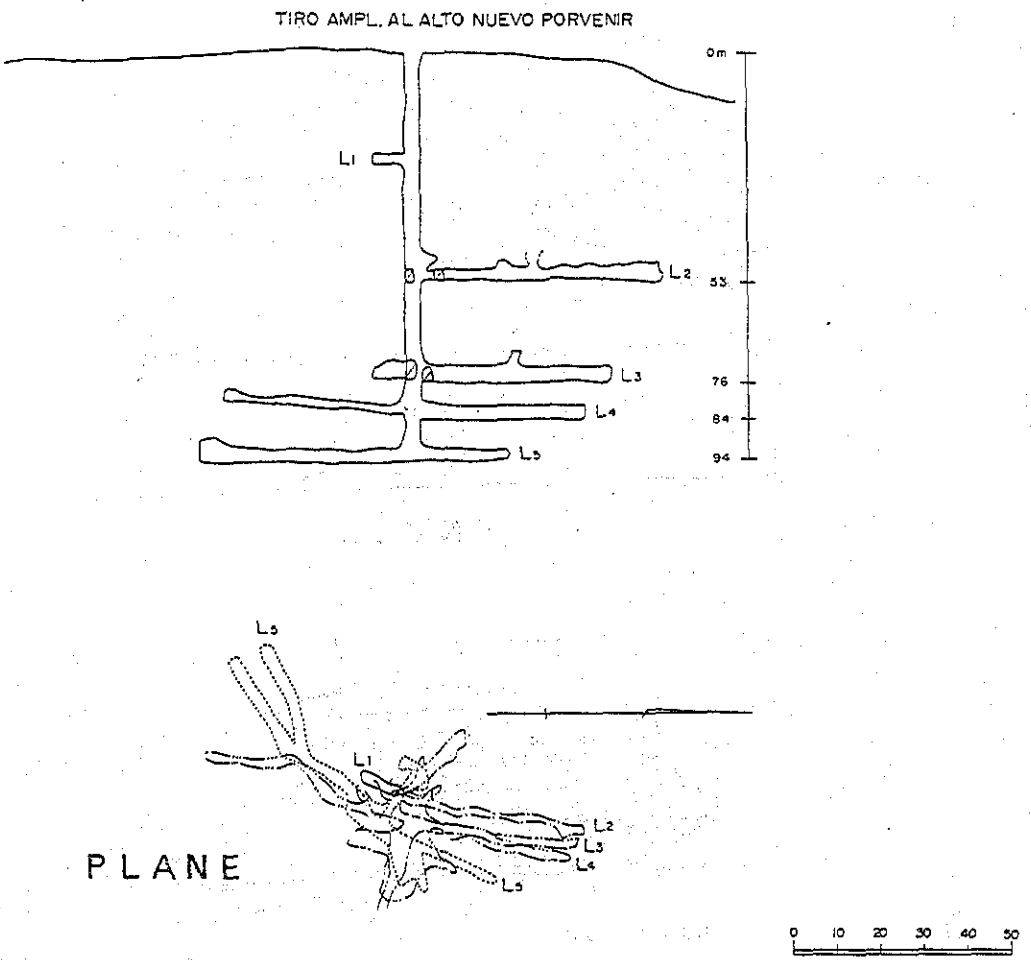


Fig. 3.3.11 Ampl. Al Alto Nuevo Porvenir -Plane and Longitudinal Section-

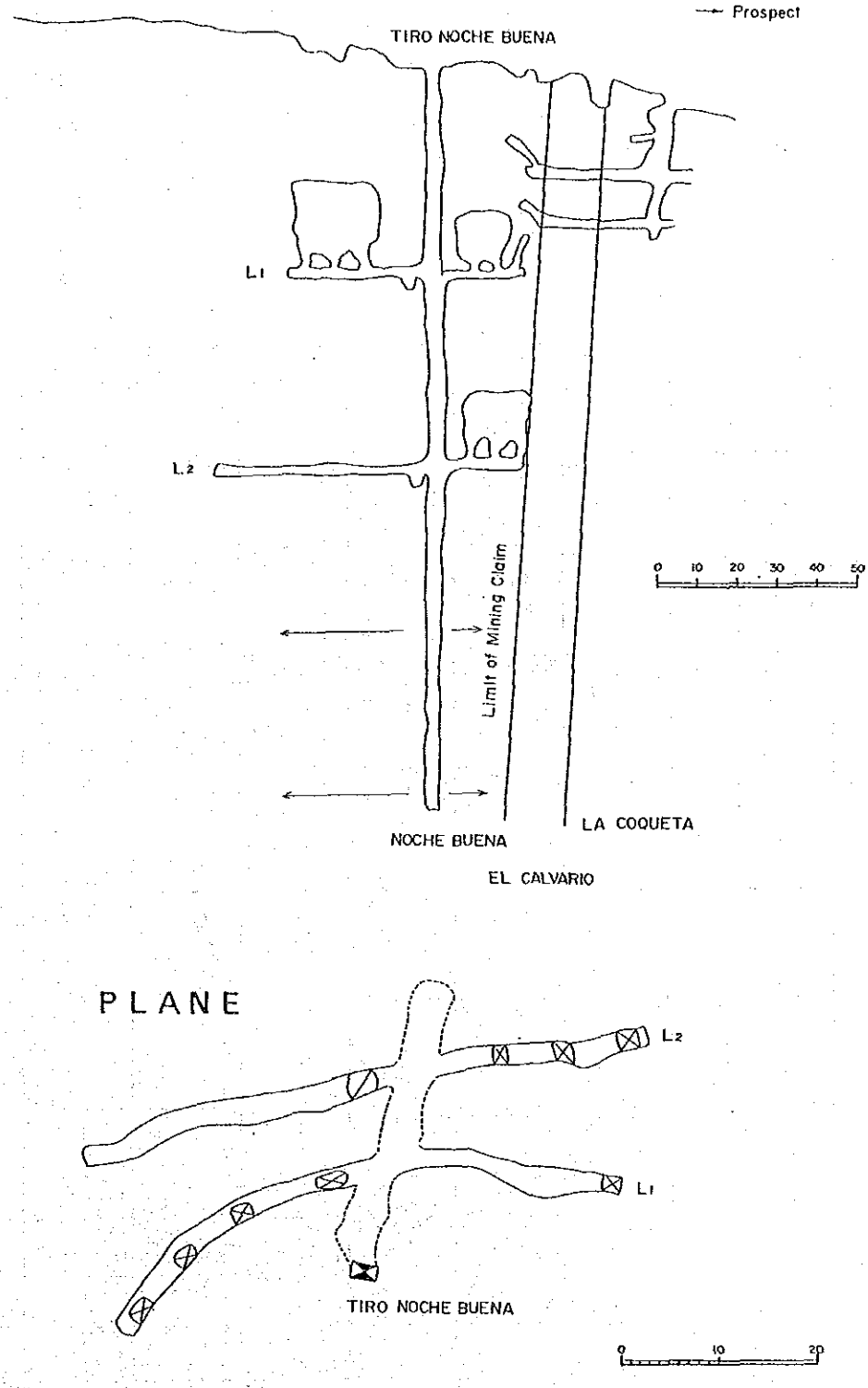


Fig. 3. 3. 12 Noche Buena -Plane and Longitudinal Section-

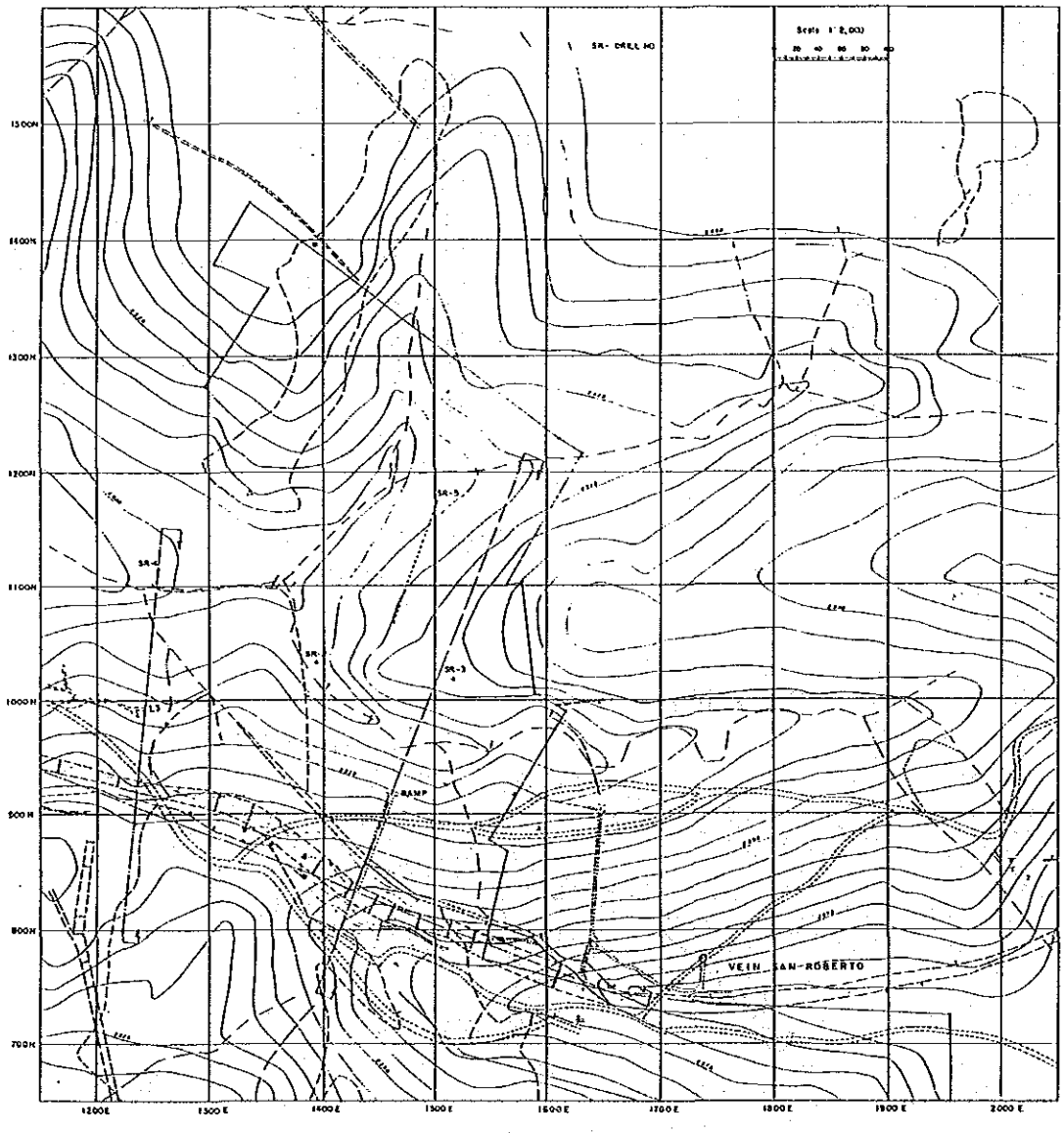
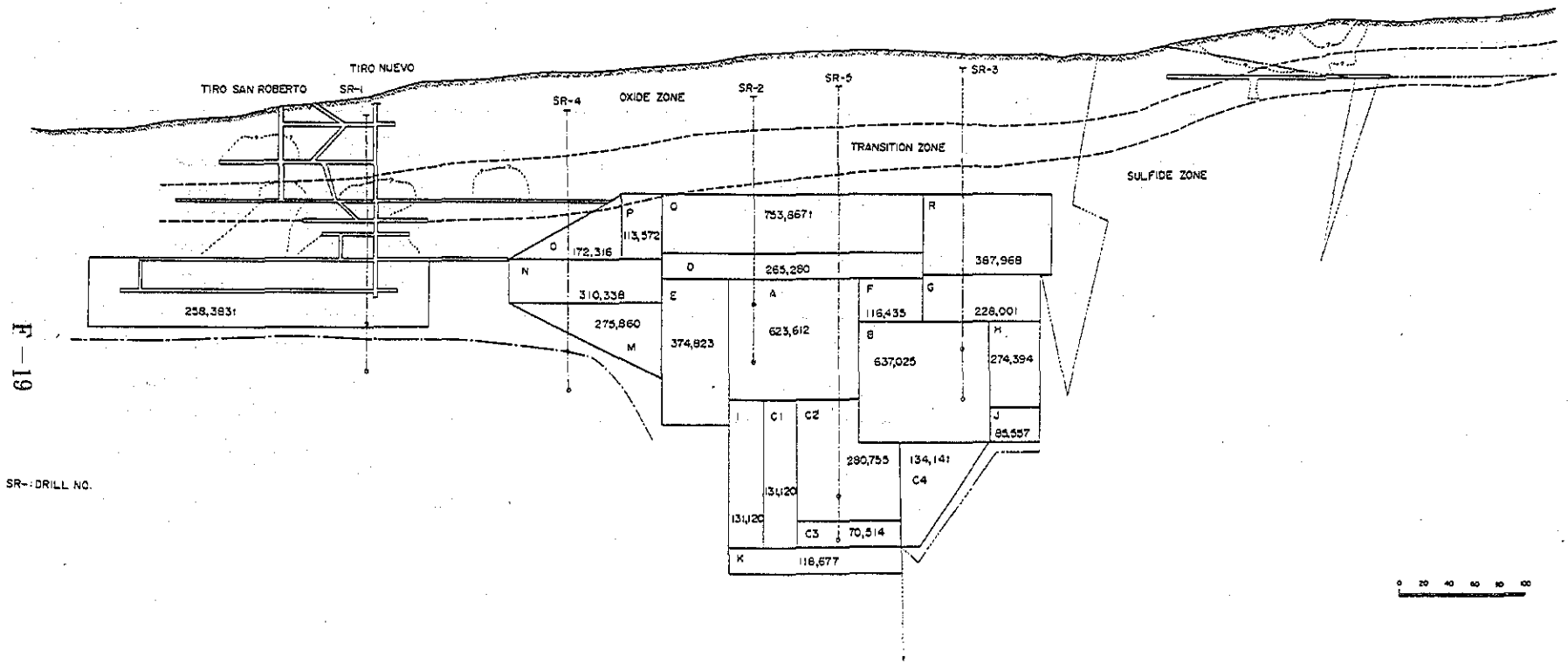


Fig. 3. 3. 13. a San Roberto -Topographic Map-



H-19

Fig. 3.3.13.b San Roberto -Longitudinal Section-

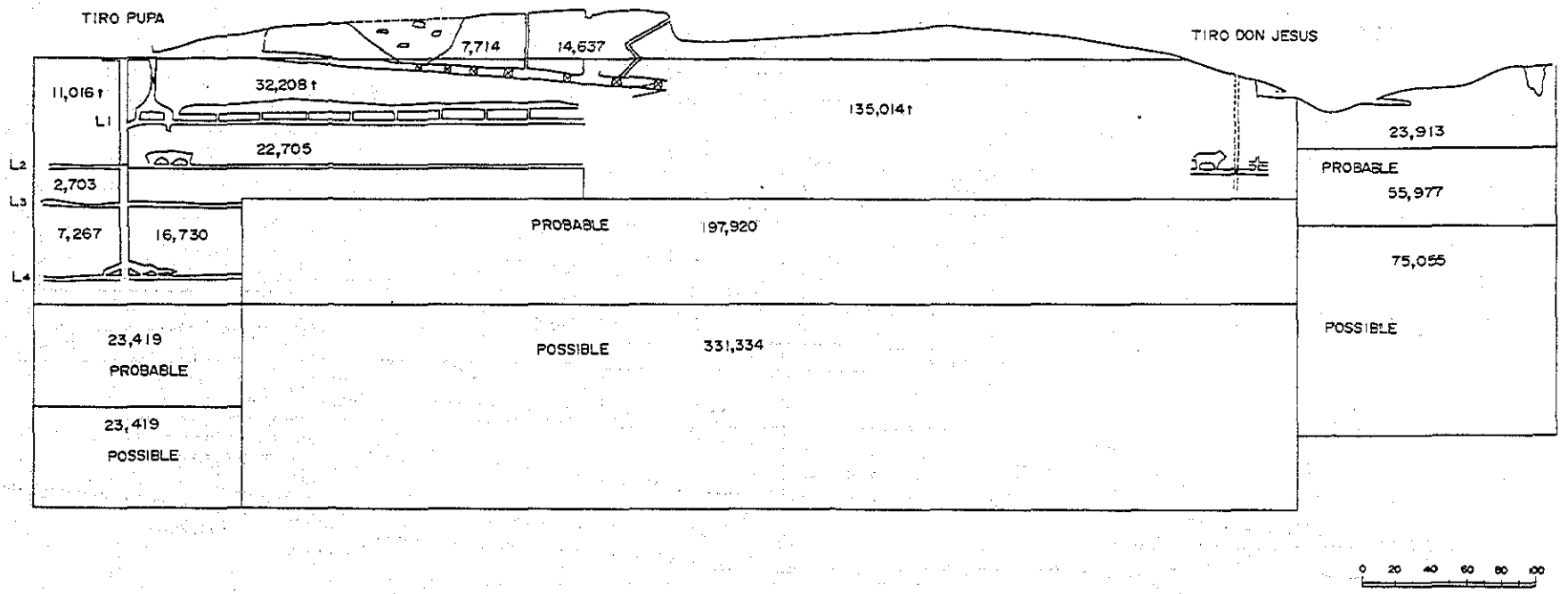


Fig. 3. 3. 14. a San Bernabe y Pupa (Pupa) -Longitudinal section-

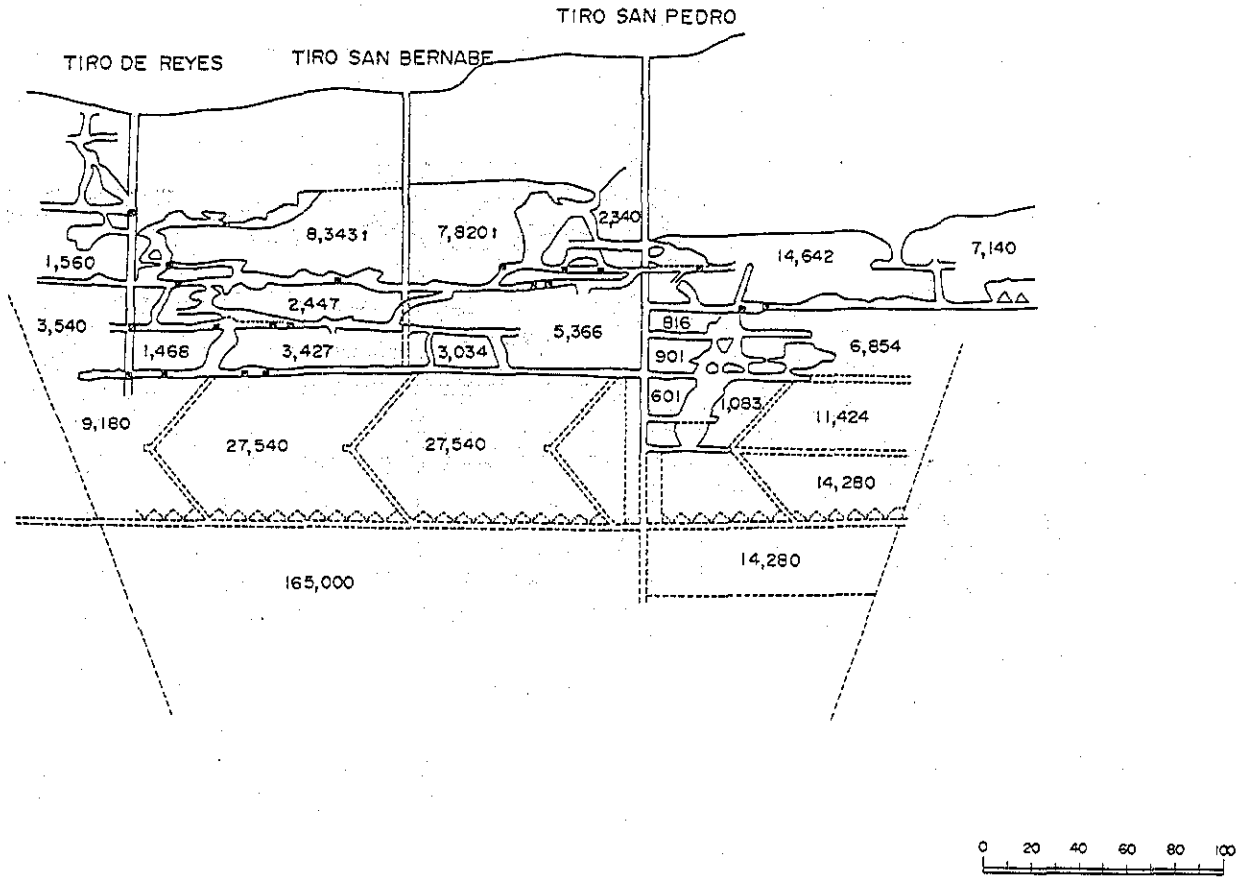
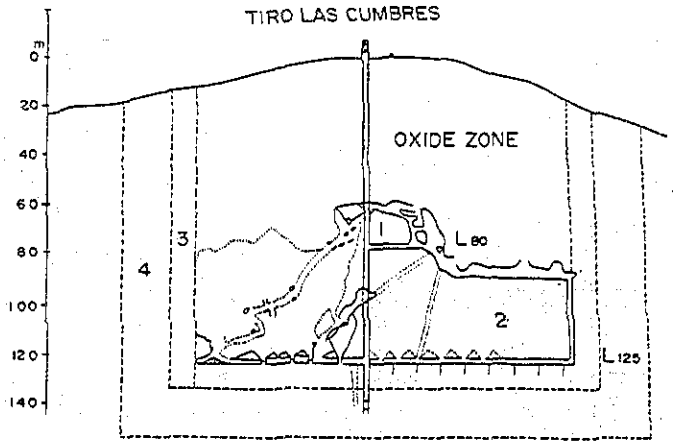


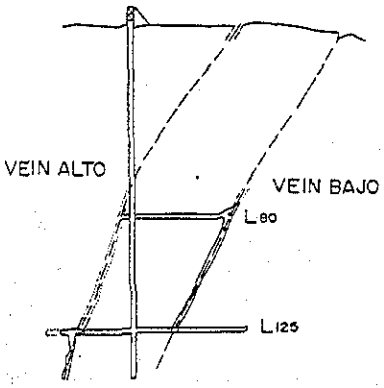
Fig. 3. 3. 14. b San Bernabe y Pupa (San Bernabe) -Longitudinal Section-

→ Prospect

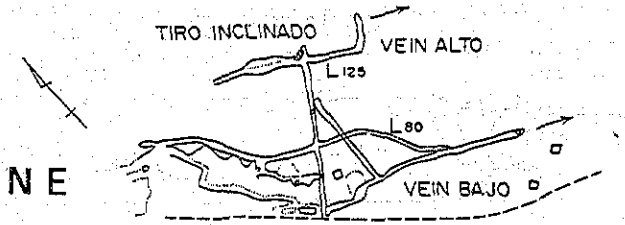
LONGITUDINAL SECTION



CROSS SECTION



PLANE



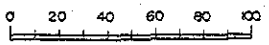


Fig. 3. 3. 15 Las Cumbres -Plane and Section-

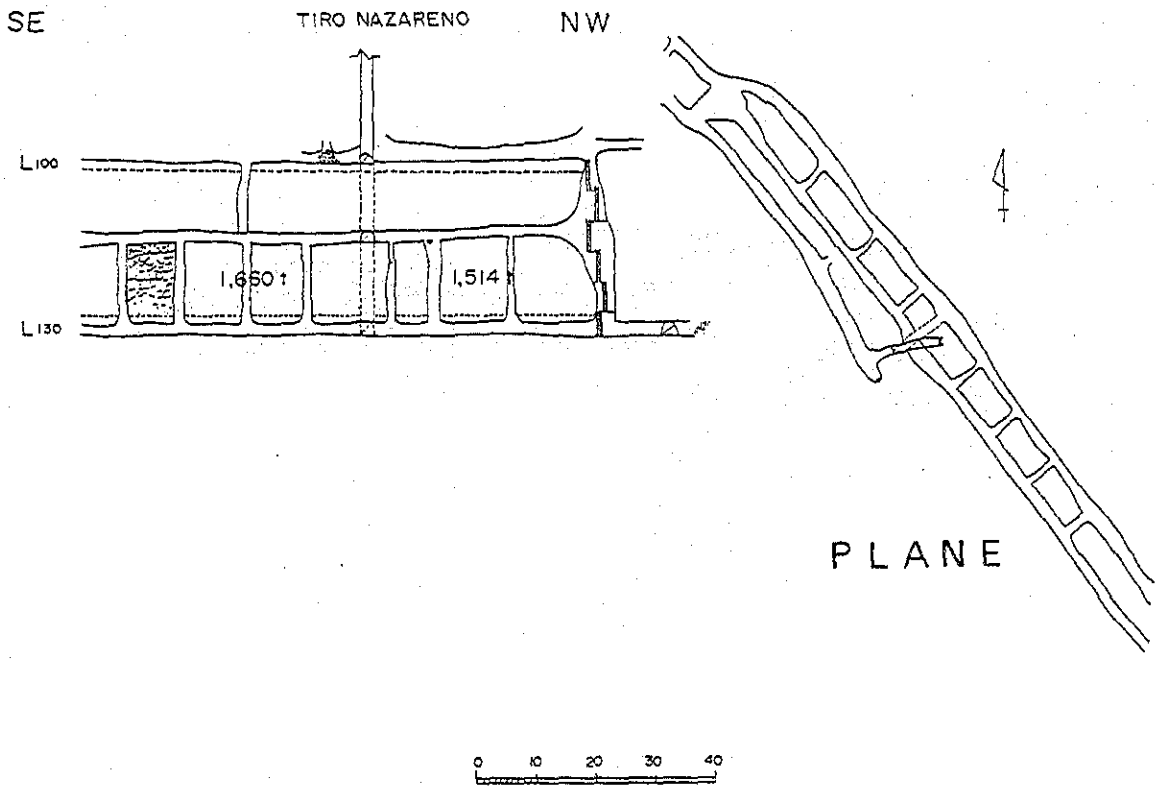


Fig. 3. 3. 16. a Calicanto -Plane and Longitudinal Section-

LONGITUDINAL SECTION

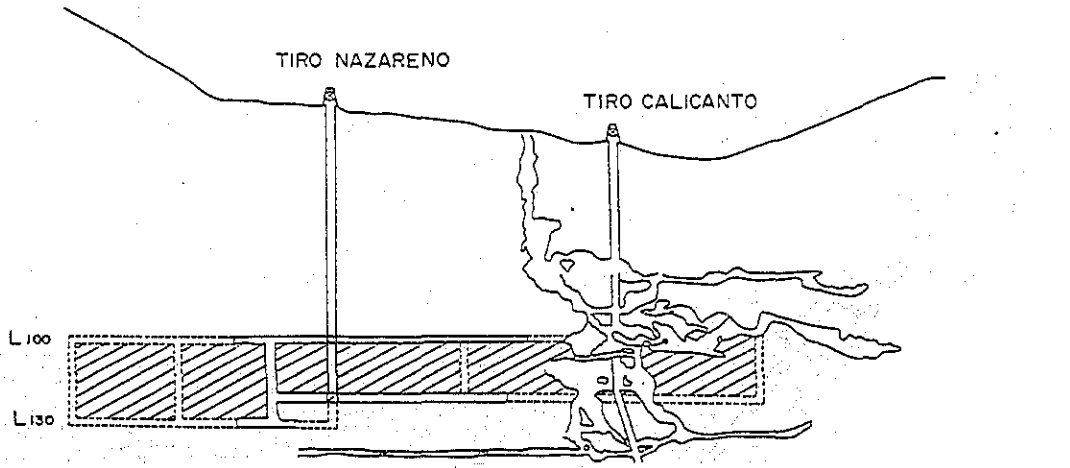


Fig. 3. 3. 16. b Calicanto -Plane and Section-

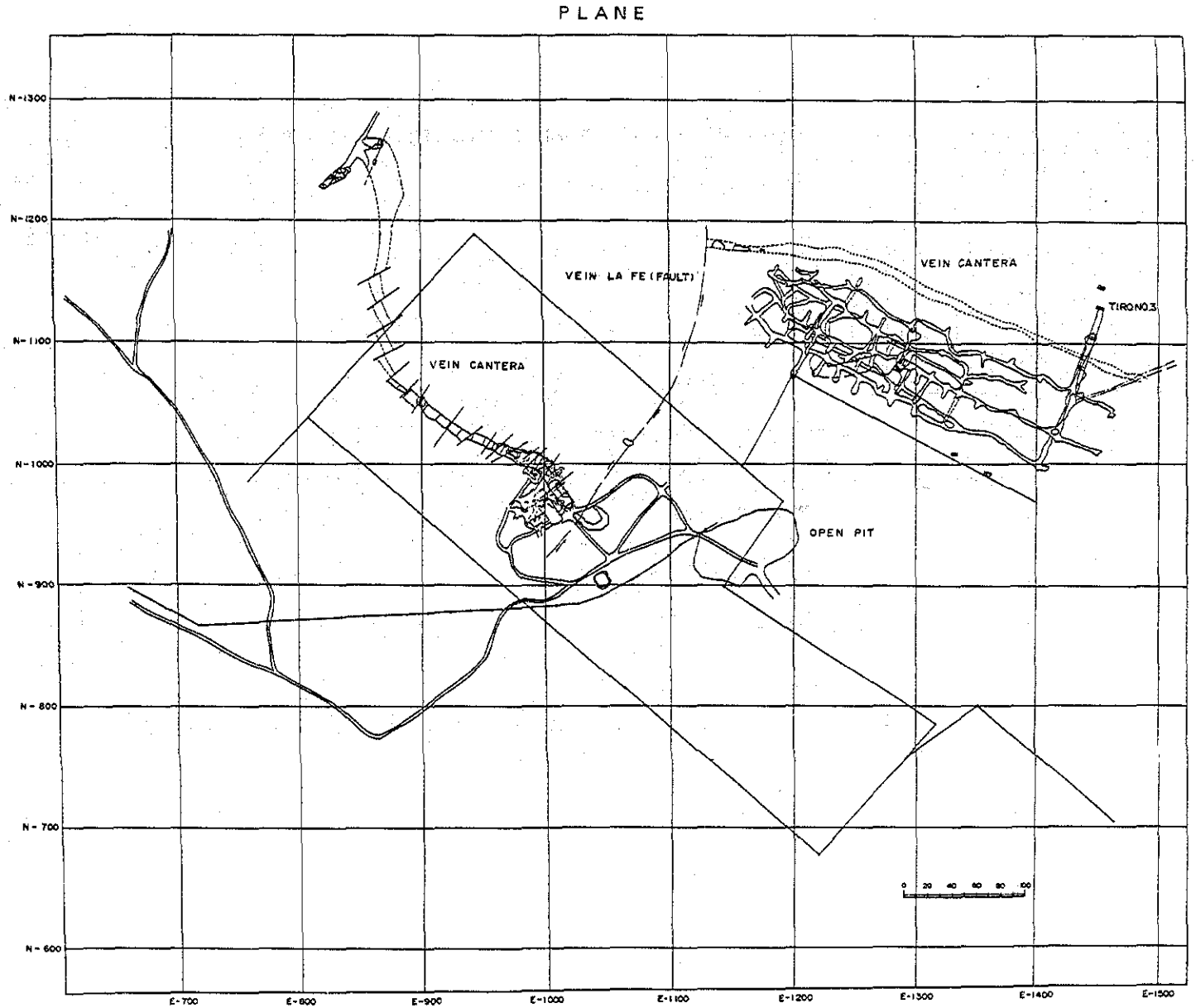


Fig. 3. 3. 17. a California -Plane-

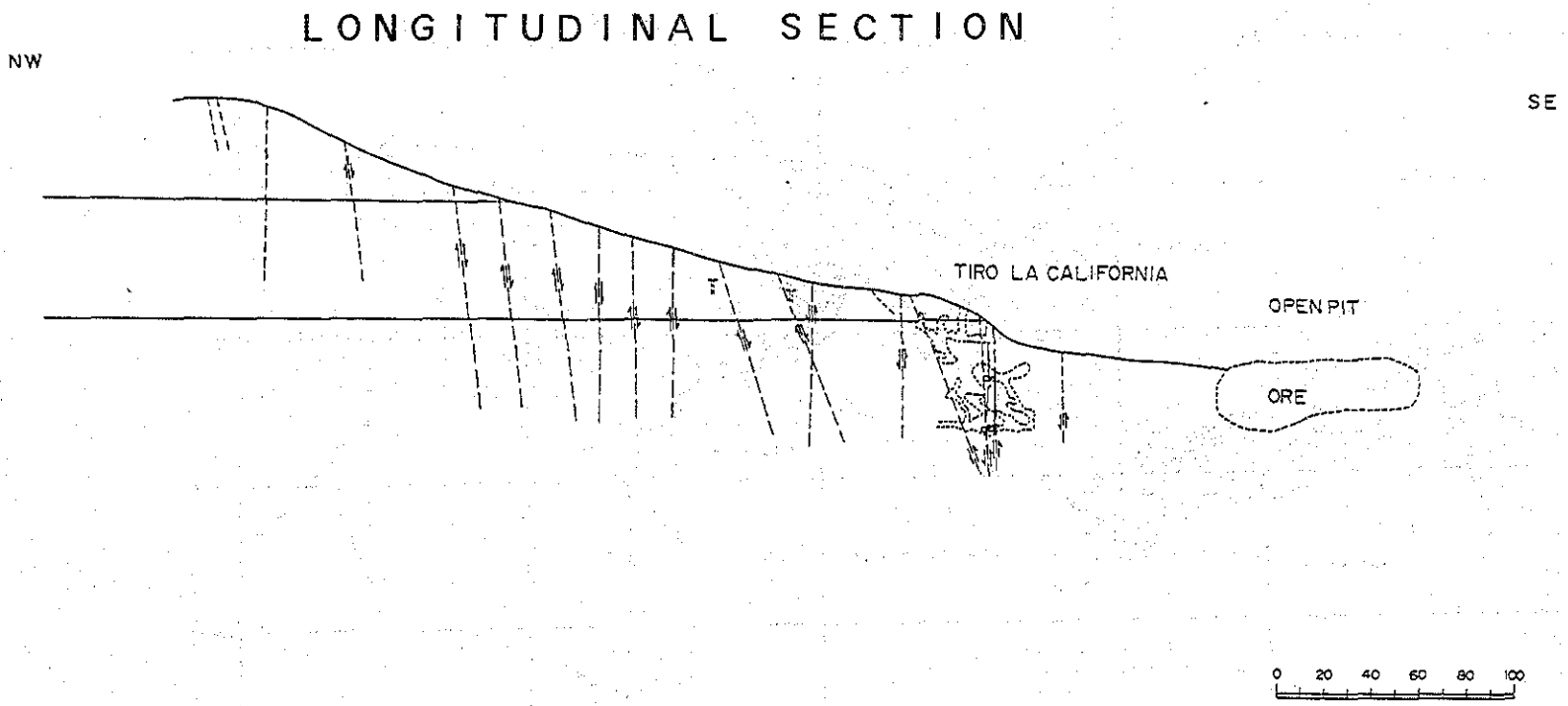


Fig. 3. 3. 17. b California -Longitudinal Seciton-

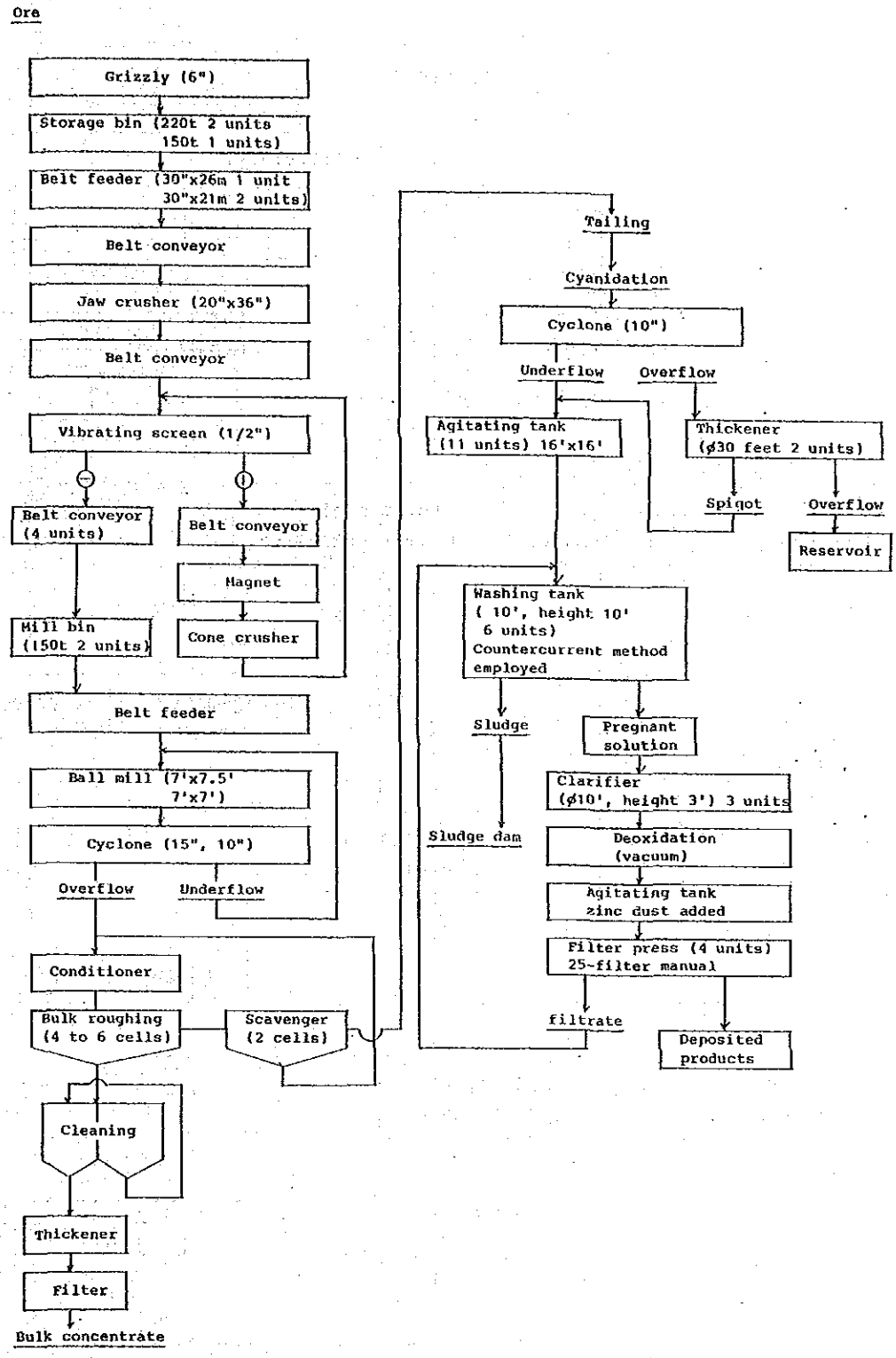


Fig. 3.6.1 Flow sheet of Porral Plant

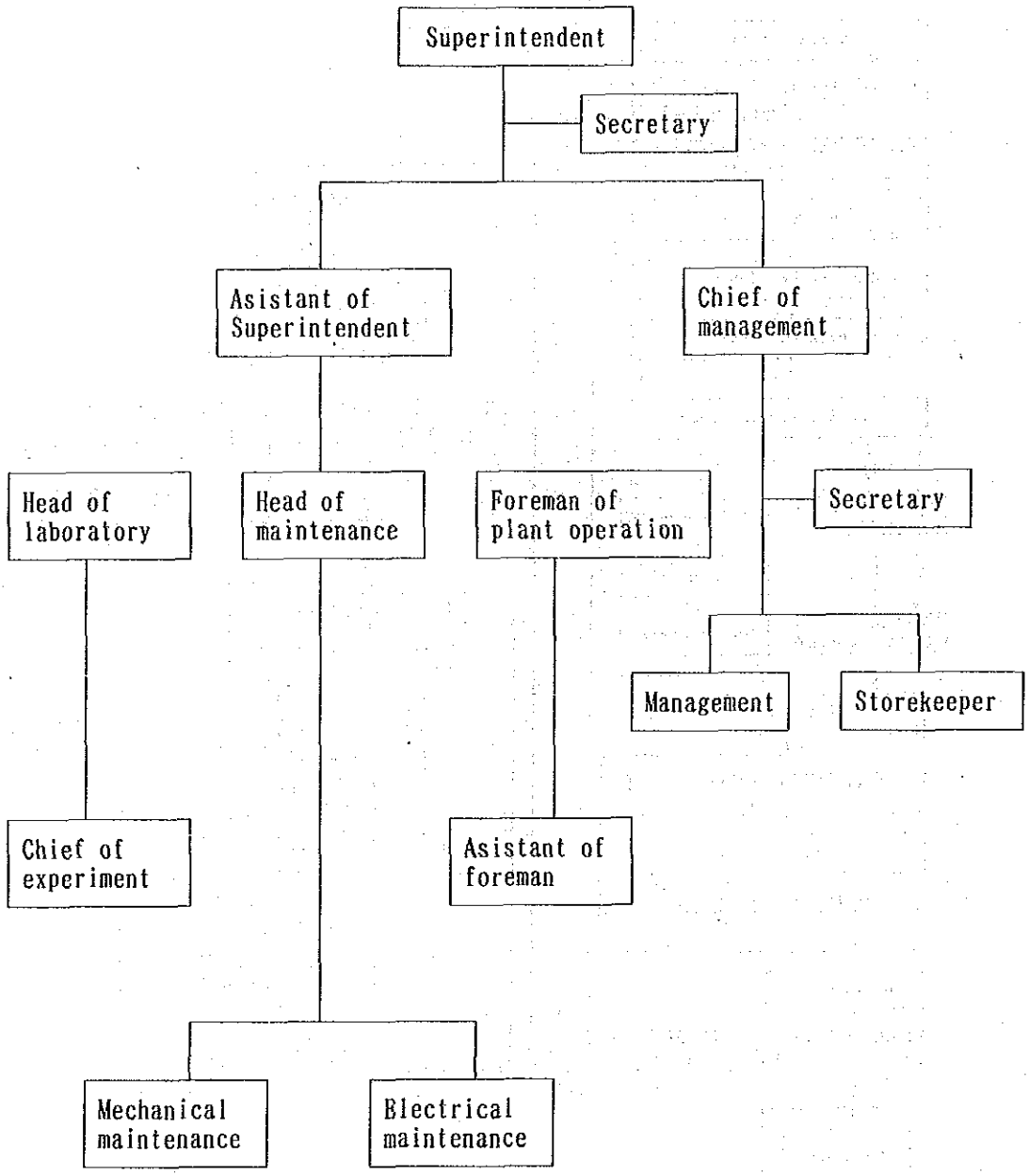


Fig. 3.6.2 Figure of Organization and Personnel

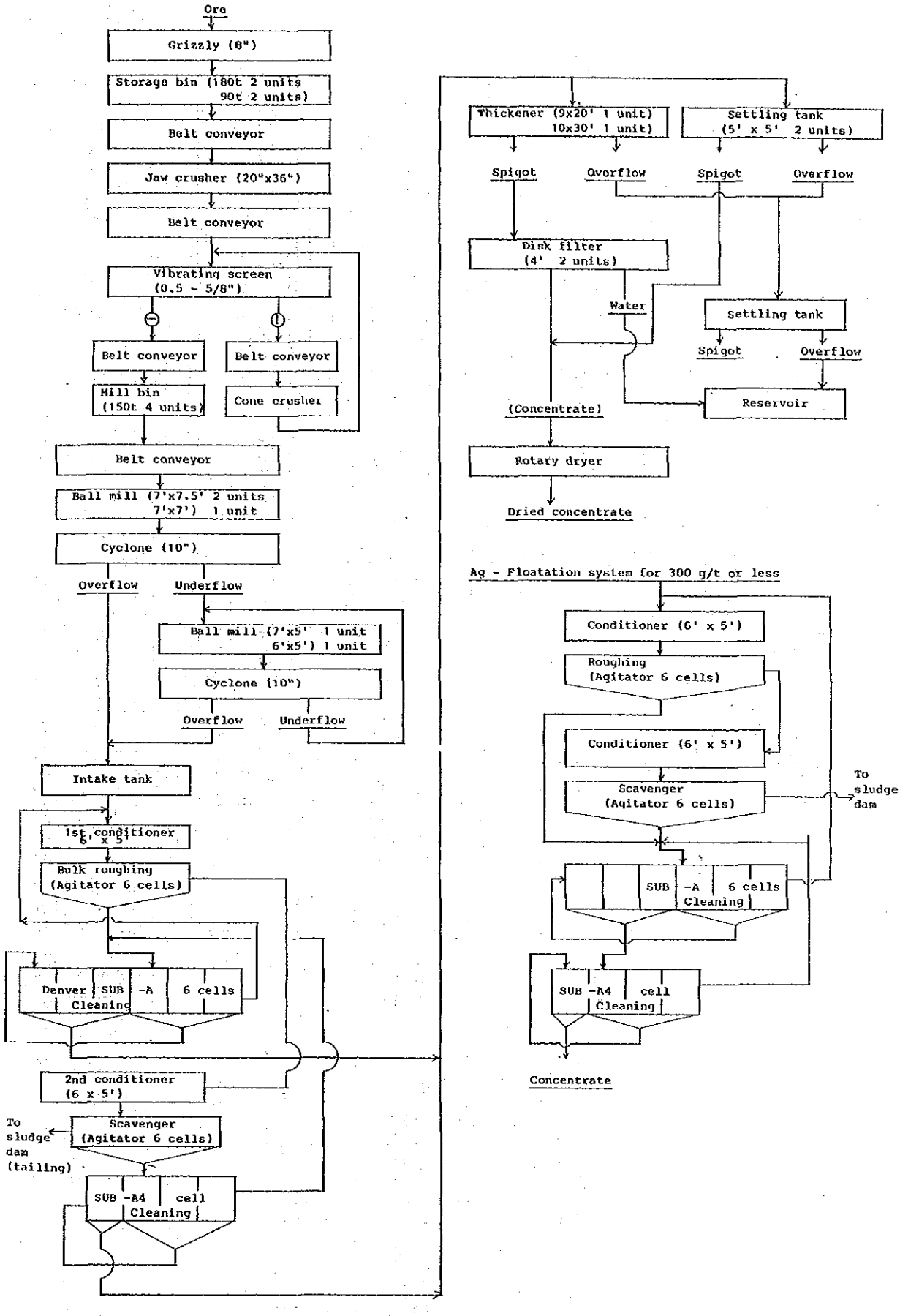


Fig. 3.6.3 Flowsheet of Guanacevi Plant

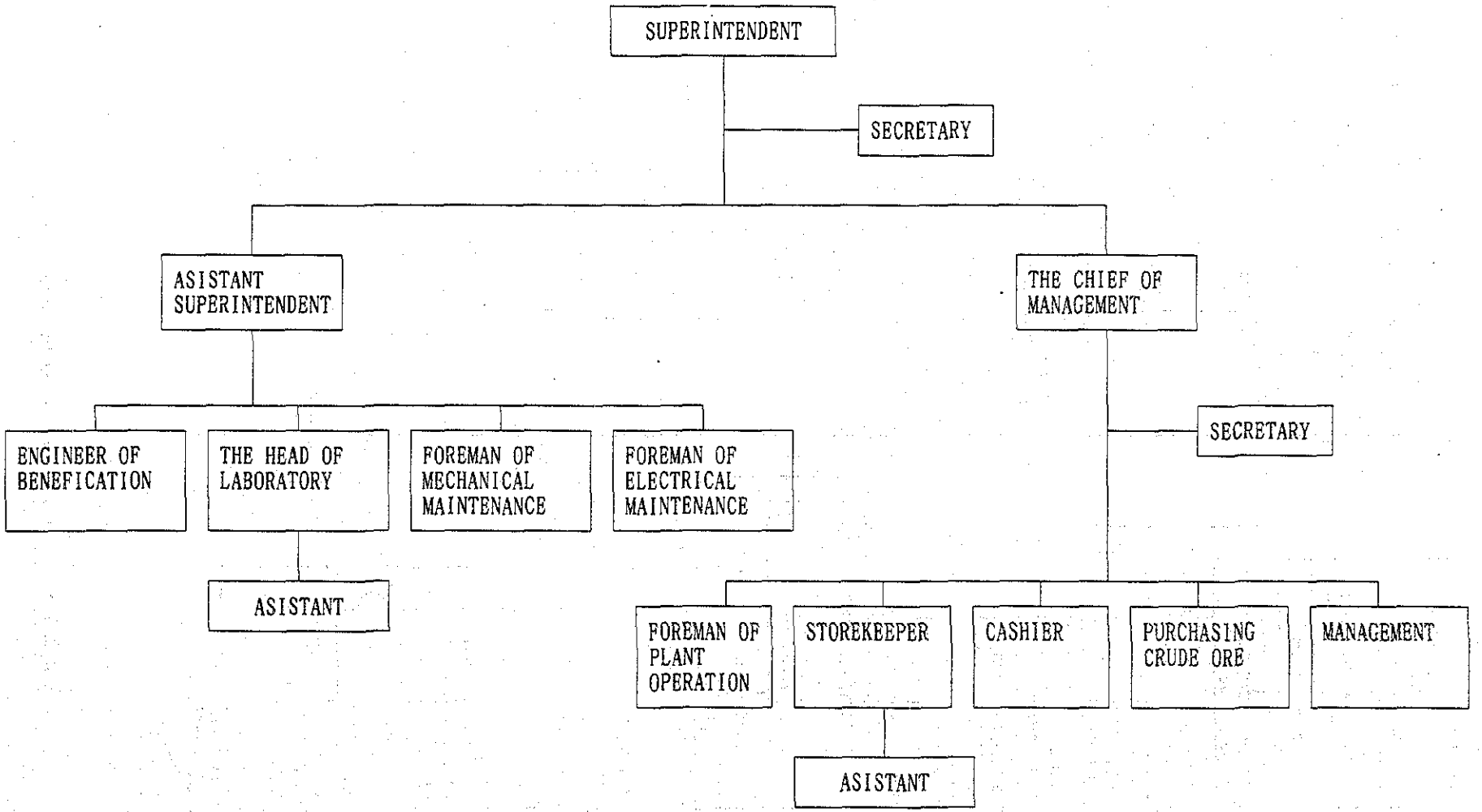


Fig 3.6.4 Figure of organization and personnel Guanacevi

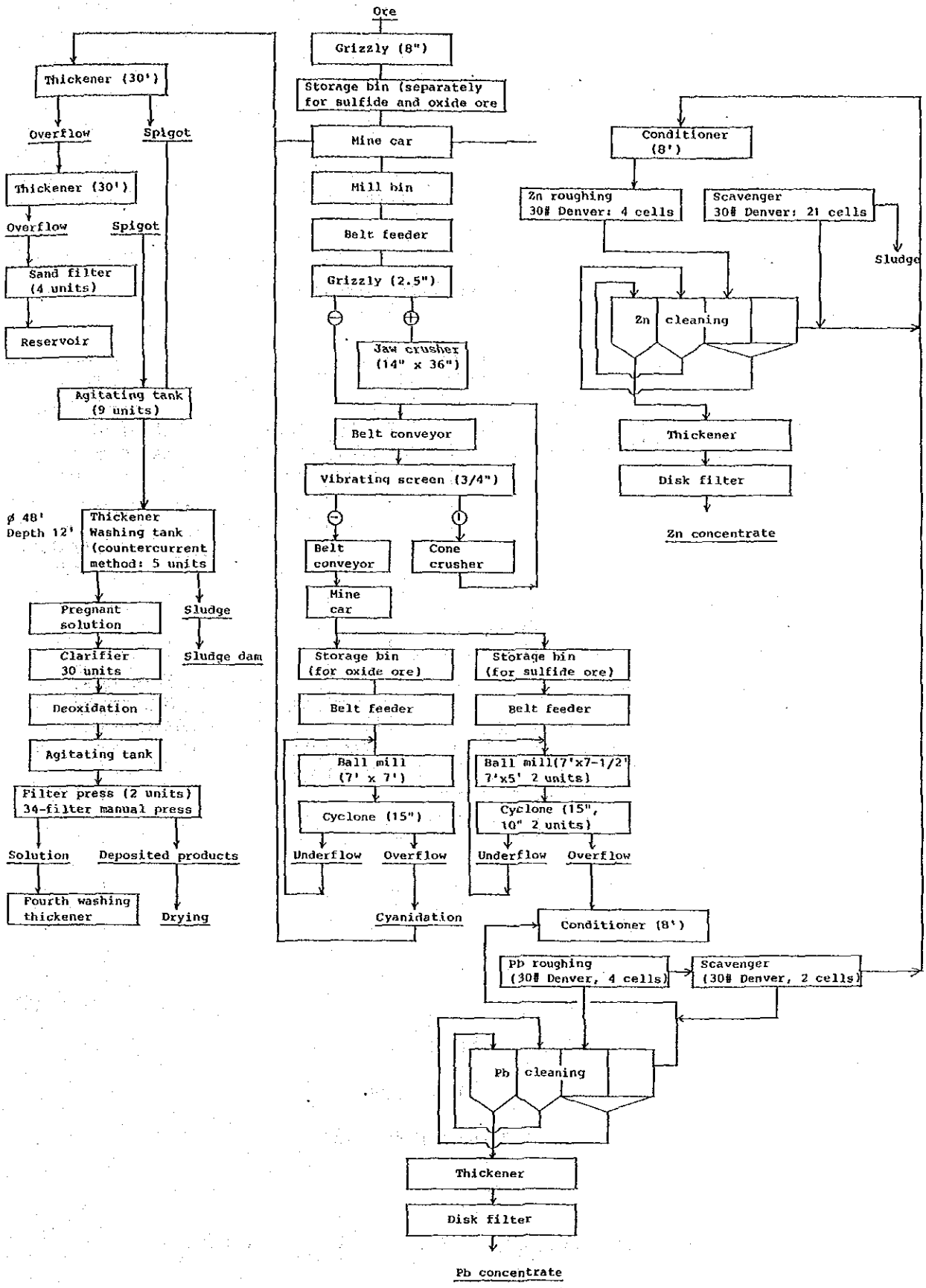
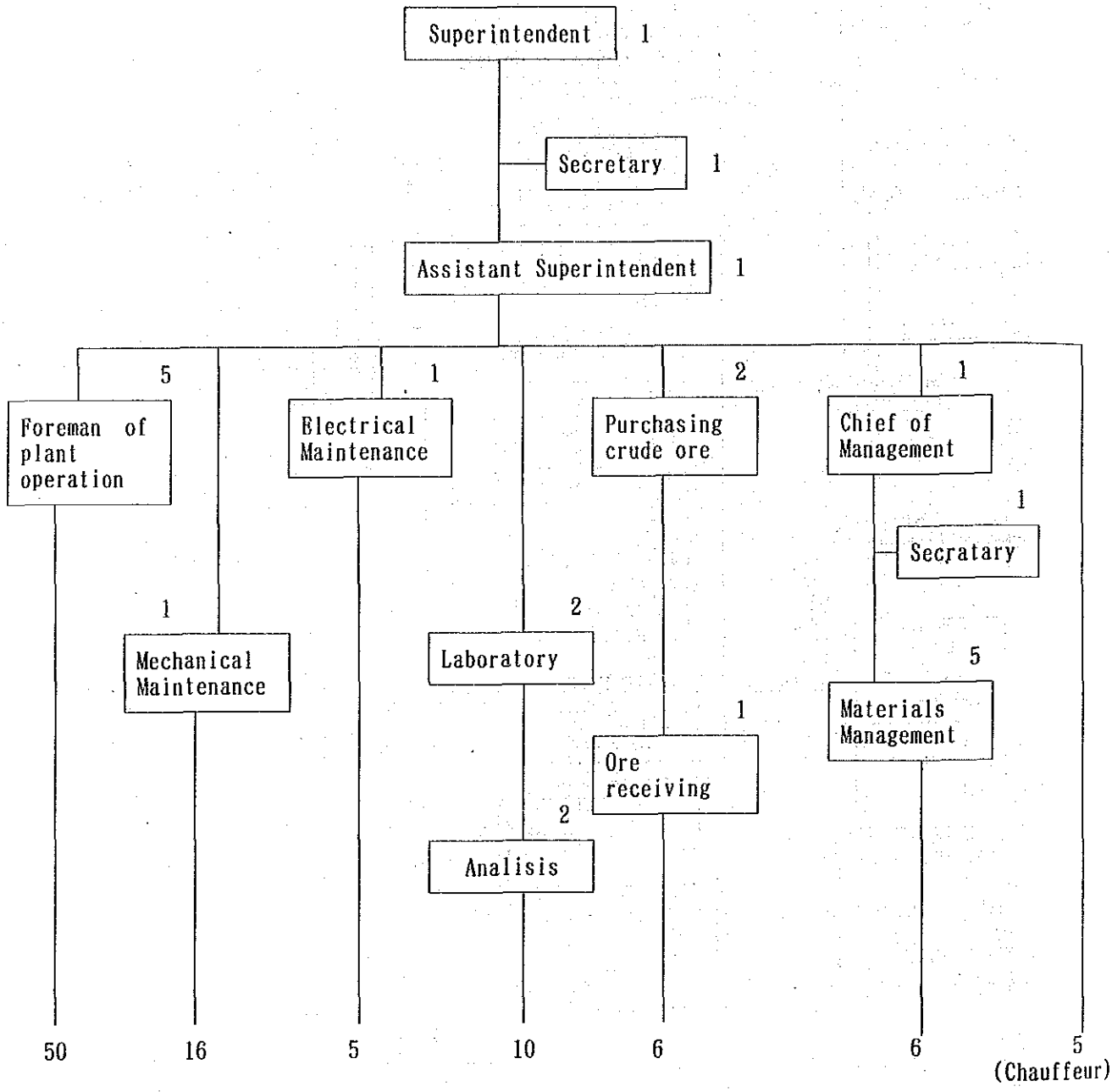


Fig. 3.6.5 Flowsheet of Barones plant



Staff ; 24

Worker ; 98

Total personnel ; 122

Fig. 3.6.6 Figure of Organization and Personnel

Bulk Flotation-Cyanidation

Example

	Wt	Au	Ag
	tons	g/t	g/t
Distribution	%	%	%

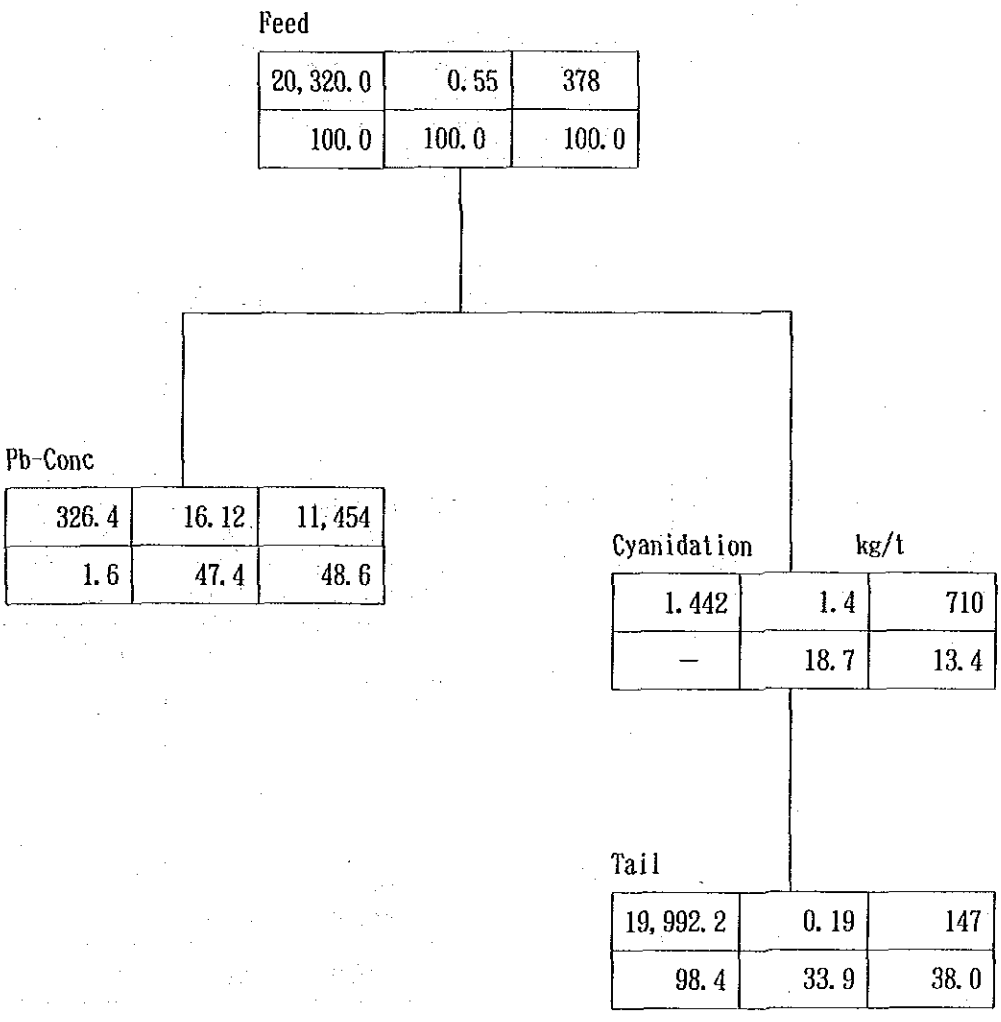


Fig. 3.7.1 Metallurgical Balance at Parral Plant 1

Pb Flotation-Cyanidation

Example

	Wt	Au	Ag	Pb
	tons	g/t	g/t	%
Distribution	%	%	%	%

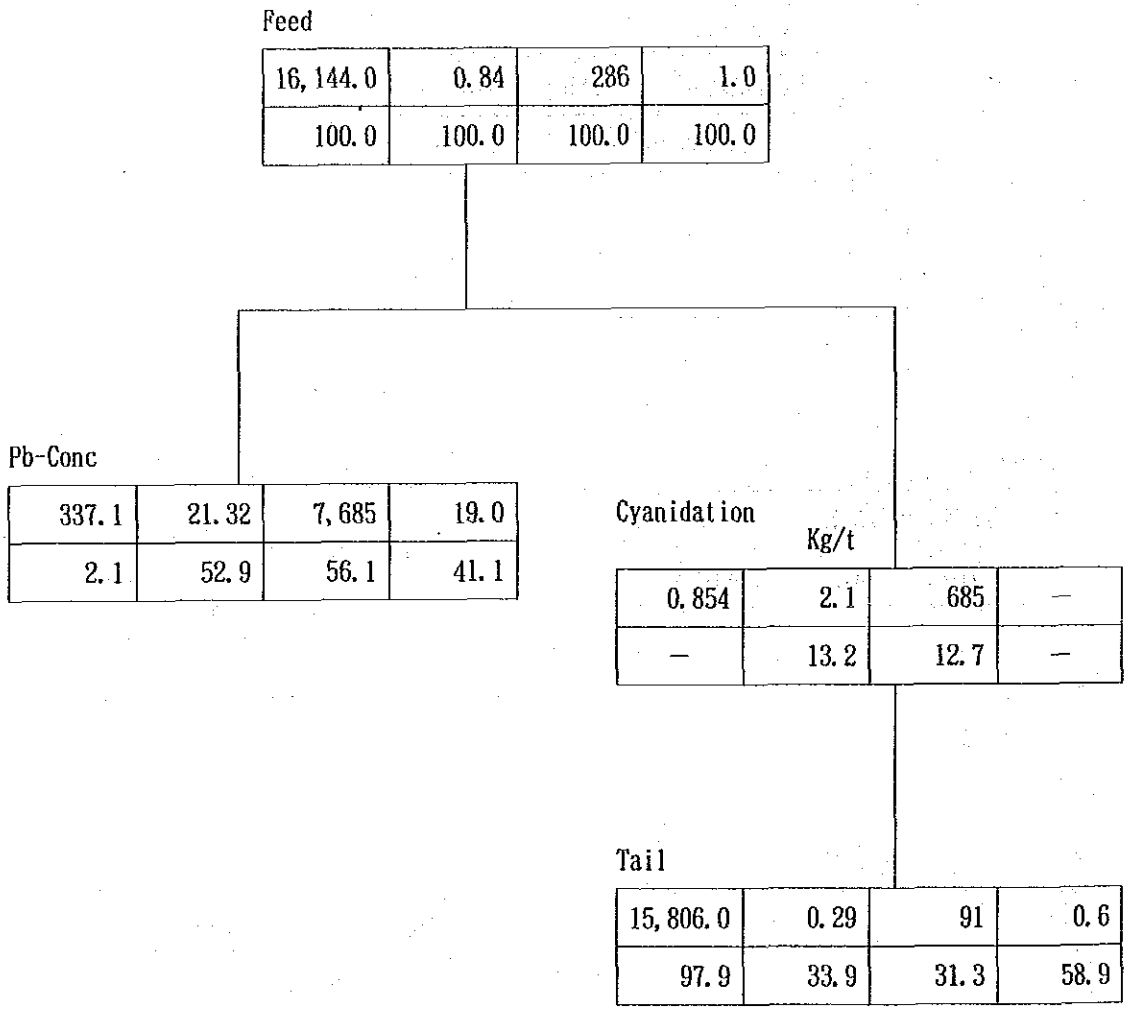


Fig. 3.7.2 Metallurgical Balance at Parral Plant 2

Pb/Zn Flotation

Example

	Wt	Au	Ag	Pb	Zn
	tons	g/t	g/t	%	%
Distribution	%	%	%	%	%

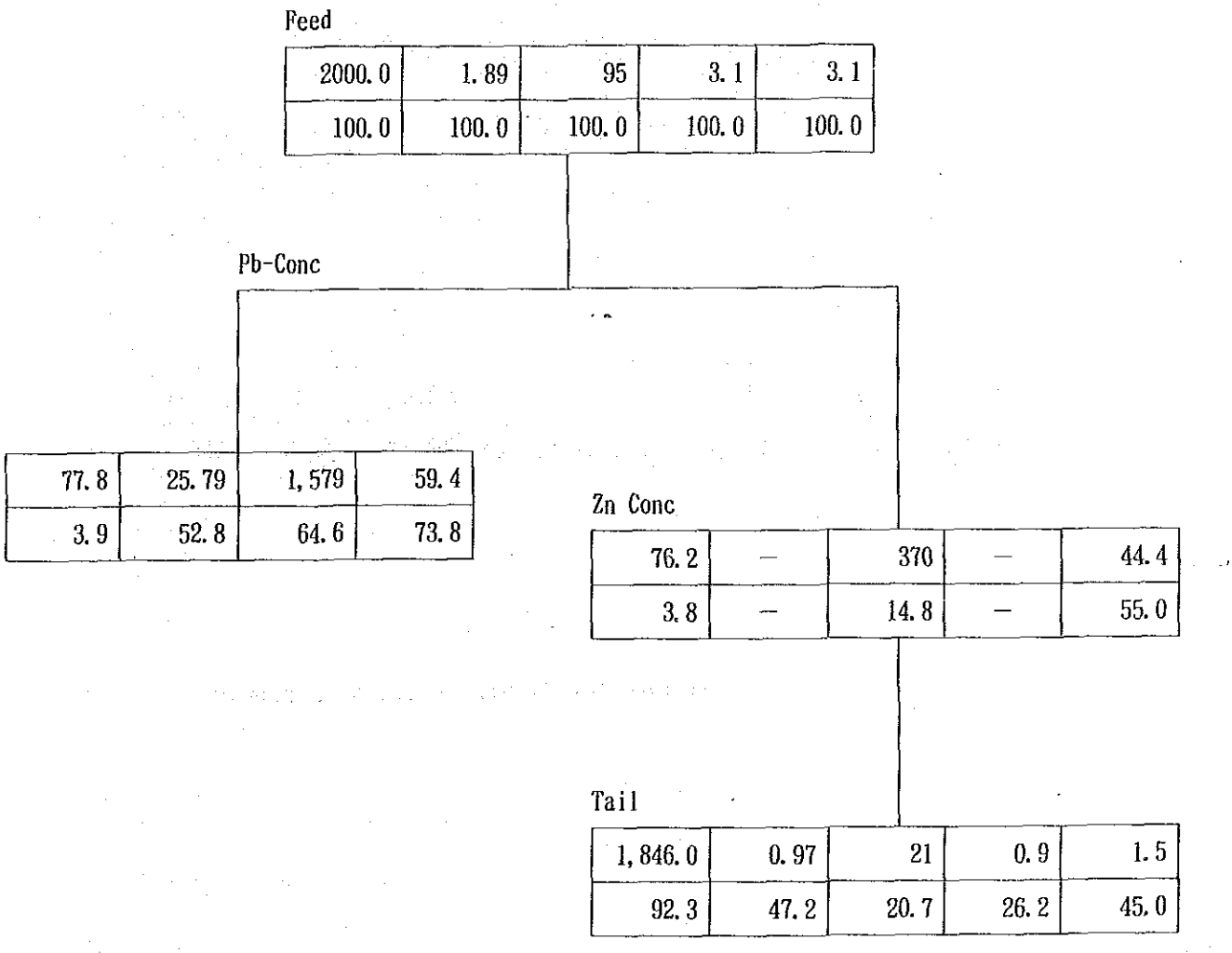


Fig. 3.7.3 Metallurgical Balance at Parral Plant 3

Buena Fortuna

'89 1-7

Example

	Wt	Au	Ag
	tons	Assay(g/t)	Assay(g/t)
Distribution	%	%	%

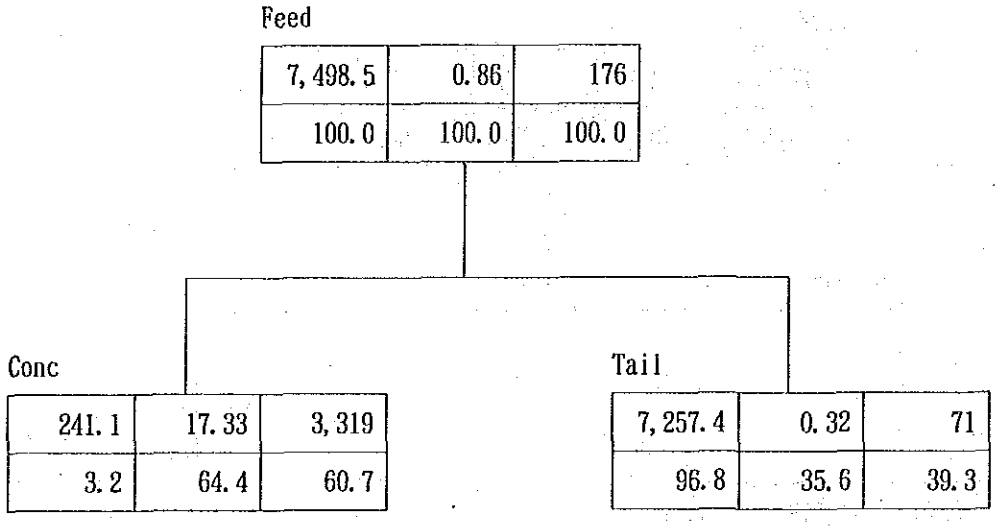


Fig. 3.7.4 Metallurgical Balance of Buena Fortuna ore

San Narcos

'89 1-7

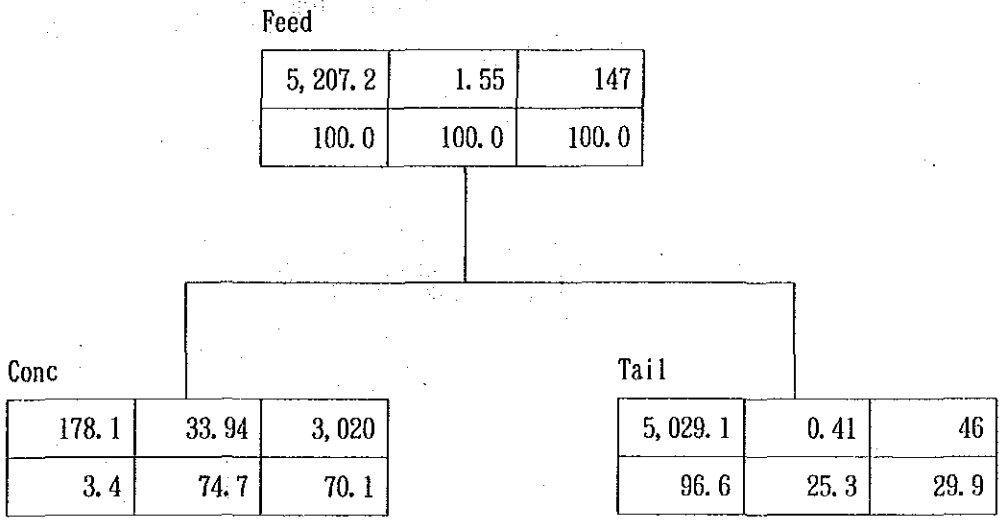


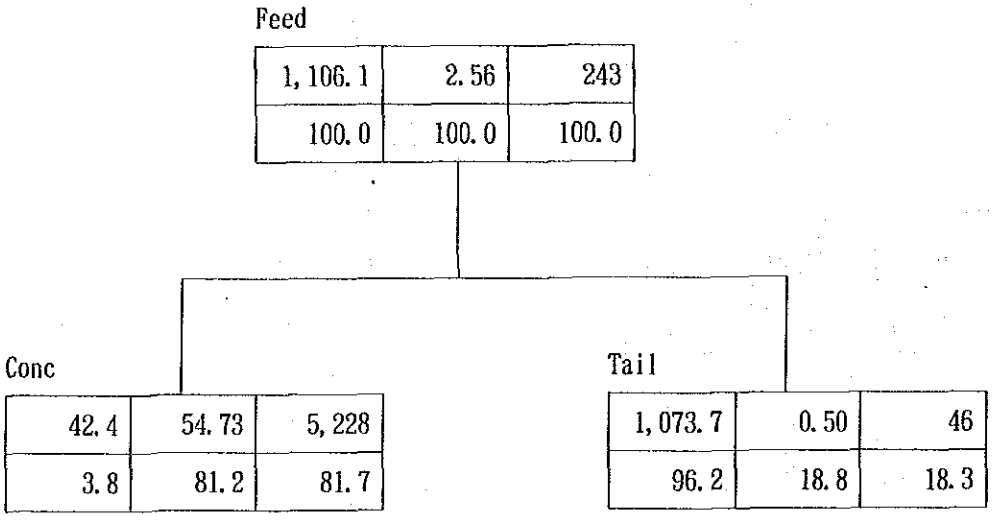
Fig. 3. 7. 5 Metallurgical Balance of San Marcos

San Jose Chico

'89. 7

Example

	Wt	Au	Ag
	tons	Assay(g/t)	Assay(g/t)
Distribution	%	%	%



'89 1-7

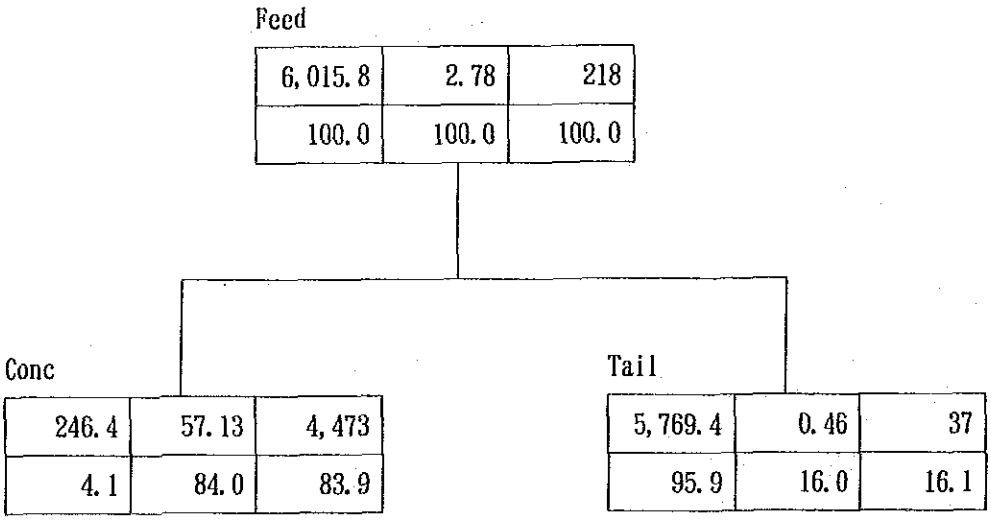


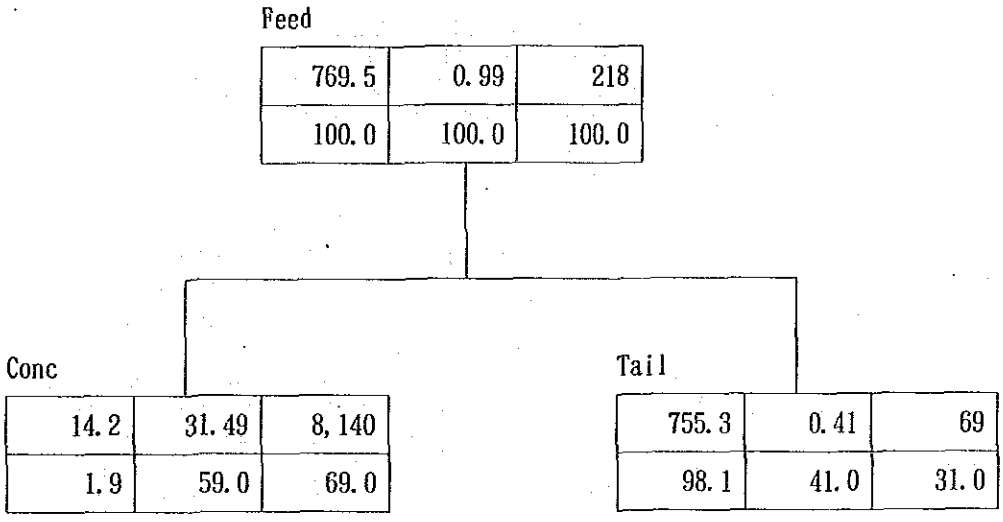
Fig. 3.7.6 Metallurgical Balance of Sun Josè Chico

Capuzaya

'89. 7

Example

	Wt	Au	Ag
	tons	Assay(g/t)	Assay(g/t)
Distribution	%	%	%



'89 1-7

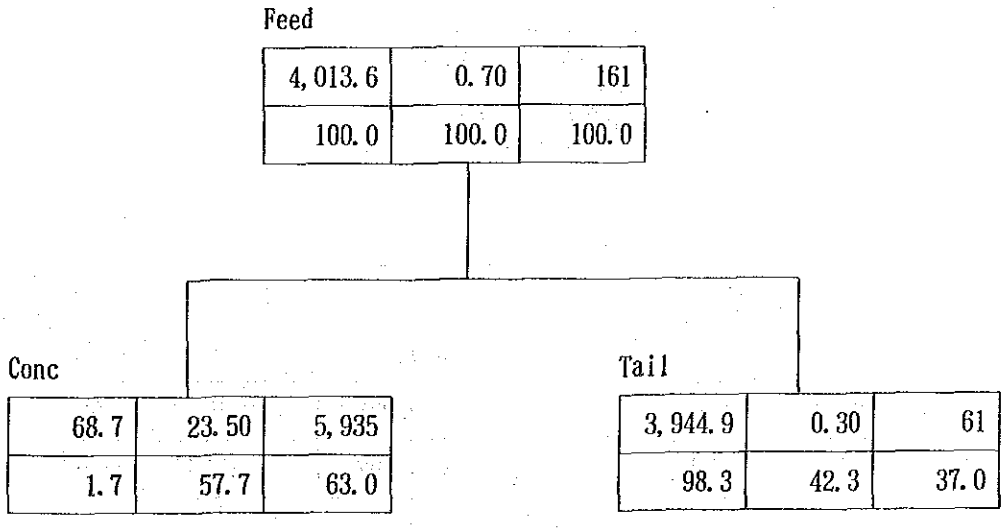


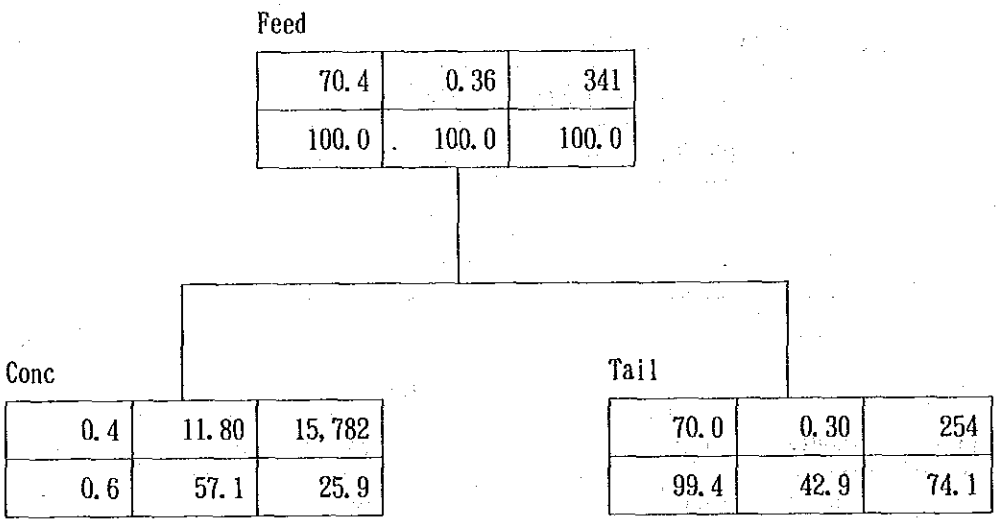
Fig. 3.7.7 Metallurgical Balance of Capuzaya

El Soto

'89. 7

Example

	Wt	Au	Ag
	tons	Assay(g/t)	Assay(g/t)
Distribution	%	%	%



'89 1-7

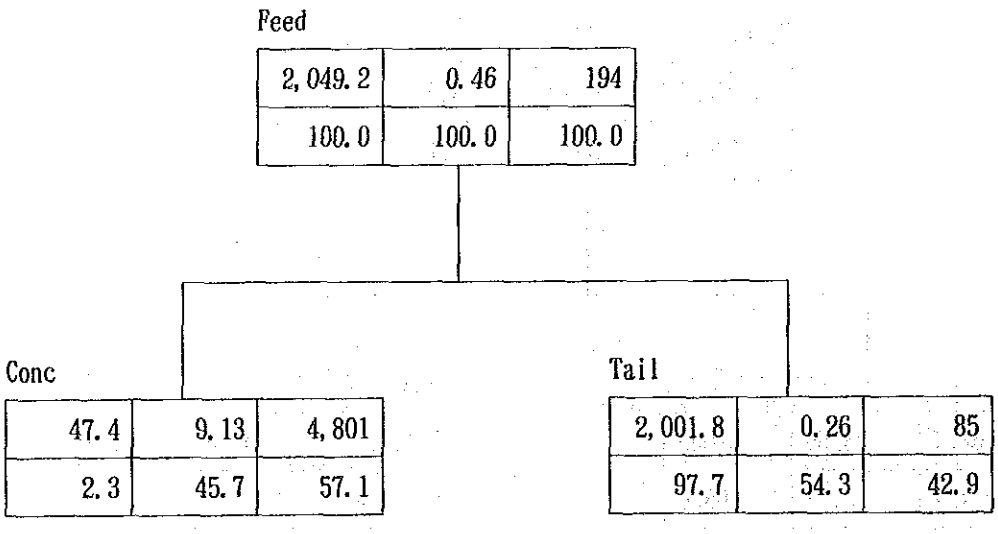


Fig. 3. 7. 8 Metallurgical Balance of El Soto

Bulk Flotation

Example

	Wt	Au	Ag	Pb	Zn	Fe
	tons	g/t	g/t	%	%	%
Distribution	%	%	%	%	%	%

Feed

15548.6	0.38	177	0.2	0.2	0.5
100.0	100.0	100.0	100.0	100.0	100.0

Conc

163.3	6.79	9,122	3.8	3.3	12.2
1.1	18.9	54.2	21.7	19.5	2.6

Tail

15385.3	0.31	82	0.1	0.1	4.9
98.9	81.1	45.8	78.3	80.5	97.4

Fig. 3.7.9 Metallurgical Balance of Bulk Flotation at Barones Plant

Pb/Zn Flotation

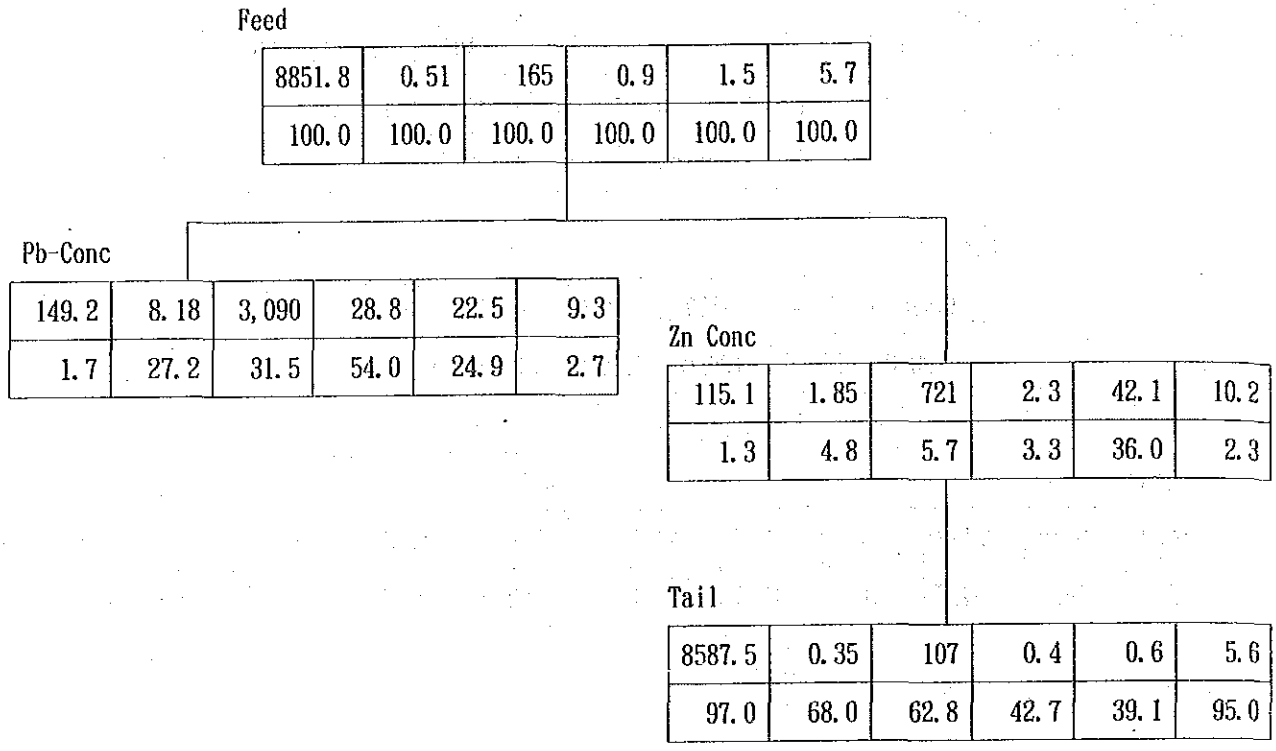


Fig. 3.7.10 Metallurgical Balance of Pb/Zn Flotation at Barones Plant

Metallurgical Balancesheet of Barones

Pb/Cu/Ze Flotation

'89 1-6

Example

	Wt	Au	Ag	Pb	Cu	Zn	Fe
Assay	tons	g/t	g/t	%	%	%	%
Distribution	%	%	%	%	%	%	%

Feed

13057.2	0.31	100	0.5	0.5	1.0	6.5
100.0	100.0	100.0	100.0	100.0	100.0	100.0

Pb-Conc

76.5	1.99	2536	32.9	15.2	3.9	10.7
0.6	3.8	14.8	37.4	17.5	2.4	1.0

Cu Conc

239.1	1.79	2284	6.8	18.2	8.4	16.0
1.8	10.7	41.7	24.2	65.6	16.0	4.5

Zn Conc

145.3	0.92	379	0.8	1.1	43.8	8.0
1.1	3.3	4.2	1.6	2.4	50.4	1.4

Tail

12596.3	0.26	41	0.2	0.1	0.3	6.2
96.5	82.3	39.3	36.7	14.5	31.2	93.1

Fig. 3.7.11 Metallurgical Balance of Pb/Cu/Zn Flotation at Barones Plant

Cyanidation

	Wt	Au	Ag
Assay	tons	g/t	g/t ・%
Distribution	%	%	%

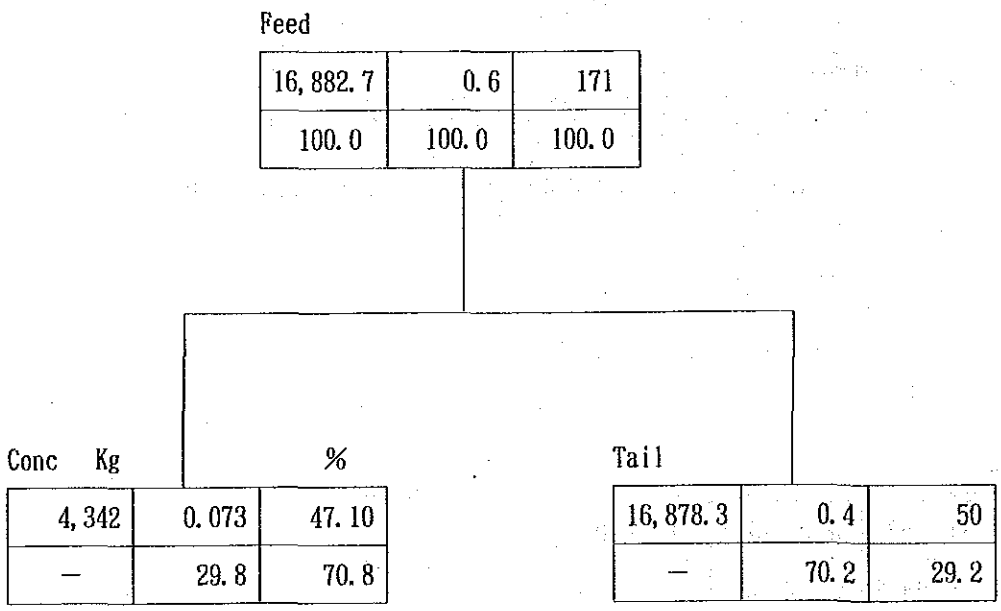


Fig. 3.7.12 Metallurgical Balance of Cyanidation at Barones Plant

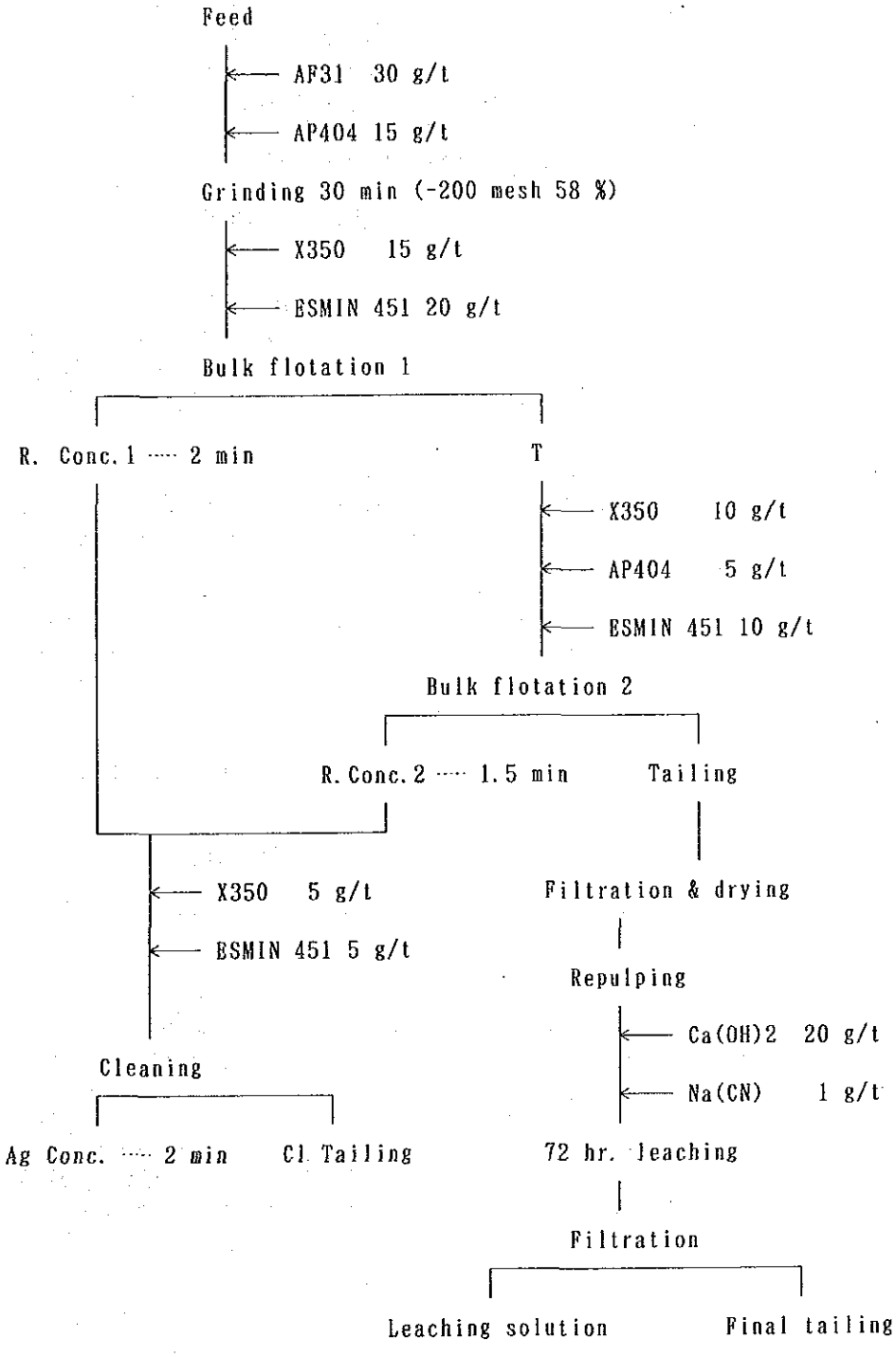
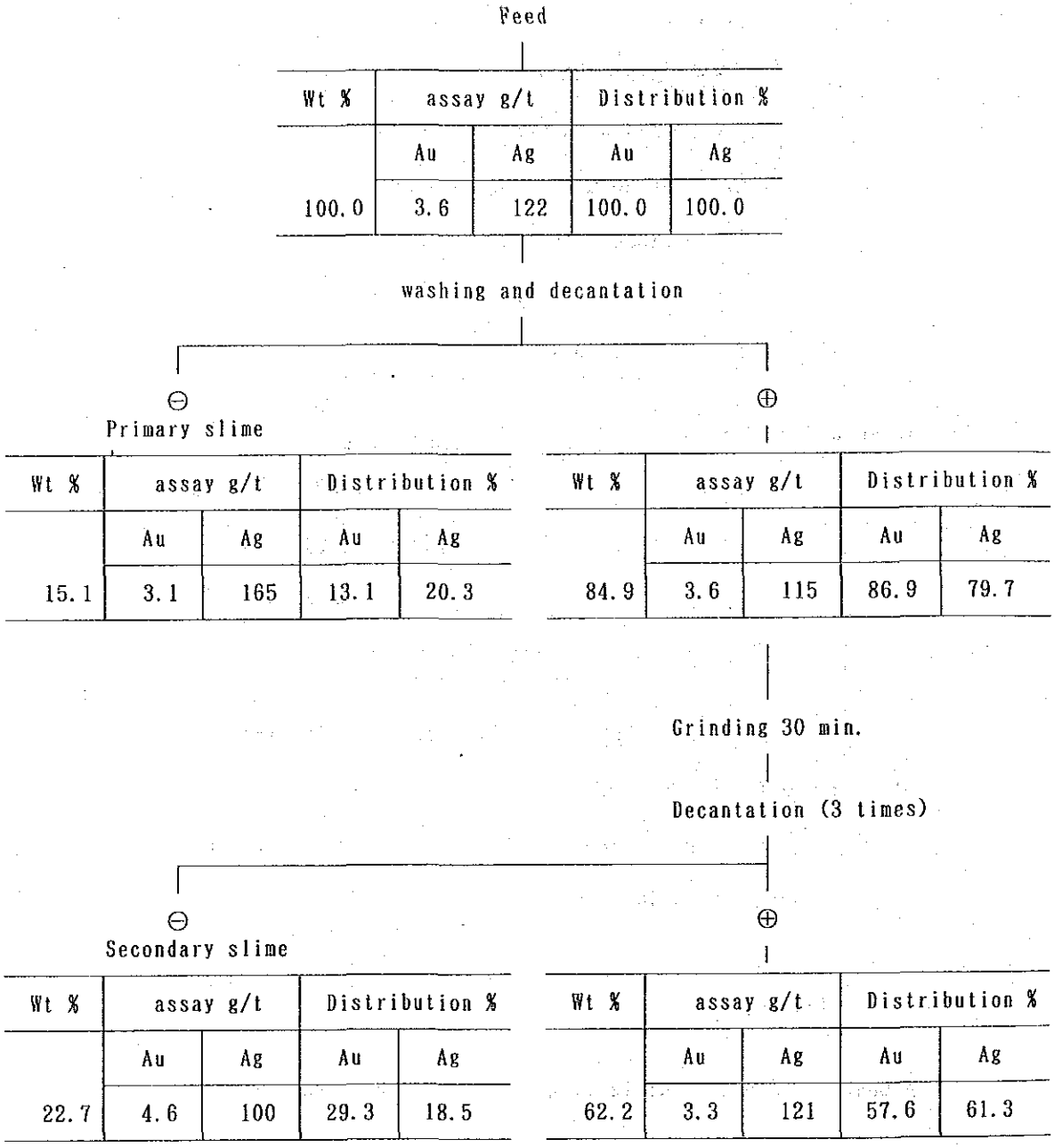


Fig. 4. 1. 1 Flow sheet of Beneficiation test No. 1



Wt %	assay g/t		Distribution %	
	Au	Ag	Au	Ag
100.0	3.6	122	100.0	100.0

Wt %	assay g/t		Distribution %	
	Au	Ag	Au	Ag
15.1	3.1	165	13.1	20.3

Wt %	assay g/t		Distribution %	
	Au	Ag	Au	Ag
84.9	3.6	115	86.9	79.7

Wt %	assay g/t		Distribution %	
	Au	Ag	Au	Ag
22.7	4.6	100	29.3	18.5

Wt %	assay g/t		Distribution %	
	Au	Ag	Au	Ag
62.2	3.3	121	57.6	61.3

Fig. 4.1.2 Result of Washing test of Jose Galindo Ore

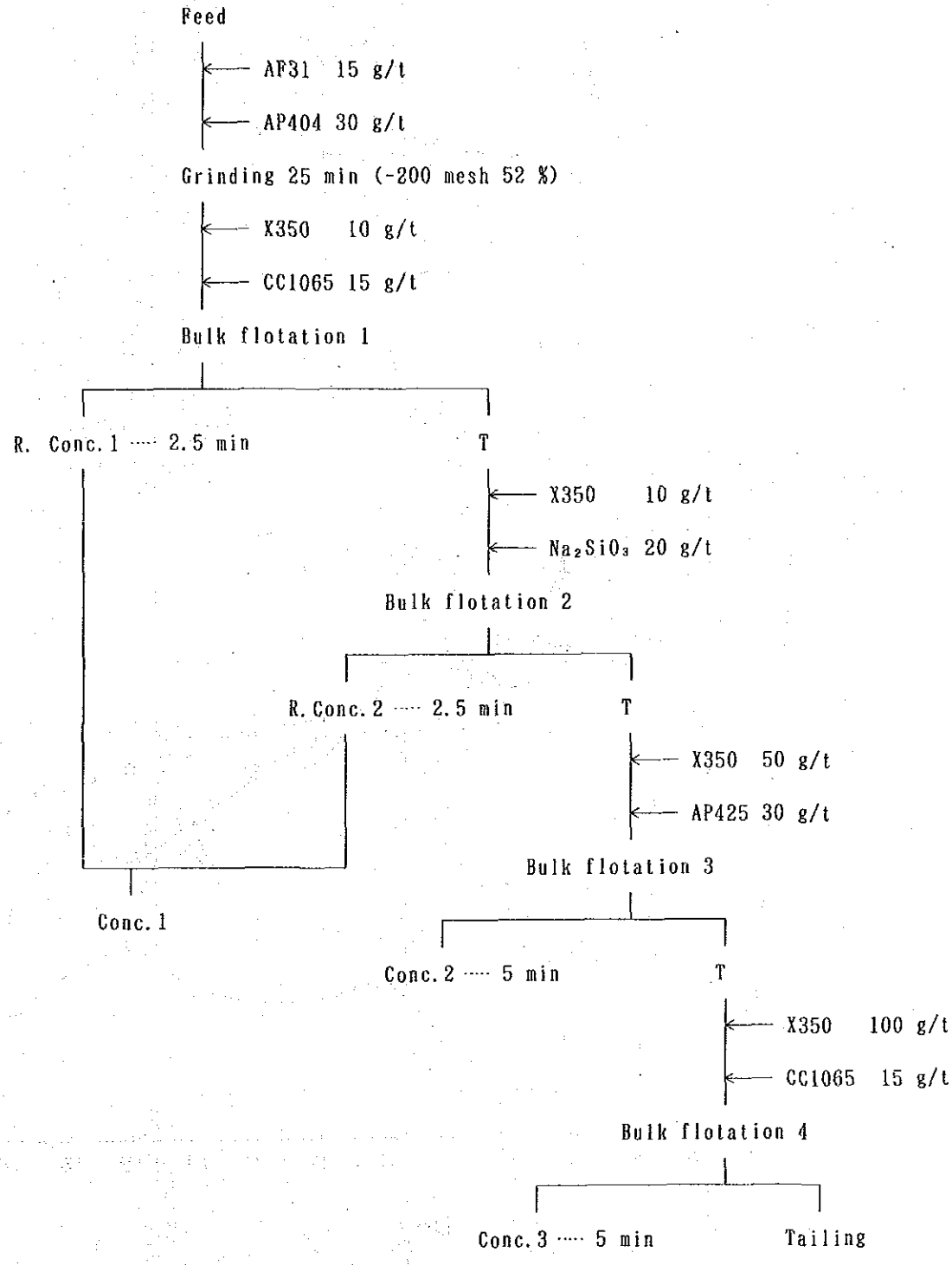


Fig. 4.1.3 Flow sheet of Flotation test for Rosavio Oxide (Test No. 1)

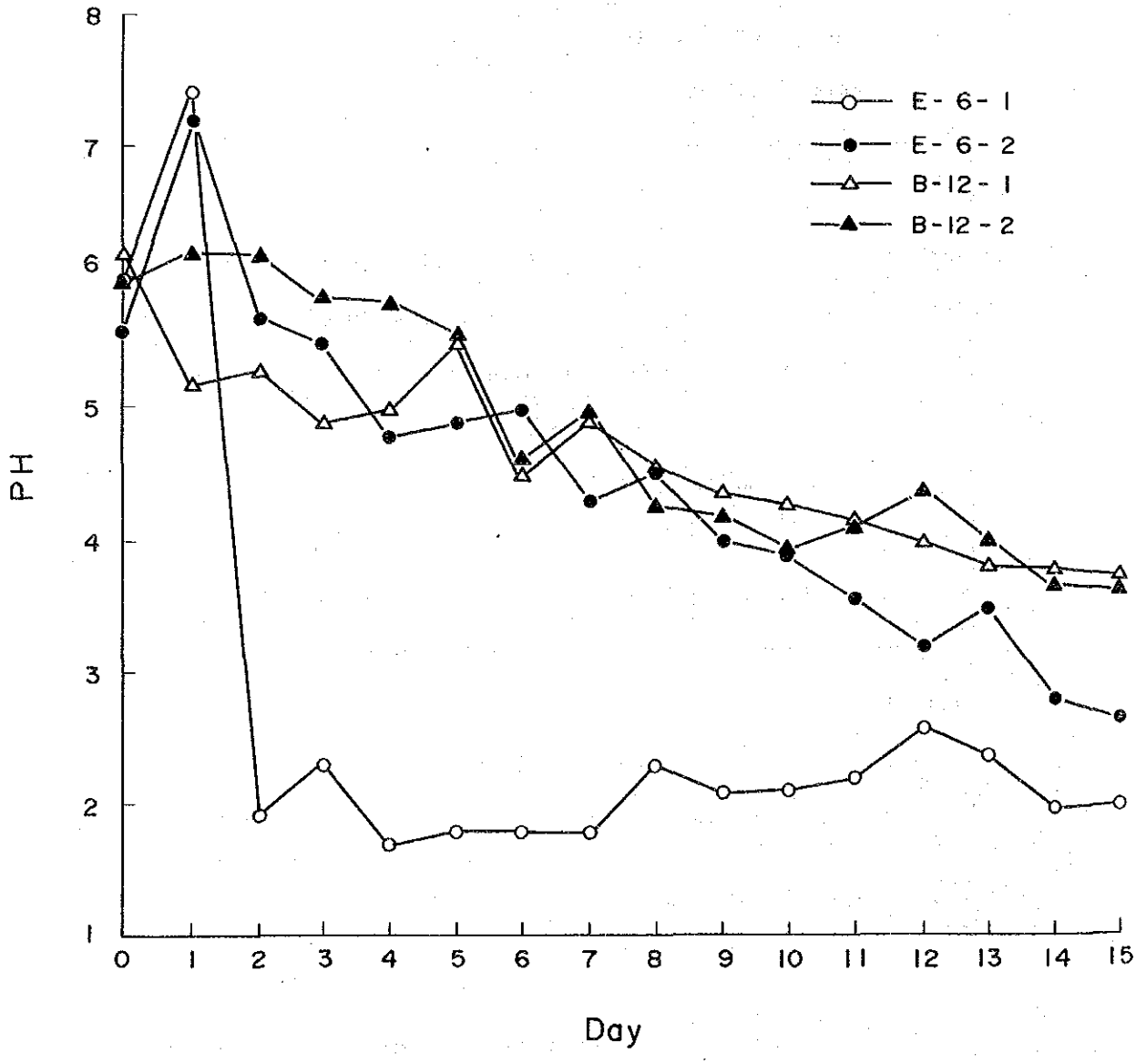


Fig. 4. 2. 1 Relation between pH and Leaching time

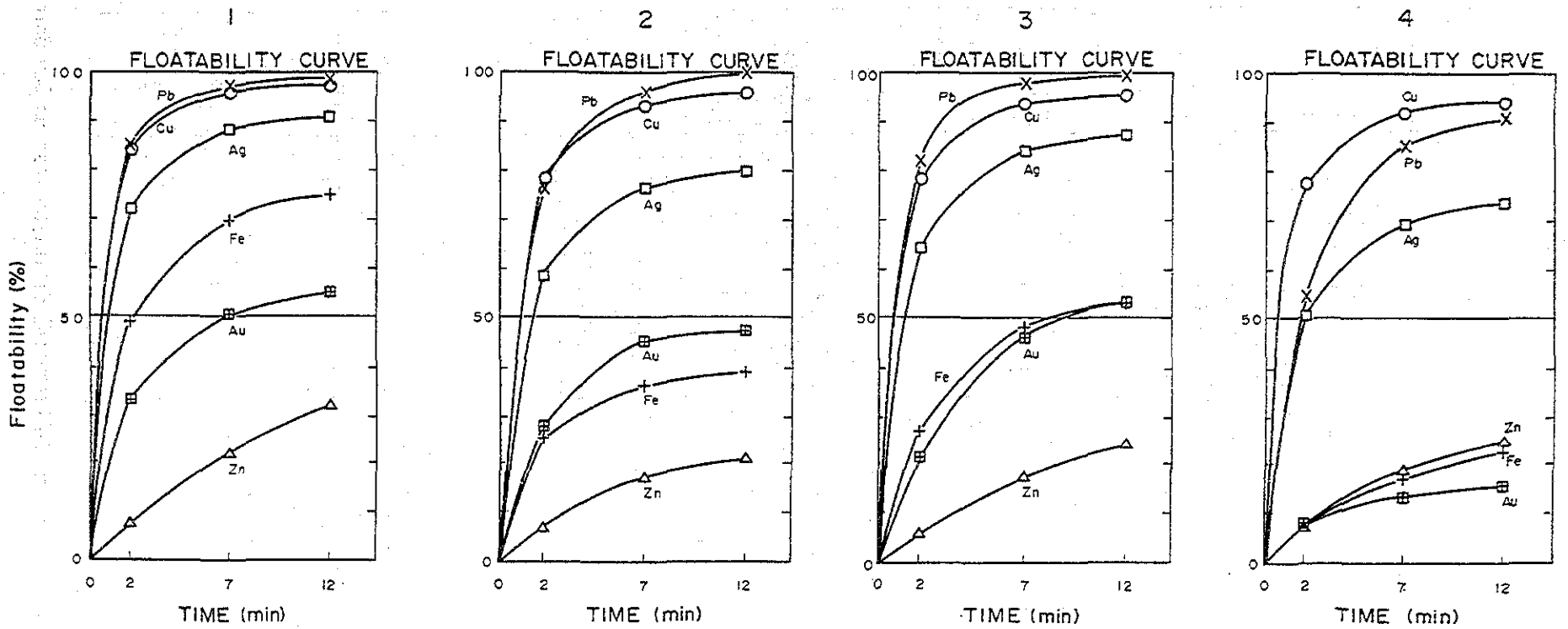


Fig. 4. 2. 2 Flotablities of Fundamental Flotation test on San Bernabe Ore [a]

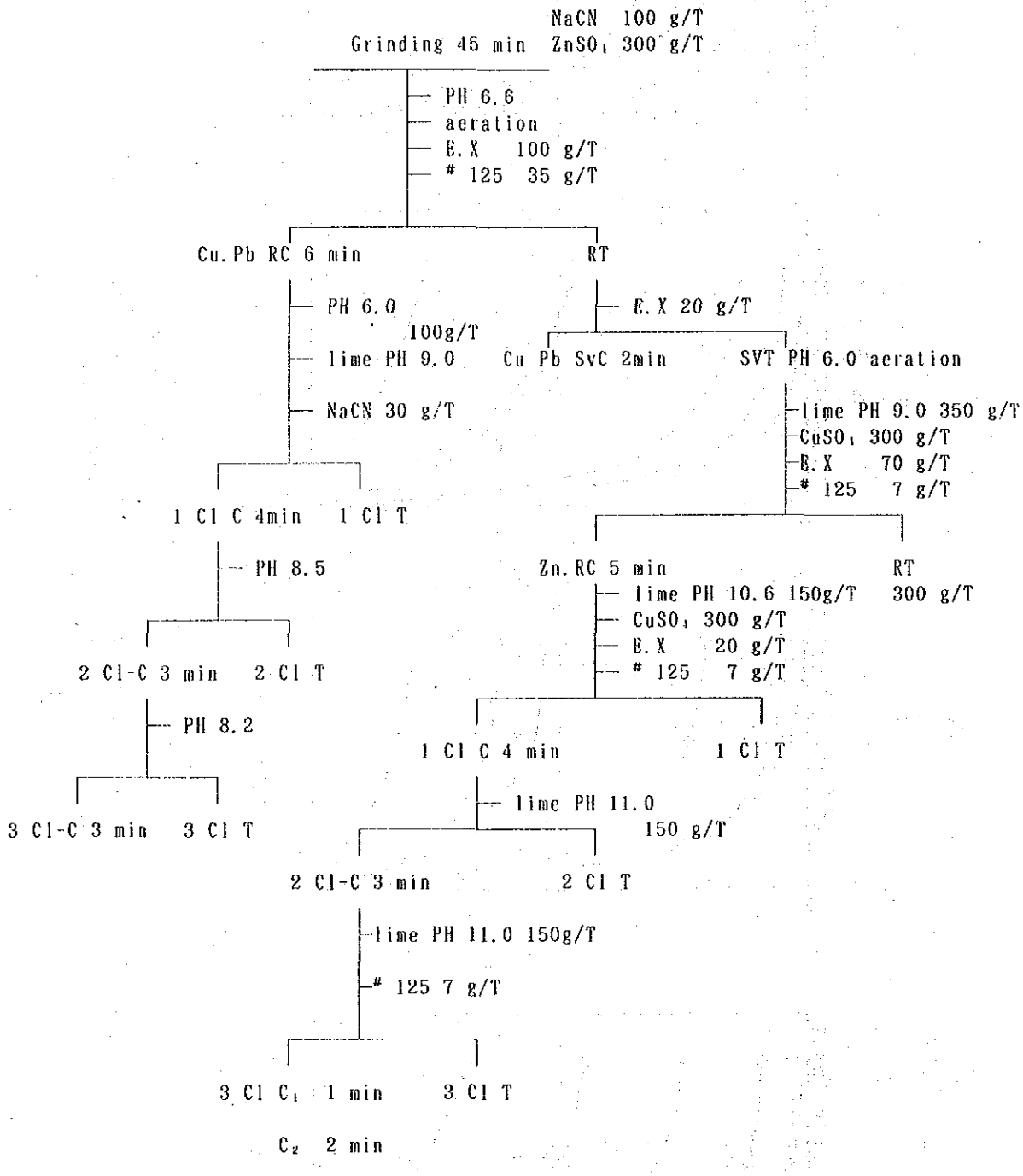


Fig. 4.2.3 Folow sheet on Differential Flotation test on San Bernabe Ore

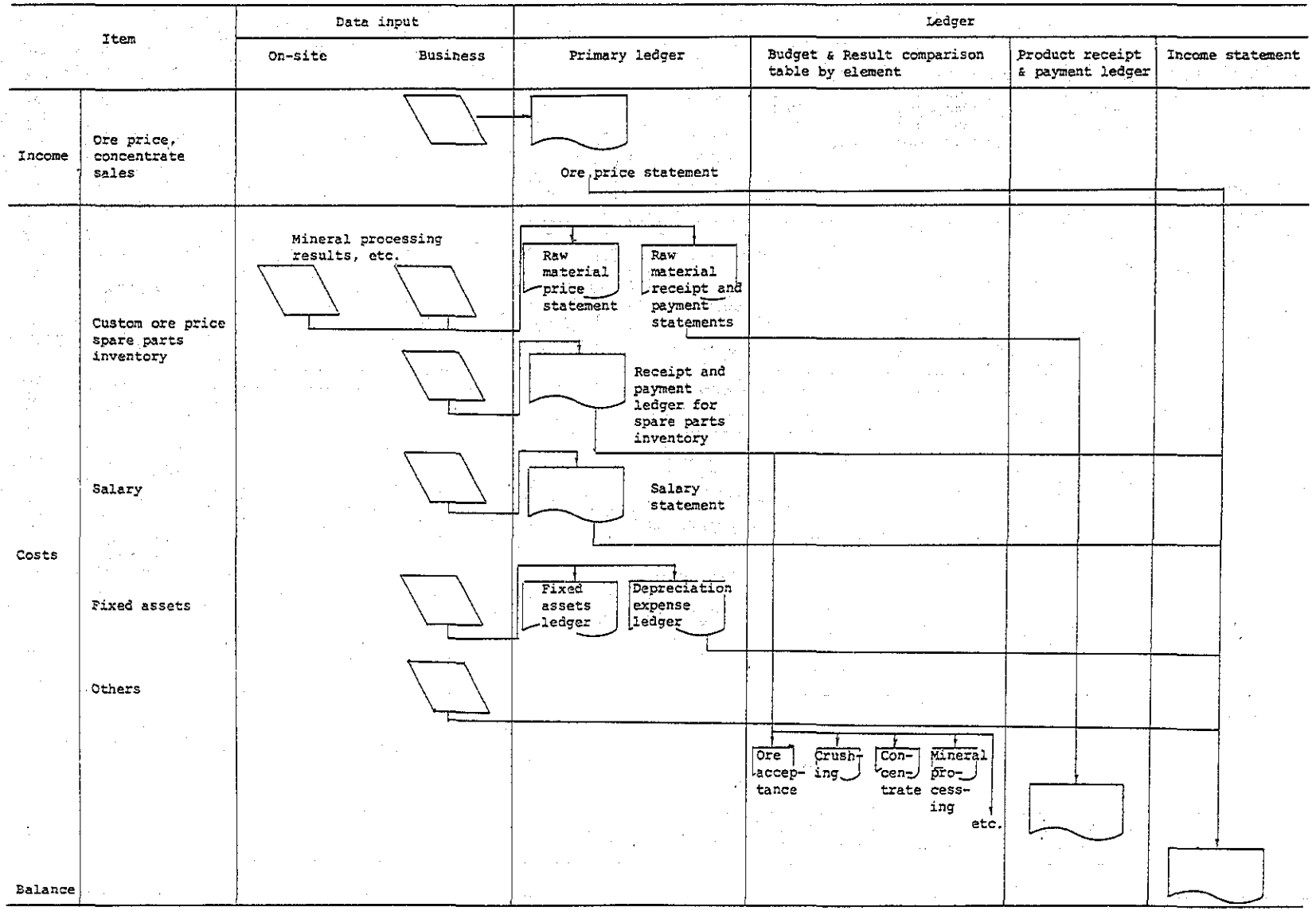


Fig. 6. 6. 1 Flow chart of Rationalized office work

Item		Data input		Ledger			
		On-site	Business	Primary ledger	Budget & Result comparison table by element	Product receipt & payment ledger	Income statement
Income	Ore price, concentrate sales			Ore price statement			
		Mineral processing results, etc.		Raw material price statement	Raw material receipt and payment statements		
	Custom ore price spare parts inventory						
					Receipt and payment ledger for spare parts inventory		
	Salary				Salary statement		
Costs							
	Fixed assets			Fixed assets ledger	Depreciation expense ledger		
	Others						
					Ore acceptance, Crushing, Concentrate, Mineral processing, etc.		
Balance							

Fig. 6.6.1 Flow chart of Rationalized office work

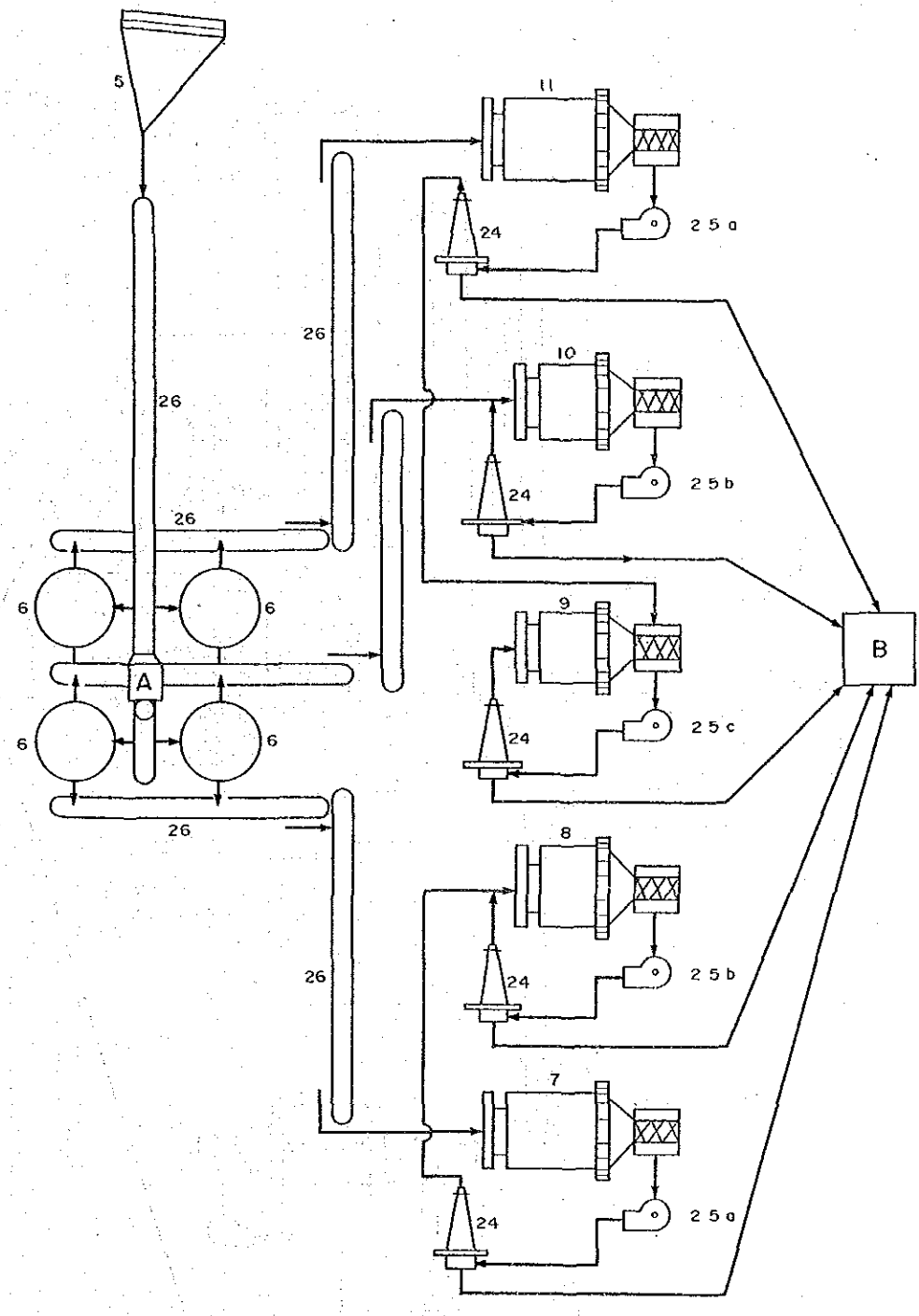


Fig. 8.3.1 Current flow sheet of Grinding Process at Guanacevi Plant

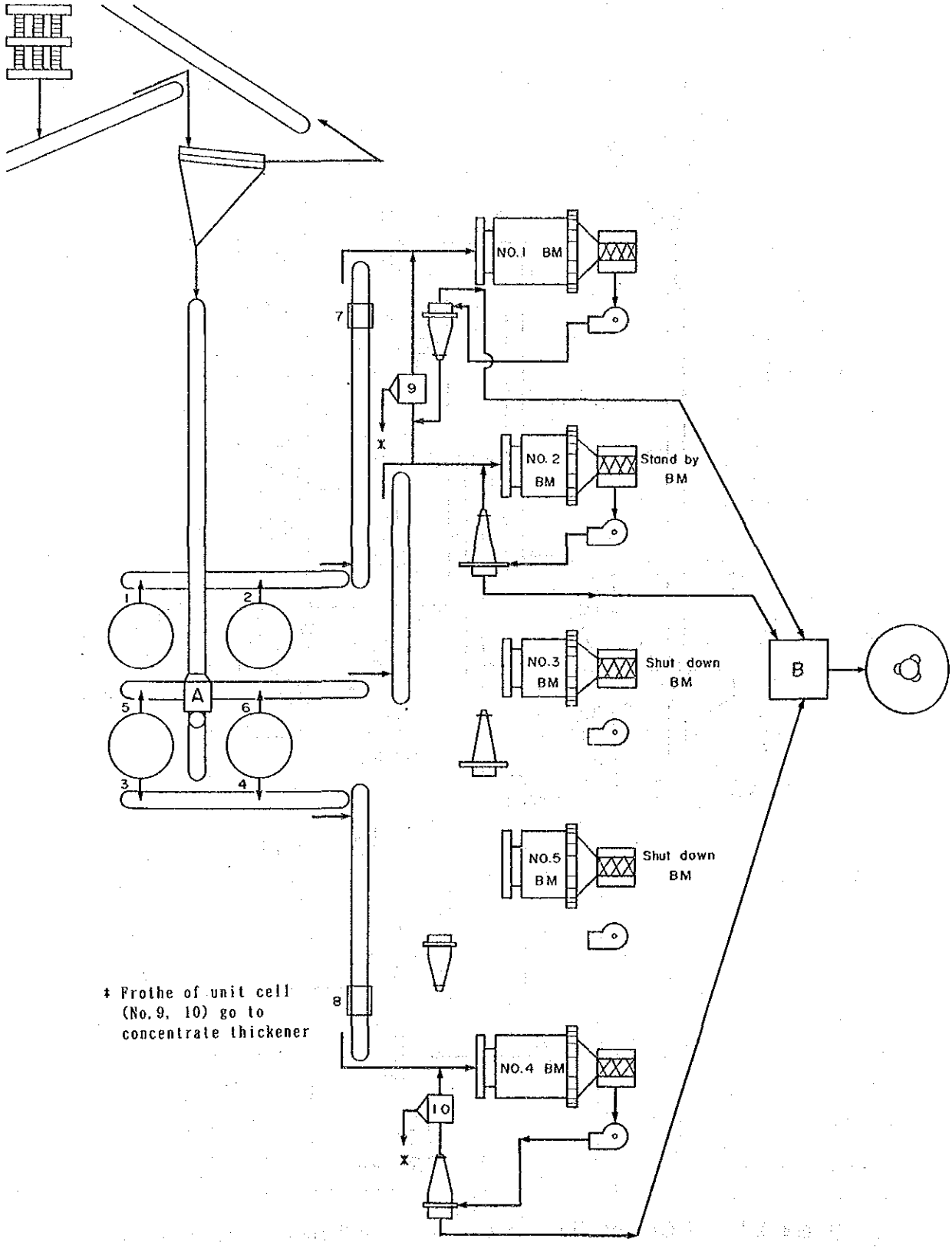


Fig. 8. 3. 2 Flow sheet of Improvement Plant for Grinding Process at Guanacevi Plant

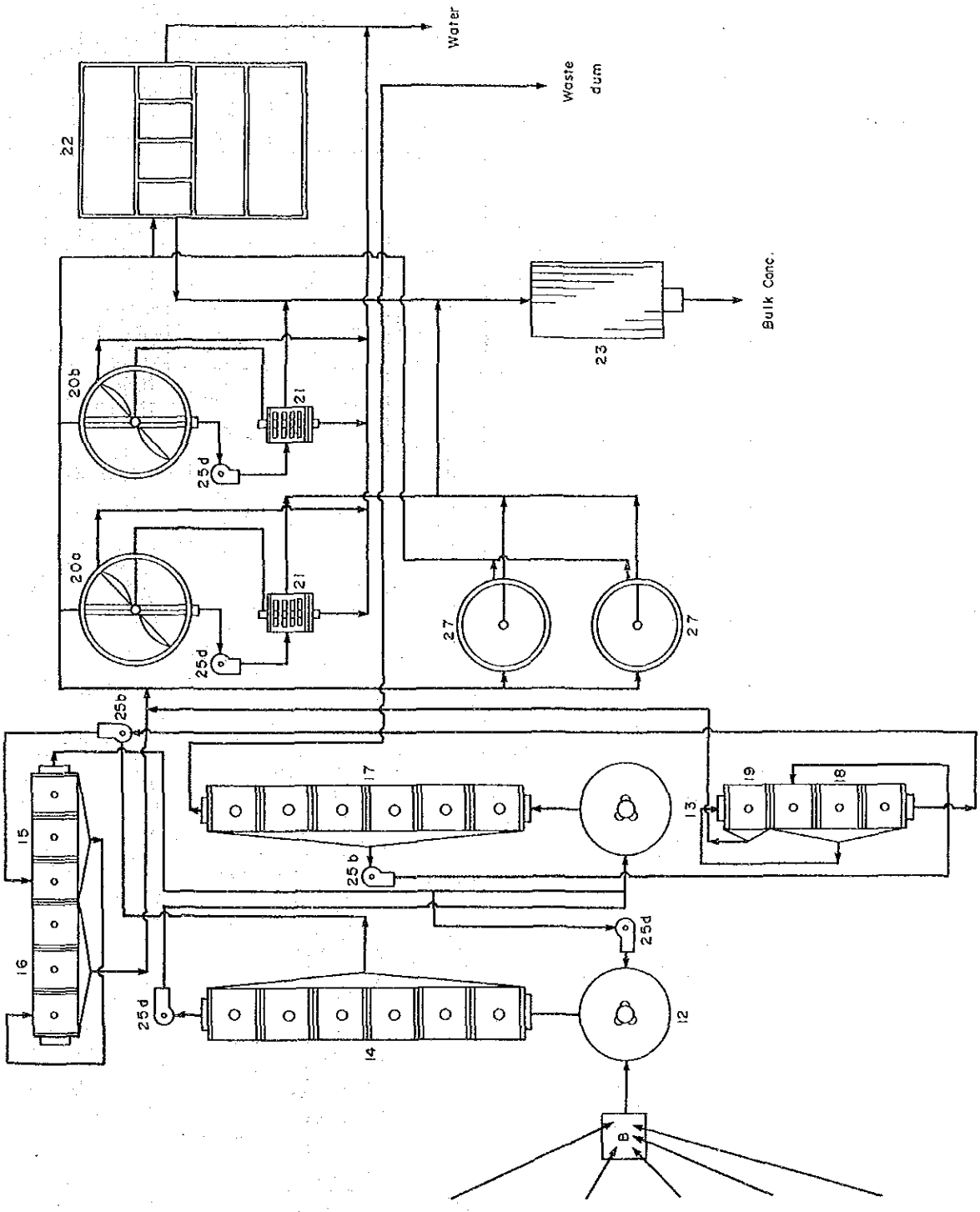


Fig. 8.3.3 Current flow sheet of Flotation and Dewatering Process at Guanacevi Plant

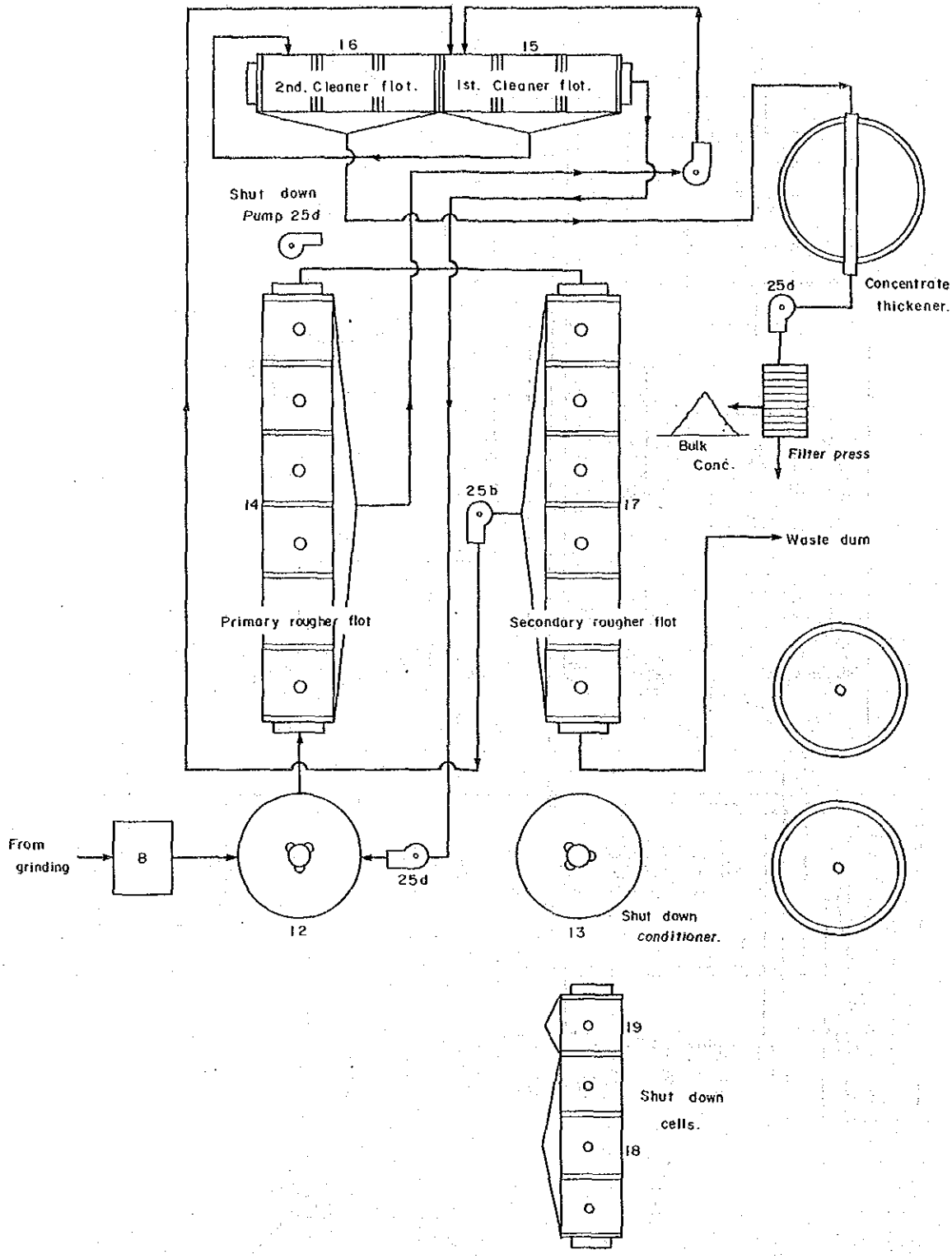


Fig. 8.3.4 Flow sheet of Improvement Plan for Flotation and Dewatering Process at Guanacevi Plant

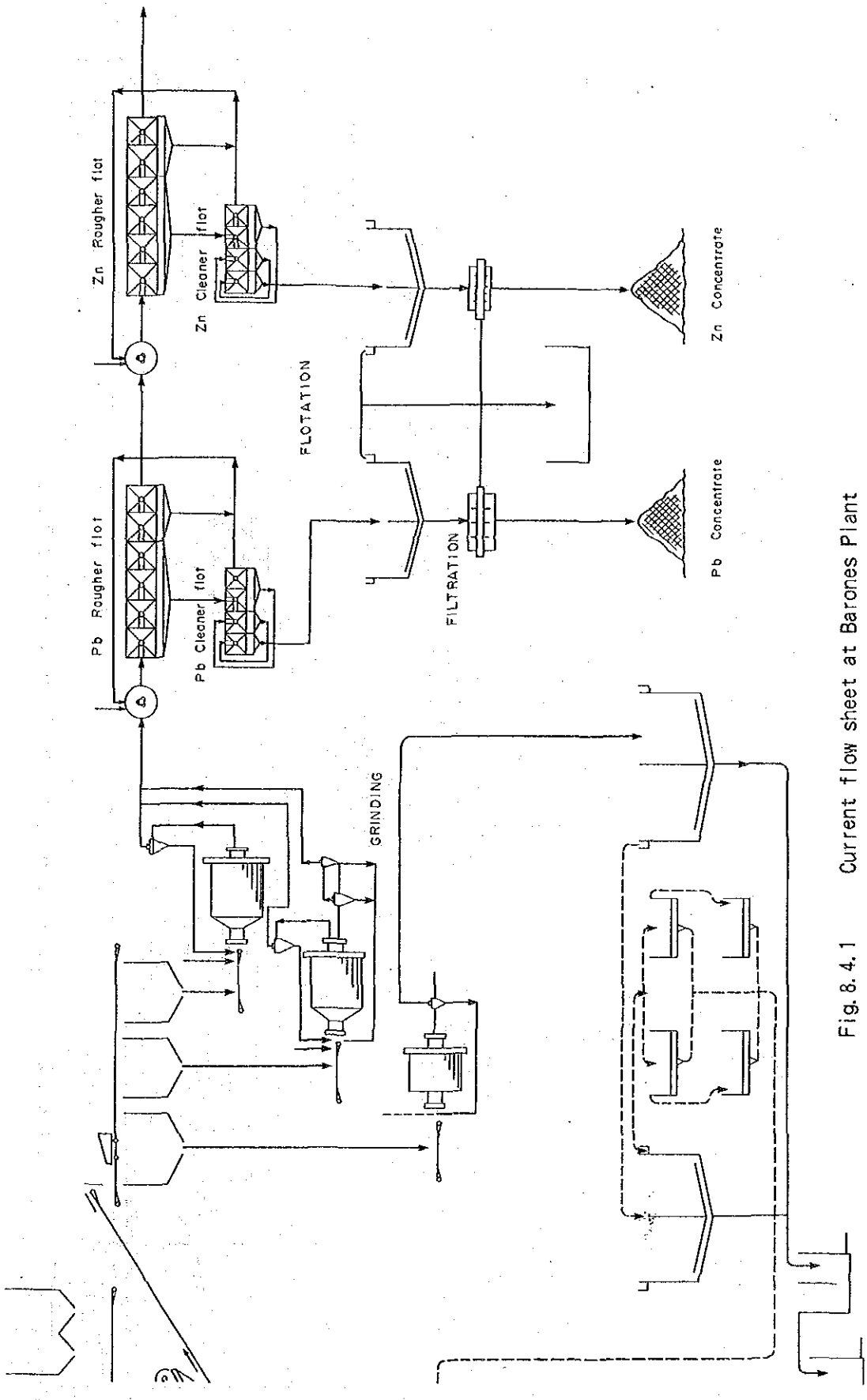


Fig. 8. 4. 1 Current flow sheet at Barones Plant

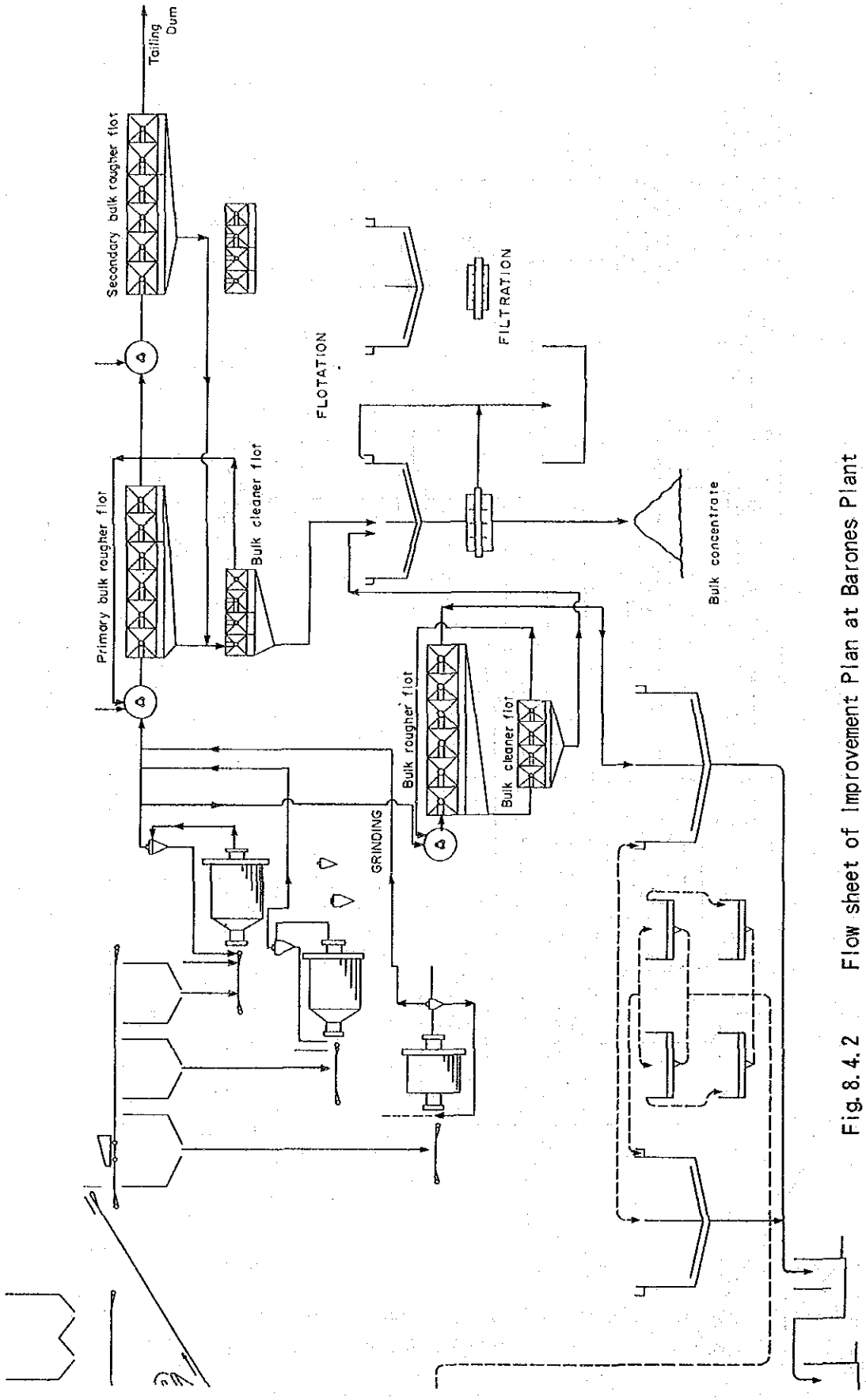


Fig. 8. 4. 2 Flow sheet of Improvement Plan at Barones Plant

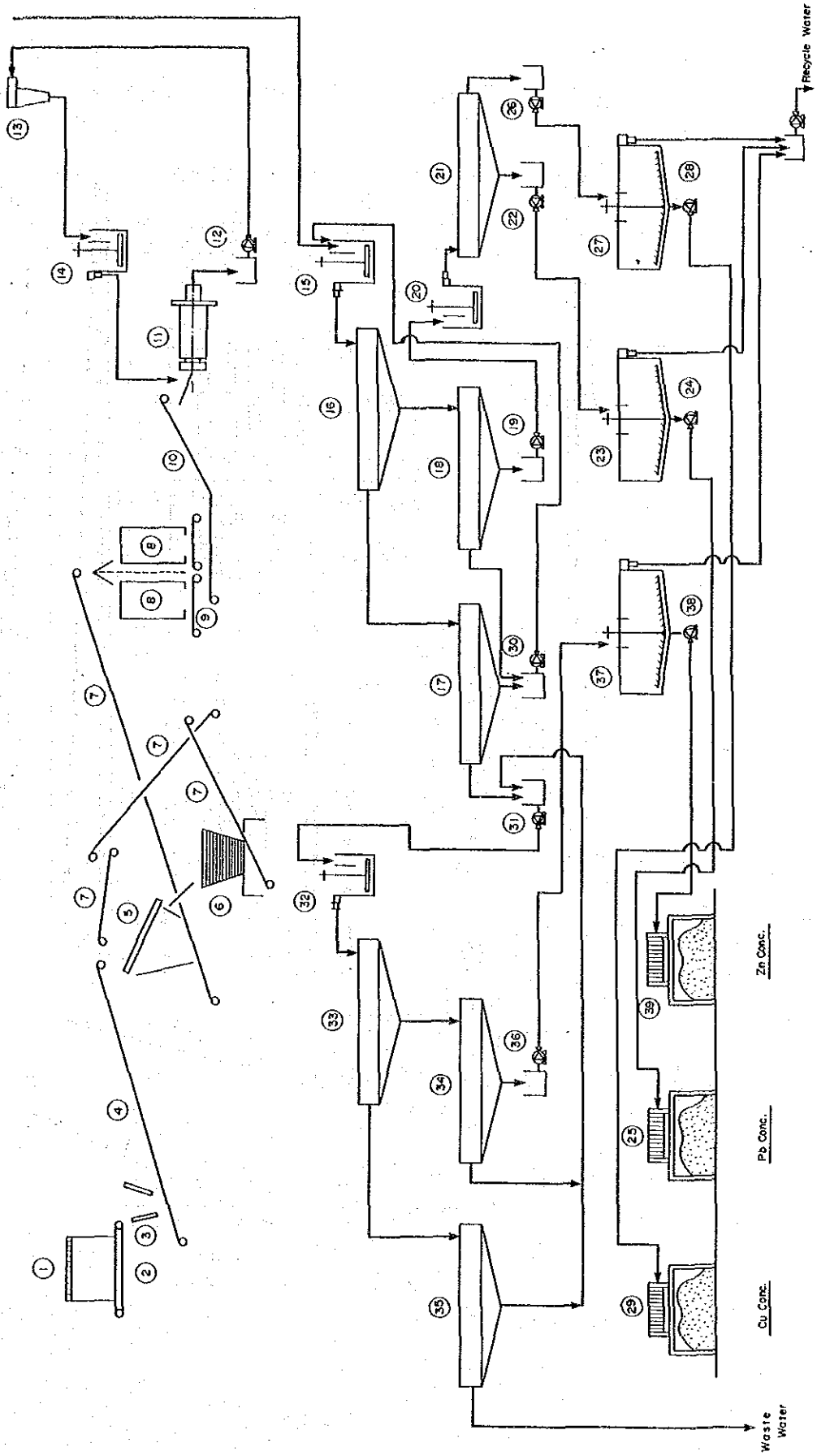


Fig. 8.5.1 150 t/D Plant Flow Diagram

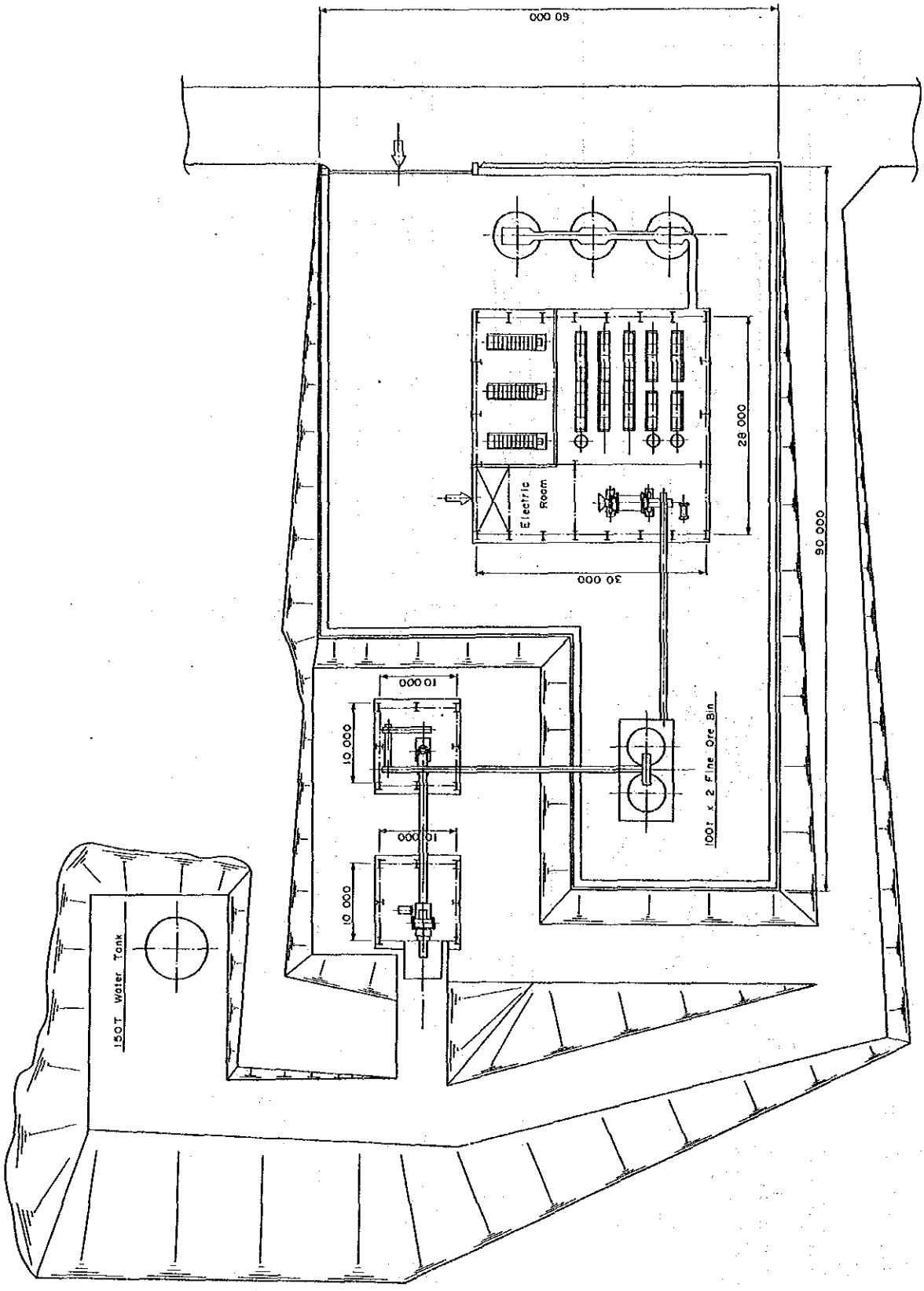


Fig. 8. 5. 2 Lay Out of 150 t/D Plant S=1/500

Table 2.1.1 a) Gross National Production 1983~87

(in millions of Pesos)

Year	Gross National Product (total)	GNP (Industrial and Mining Sector)	GNP (Mining)	Ratio of Mining	
				To GNP	To industrial and Mining Sector
1983	17,141,694	6,737,860	303,769	1.8	4.5
1984	28,748,889	11,790,025	427,472	1.5	3.8
1985	45,419,841	17,672,860	664,756	1.5	3.7
1986	79,353,450	25,833,231	1,734,395	1.7	5.3
1987	195,614,485	67,397,139	3,795,480	1.9	5.6

Source: National Statistics by the Ministry of budget, Bureau of Geographic Data, Bureau of Mines of the Ministry of Energy, Mines and National Corporations, etc.

Table 2.1.1 b) Mexican Mining Production 1983~87

(in millions of Pesos)

Year	Total	Metal	Non-metal
1983	303,769	198,987	104,782
1984	427,472	260,060	167,412
1985	664,756	329,654	335,102
1986	1,374,395	721,203	653,192
1987	3,795,480	1,137,710	1,657,770

Source: Bureau of Mines, Ministry of Energy, Mines and National Corporations

Table 2.1.3 Mexican Export 1983~87 (in Millions of Pesos)
(in Millions of Pesos)

Year	All Sectors	Mining Sector	%
1983	2,571,440	141,713	5.5
1984	4,059,339	182,856	4.5
1985	5,855,065	249,693	4.3
1986	9,916,200	613,796	6.2
1987	26,451,431	1,376,078	5.2

Source: National Statistics by the Ministry of Planning and Budget

Table 3.4.1 Estimation of the Mining cost

Parral

Mine			La Revancha			La Presa		La Esperanza			Tilita			Unificacion Cordero		
Data Source			Survey	Calc 1	Calc 2	Survey	Calc	Survey	Calc 1	Calc 2	Survey	Calc 1	Calc 2	Survey	Calc 1	Calc 2
Underground/Surface			U/G	U/G	U/G	U/G	U/G	U/G	U/G	U/G	U/G	U/G	U/G	U/G	U/G	U/G
Daily Tonnage (mt)			70	70	100	50	50	20	20	20	10	10	10	15	15	15
Stoping Width (m)			2	2	3	1.5	1.5	0.7-2	2	1	2.5	3	1	1.2	2	1
Employees (men)			40	37	39		34	14	15	22	13	8	13		13	18
Cost (Peso/mt)	Exploration															
	Mining	Labor (per worker-week)		7,500 (85,000)	5,500 (85,000)		9,600 (85,000)		10,600 (85,000)	15,600 (85,000)		6,400 (50,000)	10,400 (50,000)	41,050	12,300 (85,000)	17,000 (85,000)
		Supplies		21,000	18,700		23,000		23,800	27,400		23,600	29,400		24,500	28,200
		Transportation		5,000	5,000		5,000		5,000	5,000		5,000	5,000	12,000	12,000	12,000
		Drainage												25,000	25,000	25,000
	Total		34,500	33,500	29,200		37,600	30,000	39,400	48,000	28,000	35,000	44,800	78,050	73,800	82,200

Guanacevi

Mine			San Jose Chico		Barradon			Capuzaya		San Rafael		Ample Al Alto Porvenir			Noche Buena	
Data Source			Survey	Calc	Survey	Calc 1	Calc 2	Survey	Calc	Survey	Calc	Survey	Calc 1	Calc 2	Survey	Calc
Underground/Surface			U/G	U/G	U/G	U/G	U/G	U/G	U/G	U/G	U/G	U/G	U/G	U/G	U/G	U/G
Daily Tonnage (mt)			35	35	13	13	13	9	9	50	50	50	50	50	120	120
Stoping Width (m)			1	1	1	1	2	2	2	2	2	2	2	5	0.7-2	2
Employees (men)			36	32	10	16	8		9	30	29	18	29	18		54
Cost (Peso/mt)	Exploration		21,000	21,000												
	Mining	Labor (per worker-week)	19,600	22,900 (150,000)		18,500 (90,000)	9,200 (90,000)		15,000 (90,000)	30,000	14,500 (150,000)		14,500 (150,000)	9,000 (150,000)	25,000	9,000 (120,000)
		Supplies	29,400	25,900		28,600	18,700		25,800		21,800		21,800	18,100		19,900
		Transportation	8,500	8,500		8,500	8,500		8,500	9,000	9,000		9,000	9,000	(8,000)	8,000
		Drainage														
	Total		78,500	78,300	22,693	55,600	36,400	27,249	49,300	39,000	45,300	21,000	45,300	36,100	25,000	36,900

Table 3.4.1 Estimation of the Mining cost

Barones

Mine			San Roberto & San Bernabe					Las Cumbres			Calicanto				Ampl. San Miguel	
Data Source			Survey			Calc		Survey		Calc	Survey		Calc		Survey	Calc
Underground/Surface			U/G	U/G	Surface	U/G	U/G	Surface	U/G	U/G	U/G	Surface	U/G	Surface	U/G	U/G
Daily Tonnage (mt)			60	80	40	60	80	40	25	25	35	15	35	15	12	12
Stoping Width (m)			3.15	0.2-2.5		5	2		2	2	0.7-2		2		0.7-2.5	2.5
Employees (men)			18	62		21x70%=15	40	4	15	18	45		23	3	10	10
Exploration																
Cost (Peso/mt)	Mining	Labor (per worker-week)				12,500 (300,000)	25,000 (300,000)	2,500 (300,000)		10,100 (98,000)			9,200 (98,000)	2,800 (98,000)		12,500 (90,000)
		Supplies				17,800	20,800	9,600		23,300			22,500	14,600		24,000
		Transportation				5,000	5,000	5,000		5,000			5,000	5,000		5,000
		Drainage														
	Total			18,500		35,300	50,800	17,100	35,191	38,400	35,974		36,700	22,400	35,099	41,500
	(Average)						(38,100)						(32,410)			

Table 3.4.1 Estimation of the Mining cost

Barones

Mine			California		
Data Source			Survey	Calc 1	Calc 2
Underground/Surface			Surface	Surface	Surface
Daily Tonnage (mt)			120	120	120
Stoping Width (m)					
Employees (men)			40	8	40
Cost (Peso/mt)	Exploration				
	Mining	Labor (per worker-week)		1,000 (90,000)	5,000 (90,000)
		Supplies		6,000	6,000
		Transportation		5,000	5,000
		Drainage			
Total			16,029	12,000	16,000

Table 3.7.1 Metallurgical Balance of each Plant (1988)

(1) Parral ('88. 1~12)

	Weight (Ton)	Assay				Content				Distribution %			
		Au g/t	Ag g/t	Pb %	Zn %	Au g	Ag Kg	Pb t	Zn t	Au	Ag	Pb	Zn
Feed	85,670.1	0.66	240	0.7	0.2	56,473	20,520	603.1	135.9	100	100	100	100
Bulk conc.	277.0	47.30	7,300	—	—	13,102	2,022	—	—	23	9	—	—
Pb conc.	1,539.5	8.91	6,003	19.9	—	13,722	9,241	306.3	—	24	45	51	—
Zn conc.	179.6	—	178	—	43.3	—	32	—	77.8	—	0.2	—	57
Au•Ag Precip.	3,533 kg	2/3 kg/t	690 kg/t	—	—	8,019	2,438	—	—	14	12	—	—
Tailings	83,670.5	0.26	81	0.4	0.1	21,630	6,787	296.8	58.1	39	33.8	49	43

(2) Guanacevi('88. 1~12)

	Weight (Ton)	Assay				Content				Distribution %			
		Au g/t	Ag g/t	Pb %	Zn %	Au g	Ag Kg	Pb t	Zn t	Au	Ag	Pb	Zn
Feed	111,347	1.18	202	—	—	131,147	22,507	—	—	100	100	—	—
Bulk conc.	3,294	28.33	4,739	—	—	93,301	15,610	—	—	71	69	—	—
Tailings	108,053	0.35	64	—	—	37,846	6,897	—	—	29	31	—	—

(3) Barones('88. 1~12)

	Weight (Ton)	Assay					Content					Distribution %				
		Au g/t	Ag g/t	Pb %	Cu %	Zn %	Au g	Ag Kg	Pb t	Cu t	Zn t	Au	Ag	Pb	Cu	Zn
Feed	126,806	0.51	145	0.3	0.1	0.4	64,682	18,416	403	124	497	100	100	100	100	100
Au•Ag Precip.	7516Kg	0.16%	40.3%	—	—	—	12,117	3,027	—	—	—	19	16	—	—	—
Bulk conc.	1,037	8.44	4,303	5.5	—	—	8,750	4,462	57	—	—	14	24	14	—	—
Pb conc.	439	11.51	4,440	33.9	3.6	9.8	5,051	1,949	149	16	43	8	11	37	13	8
Cn conc.	472	1.45	1,250	4.9	17.6	9.5	686	590	23	83	45	1	3	6	67	9
Zn conc.	560	1.54	689	2.1	1.1	42.3	864	386	12	6	237	1	2	3	5	48
Tailings	124,300	0.30	64	0.1	—	0.1	37,214	7,954	162	19	172	58	43	40	15	35

Table 3.7.2 Metallurgical Balance of each Plant (1989)

(1) Parral ('89. 1～6)

Products	Weight (Ton)	Assay				Content				Distribution %			
		Au g/t	Ag g/t	Pb %	Zn %	Au g	Ag Kg	Pb t	Zn t	Au	Ag	Pb	Zn
Feed	38,464	0.74	325	0.6	0.2	28,476	12,500	218.1	61.1	100.0	100.0	100.0	100.0
Bulk conc.	326	16.12	11,454	—	—	5,255	3,734	—	—	18.5	29.9	—	—
Pb conc.	412	22.29	6,582	26.7	—	9,184	2,712	110.0	—	32.3	21.7	50.4	—
Zn conc.	76	—	370	—	44.4	—	28	—	33.6	—	0.2	—	55.0
Au • Ag Precip.	kg 2,296	kg/t 1.7	kg/t 708	—	—	3,867	1,627	—	—	13.6	13.0	—	—
Tailings	37,648	0.30	117	0.3	0.1	11,170	4,399	108.1	27.5	35.6	35.2	49.6	45.0

(2) Guanacevi('88. 1～7)

Products	Weight (Ton)	Assay		Content		Distribution	
		Au g/t	Ag g/t	Au g	Ag Kg	Au %	Ag %
Feed	54,258	1.45	253	78,447	13,726	100.0	100.0
Bulk conc.	1,724	35.39	6,131	61,029	10,572	77.8	77.0
Tailings	52,534	0.33	60	17,418	3,154	22.2	23.0

Table 3.7.2 Metallurgical Balance of each Plant (1989)

(3) Barones('89. 1～6)

Products	Weight (Ton)	Assay						Content						Distribution %					
		Au g/t	Ag g/t	Pb %	Cu %	Zn %	Fe %	Au g	Ag Kg	Pb t	Cu t	Zn t	Fe t	Au	Ag	Pb	Cu	Zn	Fe
Feed	37,458	0.38	145	0.5	0.2	0.8	5.7	14,381	5,516	175.3	66.2	289.0	2,132	100.0	100.0	100.0	100.0	100.0	100.0
Bulk conc	163	6.79	9,122	3.8	—	3.3	12.3	1,109	1,489	6.2	—	5.4	20	7.7	27.0	3.5	—	1.9	0.9
Pb conc	226	6.07	2,898	30.1	5.1	16.2	9.7	1,372	655	68.1	11.6	36.6	22	9.5	11.9	38.8	17.5	12.7	1.0
Cn conc	239	1.79	2,285	6.8	18.2	8.5	15.9	429	546	16.3	43.4	20.2	38	3.0	9.9	9.3	65.6	7.0	1.8
Zn conc	260	1.33	531	1.4	0.6	43.2	8.8	346	138	3.7	1.6	112.2	23	2.4	2.5	2.1	2.4	38.8	1.1
Tailings	36,570	0.30	74	0.3	0.03	0.3	5.5	11,125	2,688	81.0	9.6	114.6	2,029	77.4	48.7	46.3	14.5	39.6	95.2
Cyanidation Feed	16,883	0.6	171					10,602	2,885					100.0	100.0				
Au・Ag Precip	4,342	0.073%	47.1%					3,156	2,044					29.8	70.8				
Tailings	16,878	0.4	50					7,446	841					70.2	29.2				

Table 3.7.3(a) Net sales of concentrates Parral Plant (1989 Jan-June)

BULK-CONC		PARRAL GRADE		CONTENTS		RECOVERY	REC. METAL	VALUE	R/C&T/C	PENALTY	SUB TOTAL	M.P.TAX	SUB TOTAL	I.V.A	US$ TOTAL
DMT T	Pb	0.00	%	0.000	T	1.5UL&90 %	0.000 T	0	0		0	0	0		0
326.000	Au	16.12	G/T	5,255.1	G	100 %	5,255.1 G	59,996			59,996	4,200	55,796		55,796
	Ag	11,454.00	G/T	3,734.004	KG	100 %	3,734.004 KG	642,763			642,763	44,993	597,770		597,770
	Cu	0.50	%	1.630	T	5 KGL	0.000 T	0	0		0	0	0		0
	T/C	77.03	$/DT						25.112		-25,112		-25,112		-25,112
	INSOLUBLE	30.00	%							1,223	-1,223		-1,223		-1,223
	S	20.00	%							815	-815		-815		-815
	As	2.00	%							326	-326		-326		-326
	H2O		%												
	I.V.A.													101,292	101,292
	TOTAL							702,759	25,112	2,364	675,283	49,193	626,090	101,292	727,382

PB-CONC.		PARRAL GRADE		CONTENTS		RECOVERY	REC. METAL	VALUE	R/C	PENALTY	SUB TOTAL	M.P.TAX	SUB TOTAL	I.V.A	US$ TOTAL
DMT T	Pb	26.70	%	110.004	T	1.5UL&90 %	93.442 T	59,237	10,198		49,039	2,452	46,587		46,587
412.000	Au	22.29	G/T	9,183.5	G	100 %	9,183.5 G	104,846			104,846	7,339	97,507		97,507
	Ag	6,582.00	G/T	2,711.784	KG	100 %	2,711.784 KG	466,801			466,801	32,676	434,125		434,125
	Cu	1.00	%	4.120	T	5 KGL	2.060 T	5,993	1,381		4,612	231	4,381		4,381
	T/C	77.03	$/DT						31,736		-31,736		-31,736		-31,736
	INSOLUBLE	27.00	%							1,391	-1,391		-1,391		-1,391
	S	24.00	%							1,030	-1,030		-1,030		-1,030
	As	2.00	%							412	-412		-412		-412
	H2O		%												0
	I.V.A.													88,609	88,609
	TOTAL							636,877	43,315	2,833	590,729	42,698	548,031	88,609	636,640

ZN-CONC		PARRAL GRADE		CONTENTS		RECOVERY	REC. METAL	VALUE	R/C	PENALTY	SUB TOTAL	M.P.TAX	SUB TOTAL	I.V.A	US$ TOTAL
DMT T	Zn	44.40	%	33.744	T	8 UL	27.664 T	45,303			45,303	2,265	43,038		43,038
76.000	Ag	370	G/T	28.1	KG	93.3GLES*65%	13.7 KG	2,358			2,358	165	2,193		2,193
	T/C	266.96	$/DT						20,289		-20,289		-20,289		-20,289
	Fe	8.00	%							114	-114				-114
	H2O		%												
	I.V.A.													4,089	4,089
	TOTAL										27,258	2,430	24,942	4,089	28,917

Table 3.7.3(b) Net sales of concentrates Parral Plant (1989 Jan-June)

AU-AG PRECIPITATION PARRAL		GRADE	CONTENTS	RECOVERY	REC. METAL	VALUE	R/C	PENALTY	SUB TOTAL	M.P.TAX	SUB TOTAL	I.V.A	US$ TOTAL
DMT T 2.296	Pb	0.00 %	0.000 T	1.5UL&90 %	0.000 T	0	0		0	0	0		0
	Au	1,700.00 G/T	3,903.2 G	100 %	3,903.2 G	44,562			44,562	3,119	41,443		41,443
	Ag	708,000.00 G/T	1,625.568 KG	100 %	1,625.568 KG	279,822			279,822	19,588	260,234		260,234
	Cu	0.00 %	0.000 T		0.000 T	0	0		0	0	0		0
	T/C	77.03 $/DT					177		-177		-177		-177
	INSOLUBLE	0.00 %						0	0		0		0
	S	0.00 %						0	0		0		0
	As	0.00 %						0	0		0		0
	H20	%											0
	I.V.A.											48,631	48,631
	TOTAL					324,384	177	0	324,207	22,707	301,500	48,631	350,131

Table 3.7.4 Net sales of concentrates Guanacevi Plant (1989 Jan.-July)

BULK-CONC		GUANACEVI GRADE	CONTENTS	RECOVERY	REC. METAL	VALUE	R/C	PENALTY	SUB TOTAL	M.P.TAX	SUB TOTAL	I.V.A	US$ TOTAL
DMT T	Pb	0.00 %	0.000 T	1.50L&90 %	0.000 T	0	0		0	0	0		0
1,724.000	Au	35.39 G/T	61,012.4 G	100 %	61,012.4 G	696,566			696,566	48,760	647,806		647,806
	Ag	6,131.00 G/T	10,569.844 KG	100 %	10,569.844 KG	1,819,470			1,819,470	127,363	1,692,107		1,692,107
	Cu	0.50 %	8.620 T	5 KGL	0.000 T	0	0		0	0	0		0
	T/C	77.03 $/DT					132,800		-132,800		-132,800		-132,800
	INSOLUBLE	30.00 %						6,465	-6,465		-6,465		-6,465
	S	20.00 %						4,310	-4,310		-4,310		-4,310
	As	2.00 %						1,724	-1,724		-1,724		-1,724
	H2O	%											0
	I.V.A.											355,611	355,611
	TOTAL					2,516,036	132,800	12,499	2,370,737	176,123	2,194,614	355,611	2,550,225

Table 3.7.5(a) Net sales of concentrates Barones Plant (1989 Jan.-June)

CU-CONC		BARONES GRADE	CONTENTS	RECOVERY	REC. METAL	VALUE	R/C&T/C	PENALTY	SUB TOTAL	M. P. TAX	SUB TOTAL	I. V. A	US$ TOTAL
DMT T	Cu	18.20 %	43.498 T	90 %	39.148 T	113,881	7,759		106,122	5,306	100,816		100,816
239.000	Au	1.79 G/T	427.8 G	100 %	427.8 G	4,884			4,884	342	4,542		4,542
	Ag	2,285.00 G/T	546.115 KG	100 %	546.115 KG	94,007			94,007	6,580	87,427		87,427
	Pb	6.80 %	16.252 T	47 %	7.6 T	4,818	4,581		237	12	225		225
	T/C	79.83 $/DT					19,079		-19,079		-19,079		-19,079
	INSOLUBLE	3.00 %						72	-72		-72		-72
	Zn	8.50 %						90	-90		-90		-90
	As	1.00 %						120	-120		-120		-120
	H2O	%											0
	I. V. A.											27,883	27,883
	TOTAL					217,590	31,419	282	185,889	12,240	173,649	27,883	201,532

BULK-CONC		BARONES GRADE	CONTENTS	RECOVERY	REC. METAL	VALUE	R/C&T/C	PENALTY	SUB TOTAL	M. P. TAX	SUB TOTAL	I. V. A	US$ TOTAL
DMT T	Pb	3.80 %	6.194 T	1.5UL&90 %	0.000 T	0	0		0	0	0		0
163.000	Au	6.79 G/T	1,106.8 G	100 %	1,106.8 G	12,636			12,636	885	11,751		11,751
	Ag	9,122.00 G/T	1,486.886 KG	100 %	1,486.886 KG	255,949			255,949	17,916	238,033		238,033
	Cu	0.50 %	0.815 T	5 KGL	0.000 T	0	0		0	0	0		0
	T/C	77.03 $/DT					12,556		-12,556		-12,556		-12,556
	INSOLUBLE	30.00 %						611	-611		-611		-611
	S	20.00 %						408	-408		-408		-408
	As	2.00 %						163	-163		-163		-163
	H2O	%											0
	I. V. A.											38,227	38,227
	TOTAL					268,585	12,556	1,182	254,847	18,801	236,046	38,227	274,273

PB-CONC		BARONES GRADE	CONTENTS	RECOVERY	REC. METAL	VALUE	R/C&T/C	PENALTY	SUB TOTAL	M. P. TAX	SUB TOTAL	I. V. A	US$ TOTAL
DMT T	Pb	30.10 %	68.026 T	1.5UL&90 %	58.172 T	36,878	6,349		30,529	1,526	29,003		29,003
226.000	Au	6.07 G/T	1,371.8 G	100 %	1,371.8 G	15,662			15,662	1,096	14,566		14,566
	Ag	2,898.00 G/T	654.948 KG	100 %	654.948 KG	112,741			112,741	7,892	104,849		104,849
	Cu	5.10 %	11.526 T	90 %	10.373 T	30,175	6,952		23,223	1,161	22,062		22,062
	T/C	77.03 $/DT					17,409		-17,409		-17,409		-17,409
	INSOLUBLE	27.00 %						763	-763		-763		-763
	S	24.00 %						565	-565		-565		-565
	As	2.00 %						226	-226		-226		-226
	H2O	%											0
	I. V. A.											24,479	24,479
	TOTAL					195,456	30,710	1,554	163,192	11,675	151,517	24,479	175,996

Table 3.7.5(b) Net sales of concentrates Barones Plant (1989 Jan.-June)

ZN-CONC		BARONES GRADE	CONTENTS	RECOVERY	REC. METAL	VALUE	R/C&T/C	PENALTY	SUB TOTAL	M.P.TAX	SUB TOTAL	I.V.A	US$ TOTAL
DMT T	Zn	43.20 %	112.320 T	8 UL	91.520 T	149.875			149,875	7,494	142,381		142,381
260.000	Ag	531 G/T	138.1 KG	93.3GLES*65%	74 KG	12,738			12,738	892	11,846		11,846
	T/C	266.96 $/DT					69,410		-69,410		-69,410		-69,410
	Fe	8.80 %						1,014	-1,014				-1,014
	H2O	%											
	I.V.A.											13,828	13,828
	TOTAL								92,189	8,386	84,817	13,828	97,631

Au-Ag PRECIPITATION BARONES		GRADE	CONTENTS	RECOVERY	REC. METAL	VALUE	R/C&T/C	PENALTY	SUB TOTAL	M.P.TAX	SUB TOTAL	I.V.A	US$ TOTAL
DMT KG	Pb	0.00 %	0.000 T	1.5UL&90 %	0.000 T	0	0		0	0	0		0
4.342	Au	730.00 G/T											
	Ag	471,000.00 G/T	2,045.082 KG	100 %	2,045.082 KG	352,036			352,036	24,643	327,393		327,393
	Cu	0.00 %	0.000 T		0.000 T	0	0		0	0	0		0
	T/C	77.03 $/DT					334		-334		-334		-334
	INSOLUBLE	0.00 %						0	0		0		0
	S	0.00 %						0	0		0		0
	As	0.00 %						0	0		0		0
	H2O	%											0
	I.V.A.											58.233	58.233
	TOTAL					388.223	334	0	388.223	27.176	360.713	58.233	418.946

Table 4.1.1 Main equipment for Beneficiation test

Equipment	Number	Status
Ball mill(8″ ×8″)	1	good
Flotation Machine(WEMCO)	2	good
Ro-Tap sieve shaker	1	good
PH meter	3	out of order
Filter press(12″ ×12″ ,8×12″)	2	good
Agitater for laboratory	2	good

Table 4.1.2 Beneficiation tests at Parral

PROBLEM	OBJECT OF TEST	SAMPLE	CONTENT OF TEST
1. Metallurgical results of Casale ・Low revovery of Ag	1. Improvement of metallurgical results 2. Study on the cause of low recovery of Ag	casale	1. Flotation and Cyanidation No. 1 Standard test No. 2 Regrinding for flotation tailing (15 min.) No. 3 Increasing of flotation time No. 4 Increasing of grinding time No. 5 Using AF4037 as collector No. 6 Addition of H_2SO_4 (PH 4.5) No. 7 Addition of H_2SO_4+Na_2S (Na_2S= Rougher 300 g/t, SCAV. 300 g/t) 2. EPMA analysis on Ag minerals tailings of flotation and cyanidation.
1. Dust of crushing plant, suspended solid in leaching solution	1. De sliming of crude ore by washing	José Galindo	1. Washing and decantation of crude ore.
1. Treatment of mixed ore	1. Improvement of rate of operation and reduction of operation cost	Nochebuena San luis II La Unión	1. Flotation (1) Individual Sample (2) Mixed Sample

Table 4.1.3 Result of Beneficiation test for Casale Ore

Test No.	Product	FLOTATION			CYANIDATION		
		Assay g/t	Distribution %	Recovery %	assay g/t	Recovery* %	Total Recovery %
		Ag	Ag	Ag	Ag	Ag	Ag
1	Feed	364	100.0	26.5	238	8.5	35.0
	Conc.	5,428	26.5				
	Middling	275	5.6				
	Tailing	272	67.9				
2	Feed	364	100.0	23.3	236	11.5	34.8
	Conc.	6,434	23.3				
	Middling	291	6.0				
	Tailing	282	70.7				
3	Feed	368	100.0	30.3	231	8.5	38.8
	Conc.	2,640	30.4				
	Middling	268	7.8				
	Tailing	268	61.8				
4	Feed	361	100.0	34.2	258	2.8	37.0
	Conc.	6,290	34.2				
	Middling	283	1.8				
	Tailing	270	64.0				
5	Feed	371	100.0	28.2	243	6.9	35.1
	Conc.	4,162	28.2				
	Middling	281	8.9				
	Tailing	273	62.9				
6	Feed	385	100.0	29.6	239	7.2	36.8
	Conc.	9,426	29.6				
	Middling	335	7.3				
	Tailing	270	63.1				
7	Feed	381	100.0	27.9	253	6.9	34.8
	Conc.	2,590	27.9				
	Middling	479	3.5				
	Tailing	281	68.6				

Table 4.1.4 Metallurgical Results of Flotation tests for each Ore

SAN LUIS II

	wt	Assay %								Distribution %							
	%	Au g/t	Ag g/t	Pb	Zn	Cu	Fe	S	Insol	Au	Ag	Pb	Zn	Cu	Fe	S	Insol
F	100.0	0.2	294	0.44	0.23	0.03	2.25	0.69	83.56	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Cl・C	1.4	0.2	11,666	3.80	1.20	0.15	6.00	2.04	68.20	1.5	53.9	11.7	7.0	6.1	3.6	4.0	1.1
Cl・T	13.5	0.1	293	0.54	0.28	0.04	2.80	0.33	80.42	7.2	13.4	16.6	16.2	16.4	16.8	65.0	13.0
RT	85.1	0.2	113	0.37	0.21	0.03	2.10	0.25	84.30	91.3	32.7	71.7	76.8	77.5	79.6	31.0	85.9

NOCHE BUENA

	wt	Assay %								Distribution %							
	%	Au g/t	Ag g/t	Pb	Zn	Cu	Fe	S	Insol	Au	Ag	Pb	Zn	Cu	Fe	S	Insol
F	100.0	0.1	367	1.14	0.58	0.04	4.23	0.23	64.73	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Cl・C	1.6	0.4	11,814	7.20	2.40	0.23	9.20	5.63	50.98	5.5	51.2	10.0	6.6	10.2	3.5	39.1	1.3
Cl・T	10.0	0.2	613	1.45	0.70	0.06	5.50	0.33	59.26	14.5	16.8	12.7	12.1	16.6	13.0	14.5	9.2
RT	88.4	0.1	133	1.00	0.53	0.03	4.00	0.12	65.60	77.0	32.0	77.3	81.3	73.2	83.5	46.4	89.5

LA UNION

	wt	Assay %								Distribution %							
	%	Au g/t	Ag g/t	Pb	Zn	Cu	Fe	S	Insol	Au	Ag	Pb	Zn	Cu	Fe	S	Insol
F	100.0	0.8	243	0.26	0.17	0.03	4.16	0.10	87.92	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Cl・C	0.7	44.8	15,063	1.70	2.00	0.17	11.60	5.47	65.66	36.7	41.6	4.3	7.9	3.6	1.9	35.3	0.5
Cl・T	7.5	2.0	408	0.41	0.24	0.04	5.40	0.16	82.84	18.4	12.7	11.8	10.7	9.5	9.8	11.6	7.1
RT	91.8	0.4	121	0.24	0.15	0.03	4.00	0.06	88.50	44.9	45.7	83.9	81.4	86.9	88.3	53.1	92.4

Calculated result

	wt	Assay %								Distribution %							
	%	Au g/t	Ag g/t	Pb	Zn	Cu	Fe	S	Insol	Au	Ag	Pb	Zn	Cu	Fe	S	Insol
F	100.0	0.4	301	0.62	0.33	0.03	3.54	0.34	78.70	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Cl・C	1.2	0.9	12,350	4.89	1.87	0.19	8.43	4.24	60.16	27.6	49.5	9.6	6.9	6.8	2.9	15.1	0.9
Cl・T	10.4	0.6	424	0.80	0.40	0.05	4.30	1.58	74.18	16.5	14.6	13.5	12.9	14.3	12.6	48.2	9.8
RT	88.4	0.2	122	0.53	0.30	0.03	3.39	0.14	79.50	55.9	35.9	76.9	80.2	78.9	84.5	36.7	89.3

F : Feed, cl・C : Cleaner Concentrate, Cl・T : Cleaner tailing, RT : Rougher tailing

Table 4.1.5 Metallurgical Result of Flotation test for mixed Ore

Mixed ore SAN LUIS Ⅱ : NOCHE BUENA : LA UNION = 1 : 1 : 1

	wt	Assay %								Distribution %							
	%	Au g/t	Ag g/t	Pb	Zn	Cu	Fe	S	Insol	Au	Ag	Pb	Zn	Cu	Fe	S	Insol
F	100.0	0.4	295	0.55	0.30	0.02	3.68	0.15	78.43	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Cl・C	0.4	0.2	406	9.60	3.60	0.38	10.40	8.84	49.30	0.9	1.1	6.4	4.3	6.2	1.0	20.9	0.2
Cl・T	6.2	0.6	390	0.70	0.40	0.04	4.60	0.19	74.22	9.1	16.5	7.8	8.0	11.1	7.7	7.5	5.8
RT	93.4	0.3	129	0.51	0.29	0.02	3.60	0.12	79.90	90.0	82.4	85.8	87.7	87.7	91.3	71.6	94.0

Table 4.1.6 Main Equipment for Beneficiation test

Equipment	Number	Status
Ball mill(9 3/4" ×9 7/8")	1	good
Flotation Machine(WEMCO)	1	good
Ro-Tap sieve shaker	1	good

Table 4.1.7 Beneficiation tests at Guanacevi

PROBLEM	OBJECT OF TEST	SAMPLE	CONTENT OF TEST
1. Metallurgical results of Rosario oxide Low recovery of Ag	1. Improvement of metallurgical results	1. Rosario oxide	1. Flotation test No. 1 Standard test No. 2 Increasing of grinding and addition of collector No. 3 N_2SO_4+Na_2S addition, until I st cleaning No. 4 Decreasing of grinding time
2. Treatment of mixed ore	1. Improvement of rate of operation and reduction of operation cost	1. Rosario oxide and sulfide	2. Flotation (1) Individual sample (2) Mixed sample
Shipping sample to Japan	1. Treatment on refractory silver ore which contains manganese	1. La prieta	1. Bacterial leaching test

Table 4.1.8 Results of Flotation tests for Rosario Oxide

Test No.	Production	Wt %	assay g/t		Distribution %		Flotation Condition
			Au	Ag	Au	Ag	
	Feed	100.0	1.0	181	100.0	100.0	−200 mesh 52%, pH7.9
	Conc. 1	5.4	8.6	1,904	46.9	55.7	Total flotation time 15 min.
1	Conc. 2	2.7	3.2	744	8.8	10.9	Total AF 31 15 g/t
	Conc. 3	3.2	2.6	488	8.5	8.5	AP 404 30 g/t
	Tailing	88.7	0.4	52	35.8	25.9	X-350 170 g/t
							AP-425 30 g/t
	Feed	100.0	0.9	187	100.0	100.0	−200 mesh 60%, pH4.5 (H_2SO_4)
2	Conc. 1	6.6	7.2	1,930	54.6	68.1	Total Flotation time 10 min.
	Conc. 2	1.8	1.8	432	3.7	4.1	Total AF 31 30 g/t
	Tailing	91.6	0.4	57	41.7	27.8	AP 404 60 %/t
							X-350 140 g/t
	Feed	100.0	0.9	192	100.0	100.0	−200 mesh 62%, pH4.5 (H_2SO_4)
	Cl. Conc.	3.4	11.8	3,036	45.5	53.9	Total Flotation time 10 min.
3	Cl. Tailing	9.2	0.9	256	9.1	12.3	Total Na_2S 400 g/t
	SV. Conc.	1.4	4.7	956	6.8	7.0	AP 31 30 g/t
	Tailing	86.0	0.4	60	38.6	26.8	AP 404 180 g/t
							X-350 40 g/t
							(Cleaner X-350 10 g/t)
	Feed	100.0	0.6	183	100.0	100.0	−200 mesh 53%, pH7.8
	Conc. 1	4.2	3.6	1,766	25.9	40.5	Total Flotation time 15 min.
4	Conc. 2	1.2	2.9	1,032	5.8	6.8	Total AF 31 15 g/t
	Conc. 3	6.2	0.8	356	8.5	12.1	AP 404 30 g/t
	Tailing	88.4	0.4	84	60.8	40.6	X-350 170 g/t
							AP 425 30 g/t

Table 4.1.9 Metallurgical Results of Flotation tests for each Ore

ROSARIO oxide

	wt	Assay %								Distribution %							
	%	Au g/t	Ag g/t	Pb	Zn	Cu	Fe	S	Insol	Au	Ag	Pb	Zn	Cu	Fe	S	Insol
F	100.0	0.7	181	0.64	0.72	0.35	2.85	0.60	84.83	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
RC	7.1	6.7	1666	5.40	7.69	2.73	6.14	7.49	56.15	72.0	65.5	59.6	75.6	55.1	15.3	89.1	4.7
RT	92.9	0.2	67	0.28	0.19	0.17	2.60	0.07	87.02	28.0	34.5	40.4	24.4	44.9	84.7	10.9	95.3
Cl-C	2.2	19.0	4535	15.20	22.80	7.60	10.00	22.33	7.00	63.1	55.3	52.0	69.5	47.6	7.7	82.4	0.2
Cl-T	4.9	1.2	378	1.00	0.90	0.54	4.40	0.82	78.22	8.9	10.2	7.6	6.1	7.5	7.6	6.7	4.5

ROSARIO sulfide

	wt	Assay %								Distribution %							
	%	Au g/t	Ag g/t	Pb	Zn	Cu	Fe	S	Insol	Au	Ag	Pb	Zn	Cu	Fe	S	Insol
F	100.0	0.8	248	10.06	7.72	1.52	3.14	6.08	65.45	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
RC	33.5	2.1	690	27.98	22.30	4.30	5.21	17.29	18.54	83.9	93.0	93.2	96.8	95.2	55.5	95.2	9.5
RT	66.5	0.2	26	1.03	0.37	0.11	2.10	0.44	89.08	16.1	7.0	6.8	3.2	4.8	44.5	4.8	90.5
Cl-C	25.5	2.4	804	34.00	27.00	5.20	5.40	20.66	4.56	74.2	82.5	86.2	89.2	87.5	43.8	86.6	1.8
Cl-T	8.0	1.0	326	8.80	7.30	1.45	4.60	6.53	63.12	9.7	10.5	7.0	7.6	7.7	11.7	8.6	7.7

Calculated result

	wt	Assay %								Distribution %							
	%	Au g/t	Ag g/t	Pb	Zn	Cu	Fe	S	Insol	Au	Ag	Pb	Zn	Cu	Fe	S	Insol
F	100.0	0.8	215	5.35	4.23	0.93	3.01	3.34	75.23	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
RC	20.3	2.9	861	24.01	19.75	4.01	5.39	15.57	25.12	78.7	81.5	91.2	94.9	87.6	36.4	94.6	6.8
RT	79.7	0.2	50	0.59	0.27	0.14	2.40	0.23	87.99	21.3	18.5	8.8	5.1	12.4	63.6	5.4	93.2
Cl-C	13.9	3.8	1100	32.49	26.71	5.42	5.78	20.79	4.77	69.4	71.1	84.2	87.6	80.6	26.6	86.2	0.9
Cl-T	6.4	1.1	346	5.81	4.81	1.01	4.57	4.34	68.84	9.3	10.4	7.0	7.3	7.0	9.8	8.4	5.9

F : Feed, Cl・C : Cleaner concentrate, Cl・T : Cleaner tailing, RC : Rougher concentrate, RT : Rougher tailing

Table 4.1.10 Metallurgical Result of Flotation test for mixed Ore

Mixed ore Oxide≒Sulfide = 1 : 1

	wt	Assay %								Distribution %							
	%	Au g/t	Ag g/t	Pb	Zn	Cu	Fe	S	Insol	Au	Ag	Pb	Zn	Cu	Fe	S	Insol
F	100.0	0.7	222	5.09	1.84	0.93	2.85	3.27	74.97	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Sul-C	14.9	3.4	1,165	29.30	10.00	5.00	5.80	19.88	8.04	69.6	78.3	85.7	81.1	80.0	30.0	90.7	1.6
Sul-C1T	4.4	0.9	316	5.20	2.60	1.18	4.80	3.02	72.14	5.4	6.3	4.5	6.2	5.6	7.4	4.1	4.2
OXD-C	1.0	1.4	555	10.00	3.00	1.71	5.60	3.67	63.60	1.9	2.5	2.1	1.6	1.8	2.0	1.1	0.8
OXD-C1T	8.0	0.3	117	1.50	0.65	0.39	3.60	0.60	81.90	3.3	4.2	2.4	2.8	3.4	10.1	1.5	8.7
T	71.7	0.2	27	0.38	0.21	0.12	2.00	0.12	88.40	19.8	8.7	5.3	8.2	9.2	50.2	2.6	84.7
Total-C	15.9	3.3	1,127	28.09	9.56	4.79	5.15	18.86	11.53	71.5	80.8	87.8	82.7	81.8	32.3	91.8	2.4

Table 4.1.11 Main Equipment for Beneficiation test

EQUIPMENT	NUMBER	STATUS
Ball mill (8″ x 8″)	2	good
(12″ x 8″)	1	good
Flotation machine (WEMCO)	2	One is out ot order
(DENVER)	1	Out of order
Ro-Tap sieve shaker	2	good
Filter press (12″ x13″)	2	good
(8″ x 9″)	1	good
pH meter	1	Out of order

Table 4.1.12 Beneficiation test at Barones

PROBLEM	OBJECT OF TEST	SAMPLE	CONTENT OF TEST
1. Metallurgical Result of Veta Linda ・Low recovery of Ag	1. Improvement of Metllur-gical result	Veta Linda	Cyanidation Test 1. Grinding time (partide size) 2. Agitation time 3. Addition of Pb $(NO_3)_2$ 4. Pulp heating
2. Dust in crushing plant, suspended solid in leaching solution	2. Desliming of curde ore by washing Influence of secondary slime on sedimentation	Don Jesus AMP. SN Miguel Asturiana Azteca Rayo Veta Linda Mexicapan	1. Washing and decantation of crude ore 2. Sedmentation test for cyanidation tatiling of curde ore with washing and without washing
3. Low Zn recovery of Sta. Marta ore	3. Study of low Zn recovery	Sta Marta	1. EPMA analysis of Zn flot. tailing in Japan
4. Treatmen of mixed ore	4. Improvement of the rate of operation and reduc-tion of operation cost	Calicanto Sulfide Oxide	Flotation + Cyanidation 1. Sulfide flotation 2. Oxide cyanidation 3. Mixed sample flotation+cyanidation
Shipping samples to Japan	Differencial flotation	Sn Bernabé	Execution of differencial flotation test in Japan

Table 4.1.13 Assay of crude Ore

MINE	Assay(g/t, %)					
	Au	Ag	Cu	Pb	Zn	Fe
1. DON JESUS	0.60	191	–	0.16	0.26	3.27
2. AMP. Sn MIGUEL	0.55	226	–	0.11	0.11	3.27
3. ASTURIANA	0.50	126	–	0.16	0.25	3.86
4. AZTECA	0.50	121	0.05	0.15	0.20	5.35
5. RAYO	0.55	151	0.05	0.33	0.44	4.17
6. CALICANTO SULFIDE	1.40	208	–	0.60	1.05	8.30
7. CALICANTO OXIDE	1.30	130	0.05	0.40	0.40	7.10
8. VETA LINDA OXIDE	0.55	169	0.05	0.25	0.35	4.00
9. VETA LINDA SULFIDE	0.58	207	–	0.13	0.14	3.58
10. MEXICAPAN	0.67	168	0.05	0.55	0.42	6.78
11. STA. MARTA	0.60	186	0.10	0.10	2.80	5.40

Table 4.1.14 Effect of Particle size on Au, Ag Dissolution

No.	Grinding time min.	−200 mesh %	Assay, g/t		Dissolution %	
			Au	Ag	Au	Ag
	Feed	−	0.55	170	−	−
1	8′	44	0.30	57	45.5	66.4
2	16′	80	0.28	59	49.1	65.3
3	40′	96	0.28	45	49.1	73.5

CN initial concentration	0.15%
CaO	12kg/t
Agitation time	48hrs
Dilution	3 : 1

Table 4.1.15 Effect of Agitation time on Au, Ag Dissotution

No.	Agitation time hrs.	Assay, g/t		Dissolution %	
		Au	Ag	Au	Ag
	Feed	0.55	170	−	−
4	24	0.30	61	45.5	64.1
1	48	0.30	57	45.5	66.4
5	72	0.25	40	52.8	76.4

CN initial concentration	0.15%
CaO	12kg/t
-200 mesh	43.8%
Dilution	3 : 1

Table 4.1.16 Effect of $Pb(NO_3)_2$ added

No.	$Pb(NO_3)_2$ g/t	Assay, g/t		Dissolution %	
		Au	Ag	Au	Ag
	Feed	0.55	170	—	—
1	0	0.30	57	45.5	66.4
6	200	0.25	45	54.5	73.4

CN initial concentration	0.15%
CaO	12kg/t
-200 mesh	43.8%
Agitation time	48hrs
Dilution	3 : 1

Table 4.1.17 Effect of hot pulp agitation

No.		Assay, g/t		Dissolution %	
		Au	Ag	Au	Ag
	Feed	0.55	169	—	—
7	25℃	0.25	35	54.5	79.3
8	35℃	0.25	37	54.5	78.4

CN initial concentration	0.15%
CaO	12kg/t
-200 mesh	53.6%
agitation time	48hrs
Dilution	3 : 1

Table 4.1.18 Result of Washig and Decantation test

SAMPLE		wt %	Assay g/t %					Distribution %				
			Au	Ag	Pb	Zn	Fe	Au	Ag	Pb	Zn	Fe
DON JESUS	FINE	9.7	0.6	253	0.30	0.35	5.8	9.7	12.9	17.7	13.1	17.2
	COASE	90.3	0.6	154	0.15	0.25	3.0	90.3	87.1	82.3	86.9	82.8
AMP. SN. MIGUEL	FINE	5.4	0.6	266	0.30	0.35	8.0	5.9	6.3	14.7	16.7	13.2
	COASE	94.6	0.55	224	0.10	0.10	3.0	94.1	93.7	85.3	83.3	86.8
ASTURIANA	FINE	8.9	0.50	106	0.20	0.25	4.5	9.0	7.5	11.6	8.8	10.4
	COASE	91.1	0.50	128	0.15	0.25	3.8	91.0	92.5	88.4	91.2	89.6
AZTECA	FINE	8.3	0.55	141	0.20	0.20	7.1	9.1	9.7	10.8	8.3	11.0
	COASE	91.7	0.50	119	0.15	0.20	5.2	90.9	90.3	89.2	91.7	89.0
RAYO	FINE	11.1	0.50	114	0.20	0.35	5.5	10.3	8.4	6.6	8.9	14.7
	COASE	88.9	0.55	155	0.35	0.45	4.0	89.7	91.6	93.4	91.1	85.3
VETA LINDA OXIDO	FINE	14.4	0.50	136	0.30	0.30	4.1	12.3	9.4	33.3	5.2	16.5
	COASE	85.6	0.60	220	0.10	0.15	3.5	87.7	90.6	66.7	94.8	83.5
MEXICAPAN	FINE	16.3	0.50	57	0.80	0.50	10.6	12.3	5.6	23.7	19.7	25.6
	COASE	83.7	0.70	189	0.50	0.40	6.0	87.7	94.4	76.3	80.3	74.4

Table 4.1.19 Metallurgical Results of Beneficiation tests for each Ore

CALICANTO Sulfide

	wt	Assay %					Distribution %				
	%	Au g/t	Ag g/t	Pb	Zn	Fe	Au	Ag	Pb	Zn	Fe
F	100.0	1.4	223	0.54	0.75	7.3	100.0	100.0	100.0	100.0	100.0
Cl・C	9.8	8.0	1,600	4.40	5.50	25.0	58.0	70.4	80.0	71.6	33.7
Cl・T	14.2	1.2	220	0.20	0.40	11.9	12.6	14.0	5.2	7.6	23.2
SVC	4.6	0.9	120	0.20	0.30	10.8	3.0	2.5	1.7	1.8	6.8
SVT	71.4	0.5	41	0.10	0.20	3.7	26.4	13.1	13.1	19.0	36.3

CALICANTO oxide

	wt	Assay g/t		Distribution %	
	%	Au	Ag	Au	Ag
F	100.0	1.2	229	100.0	100.0
Disol.	-	-	-	100.0	81.2
CNT	100.0	Tr	43	0	18.8

Calculated result

	wt	Assay %					Distribution %				
	%	Au g/t	Ag g/t	Pb	Zn	Fe	Au	Ag	Pb	Zn	Fe
F	100.0	1.3	225	0.27	0.38	3.6	100.0	100.0	100.0	100.0	100.0
Cl・C	4.9	8.0	1,600	4.40	5.50	25.0	30.7	34.7	80.0	71.6	33.7
Cl・T	7.1	1.2	220	0.20	0.40	11.9	6.7	6.9	5.2	7.6	23.2
SVC	2.3	0.9	120	0.20	0.30	10.8	1.6	1.2	1.7	1.8	6.8
SVT	35.7	0.5	41	0.10	0.20	3.7	14.0	6.5	13.1	19.0	36.3
Disol	-	-	-	-	-	-	47.0	41.2	-	-	-
CNT	50.0	Tr	43	-	-	-	-	9.5	-	-	-
Total recovery %							77.7	75.9			

Table 4.1.20 Metallurgical Results Beneficiation tests for mixed Ore

Mixed ore Sulfide : oxide = 5 : 5

	wt	Assay %					Distribution %				
	%	Au g/t	Ag g/t	Pb	Zn	Fe	Au	Ag	Pb	Zn	Fe
F	100.0	1.9	205	0.40	0.51	8.3	100.0	100.0	100.0	100.0	100.0
Cl・C	7.2	17.0	1,741	3.40	4.20	36.0	66.0	61.2	61.7	59.2	31.2
Cl・T	8.2	1.5	276	0.41	0.48	9.8	6.6	11.1	8.6	7.7	9.7
RT	84.6	0.6	67	0.14	0.20	5.8	27.4	27.7	29.7	33.1	59.1
Disol.	-		-				18.2	19.8			
CNT	84.6	0.2	19	-			9.2	7.9			
Total recovery %							84.2	81.0			

Mixed ore Sulfide : Oxide = 3 : 7

	wt	Assay %					Distribution %				
	%	Au g/t	Ag g/t	Pb	Zn	Fe	Au	Ag	Pb	Zn	Fe
F	100.0	1.2	208	0.36	0.43	8.4	100.0	100.0	100.0	100.0	100.0
Cl・C	5.6	13.8	2,130	3.40	4.00	34.5	65.9	57.4	53.1	52.5	23.0
Cl・T	7.6	0.7	242	0.38	0.38	9.8	4.5	8.8	8.1	6.8	8.9
RT	86.8	0.4	81	0.16	0.20	6.6	29.6	33.8	38.8	40.7	68.1
Disol.	-						14.8	22.1			
CNT	86.8	Tr	28				14.8	11.7			
Total recovery %							80.7	79.5			

Table 4.1.21 Sampling data of Cyanidation Plant (Salvador Iugo Ore)

S A M P L E	SOLID / LIQUID	pH	P.D.	NaCN g/m³	Cal g/m³	assay, g/t, % Au	Ag	Pb	Zn	Fe
BALL MILL FEED	SOLID					0.55	182			
CYCLONES O.F.	SOLID	12.7	27	0.105	0.125	0.50	133	0.13	0.30	6.20
	LIQUID						50	0.0	0.0	13.0
THIKENER O.F.	LIQUID	12.9		0.115	0.123		45	0.0		14.0
THIKENER SPIGOT	SOLID	12.8	43	0.109	0.125	0.55	137	0.22	0.25	6.10
	LIQUID						49	0.0		13.0
AGITATOR TANK #1	SOLID	12.9	43.5	0.95	0.085	0.40	91	0.22	0.25	7.2
PULP	LIQUID						49	0.0		13.0
AGITATOR TANK #2	SOLID	12.9		0.108	0.085		81	0.15	0.33	4.3
PULP	LIQUID						56	0.0		15.0
AGITATOR TANK #3	SOLID	12.8		0.102	0.078	0.40	76	0.22	0.30	5.7
PULP	LIQUID						56	0.0		16.0
AGITATOR TANK #4	SOLID	12.6		0.107	0.066	0.50	106	0.22	0.25	5.0
PULP	LIQUID						56	0.0		15.0
AGITATOR TANK #5	SOLID / LIQUID			OUT OF ORDER						
AGITATOR TANK #6	SOLID	12.6		0.123	0.060	0.40	73	0.23	0.25	6.20
	LIQUID						62	0.0		15.0
AGITATOR TANK #7	SOLID			0.130	0.057	0.30	72	0.24	0.35	5.40
	LIQUID						66	0.0		15.0
AGITATOR TANK #8	SOLID			0.108	0.054	0.40	70	0.22	0.30	4.60
	LIQUID						62	0.0		16.0
AGITATOR TANK #9	SOLID	11.5	38	0.098	0.054	0.55	70			
	LIQUID									
C.C. TANK #1 O.F.	LIQUID	11.8		0.095	0.039		47	0.0		18.0
C.C. TANK #1 SPIGOT	SOLID		44	0.084	0.025	0.25	49	0.22	0.25	5.80
	LIQUID						47	0.0		19.0
C.C. TANK #3 O.F.	LIQUID	11.73		0.086	0.035		28	0.0		17.0
C.C. TANK #3 SPIGOT	SOLID		43.5	0.075	0.023					
	LIQUID						34	0.0		20.00
C.C. TANK #4 O.F.	LIQUID	11.63		0.078	0.024		14	0.0		17.0
C.C. TANK #4 SPIGOT	SOLID		43	0.065	0.023	0.25	50	0.24	0.30	6.10
	LIQUID						15	0.0		19.0
C.C. TANK #5 O.F.	LIQUID	11.24		0.052	0.015		7	0.0		16.0
C.C. TANK #5 SPIGOT	SOLID		47	0.051	0.024	0.40	75	0.22	0.25	6.20
	LIQUID						8	0.0		17.0
BARREN SOLUTION	LIQUID	12.13		0.110	0.045		3.0	0.0		18.0
SEMI PREGNANT SOLUTION	LIQUID	12.11		0.110	0.050		49	0.0		21.0

Table 4.2.1 Complete Analysis

	Sample	Au (ppm)	Ag (ppm)	Cu (%)	Hg (ppm)	As (%)	Cd (%)	Pb (%)	Zn (%)	Bi (%)	Al2O3 (%)	Sb (%)	MnO (%)	S (%)	Fe (%)	F (%)	CaO (%)
PARRAL	1. LA FORTUNA	0.8	1,168	0.11	0.6	1.43	0.017	1.15	2.37	<0.001	1.18	0.270	2.62	6.01	7.42	0.34	8.40
	2. UNFICACION CORDERO	1.6	1,630	0.11	3.2	0.352	0.055	31.07	7.96	0.004	0.93	0.118	0.49	21.92	11.67	0.31	4.95
	3. REVANCHA	0.1	145	0.02	0.2	0.042	0.004	0.04	0.26	<0.001	13.94	0.009	0.46	0.58	4.61	0.30	5.30
	4. LA ESPERANZA	0.8	331	0.15	5.0	0.141	0.091	17.42	16.40	<0.001	1.39	0.030	0.21	12.50	5.65	2.74	6.82
	5. LA PRESA	1.3	92	0.09	0.8	0.049	0.051	7.11	12.26	<0.001	0.24	0.010	0.24	13.12	3.13	15.51	37.73
	6. TILITA	7.5	530	0.20	0.2	1.51	0.003	6.38	1.63	<0.001	0.51	0.119	0.09	7.41	4.86	1.18	2.31
CUANCVI	1. BARRADON	0.3	105	0.12	1.0	0.005	0.002	0.35	0.40	<0.001	4.86	0.009	0.96	0.30	2.06	0.02	0.90
	2. SAN JOSES CHICO	8.5	921	0.58	6.8	0.012	0.122	7.72	18.28	<0.001	2.55	0.010	0.25	11.53	4.08	0.07	0.19
	3. CAPUZAYA	0.2	126	0.13	1.2	0.003	0.003	0.41	0.40	<0.001	4.27	0.012	1.04	0.36	1.83	0.02	0.83
	4. AMPLE DEL ALTO DEL NUEVO PORVEIR	0.7	1,425	0.07	2.2	0.016	0.001	0.15	0.24	<0.001	12.91	0.019	0.17	3.14	3.52	0.03	0.71
	5. SAN RAFAEL	3.4	300	0.13	0.6	0.010	0.002	0.58	0.33	<0.001	5.95	0.007	1.52	2.81	4.13	0.21	0.60
	6. NOCHE BUENA	0.8	216	0.12	0.6	0.013	0.003	0.41	0.63	<0.001	6.25	0.010	1.21	2.36	3.51	0.11	0.75
BARONES	1. AMPL SAN MIGUEL	3.0	138	0.02	2.4	0.027	0.005	0.34	0.99	<0.001	1.09	0.007	0.13	5.74	5.37	0.01	1.15
	2. LAS COMBERES	1.6	105	0.06	0.6	0.031	0.078	16.16	17.02	<0.001	1.29	0.008	0.22	15.56	7.86	0.01	0.87
	3. CALICANTO	2.7	37	0.09	1.8	0.062	0.009	0.90	1.03	<0.001	1.45	0.003	0.47	14.27	12.66	0.04	5.38
	4. CALIFORNIA	0.3	167	0.01	0.2	0.009	<0.001	0.18	0.16	<0.001	0.77	0.005	0.07	0.28	6.35	0.17	0.46
	5. SAN ROBERTO	20.4	33	0.19	0.6	0.039	0.117	0.48	16.11	0.001	1.06	0.004	0.34	11.96	8.97	0.02	0.26
	6. SAN BERNABE	1.4	512	0.05	1.2	0.019	0.016	1.24	2.13	<0.001	4.26	0.007	0.10	10.87	8.91	0.01	0.17

Tabe 4.2.2 a Analytical result by X-ray powder Method

	Mine	Mineral
Parral	La Fortuna	Galena Sphalerite Pyrite Calcite Quartz
	Unificacion Cordero	Galena Sphalerite Pyrite Calcite Quartz
	Revancha	Orthoclase Pyrite Calcite Monmorillonite Quartz
	La Esperanza	Fluorite Galena Sphalerite Pyrite Quartz Calcite

Table 4.2.2 a) Analytical Result by X-ray Powder Method

	Mine	Mineral
Parral	La Presa	Galena Sphalerite Pyrite Fluorite Quartz Calcite
	Tilita	Galena Sphalerite Pyrite Arsenopyrite Fluorite Quartz Calcite
Guanacevi	Barradon	Quartz Chlorite Fluorite
	San Joses Chico	Galena Sphalerite Pyrite Chalcopyrite Quartz Chlorite

Table 4.2.2 a) Analytical Result by X-ray Powder Method

	Mine	Mineral
Guanacevi	Capuzaya	Orthoclase Chlorite Sericite Quartz
	Ample del Alto der Nuevo Porvenir	Pyrite Orthoclase Sericite Quartz
	San Rafael	Pyrite Orthoclase Chlorite (Kaolinite) Quartz
	Noche Buena	Quartz Orthoclase Chlorite Pyrite
Barones	Ample. San Miguel	Pyrite Ankerite Quartz

Table 4.2.2 a) Analytical Result by X-ray Powder Method

	Mine	Mineral
Barones	Las Cumbres	Galena Sphalerite Pyrite Quartz
	Calicanto	Pyrite Galena Calcite Montmorillonite Quartz
	California	Hematite Pyrite Fluorite Quartz
	San Robert	Sphalerite Pyrite Galena Quartz Kaolinite
	San Bernabe	Galena Sphalerite Pyrite

Table 4.2.2 a) Analytical Result by X-ray Powder Method

	Mine	Mineral
Barones	San Bernabe	Quartz

Table 4.2.2 b) Analytical Result by X-ray Powder Method (Refernce)

Mineral	Chemical Composition	Note
Ankerite	$Ca(Fe,Mg,Mn)(CO_3)_2$	Hardness: 3.5-4 Sp.gr.: 2.95-3.1 Trigonal, Fe>Mg
Arsenopyrite	FeAsS	Hardness: 5.5-6 Sp.gr.: 5.9-6.2 Orthorhombic, soluble in HNO_3 generating NO_2 gas
Calcite	$CaCO_3$	Hardness: 3 Sp.gr.: 2.71 Trigonal Streak: white - gray, crystallizes in columnar, plate, rhombohedron or nodule shapes
Chalcopyrite	$CuFeS_2$	Hardness: 3.5-4 Sp.gr.: 4.1-4.3 Tetragonal Streak: black, usually tetrahedron, frequently massive and compact
Chlorite	$(Mg,Fe^{2},Al)_{12}SiAl_8O_{18}(OH)_{16}$	Hardness: 2-3 Sp.gr.: 2.6-3.3 Monoclinic formed through hydrothermal alteration
Fluorite	CaF_2	Hardness: 4 Sp.gr.: 3.18 Isometric Cleavage: complete, fluorescent
Galena	PbS	Hardness: 2.5-3 Sp.gr.: 7.4-7.5 Isometric Streak: lead gray, cleavable mass ore column
Hematite	Fe_2O_3	Hardness: 5-6 Sp.gr.: 5.26 Streak: red, trigonal, plate or soil-like form
Kaolinite	$Al_2Si_2O_5(OH)_4$	White powder, hardness: 2-2.5 Sp.gr.: 2.61, formed through hydrothermal alteration
Montmorillonite	$(CaNa)xAl_2(SiyAlx)O_{10}(OH)_2$	Powder, ion exchangeable, extremely swelling, formed through weathering or hydrothermal alteration
Orthoclase	$KAlSi_3O_8$	Hardness: 6-6.5 Sp.gr.: 2.56 Single crystal Cleavage: complete and good

Table 4.2.2 b) Analytical Result by X-ray Powder Method (Refernce)

Mineral	Chemical Composition	Note
Pyrite	FeS_2	Hardness: 6-6.5 Sp.gr.: 4.95-5.10 Isometric Streak: black, crystallizes in hexahedron, octahedron or pentagon dodecahedron forms
Quartz	SiO_2	Hardness: 7 Sp.gr.: 2.65 Hexagonal, semitransparent white mass, characterized by shell-like fracture
Sericite	$K_2Al_4(Si_6Al_2)O_{20}(OH,F)_4$	Phyllosilicate, frequently produced in hexagonal plate form, formed through hydrothermal alteration
Sphalerite	ZnS	Hardness: 3.5-4 Sp.gr.: 3.9-4.1 Isometric Streak: brown- to yellow-tinged, completely cleaves into rhombodedecahedron shape

Table 4.2.3

Microscopic observation I

	Mine	Mineral
Parral	La Fortuna	Galena(Pbs), Sphalerite(ZnS), Pyrite(FeS_2)
	Unficacion cordero	Galena, Sphalerite, Pyrite
	Revancha	Galena, Sphalerite,
	La Esperanza	Chalcopyrite($CuFeS_2$), Galena, Sphalerite, Pyrite
	La presa	Sphalerite, Pyrite
	Tilita	Chalcopyrite, Sphalerite, Pyrite
Guanacevi	Barradon	Chalcopyrite, Sphalerite, Marcasite (FeS_2)
	San Joses Chico	Galena, Sphalerite, Pyrite
	Capuzaya	Chalcopyrite, Tetrahedrite ($(Cu, Ag)_{10}(Fe, Zn)_2(As, Sb)_4 S_{13}$) Sphalerite, Pyrite, Marcasite
	Ample del Alto del Nvevo Porvenir	Sphalerite, Pyrite,
	San Rafael	Marcasite, Galena, Sphalerite, Pyrite
	Noche Bvena	Chalcopyrite, Sphalerite, Pyrite
Barones	Ampl. San Miguel	Sphalerite, Pyrite,
	Las Cumbres	Galena, Sphalerite, Pyrite
	Calicanto	Chalcopyrite, Galena, Pyrite
	California	Tetrahedrite
	San Roberto	Chalcopyrite, Galena, Sphalerite, Pyrite
	San bernabe	Chalcopyrite, Sphalerite, Pyrite

Table 4.2.4

Results of E.P.M.A. observation

	Mine	Mineral
Parral	La Fortuna	Ag-Tetrahedrite($(Cu,Ag)_{10}(Fe_2,Zn)_2(As,Sb)_4S_{13}$) Arsenopyrite(Fe, As, S) Stromeyerite, (Cu, AgS)
	Unficacion cordero	Galena(PbS), Ag-Te-(Sb) Manganocalcite($(Ca,Mn)\ CO_3$)
	Revancha	Ag-Tetrahedrite, Arsenopyrite
	La Esperanza	Ag-Tetrahedrite, Arsenopyrite Cupriangold(Au-Cu)
	La presa	Ag-Tetrahedrite, Chalcopyrite ($CuFeS_2$)
	Tilita	Ag-Tetrahedrite, Galena
Guanaceve	Barradon	Argentite(Ag_2S)
	San Joses Chico	Electrum(Au, Ag), Argentite, Stromeyerite, Chalcopyrite, Galena, Hematite(Fe_2O_3)
	Capuzaya	Ag-Tetrahedrite,
	Ample del Alto Nvevo Porvenir	Polybasite-Antimon pearceite(8(Ag, Cu_2 .)S • (SbAS)
	San Rafael	Electrum
	Noche Bvena	Ag-Tetrahedrite,
Barones	Ampl San Miguel	Polybasite or Antimonpearceite. Argentite Sphalerite
	Las Cumbres	Polybasite-Antimonpearceite, Electrum Argentite, Pyrite (FeS_2)
	Calicanto	Ag-Tetrahedrite, Chaloopyrite
	California	Argentite
	San Roberto	Matildite(Ag Bi S_2), Electrum Shalerite
	San bernabe	Stromeyerite, Galena, Sphalerite, Pyrite

Table 4.2.5

Microscopia observation II

Plant	Sample	Mineral
Parral	Casale ——flotation tailing	Pyrite(FeS_2)
	Casale ——cyanidation tailing	Pyrite
Guanaceve	La Prieta ——bacterial leaching feed	Tetrahedrite($(Cu, Ag)_{10}(Fe, Zn)_2(As, Sb)_4S_{13}$)
Barones	Santa Marta ——Zn flotation tailing	Pyrite

Table 4.2.6 Result of Liquid Analysis (mg/l)

		Au	Ag	Cu	Pb	Zn	Mn	Fe^{++}	Fe	As
E-6-1	1 hr	< 0.01	< 0.2	0.25	0.55	1.76	6.28	< 0.02	3.06	< 0.01
	5 days	< 0.01	< 0.2	18.5	2.02	541	969	< 0.01	170	0.33
	10	< 0.01	< 0.2	10.1	0.46	654	1,010	0.01	91.5	0.17
	15	< 0.01	< 0.2	21.2	0.37	768	862	0.01	50.2	0.07
Na CN	24 hrs	0.01	0.2	0.42	0.76	2.38	0.1	0.02	1.68	< 0.01
	48	0.01	< 0.2	0.06	0.19	0.72	0.1	0.02	0.84	< 0.01
E-6-2	1 hr	< 0.01	< 0.2	0.16	0.18	5.99	237	0.07	1.58	< 0.01
	5 days	< 0.01	< 0.2	0.14	0.18	76.3	252	0.02	1.67	< 0.01
	10	< 0.01	< 0.2	1.25	0.09	286	524	0.03	0.28	< 0.01
	15	< 0.01	< 0.2	10.4	0.28	517	1,510	0.01	12.0	< 0.01
$CS(NH_2)_2$	24 hrs	< 0.01	5.12	7.50	3.04	868	18,300	0.01	7.42	0.02
	48	0.01	4.19	477	114	398	18,800	0.03	1.61	0.02
B-12-1	1 hr	< 0.01	< 0.2	0.20	0.18	6.18	31.0	0.03	1.88	< 0.01
	5 days	< 0.01	< 0.2	0.48	0.18	66.7	74.9	0.03	1.11	< 0.01
	10	< 0.01	< 0.2	0.13	0.28	40.3	46.5	0.04	0.77	< 0.01
	15	< 0.01	< 0.2	0.11	0.73	4.03	0.28	0.01	1.74	< 0.01
Na CN	24 hrs	0.02	9.09	0.54	0.76	3.18	18.5	0.02	1.68	0.03
	48	0.05	0.76	0.12	0.66	0.92	56.0	0.02	0.60	< 0.01
B-12-2	1 hr	< 0.01	< 0.2	0.20	0.37	4.37	7.79	0.02	1.06	< 0.01
	5 days	< 0.01	< 0.2	0.17	0.37	15.6	6.94	0.02	0.68	< 0.01
	10	< 0.01	< 0.2	0.34	0.37	117	69	0.02	0.97	< 0.01
	15	< 0.01	< 0.2	0.93	0.37	200	157	0.04	1.26	< 0.01
$CS(NH_2)_2$	24 hrs	< 0.01	15.5	4.64	1.90	4.200	18,000	0.02	5.98	0.02
	48	0.01	4.78	4.86	1.14	430	19,800	0.1	1.97	< 0.01

Table 4.2.7 Result of Liquid Analysis (mg/l)

		Au	Ag	Cu	Pb	Zn	Mn	Fe^{++}	Fe	As
$Fe_2(SO_4)_3$	1 hr	0.01	0.31	8.80	0.47	821	578	0.01	19,500	2.96
	24	0.01	0.10	13.62	0.75	689	764	0.01	17,000	3.46
H_2SO_4	1 hr	0.01	0.12	12.3	0.1	371	394	0.01	327	0.18
	24	0.01	0.07	8.84	0.1	394	835	0.01	50.3	0.01
Na CN	24 hrs	0.06	37.0	0.06	0.1	1.28	0.99	0.01	0.60	0.01
	48	0.07	18.2	0.12	0.1	1.03	0.44	0.01	0.37	0.01
$CS(NH_2)_2$	24 hrs	0.02	3.63	2.65	0.1	33.0	4,920	0.48	1.51	0.01
	48	0.02	2.76	2.29	0.37	19.8	3,390	0.11	0.39	0.01

Table 4.2.8 Result of Sand Analysis

		Au	Ag	Cu	Pb	Zn	Mn	Fe	S	As
		(g/ton)	(g/ton)	%	%	%	%	%	%	%
B-6-1	5 days	0.2	342	0.03	0.17	0.48	6.52	4.19	9.31	0.015
	10	0.2	346	0.03	0.18	0.47	5.98	4.60	9.37	0.008
	15	0.2	277	0.02	0.18	0.55	3.90	3.02	9.50	0.009
Na CN	24 hrs	0.1	346	0.03	0.21	0.56	6.38	4.61	9.01	0.009
	48	0.1	344	0.02	0.15	0.55	5.35	5.43	10.12	0.007
B-6-2	5 days	0.2	334	0.03	0.17	0.59	6.48	4.67	9.36	0.015
	10	0.2	367	0.03	0.19	0.61	6.42	4.75	7.97	0.008
	15	0.2	323	0.03	0.18	0.58	3.72	3.32	7.50	0.009
$CS(NH_2)_2$	24 hrs	0.1	403	0.03	0.21	0.26	1.08	5.62	10.59	0.008
	48	0.1	367	0.02	0.17	0.36	1.34	5.53	10.41	0.007
B-12-1	5 days	0.2	261	0.02	0.12	0.51	5.34	4.59	12.26	0.01
	10	0.2	270	0.02	0.12	0.49	4.70	5.15	13.01	0.006
	15	0.3	388	0.03	0.18	0.74	4.06	3.48	9.45	0.009
Na CN	24 hrs	0.1	375	0.03	0.20	0.58	6.59	3.67	8.99	0.008
	48	0.1	367	0.03	0.16	0.72	5.50	3.85	9.17	0.007
B-12-2	5 days	0.2	323	0.03	0.15	0.61	6.48	4.67	10.16	0.014
	10	0.2	332	0.03	0.15	0.55	5.90	4.81	9.77	0.006
	15	0.2	312	0.03	0.14	0.64	4.00	3.37	10.08	0.008
$CS(NH_2)_2$	24 hrs	0.1	378	0.03	0.21	0.33	1.46	4.61	10.28	0.006
	48	0.2	364	0.03	0.17	0.46	1.81	5.43	10.52	0.008

Table 4.2.9 Result of Sand Analysis

		Au	Ag	Cu	Pb	Zn	Mn	Fe	As
$Fe_2(SO_4)_3$	1 hr	0.2	388	0.03	0.21	0.91	7.17	5.30	0.018
	24	0.1	377	0.03	0.20	0.71	6.01	5.30	0.105
H_2SO_4	1 hr	0.2	409	0.03	0.22	0.89	7.10	5.48	0.018
	24	0.2	382	0.03	0.20	0.80	6.40	5.48	0.017
Na CN	24 hr	0.1	305	0.03	0.21	0.86	7.30	5.66	0.019
	48 rs	0.1	358	0.04	0.20	0.95	3.91	4.70	
$CS(NH_2)_2$	24 hrs	0.1	419	0.04	0.23	0.89	6.27	5.48	0.020
	48	0.1	382	0.03	0.22	0.79	2.91	5.00	

Table 4.2.10 Extraction Rate of Metals

		Mn	Au	Ag
E-6-1	5 days	3.4	—	—
	10	3.8	—	—
	15	4.9	—	—
Na CN	24 hrs	0	18.9	0.1
	48	0	18.9	0.1
E-6-2	5 days	0.9	—	—
	10	1.9	—	—
	15	8.7	—	—
$CS(NH_2)_2$	24	79.8	0	2.9
	48	76.6	18.9	2.6
B-12-1	5 days	0.3	—	—
	10	0.2	—	—
	15	0	—	—
Na CN	24 hrs	0.1	31.8	5.4
	48	0	53.8	0.5
B-12-2	5 days	0	—	—
	10	0.3	—	—
	15	0.9	—	—
$CS(NH_2)_2$	24 hrs	74.2	0	8.7
	48	71.9	10.4	3.0
$Fe_2(SO_4)_3$	48			
H_2SO_4	48			
Na CN	24	0	58.3	22.0
	48	0	61.5	10.5
$CS(NH_2)_2$	24	15.4	33.3	1.9
	48	21.4	33.3	1.5

Table 4.2.11 Metallurgical Results of Fundamental Flotation test on San Bernabe Ore

Test 1

PRODUCT	wt	Assay %						Distribution %					
	%	Au g/T	Ag g/T	Cu	Pb	Zn	Fe	Au	Ag	Cu	Pb	Zn	Fe
FEED	100.0	0.1	65.2	0.71	4.49	6.55	15.61	100.0	100.0	100.0	100.0	100.0	100.0
COMC. -1	22.1	0.2	213.0	2.70	17.31	2.32	34.51	33.0	72.2	84.4	85.1	7.8	48.9
COMC. -2	11.8	0.2	88.0	0.69	4.58	7.82	27.48	17.6	15.9	11.5	12.0	14.1	20.8
COMC. -3	5.7	0.1	30.0	0.19	1.09	11.15	13.87	4.3	2.6	1.5	1.4	9.7	5.1
Total	39.6	0.2	149.4	1.74	11.18	5.23	29.14	54.9	90.7	97.4	98.5	31.6	74.7
TAILING	60.4	0.1	10.0	0.03	0.11	7.41	6.54	45.1	9.3	2.6	1.5	68.4	25.3

Test 2

PRODUCT	wt	Assay %						Distribution %					
	%	Au g/T	Ag g/T	Cu	Pb	Zn	Fe	Au	Ag	Cu	Pb	Zn	Fe
FEED	100.0	0.1	63.8	0.71	4.04	0.72	14.77	100.0	100.0	100.0	100.0	100.0	100.0
COMC. -1	13.4	0.3	281.0	4.14	23.13	3.99	28.31	28.0	59.0	78.6	76.7	7.6	25.7
COMC. -2	8.3	0.3	135.0	1.22	9.26	8.11	18.81	17.4	17.6	14.4	19.0	9.6	10.6
COMC. -3	3.1	0.1	71.0	0.63	5.40	18.54	13.01	2.2	3.4	2.8	4.1	3.8	2.7
Total	24.8	0.3	205.9	2.72	16.27	5.94	23.22	47.6	80.0	95.7	99.8	21.0	39.0
TAILING	75.2	0.1	17.0	0.04	0.01	7.38	11.99	52.4	20.0	4.3	0.2	79.0	61.0

Test 3

PRODUCT	wt	Assay %						Distribution %					
	%	Au g/T	Ag g/T	Cu	Pb	Zn	Fe	Au	Ag	Cu	Pb	Zn	Fe
FEED	100.0	0.1	63.1	0.72	4.19	6.67	15.30	100.0	100.0	100.0	100.0	100.0	100.0
COMC. -1	16.0	0.2	257.0	3.57	21.62	2.86	27.24	22.2	65.2	78.9	82.6	6.9	28.5
COMC. -2	11.5	0.3	103.0	0.92	5.55	6.06	26.54	23.9	18.8	14.6	15.2	10.4	19.9
COMC. -3	5.2	0.2	39.0	0.25	1.18	19.17	15.43	7.2	3.2	1.8	1.5	7.1	5.2
Total	32.7	0.2	168.2	2.11	12.72	4.99	25.12	53.3	87.2	95.3	99.4	24.5	53.3
TAILING	67.3	0.1	12.0	0.05	0.04	7.49	10.53	46.7	12.8	4.7	0.6	75.5	46.3

Test 4

PRODUCT	wt	Assay %						Distribution %					
	%	Au g/T	Ag g/T	Cu	Pb	Zn	Fe	Au	Ag	Cu	Pb	Zn	Fe
FEED	100.0	0.2	62.3	0.67	3.74	6.77	15.07	100.0	100.0	100.0	100.0	100.0	100.0
COMC. -1	8.2	0.2	398.0	6.41	25.13	6.29	14.31	8.8	51.1	78.2	55.1	7.6	7.8
COMC. -2	8.5	0.1	134.0	1.10	13.26	8.77	16.81	4.6	18.3	13.9	30.1	11.0	9.5
COMC. -3	4.9	0.1	54.0	0.28	4.05	8.80	17.74	2.6	4.2	2.0	5.3	6.4	5.8
Total	21.6	0.1	212.3	2.93	15.68	7.84	16.07	16.0	73.6	94.2	90.6	25.0	23.0
TAILING	78.4	0.2	21.0	0.05	0.45	6.48	14.79	84.0	26.4	5.8	9.4	75.0	77.0

Table 4.2.12 Result of Differential Flotation test on San Bernabe Ore

PRODUCT	wt	Assay %						Distribution %					
	%	Au g/T	Ag g/T	Cu	Pb	Zn	Fe	Au	Ag	Cu	Pb	Zn	Fe
FEED	100.0	0.2	60.5	0.69	4.10	6.82	14.71	100.0	100.0	100.0	100.0	100.0	100.0
Pb RC	24.6	0.2	196.3	2.63	16.24	6.58	23.87	23.7	79.8	94.1	97.4	23.7	39.9
1 cl C	8.4	0.1	418.5	5.54	45.80	3.37	12.45	5.1	58.1	67.7	93.8	4.1	7.7
1 cl T	16.2	0.2	81.0	1.12	0.91	8.24	29.28	18.6	21.7	26.4	3.6	19.6	32.2
2 cl C	6.6	0.1	502.1	6.74	57.13	1.71	10.50	4.1	54.8	64.7	91.9	1.7	4.7
2 cl T	1.8	0.1	112.0	1.18	4.26	9.45	24.26	1.0	3.3	3.1	1.9	2.5	3.0
3 cl C	6.1	0.1	525.0	7.07	60.84	1.35	8.95	3.5	53.0	62.7	90.4	1.2	3.7
3 cl T	0.5	0.2	223.0	2.65	11.93	6.06	29.40	0.6	1.8	1.9	1.5	0.4	1.0
Pb RT	75.4	0.2	16.2	0.05	0.14	6.90	11.72	76.3	20.2	5.9	2.6	76.3	60.1
Pb Svt C	6.4	0.2	52.0	0.11	0.55	10.27	31.02	7.4	5.5	1.0	0.9	9.6	13.5
Pb Sv T	69.0	0.2	12.9	0.05	0.11	6.59	9.93	68.9	14.7	4.8	1.8	66.7	46.6
Zn RC	19.7	0.1	25.0	0.12	0.25	22.45	15.28	12.3	8.2	3.4	1.2	64.8	20.5
Zn RT	49.3	0.2	8.0	0.02	0.05	0.25	7.79	56.6	6.5	1.4	0.6	1.8	76.1
1 cl C	13.7	0.1	32.1	0.16	0.31	31.91	18.55	8.8	7.3	3.2	1.0	64.1	7.3
1 cl T	6.0	0.1	9.0	0.03	0.11	9.87	7.80	3.4	0.9	0.3	2	0.8	3.2
2 cl C	10.6	0.1	32.1	0.18	0.31	40.30	19.98	7.1	5.6	2.8	0.8	62.6	14.4
2 cl T	3.1	0.1	32.0	0.07	0.32	3.20	13.66	1.8	1.6	0.3	0.2	1.5	2.9
3 cl C1	6.9	0.1	27.0	0.20	0.30	47.30	16.14	4.0	3.1	2.0	.5	47.8	7.6
3 cl C2	2.0	0.1	36.0	0.20	0.37	44.20	17.88	1.1	1.2	0.6	0.2	13.0	2.4
3 cl T	1.7	0.2	48.0	0.10	0.25	7.30	38.05	2.0	1.3	0.2	0.1	1.8	4.4
3 cl C	8.9	0.1	29.0	0.20	0.32	46.60	16.53	5.1	4.3	2.6	0.7	60.8	10.0

Table 4.2.13 Expected Metallurgical Result on San Bernabe Ore

	wt	Assay %						Distribution %					
	%	Au g/T	Ag g/T	Cu	Pb	Zn	Fe	Au	Ag	Cu	Pb	Zn	Fe
FEED	100.0	0.2	60.5	0.69	4.10	6.82	14.71	100.0	100.0	100.0	100.0	100.0	100.0
Pb Conc.	6.6	0.1	502.1	6.74	57.13	1.71	10.50	4.1	54.8	64.7	91.9	1.7	4.7
Zn Conc.	13.1	0.1	61.0	1.01	0.97	46.60	16.73	7.1	13.2	19.1	3.1	89.6	14.9
Tailing.	80.3	0.2	24.1	0.14	0.26	0.74	14.73	88.8	32.0	16.2	5.0	8.7	80.4
Recovery								11.2	68.0	83.8	91.9	89.6	—

Table 5.2.1.a Evaluation of the mines based on ore reserved Parral

Parral

Mine			LA REVANCHA	LA PRESA	LA ESPERANZA	TILITA	UNIF.CORDERO
Ore Value	Head Grade (g/t, %)	Au				0.90	
		Ag	374	120	100	519	304
		Pb		4.36	4.00		6.50
		Zn		3.88	5.00		4.30
	Mill Recovery (%)	Au				60	
		Ag	60	65	65	80	65
		Pb		50	35		50
		Zn		55	55		55
	Smelter Recovery (%)	Au	92	92	92	92	92
		Ag	89	89	89	89	89
		Pb	81	81	81	81	81
		Zn	76	76	76	76	76
	Recoverable Metals Value (Peso/t)	Au	0	0	0	15,972	0
		Ag	83,473	29,015	24,179	154,448	73,504
		Pb	0	30,902	19,845	0	46,069
		Zn	0	56,764	73,150	0	62,909
	Total (Peso/t)		83,473	116,681	117,174	170,420	182,482
Operating Cost (Peso/t)	Mining		33,500	37,600	39,400	35,000	82,200
	Milling		31,902	31,902	31,902	31,902	31,902
	Smelter Charges		8,347	23,336	23,435	17,042	36,496
	Total		73,749	92,838	94,737	83,944	150,598
Operating	Cash Flow (Peso/t)		9,724	23,843	22,437	86,476	31,883

Metal Prices	
Au (US$/oz)	400
Ag (US$/oz)	5.2
Pb (US$/t)	700
Zn (US$/t)	1400
g/oz	31.1035
Peso/US$	2500

Table 5.2.1.b Evaluation of the mines based on ore reserved Guaracevi

Guanacevi

Mine			S.JOSE CHICO	BARRADON	CAPUZAYA	SAN RAFAEL	A.PORVENIR	NOCHE BUENA
Ore Value	Head Grade (g/t, %)	Au	2.50	1.55	0.48	4.10	0.63	0.30
		Ag	260	183	205	396	579	160
		Pb						
		Zn						
	Mill Recovery (%)	Au	80	75	60	80	70	80
		Ag	80	70	60	80	60	80
		Pb						
		Zn						
	Smelter Recovery (%)	Au	92	92	92	92	92	92
		Ag	89	89	89	89	89	89
		Pb	81	81	81	81	81	81
		Zn	76	76	76	76	76	76
	Recoverable Metals Value (Peso/t)	Au	59,157	34,385	8,519	97,018	13,044	7,099
		Ag	77,373	47,651	45,754	117,844	129,227	47,614
		Pb	0	0	0	0	0	0
		Zn	0	0	0	0	0	0
	Total (Peso/t)		136,530	82,036	54,273	214,863	142,271	54,713
Operating Cost (Peso/t)	Mining		78,300	36,400	49,300	45,300	45,300	36,900
	Milling		30,000	30,000	30,000	30,000	30,000	30,000
	Smelter Charges		13,653	8,204	5,427	21,486	14,227	5,471
	Total		121,953	74,604	84,727	96,786	89,527	72,371
Operating Cash Flow (Peso/t)			14,577	7,433	-30,455	118,076	52,744	-17,658

Metal Prices	
Au (US$/oz)	400
Ag (US$/oz)	5.2
Pb (US$/t)	700
Zn (US$/t)	1400
g/oz	31.1035
Peso/US$	2500

Table 5.2.1.c Evaluation of the mines based on ore reserved Barones

Barones

Mine			SAN ROBERTO	SAN BERNABE	LAS CUMBRES	CALICANTO	A.S.MIGUEL	CALIFORNIA
Ore Value	Head Grade (g/t, %)	Au	0.50	0.56	0.45	1.10	0.70	0.58
		Ag	109	170	185	175	303	300
		Pb	0.93	1.17	1.00	0.51		
		Zn	1.88	1.42	1.84			
		Cu	2.86					
	Mill Recovery (%)	Au	20	20	40	50	60	20
		Ag	60	60	60	60	70	55
		Pb	50	50	55	50		
		Zn	45	45	50			
		Cu	60					
	Smelter Recovery (%)	Au	92	92	92	92	92	92
		Ag	89	89	89	89	89	89
		Pb	81	81	81	81	81	81
		Zn	76	76	76	76	76	76
		Cu	90	90	90	90	90	90
	Recoverable Metals Value (Peso/t)	Au	2,958	3,313	5,324	16,268	12,423	3,431
		Ag	24,328	37,942	41,290	39,058	78,898	61,377
		Pb	6,591	8,292	7,796	3,615	0	0
		Zn	22,504	16,997	24,472	0	0	0
		Cu	81,081	0	0	0	0	0
	Total (Peso/t)		137,462	66,545	78,883	58,941	91,321	64,808
Operating Cost (Peso/t)	Mining		38,100	38,100	38,400	32,410	41,500	16,000
	Milling		16,500	16,500	16,500	20,375	16,500	16,500
	Smelter Charges		27,492	13,309	15,777	5,894	9,132	6,481
	Total		82,092	67,909	70,677	58,679	67,132	38,981
Operating Cash Flow (Peso/t)			55,369	-1,364	8,206	262	24,189	25,828

Metal Prices	
Au (US$/oz)	400
Ag (US$/oz)	5.2
Pb (US$/t)	700
Zn (US$/t)	1400
Cu (US$/t)	2100
g/oz	31.1035
Peso/US$	2500

Table 6.4.1 Schedule of anual maintenance

Section	Equip	Detail	Replacement of parts Cycle of ovethaul	Expected date of replacement of parts	N o t e
Crushing	Jaw Crusher Vibrating Screen	eccentric shaft toggle bearing unbalance Weight	'86.5 ～'88.5	'90.5	Need to replace
Grinding	No.1 Ball Mill	trunnion liner feed side discharge side scoop feeder			
Flotation	Blower	bearings			
Filtration	Disk Fiter	inside tubes			

Table 6.4.2 Schedule of anual maintenance

Machine Register No.				
Name :				
Date of Acquisition		Plice		
Production	Maker			
	Date		No.	
	Type		Material	
	Size		Weight	
Function				

Date	Contents of Repairment	expense

Table 6.4.3 Schedule of anual maintenance

Daily Report of Grinding Date . .			
Name :	1st.	2nd.	3rd.
Treatment t/h			
P.D. (%)			
No. 1 B.M.			
No. 2 B.M.			
Presure of Cyclone (p.s.i)			
No. 1			
No. 2			
Current (A)			
No. 1 B.M.			
Pump			
No. 2 B.M.			
Pump			
Statement			
No. 1 B.M.			
Pump			
No. 2 B.M.			
Pump			
Other equips Notes			

Table 6.4.4 Schedule of anual maintenance

Daily Report of Flotation

Date . .

Name	1st.	2nd.	3rd.
P.D.			
Zn RF			
Zn RT			
Zn Cl.T			
Reagent			
Zn R EX			
$CuSO_4$			
PH			
Temperature of Blower			
Notes			

Table 6.6.1 Example form of the copmarison between budget and results

Item			Budget (A)	Oct.	Nov.	Dec.	Jan.	Feb.	March	Total budget (C)	Total actual result (D)	Increase/ decrease (D)-(C)
Work quantity												
Personnel expenses	Salary	Number	3	3	3			3		6	6	
		Amount	942,000	989,921	969,019			979,470	27,019	1,884,000	1,958,940	74,940
	Sum		1,534,000	1,584,807	1,606,276			1,595,542	72,276	3,068,000	3,191,083	123,083
Labor related expenses			724,000	724,000	721,000			722,500	-3,000	1,448,000	1,445,000	-3,000
Commodity expense	Oils			25,620				12,810			25,620	25,620
	Metal product											
	Medicines				18,950			9,475	18,950		18,950	18,950
	Chemicals Rubber & leather goods			1,880	4,760			3,320	4,760		6,640	6,640
	Machines			24,560	21,000			22,680	21,000		45,360	45,360
	Tools											
	Misc. goods & others		150,000	29,750				14,875	-150,000	300,000	29,750	-270,250
	Total		150,000	54,320	238,874			390,597	88,874	300,000	781,194	481,196
Simple expenses	Repair cost payable		100,000						-100,000	200,000		-200,000
	Power rates payable											
	Freight rates payable											
	Contract expenses											
	Traveling and transportation expenses											

Table 6.6.1 Example form of the copmarison between budget and results

Item		Budget (A)	Oct.	Nov.	Dec.	Jan.	Feb.	March	Total budget (C)	Total actual result (D)	Increase/ decrease (D)-(C)
Simple expenses	Communication expenses										
	Rent										
	Expense accounts										
	Misc. expenses and others										
	Total	100,000	662,961				331.481	-100,000	200,000	662,961	462,961
Compound expenses	Power electricity expenses KWH										
	Amount										
	Electricity expenses KWH										
	Amount										
	Analysis expenses Number	192						-192	384		-384
	Amount	50,000						-50,000	100,000		-100,000
	Water expenses m^3										
	Amount										
	Total	50,000						-50,000	100,000		-100,000
Total expenses		150,000	662,961				331,481	-150,000	300,000	662,961	362,961
Depreciation expenses		456,000						-456,000	912,000		-912,000
Total		3,514,088	3,514,088	2,566,150			3,040,119	-447,850	6,028,000	6,080,238	52,238
Original unit price											

Table 7.1.1 Statement of Profits and Losses, Parral plant (Jan.1, 1988-Dec.31, 1988)

Unit: Peso

Sales	7,302,555,902 (85,241 peso/ton)
Sales costs	6,720,536,159
Sales profit	582,019,743
General administrative expenses	214,377,505
Selling expenses	159,915,032
Operating profit	207,727,206
Non-operating income	50,853,275
Non-operating expenses	2,905,860
Ordinary profit	255,647,621

Table 7.1.2 Total Revenues, Parral plant (Jan. 1, 1988-Dec. 31, 1988)

Unit: Peso

Lead concentrate	5,879,251,334	80.51%
Zinc concentrate	198,114,133	2.71%
Cyanided deposit	1,195,438,234	16.37%
High grade non-treatment ore	29,752,201	0.41%
Total	7,302,555,902	100%

Table 7.1.3 Total Costs of Revenues, Parral plant (Jan. 1, 1988-Dec. 31, 1988)

Unit: Peso

Sales costs	Treated ore prices		4,914,625,734	(57,367 peso/ton)	
	Operating cost	Direct costs	1,594,634,908	(28,614 peso/ton)	2 peso discrepancy
		Indirect costs	188,992,226		
		Depreciation expense	22,283,291		
		Subtotal	1,805,910,425	(21,080 peso/ton)	
	Total		6,720,536,159		

Treated ore volume : 85,670 t

Treated ore prices = Expense for purchasing treated ore + Expense for purchasing high grade non-treatment ore - Concentrate stock price
(Concentrate stock price = Term beginning stock concentrate + During-term purchased concentrate - Term-end stock concentrate)

Table 7.1.4 Detailed Operation Costs, Parroal plant (Jan. 1, 1988-Dec. 31, 1988)

Unit: Peso

	Personnel expenses	Material costs	Others	Cost of electric power	Cost of water	Total
Ore receiving	36,609,631 (509,071)	27,719,755 (14,911,767)	106,750	-	-	64,436,136 (15,420,838)
Crushing	51,412,396 (4,988,206)	18,071,198 (4,876,794)	-	28,450,695	- -	97,934,289 (9,875,000)
Grinding	33,616,848 (6,553,779)	149,790,245 (10,095,595)	1,682	112,565,794	-	295,974,569 (16,649,374)
Flotation	55,840,897 (6,812,818)	101,080,474 (1,584,060)	17,823	27,930,163	-	234,869,357 (8,396,878)
Cyanidation (Primary agitation and washing)	72,265,371 (16,151,140)	335,259,684 (48,172,339)	-	72,157,560	-	479,682,615 (64,323,479)
Cyanidation (Filtration and settlement)	31,396,555 (2,107,641)	28,031,021 (11,868,981)	426,280	21,441,103	-	81,294,959 (13,976,622)
Drying (Including can packing and shipment)	-	1,300,234	163,620	-	-	1,463,854
Cyanidation (Compr. air)	792,304 (785,560)	5,675,861 (4,656,865)	-	14,019,183	-	20,487,348 (5,472,425)
Sludge	2,135,628 (2,102,791)	8,850,535	100,171	13,606,856	-	24,693,190 (2,102,791)
Water supply	275,009 (273,105)	1,037,815	53,325	21,853,433	83,845	23,303,427 (273,105)
Stockyard	78,813,181 (1,287,336)	1,649,093	1,049,144	7,834,250	-	89,345,668 (1,287,336)
Electrical maintenance	15,626,311	401,503	3,225,960	2,350,274	-	21,604,048
Mechanical maintenance	33,857,942	801,362	6,173,107	20,451,157	-	61,283,568
Laboratory	66,042,551 (778,153)	23,139,527	8,564	9,071,236	-	98,261,878 (778,153)
Total	478,684,624 (42,359,600)	702,808,307 (96,166,401)	11,326,426 (25.19%)	401,731,704	83,845	1,594,634,906 (138,556,001)
	30%	8.85%	13.68%			8.69%

44.1%

( ) = Maintenance [included]

Treated ore volume: 85,670 t

Table 7.1.5 Statement of Profits and Loses, Parral plant (Jan. 1, 1989-Jun. 30, 1989)

Unit: peso

Sales	4,651,634,040 (120,932 peso/ton)
Sales costs	4,317,241,187
Sales profit	334,392,853
General administrative expenses	126,779,497
Selling expenses	17,368,638
Operating profit	190,244,718
Non-operating income	10,850,298
Non-operating expenses	-
Ordinary profit	201,095,016

Table 7.1.6 Total Revenues, Parral plant (Jan. 1, 1989-Jun. 30, 1989)

Unit: Peso

Consignment beneficiation fee	49,415,460	1.06%
Lead concentrate	3,463,028,355	74.45%
Zinc concentrate	94,917,507	2.04%
Cyanided deposit	1,044,272,718	22.45%
Total	4,651,634,040	100%

Table 7.1.7 Total Costs of Revenues, Parral plant(Jan. 1, 1989-Jun. 30, 1989)

Unit: Peso

Sales costs	Treated ore prices		3,329,330,442	(86,555 peso/ton)	
	Operating cost	Direct costs	903,856,783	(23,498 peso/ton)	1,950 peso discrepancy
		Indirect costs	67,850,750		
		Depreciation expense	16,203,212		
		Subtotal	987,910,745	(23,683 peso/ton)	
	Total		4,317,241,187		

Treated ore volume: 38,465 t

Table 7.1.8 Detailed Operation Costs, Parral plant (Jan. 1, 1989-Jun. 30, 1989)

Unit: Peso

	Personnel expenses	Material costs	Others	Cost of electric power	Cost of water	Total
Ore receiving	19,924,782	21,681,786	123,655,000	-	-	41,606,568
Crushing	28,744,451	11,104,984	31,609	17,811,990	-	57,693,034
Grinding	23,340,055	111,817,197	-	70,473,576	-	205,630,828
Flotation	33,515,709	65,745,414	28,197	48,789,365	-	148,078,685
Cyanidation (Primary agitation and washing)	37,694,123	135,219,404	-	45,175,338	-	218,088,865
Cyanidation (Filtration and settlement)	12,162,681	19,872,499	48,348	13,423,521	-	45,507,057
Drying (Including can packing and shipment)	-	835,935	-	-	-	835,935
Cyanidation (Compr. air)	-	1,047,940	-	8,776,923	-	9,824,863
Sludge	49,556	1,807,156	-	8,518,778	-	10,375,490
Water supply	-	344,507	-	13,681,674	163,200	14,189,381
Stockyard	42,917,162	570,893	184,300	4,904,752		48,577,137
Electrical maintenance	7,686,773	307,097	2,694,203	1,471,426	-	12,159,499
Mechanical maintenance	17,974,973	887,350	4,699,523	12,803,982	-	36,365,828
Laboratory	31,318,444	17,892,033	32,000	5,679,186	-	54,921,663
Total	255,328,709	389,134,195	7,718,210	251,510,519	163,200	930,854,833
	(28.25%)	(43.05%)	(0.85%)	(27.83%)	(0.02%)	(100%)

Fixed 188,688 Total
Variable 66,641 255,392 thousand pesos

Table 7.1.9 Business Analysis Indexes, Parral plant (Jan. 1, 1989-Jun. 30, 1989)

Ratio of sales profit to sales	$\left(\frac{\text{Sales profit}}{\text{Sales}} \times 100\right) = \frac{334,392,853 \text{ Peso}}{4,651,634,040 \text{ Peso}} \times 100 = 7.19\%$
Ratio of operating profit to sales	$\left(\frac{\text{Operating profit}}{\text{Sales}} \times 100\right) = \frac{190,244,718 \text{ Peso}}{4,651,634,040 \text{ Peso}} \times 100 = 4.09\%$
Ratio of ordinary profit to sales	$\left(\frac{\text{Ordinary profit}}{\text{Sales}} \times 100\right) = \frac{201,095,016 \text{ Peso}}{4,651,634,040 \text{ Peso}} \times 100 = 4.32\%$
Ratio of total expenses to sales	$\left(\frac{\text{Total expenses}}{\text{Sales}} \times 100\right) = \frac{4,461,389,322 \text{ Peso}}{4,651,634,040 \text{ Peso}} \times 100 = 95.91\%$
Ratio of sales costs to sales	$\left(\frac{\text{Sales costs}}{\text{Sales}} \times 100\right) = \frac{4,317,241,187 \text{ Peso}}{4,651,634,040 \text{ Peso}} \times 100 = 92.81\%$
Ratio of raw material cost to sales	$\left(\frac{\text{Treated ore prices}}{\text{Sales}} \times 100\right) = \frac{3,329,330,442 \text{ Peso}}{4,651,634,040 \text{ Peso}} \times 100 = 71.57\%$
Ratio of operating costs to sales	$\left(\frac{\text{Operating costs}}{\text{Sales}} \times 100\right) = \frac{987,910,745 \text{ Peso}}{4,651,634,040 \text{ Peso}} \times 100 = 21.24\%$
Ratio of general administrative and selling expenses to sales	$\left(\frac{\text{General administrative expenses} + \text{Selling expenses}}{\text{Sales}} \times 100\right) = \frac{144,148,135 \text{ Peso}}{4,651,634,040 \text{ Peso}} \times 100 = 3.10\%$
Sales per employee	$\frac{\text{Sales}}{\text{Number of employees}} = \frac{4,651,634,040 \text{ Peso}}{79 \text{ persons}} = 58,881,444 \text{ Peso}$

Table 7.1.9 Business Analysis Indexes, Parral plant (Jan. 1, 1989-Jun. 30, 1989)

Sales profit per employee	$\left(\frac{\text{Sales profit}}{\text{Number of employees}}\right) = \frac{334,392,853 \text{ Peso}}{79 \text{ persons}}$ = 4,232,821 Peso
Operating profit per employee	$\left(\frac{\text{Operating profit}}{\text{Number of employees}}\right) = \frac{190,244,718 \text{ Peso}}{79 \text{ persons}}$ = 2,408,161 Peso
Ordinary profit per employee	$\left(\frac{\text{Ordinary profit}}{\text{Number of employees}}\right) = \frac{201,059,016 \text{ Peso}}{79 \text{ persons}}$ = 2,545,507 Peso
Total expenses per employee	$\left(\frac{\text{Total expenses}}{\text{Number of employees}}\right) = \frac{4,461,389,322 \text{ Peso}}{79 \text{ persons}}$ = 56,473,283 Peso
Sales costs per employee	$\left(\frac{\text{Sales costs}}{\text{Number of employees}}\right) = \frac{4,317,241,187 \text{ Peso}}{79 \text{ persons}}$ = 54,648,623 Peso
Raw material cost per employee	$\left(\frac{\text{Treated ore prices}}{\text{Number of employees}}\right) = \frac{3,329,330,442 \text{ Peso}}{79 \text{ persons}}$ = 42,143,423 Peso
Operating costs per employee	$\left(\frac{\text{Operating costs}}{\text{Number of employees}}\right) = \frac{987,910,745 \text{ Peso}}{79 \text{ persons}}$ = 12,505,199 Peso
General administrative and selling expenses per employee	$\frac{\text{Selling expenses} + \text{General administrative expenses}}{\text{Number of employees}}$ $= \frac{144,148,135}{79 \text{ persons}} = 1,824,660 \text{ Peso}$
Sales per ton of treated ore	$\left(\frac{\text{Sales}}{\text{Tonnage of treated ore}}\right) = \frac{4,651,634,040 \text{ Peso}}{38,465 \text{ t}}$ = 120,932 Peso/t

Table 7.1.9 Business Analysis Indexes, Parral plant (Jan. 1, 1989-Jun. 30, 1989)

Sales profit per ton of treated ore

$$\left(\frac{\text{Sales profit}}{\text{Tonnage of treated ore}}\right) = \frac{334,392,853 \text{ Peso}}{38,465 \text{ t}}$$

$$= 8,693 \text{ Peso/t}$$

Sales costs per ton of treated ore

$$\left(\frac{\text{Sales costs}}{\text{Tonnage of treated ore}}\right) = \frac{4,317,241,187}{38,465 \text{ t}}$$

$$= 112,238 \text{ Peso/t}$$

Operating costs per ton of treated ore

$$\left(\frac{\text{Operating costs}}{\text{Tonnage of treated ore}}\right) = \frac{987,910,745 \text{ Peso}}{38,645 \text{ t}}$$

$$= 25,564 \text{ Peso/t}$$

Tonnage of treated ore per employee

$$\left(\frac{\text{Tonnage of treated ore}}{\text{Number of employees}}\right) = \frac{38,645 \text{ t}}{79 \text{ persons}}$$

$$= 489 \text{ t/person}$$

Table 7.1.10 Fixed and Variable Costs, Parral paint (Jan. 1, 1989-Jun. 30, 1989)

			Fixed expense		Variable expense		Total	
Sales costs	Treated ore prices		-		3,329,330		3,329,330	
	Operating costs	Direct costs	188,88	20.88%	715,167	79.12%	903,855	
		Indirect costs	49,849		18,002		67,851	
		Depreciation expense	16,203		-		16,203	
	Subtotal		254,740	5.90%	4,062,499	94.10%	4,317,239	
General administrative expenses			109,538		17,241		126,779	
Selling expenses			-		17,369		17,369	
Total.			364,278	8.17%	4,097,109	91.83%	4,461,387	

Table 7.1.11 Variable Costs Ratio, Break-Even Point, etc., Parral plant (Jan. 1, 1989-Jun. 30, 1989)

Rate of variable expense

$$\left(\frac{\text{Variable expense}}{\text{Sales}} \times 100\right) = \frac{4,097,109 \text{ thousand peso}}{4,651,634 \text{ "}}$$

$$\times 100 = 88.08\%$$

Marginal profit

(Sales - Variable expense) =

4,651,634 thousand peso - 4,097,109 thousand peso

= 554,525 thousand peso

Marginal profit rate

$$\left(\frac{\text{Marginal profit}}{\text{Sales}} \times 100\right) = \frac{554,525 \text{ thosand peso}}{4,651,634 \text{ "}}$$

$$\times 100 = 11.92\%$$

Break-even rate of sales

$$\left(\frac{\text{Fixed expense}}{\text{Marginal profit rate}}\right) = \frac{374,177}{0.1193}$$

= 3,139,069 thousand peso

Break-even rate

$$\left(\frac{\text{Break-even rate of sales}}{\text{Actual sales}} \times 100\right) =$$

$$\frac{3,139,069 \text{ thousand peso}}{4,651,634 \text{ "}} \times 100 = 67.48\%$$

Marginal safety factor

$$\left(1 - \frac{\text{Break-even rate of sales}}{\text{Actual sales}}\right) \times 100 =$$

$$\left(1 - \frac{2,139,069 \text{ thousand peso}}{4,651,634 \text{ "}}\right) \times 100 = 32.52\%$$

Table 7.2.1 Statement of Profits and Losses, Guanacevi Plant
(Jan. 1, 1989-Dec. 31, 1989)

Unit: Peso

Sales	1,563,869,172
Sales costs	1,965,116,709
Sales profit and loss	Δ401,247,537
General administrative expenses	201,439,912
Operating profit and loss	Δ602,687,449
Non-operating income	236,665,643
Non-operating expenses	157,035
Ordinary profit and loss	Δ366,178,841

Table 7.2.2 Total Revenues, Guanacevi Plant (Jan. 1, 1988-Dec. 31, 1988)

Unit: Peso

Consignment beneficiation fee	1,558,862,900
Sales of machines and parts	5,006,272
Total	1,563,869,172

Table 7.2.3 Total Costs of Revenues, Guanacevi Plant (Jan. 1, 1988-Dec. 31, 1988)

Unit: Peso

Sales costs	Operating cost	Direct costs	1,363,885,704	
		Indirect costs	564,780,273	
		Depreciation expense	31,870,722	
		Subtotal	1,960,536,699	(17,607 peso/ton)
	Sales costs of machines and parts		4,580,010	
	Total		1,965,116,709	

Treated ore volume: 111,347 t

Table 7.2.4 Detailed Operation Costs, Guanacevi Plant (Jan. 1, 1988-Dec. 31, 1988)

Unit: Peso

	Direct cost				Indirect costs				Total	Cost/ton
	Personnel expenses	Material costs	Cost of electric power	Subtotal	Laboratory	Repair shop	Ordinary common expenses	Subtotal		
Stockyard	64,403,972	72,030,038		136,434,010	3,890,686	1,832,646	28,163,484	33,886,816	170,320,826	1,530 peso/t
Crushing	76,287,268	119,120,069	62,870,651	258,277,988	9,726,716	4,581,614	70,408,711	84,717,041	342,995,029	3,080 peso/t
Grinding	99,896,668	257,626,209	153,683,804	511,206,681	25,937,908	12,217,638	187,756,563	225,912,109	737,118,790	6,620 peso/t
Flotation	33,530,710	93,927,290	66,363,468	193,821,468	9,726,716	4,581,614	70,408,711	84,717,041	278,538,509	2,502 peso/t
Filtration	8,687,631	6,370,346	13,971,260	29,029,237	4,539,124	2,138,087	32,857,399	39,534,620	68,563,857	615 peso/t
Sludge dum	42,701,130	22,328,869	13,971,260	79,001,259	4,539,134	2,138,087	32,857,399	39,534,620	118,535,879	1,065 peso/t
Concentrate loading	36,872,718	108,763,888	10,478,455	156,115,061	6,484,476	3,054,409	46,939,141	56,478,026	212,593,087	1,909 peso/t
Total	362,380,097	680,166,709	312,338,898	1,363,885,704	64,884,770	30,544,095	469,780,273	564,780,273	1,928,665,977 (201,434,912)	17,321 peso/t (19,130 peso/t)

(Treated ore volume: 111,347 t)

(General administrative expenses)

Including general administrative expenses

Table 7.2.5 Statement of Profits and Losses, Guanacevi Plant
(Jan. 1, 1989-Jun. 30, 1989)

Unit: Peso

Sales	1,230,886.787 (26,937 peso/ton)
Sales costs	1,279,841,061
Sales profit and loss	48,954,274
General administrative expenses	118,318,920
Operating profit and loss	167,273,194
Non-operating income	25,098,853
Non-operating expenses	32,123,917
Ordinary profit and loss	174,298,258

Table 7.2.6 Total Revenues, Guanacevi Plant (Jan. 1, 1989-Jun. 30, 1989)

Unit: Peso

Consignment beneficiation fee	1,230,709,630
Sales of machines and parts	177,157
Total	1,230,886,787

Table 7.2.7 Total Costs of Revenues, Guanacevi Plant (Jan. 1, 1989-Jun. 30, 1989)

Unit: Peso

Sales costs	Operating cost	Direct costs	905,466,958	7,000 pesos discrepancy
		Indirect costs	354,183,502	300 pesos discrepancy
		Depreciation expense	20,029,541	
		Subtotal	1,279,680,009 (28,000 peso/ton)	
	Sales costs of machines and parts		161,052	
	Total		1,279,841,061	

Treated ore volume: 45,689 t

Table 7.2.8 Detailed Operation Costs, Guanacevi Plant (Jan. 1, 1989-Jun. 30, 1989)

Unit: Peso

	Direct cost				Indirect costs				Total	Cost/ton
	Personnel expenses	Material costs	Cost of electric power	Subtotal	Laboratory	Repair shop	Ordinary common expenses	Subtotal		
Stockyard	36,401,399	48,935,946	-	85,337,345	2,439,616	1,149,680	17,661,714	17,661,714	106,588,355	2,333 peso/t
Crushing	42,072,032	165,975,028	45,082,830	253,129,890	6,099,040	2,874,199	44,154,286	53,127,525	306,257,415	6,703 peso/t
Grinding	52,133,100	161,036,642	96,318,765	309,488,507	16,264,107	7,664,531	117,744,765	141,673,403	451,161,910	9,875 peso/t
Flotation	18,332,856	64,338,688	41,592,195	124,263,739	6,099,040	2,874,199	44,154,287	53,127,526	177,391,265	3,883 peso/t
Filtration	3,174,603	22,230,027	8,756,250	34,160,880	2,846,218	1,341,293	20,605,332	24,792,843	58,953,723	1,290 peso/t
Sludge dam	20,261,666	17,855,130	8,756,250	46,873,046	2,846,184	1,341,277	20,605,082	24,792,543	71,665,589	1,569 peso/t
Concentrate loading	15,151,474	30,501,887	6,567,190	52,220,551	4,066,027	1,916,133	29,436,192	35,418,352	87,638,903	1,918 peso/t
Total	187,527,130	510,873,348	207,073,480	905,473,958	40,660,232	19,161,312	294,361,658	354,183,202	1,259,657,160 (118,318,920)	27,570 peso/t (30,160 peso/t)

(Treated ore volume: 45,689 t)

(General administrative expenses)

(Including general administrative expenses)

Table 7.2.9 Business Analysis Indexes, Guanacevi Plant (Jan. 1, 1989-Jun. 30, 1989)

Ratio of sales profit to sales	$\left(\frac{\text{Sales profit}}{\text{Sales}} \times 100\right) = \frac{\Delta 48,954,274 \text{ Peso}}{1,230,886,787 \text{ Peso}}$ $\times 100 = \Delta 3.98\%$
Ratio of operating profit to sales	$\left(\frac{\text{Operating profit}}{\text{Sales}} \times 100\right) = \frac{\Delta 167,273,194 \text{ Peso}}{1,230,886,787 \text{ Peso}}$ $\times 100 = \Delta 13.59\%$
Ratio of ordinary profit to sales	$\left(\frac{\text{Ordinary profit}}{\text{Sales}} \times 100\right) = \frac{\Delta 174,298,258 \text{ Peso}}{1,230,886,787 \text{ Peso}}$ $\times 100 = \Delta 14.16\%$
Ratio of total expenses to sales	$\left(\frac{\text{Total expenses}}{\text{Sales}} \times 100\right) = \frac{1,398,159,981 \text{ Peso}}{1,230,886,787 \text{ Peso}}$ $\times 100 = 113.59\%$
Ratio of sales costs to sales	$\left(\frac{\text{Sales costs}}{\text{Sales}} \times 100\right) = \frac{1,279,680,061 \text{ Peso}}{1,230,886,787 \text{ Peso}} \times 100$ $= 103.98\%$
Ratio of operating costs to sales	$\left(\frac{\text{Operating costs}}{\text{Sales}} \times 100\right) = \frac{1,279,680,009 \text{ Peso}}{1,230,886,787 \text{ Peso}}$ $\times 100 = 103.96\%$
Ratio of general administrative and selling expenses to sales	$\left(\frac{\text{General administrative expenses} + \text{Selling expenses}}{\text{Sales}} \times 100\right)$ $= \frac{118,318,920 \text{ Peso}}{1,230,886,787 \text{ Peso}} \times 100 = 9.61\%$
Sales per employee	$\left(\frac{\text{Sales}}{\text{Number of employees}}\right) = \frac{1,230,886,787 \text{ Peso}}{96 \text{ persons}}$ $= 12,821,737 \text{ Peso}$
Sales profit per employee	$\left(\frac{\text{Sales profit}}{\text{Number of employees}}\right) = \frac{\Delta 48,954,274 \text{ Peso}}{96 \text{ persons}}$ $= \Delta 509,940 \text{ Peso}$

Table 7.2.9 Business Analysis Indexes, Guanacevi Plant (Jan. 1, 1989-Jun. 30, 1989)

Operating profit per employee

$$\left(\frac{\text{Operating profit}}{\text{Number of employees}}\right) = \frac{\Delta 167,273,194 \text{ Peso}}{96 \text{ persons}}$$

$$= \Delta 1,742,429 \text{ Peso}$$

Ordinary profit per employee

$$\left(\frac{\text{Ordinary profit}}{\text{Number of employees}}\right) = \frac{\Delta 174,298,258 \text{ Peso}}{96 \text{ persons}}$$

$$= \Delta 1,815,607 \text{ Peso}$$

Total expenses per employee

$$\left(\frac{\text{Total expenses}}{\text{Number of employees}}\right) = \frac{1,398,159,981 \text{ Peso}}{96 \text{ persons}}$$

$$= 14,564,166 \text{ Peso}$$

Sales costs per employee

$$\left(\frac{\text{Sales costs}}{\text{Number of employees}}\right) = \frac{1,278,841,061 \text{ Peso}}{96 \text{ persons}}$$

$$= 13,331,678 \text{ Peso}$$

Operating costs per employee

$$\left(\frac{\text{Operating costs}}{\text{Number of employees}}\right) = \frac{1,279,680,009 \text{ Peso}}{96 \text{ persons}}$$

$$= 13,330,000 \text{ Peso}$$

General administrative and selling expenses per employee

$$\frac{\text{Selling expenses} + \text{General administrative expenses}}{\text{Number of employees}}$$

$$= \frac{118,318,920}{96 \text{ persons}} = 1,232,489 \text{ Peso}$$

Sales per ton of treated ore

$$\left(\frac{\text{Sales}}{\text{Tonnage of treated ore}}\right) = \frac{1,230,886,787 \text{ Peso}}{45,689 \text{ t}}$$

$$= 26,941 \text{ Peso/t}$$

Sales profit per ton of treated ore

$$\left(\frac{\text{Sales profit}}{\text{Tonnage of treated ore}}\right) = \frac{\Delta 48,954,274 \text{ Peso}}{45,689 \text{ t}}$$

$$= \Delta 1,071 \text{ Peso/t}$$

Sales costs per ton of treated ore

$$\left(\frac{\text{Sales costs}}{\text{Tonnage of treated ore}}\right) = \frac{1,279,841,061}{45,689 \text{ t}}$$

$$= 28,012 \text{ Peso/t}$$

Table 7.2.9 Business Analysis Indexes, Guanacevi Plant (Jan. 1, 1989-Jun. 30, 1989)

Operating costs per ton of treated ore	$\left(\frac{\text{Operating costs}}{\text{Tonnage of treated ore}}\right) = \frac{1,279,680,009 \text{ Peso}}{45,689 \text{ t}}$	
	= 28,008 Peso/t	
Tonnage of treated ore per employee	$\left(\frac{\text{Tonnage of treated ore}}{\text{Number of employees}}\right) = \frac{45,689 \text{ t}}{96 \text{ persons}}$	
	= .476 t/person	

Table 7.2.10 Fixed and Variable Costs, Guanacevi Plant (Jan. 1, 1989-Jun. 30, 1989)

		Fixed expense	Variable expense	Total
Sales Costs	Direct costs	132,057	773,410	905,467
	Indirect costs	255,721	98,463	354,184
	Depreciation expense	20,030	-	20,030
	Subtotal	407,808 31.87%	871,873 68.13%	1,279,681
Sales costs of machines and parts		-	161	161
General administrative expenses		99,828	18,491	118,319
Total		507,636 36.31%	890,525 63.69%	1,398,161

Table 7.2.11 Fixed and Variable Costs, Guanacevi Plant (Jan. 1, 1989-Jun. 30, 1989)

Rate of variable expense	$\left(\frac{\text{Variable expense}}{\text{Sales}} \times 100\right) = \frac{890{,}525 \text{ thousand peso}}{1{,}230{,}887 \text{ "}}$
	$\times 100 = 72.35\%$
Marginal profit	(Sales - Variable expense) =
	1,230,887 thousand peso - 890,525 thousand peso
	= 340,362 thousand peso
Marginal profit rate	$\left(\frac{\text{Marginal profit}}{\text{Sales}} \times 100\right) = \frac{340{,}362 \text{ thousand peso}}{1{,}230{,}887 \text{ "}}$
	$\times 100 = 27.65\%$
Break-even rate of sales	$\left(\frac{\text{Fixed expense}}{\text{Marginal profit rate}}\right) = \frac{507{,}636}{0.2765}$
	= 1,835,935 thousand peso
Break-even rate	$\left(\frac{\text{Break-even rate of sales}}{\text{Actual sales}} \times 100\right) =$
	$\frac{1{,}835{,}935 \text{ thousand peso}}{1{,}230{,}887 \text{ "}} \times 100 = 149.16\%$
Marginal safety factor	$\left(1 - \frac{\text{Break-even rate of sales}}{\text{Actual sales}}\right) \times 100 =$
	$\left(1 - \frac{1{,}835{,}935 \text{ thousand peso}}{1{,}230{,}887 \text{ "}}\right) \times 100 = \Delta 49.16\%$
Break-even rate of consignment beneficiation fee	$\left(\frac{\text{Break-even rate of sales}}{\text{Actual treated ore volume}}\right) =$
	$= \frac{1{,}835{,}935 \text{ thousand peso}}{45{,}689 \text{ t}} = 40{,}183 \text{ peso/t}$
Break-even rate of treated ore volume	$\left(\frac{\text{Break-even rate of sale}}{\text{Actual consignment beneficiation fee}}\right) =$
	$= \frac{1{,}835{,}935 \text{ thousand peso}}{30 \text{ thousand peso}} = 61{,}198 \text{ t}$

Table 7.3.1 Statement of Profits and Losses, Barones Plant
(Jan. 1, 1988-Dec. 31, 1988)

Unit: Peso

Sales	3,727,649,237	(29,367 peso/ton)
Sales costs	4,403,641,205	
Sales profit and loss	Δ675,991,968	(Δ5,326 peso/ton)
General administrative expenses	177,591,657	
Selling expenses	306,276,597	
Operating profit and loss	Δ 1,159,860,222	(Δ 9,138 peso/ton)
Non-operating income	50,431,710	
Non-operating expenses	-	
Ordinary profit and loss	Δ1,109,428,512	

Table 7.3.2 Total Revenues, Barones Plant (Jan. 1, 1988-Dec. 31, 1988)

Unit: Peso

Consignment beneficiation fee		498,705,356
Con-centrates	Lead concentrate	1,477,156,624
	Zinc concentrate	44,454,432
	Copper concentrate	21,178,514
	Cyanided deposit	1,644,518,311
	Subtotal	3,189,307,881
Sales of machines and parts		39,636,000
Total		3,727,649,237

Table 7.3.3 Total Costs of Revenues, Barones Plant (Jan. 1, 1988-Dec. 31, 1988)

Unit: Peso

Sales Costs	Raw material cost	Purchase cost of machines and parts	29,400,000
		Treated ore prices	2,251,139,421 (17,735 peso/ton)
	Operating costs	Direct costs	1,795,265,146
		Indirect costs	373,081,890
		Depreciation expense	13,383,221
		Subtotal	2,181,730,257
	Returned concentrate cost to be carried forward		58,628,473
	Total		4,403,641,205

Treated ore volume

Flotation (ore purchasing)	38,585 t
Flotation (consignment)	47,131 t
Cyanidation (ore purchasing)	41,216 t
Total	126,932 t

Volume of purchased ore treated: 79,801 t

Table 7.3.4 Detailed Operation Costs, Barones Plant (Jan. 1, 1988-Dec. 31, 1988)

Unit: Peso

	Personnel expenses	Material costs	Cost of electric power	Total
Ore receiving	47,832,349	64,930,248	123,655,000	112,762,597
Crushing	49,740,648	59,395,060	40,900,769	150,036,477
Grinding	53,165,556	221,756,195	118,157,775	393,079,526
Flotation	56,739,208	137,903,514	140,880,426	335,523,148
Cyanidation (Primary agitation and washing)	57,706,705	158,528,128	49,989,827	266,224,660
Cyanidation (Filtration and settlement)	47,877,575	84,268,059	31,811,706	163,957,340
Drying (Including can packing and shipment)	8,730,320	1,403,065	4,544,529	14,677,914
Cyanidation (Compr. air)	448,205	601,826	9,089,061	10,139,092
Sludge	5,722,796	8,742,284	4,544,529	19,009,609
Water supply	31,434,674	54,651,336	45,445,299	131,531,309
Stockyard	15,874,861	378,750	1,817,809	18,071,420
Electrical maintenance	11,521,467	1,758,921	1,817,811	15,098,199
Mechanical maintenance	24,888,973	5,674,050	1,817,811	32,380,834
Laboratory	89,838,363	41,116,846	1,817,812	132,773,021
Total	501,521,700	841,108,282	452,635,164	1,795,265,146

Treated ore volume
Flotation (ore purchasing) 38,585 t
Flotation (consignment) 47,131 t
Total 85,716 t
Cyanidation (ore purchasing) 41,216 t
Total 126,932 t

Purchased ore total 79,801 t
11,039 peso/ton

Table 7.3.5 Statement of Profits and Losses, Barones Plant
(Jan. 1, 1989-Jun. 30, 1989)

Unit: peso

Sales	1,760,938,273
Sales costs	2,458,719,919
Sales profit and loss	Δ697,781,646
General administrative expenses	106,295,080
Selling expenses	71,029,758
Operating profit and loss	Δ875,106,484
Non-operating income	16,611,285
Non-operating expenses	-
Ordinary profit and loss	Δ858,495,199

Table 7.3.6 Total Revenues, Barones Plant (Jan. 1, 1989-Jun. 30, 1989)

Unit: Peso

Consignment beneficiation fee		5,879,251,334
Con-centrate	Lead concentrate	253,181,701
	Zinc concentrate	-
	Copper concentrate	-
	Cyanided deposit	1,059,022,600
	Subtotal	1,312,209,301
Sales of machines and parts		
Total		

Table 7.3.7 Total Costs of Revenues, Barones Plant (Jan. 1, 1989-Jun. 30, 1989)

Unit: Peso

Sales costs	Treated ore prices		1,098,796,545	(44,603 peso/ton) (purchased ore)
	Operating costs	Direct costs	1,118,602,460	
		Indirect costs	228,269,908	
		Depreciation expense	12,263,668	
		Subtotal	1,359,136,036	
	Concentrated cost brought forward from the previous term		787,338	
	Total		2,458,719,919	

Table 7.3.8 Detailed Operation Costs, Barones Plant (Jan. 1, 1989-Jun. 30, 1989)

Unit: Peso

	Personnel expenses	Material costs	Cost of electric power	Total
Ore receiving	37,958,421	21,355,045	128,332	59,441,798
Crushing	25,172,178	43,206,410	25,098,568	93,477,156
Grinding	33,678,730	130,873,566	72,506,974	237,059,270
Flotation	36,929,423	74,561,226	84,450,622	197,941,271
Cyanidation (Primary agitation and washing)	30,281,381	163,815,135	30,676,027	224,772,543
Cyanidation (Filtration and settlement)	21,898,203	62,301,344	19,521,106	103,720,653
Drying (Including can packing and shipment)	4,681,122	359,262	2,788,730	7,829,114
Cyanidation (Compr. air)	1,094,167	356,696	5,577,459	7,028,322
Sludge	4,392,433	4,573,246	2,788,730	11,754,409
Water supply	15,992,151	13,282,603	27,887,298	57,162,052
Stockyard	9,981,928	-	1,115,491	11,097,419
Electrical maintenance	7,208,174	2,782,327	1,115,491	11,105,992
Mechanical maintenance	12,613,427	5,980,807	1,115,491	19,709,725
Laboratory	56,379,274	19,007,970	1,115,492	76,502,736
Total	208,261,012	542,455,637	277,885,811	1,118,602,460

Treated ore volume

Flotation (ore purchasing)	7,753 t
Flotation (consignment)	29,705 t
Total	37,457 t

Cyanidation (ore purchasing) 16,883 t

Total 54,340 t

Purchased ore total 24,635 t

Table 7.3.9 Business Analysis Indexes, Barones Plant (Jan. 1, 1989-Jun. 30, 1989)

Ratio of sales profit to sales

$$\left(\frac{\text{Sales profit}}{\text{Sales}} \times 100\right) = \frac{\Delta 697,781,646 \text{ Peso}}{1,760,938,273 \text{ Peso}} \times 100 = \Delta 39.63\%$$

Ratio of operating profit to sales

$$\left(\frac{\text{Operating profit}}{\text{Sales}} \times 100\right) = \frac{\Delta 875,106,484 \text{ Peso}}{1,760,938,273 \text{ Peso}} \times 100 = \Delta 49.70\%$$

Ratio of ordinary profit to sales

$$\left(\frac{\text{Ordinary profit}}{\text{Sales}} \times 100\right) = \frac{\Delta 858,495,199 \text{ Peso}}{1,760,938,273 \text{ Peso}} \times 100 = \Delta 48.75\%$$

Ratio of total expenses to sales

$$\left(\frac{\text{Total expenses}}{\text{Sales}} \times 100\right) = \frac{2,636,044,757 \text{ Peso}}{1,760,938,273 \text{ Peso}} \times 100 = 149.70\%$$

Ratio of sales costs to sales

$$\left(\frac{\text{Sales costs}}{\text{Sales}} \times 100\right) = \frac{2,458,719,919 \text{ Peso}}{1,760,938,273 \text{ Peso}} \times 100 = 139.63\%$$

Ratio of raw material cost to sales

$$\left(\frac{\text{Treated ore prices}}{\text{Sales}} \times 100\right) = \frac{1,099,796,545 \text{ Peso}}{1,760,938,273 \text{ Peso}} \times 100 = 62.23\%$$

Ratio of operating costs to sales

$$\left(\frac{\text{Operating costs}}{\text{Sales}} \times 100\right) = \frac{1,359,136,036 \text{ Peso}}{1,760,938,273 \text{ Peso}} \times 100 = 77.18\%$$

Ratio of general administrative and selling expenses to sales

$$\left(\frac{\text{General administrative expenses} + \text{Selling expenses}}{\text{Sales}} \times 100\right)$$

$$= \frac{177,324,838 \text{ Peso}}{1,760,938,273 \text{ Peso}} \times 100 = 10.07\%$$

Sales per employee

$$\left(\frac{\text{Sales}}{\text{Number of employees}}\right) = \frac{1,760,938,273 \text{ Peso}}{122 \text{ persons}} = 14,433,920 \text{ Peso}$$

Table 7.3.9 Business Analysis Indexes, Barones Plant (Jan. 1, 1989-Jun. 30, 1989)

Sales profit per employee	$\left(\frac{\text{Sales profit}}{\text{Number of employees}}\right)$	$= \frac{\Delta 697,781,646 \text{ Peso}}{122 \text{ persons}}$
	$= \Delta 5,719,522$ Peso	
Operating profit per employee	$\left(\frac{\text{Operating profit}}{\text{Number of employees}}\right)$	$= \frac{\Delta 875,106,484 \text{ Peso}}{122 \text{ persons}}$
	$= \Delta 7,173,004$ Peso	
Ordinary profit per employee	$\left(\frac{\text{Ordinary profit}}{\text{Number of employees}}\right)$	$= \frac{\Delta 858,495,199 \text{ Peso}}{122 \text{ persons}}$
	$= \Delta 7,036,846$ Peso	
Total expenses per employee	$\left(\frac{\text{Total expenses}}{\text{Number of employees}}\right)$	$= \frac{2,636,044,757 \text{ Peso}}{122 \text{ persons}}$
	$= 21,606,924$ Peso	
Sales costs per employee	$\left(\frac{\text{Sales costs}}{\text{Number of employees}}\right)$	$= \frac{2,458,719,919 \text{ Peso}}{122 \text{ persons}}$
	$= 20,153,442$ Peso	
Raw material cost per employee	$\left(\frac{\text{Treated ore prices}}{\text{Number of employees}}\right)$	$= \frac{1,099,796,545 \text{ Peso}}{122 \text{ persons}}$
	$= 9,014,726$ Peso	
Operating costs per employee	$\left(\frac{\text{Operating costs}}{\text{Number of employees}}\right)$	$= \frac{2,359,136,036 \text{ Peso}}{122 \text{ persons}}$
	$= 11,140,459$ Peso	
General administrative and selling expenses per employee	$\frac{\text{Selling expenses} + \text{General administrative expenses}}{\text{Number of employees)}}$	
	$= \frac{177,324,838}{122 \text{ persons}} = 1,453,382$ Peso	
Sales per ton of treated ore	$\left(\frac{\text{Sales}}{\text{Tonnage of treated ore}}\right) = \frac{1,760,938,273 \text{ Peso}}{54,340 \text{ t}}$	
	$= 32,406$ Peso	

Table 7.3.9 Business Analysis Indexes, Barones Plant (Jan. 1, 1989-Jun. 30, 1989)

Sales profit per ton of treated ore	$\left(\frac{\text{Sales profit}}{\text{Tonnage of treated ore}}\right) = \frac{\Delta 697,781,646 \text{ Peso}}{54,340 \text{ t}}$ $= \Delta 12,841$ Peso
Sales costs per ton of treated ore	$\left(\frac{\text{Sales costs}}{\text{Tonnage of treated ore}}\right) = \frac{2,458,719,919}{54,340 \text{ t}}$ $= 45,247$ Peso
Operating costs per ton of treated ore	$\left(\frac{\text{Operating costs}}{\text{Tonnage of treated ore}}\right) = \frac{2,458,719,919 \text{ Peso}}{54,340 \text{ t}}$ $= 25,012$ Peso
Tonnage of treated ore per employee	$\left(\frac{\text{Tonnage of treated ore}}{\text{Number of employees}}\right) = \frac{54,340 \text{ t}}{122 \text{ persons}}$ $= 445$ t

Table 7.3.10 Fixed and Variable Costs, Barones Plant (Jan. 1, 1989-Jun. 30, 1989)

			Fixed expense	Variable expense	Total
Sales costs	Treated ore prices		-	1,099,584	1,099,584
	Operating costs	Direct costs	194,317 17.37%	924,285 82.63%	1,118,602
		Indirect costs	166,751	61,519	228,270
		Depreciation expense	12,264	-	12,264
	Subtotal		373,332 15.18%	2,085,388 84.82%	2,458,720
General administrative expenses			91,476	14,819	106,295
Selling expenses			-	71,030	73,030
Total			464,808 17.63%	2,171,237 82.37%	2,636,045

Table 7.3.11 Variable Costs Ratio, Break-Even Point, etc., Barones Plant (Jan. 1, 1989-Jun. 30, 1989)

Rate of variable expense

$$\left(\frac{\text{Variable expense}}{\text{Sales}} \times 100\right) = \frac{2{,}171{,}237 \text{ thousand peso}}{1{,}760{,}938 \quad "} \times 100 = 123.30\%$$

Marginal profit

(Sales - Variable expense) =

1,760,938 thousand peso - 2,171,237 thousand peso

= Δ410,299 thousand peso

Marginal profit rate

$$\left(\frac{\text{Marginal profit}}{\text{Sales}} \times 100\right) = \frac{\Delta 410{,}299 \text{ thosand peso}}{1{,}760{,}938 \quad "} \times 100 = \Delta 23.30\%$$

Table 7.3.12 Suppositional Statement of Profits and Losses, Barones Plant (Jan. 1, 1989-Jun. 30, 1989)

Unit: Peso

Sales	2,203,359.301
Sales costs	2,150,782,419
Sales profit and loss	52,576,882
General administrative expenses	106,295,080
Selling expenses	71,029,758
Operating profit and loss	Δ124,747,956
Non-operating income	16,611,285
Non-operating expenses	-
Ordinary profit and loss	Δ108,136,671

Table 7.3.13 Suppositional Total Revenues, Barones Plant
(Jan. 1, 1989-Jun. 30, 1989)

Unit: Peso

Consignment beneficiation fee		891,150,000*
Con-centrates	Lead concentrate	253,186,701
	Zinc concentrate	-
	Copper concentrate	-
	Cyanided deposit	1,059,002,600
	Subtotal	1,312,209,301
Sales of machines and parts		-
Total		2,203,359,301

* Consignment treated ore volume 29,705 t x 30 thousand Peso

Table 7.3.14 Suppositional Total Costs of Revenues, Barones Plant

(Jan. 1, 1989-Jun. 30, 1989)

Unit: Peso

Sales costs	Treated ore prices		790,859,045*
	Operating cost	Direct costs	1,118,602,460
		Indirect costs	228,269,908
		Depreciation expense	12,263,668
		Subtotal	1,359,136,036
	Concentrate cost brought forward from the previous term		787,338
	Total		2,150,782,419

* The following has been deducted from actual treated are pries

24,63 tons (the volume of purchased ore treated) x (30,000 pesos - 17,500 pesos)/ton = 307,937,500 pesos

Table 8.1.1 Sammary of Modernization Plan for the Existion Equipments

Modernization Work	Amount of Investment (000 Pesos)	Improvement Effect		Depreciation Fund + Interest		Balance Improvement		Investment Efficiency	
		000 pesos/month	000 pesos/ton of crude ore	000 pesos/ month	pesos/ton of crude ore	000 pesos/ month	pesos/ton of crude ore	APP(%)	BP (year)
Parral (6,411 t/month)									
Crushing dust collecting	26,500								
Instrumentation	431,420								
Renewal of facilities	929,355	Improvement of the recovery rate 33,037							
Subtotal	1,387,275	35,384 Cost reduction 2,347	5,519	13,813	2,155	21,571	3,365	18.7	5.4
Modernization of the administration section	106,000	2,289 (Cost reduction)	357	1,060	165	1,229	192	13.9	7.2
Total	1,493,275	37,673	5,876 Improvement of the recovery rate 5,153 Cost reduction 723	14,873	2,320	22,800	3,556	18.3	5.5
Guanacevi (7,751 t/month)		Improvement of the							
Improvement of the grinding system	300,944	28,366 recovery rate 17,945 Cost rduction 10,421	3,660	3,009	388	25,357	3,271	101.1	1.0
Rationalization of the flotation system	11,119	1,087 (Cost reduction)	140	111	14	976	126	105.3	1.0
Improvement of the reagent system	83,392	9,335 Improvement of the recovery rate 8,973 Cost reduction 362	1,204	834	108	8,501	1,097	122.3	0.8
Filter prems	308,339	6,983 (Cost reduction)	901	3,083	398	3,900	503	15.2	6.6
Modernization of the administration section	106,000	2,289 (Cost reduction)	295	1,060	137	1,229	159	13.9	7.2
Total	809,794	48,060	6,200 Improvement of the recovery rate 3,473 Cost reduction 2,727	8,097	1,045	39,963	5,156	59.2	1.7
Existing Facilities in Barones (9,056 t/month)									
Improvement of the processing system	18,500								
Instrumentation	487,550								
Modernization of the administration section	106,000		Improvement of the recovery rate 3,071						
		Improvement of the recovery rate 27,808	Cost reduction 1,191						
Total	612,050	38,595 Cost reduction 10,787	4,262	6,120	676	32,475	3,586	63.7	1.6
Full Total (23,218 t/ month)	2,915,119 (000/US$ 1,100)	124,328	5,355	29,090	1,253	95,238	4,102	39.2	2.6
(Reference) Improvement of Barones Plant (3,900 t/month)	16,025,000 (000 US$ 6,047)								

Table 8.1.2 Estimated Metallurgical Results of the Barones New Plant

System and production	Ore to be processed (t/month)	Grade						Amount of metal						Distribution rate %					
		Au g/t	Az g/t	Pb %	Cu %	Zn %	Fe %	Au g	Ag kg	Pb, t	Cu, t	Zn, t	Fe, t	Au	Ag	Pb	Cu	Zn	Fe
Original ore	3,900.0	0.8	160	0.8	0.4	1.6		3,120	624.0	31.2	15.6	62.4		100	100	100	100	100	
Pb-C	(1.15%) 44.9	14.6	5,143	43.0	5.6	4.2		655	230.9	19.3	2.5	1.9		21	37	62	16	3	
CuC	(1.47%) 57.4	6.5	3,153	5.9	19.0	6.4		374	181.0	3.4	10.9	3.7		12	29	11	70	6	
Zn-C	(2.17%) 84.8	1.5	736	1.9	1.4	50.0		125	62.4	1.6	1.2	42.4		4	10	5	8	68	
Tailings	(95.2%) 3,712.9	0.5	40	0.2	0.1	0.4		1,966	149.8	6.9	0.8	14.4		63	24	22	5	23	
														33	76	73	86	68	
		Au	Ag	Pb	Cu	Zn		Au	Ag	Pb	Cu	Zn		Au	Ag	Pb	Cu	Zn	
Original ore	(3,651.5 t/month)	0.4	126	0.7	0.3	1.2		8,502	2,771	146.8	66.2	261.3		100.0	100.0	100.0	100.0	100.0	
Pb-C	37.6	6.1	2,902	30.2	5.1			1,372	655	68.1	11.6	36.6		16.1	23.6	46.4	17.5		
Cu-C	39.9	1.8	2,284	6.8	18.2	8.4		429	549	16.3	43.4	20.2		5.0	19.7	11.1	65.6		
Zn-C	43.4		530			43.1		346	138	3.7	1.6	112.2		4.1	5.0			42.9	
Tailings	3,539.0							6,354	1,431	58.7	9.6	92.3		74.7	51.6				
														21.1	43.3	57.5	73.1	42.9	
														11.9	32.7	15.5	12.9	25.1	

Table 8.2.1 Cost Estimation for Introduction of Computor

(Unit: US$) 1US$=145 yen

Item	Cost				Note
	Hardware	Existing Software	Software Preparation	Total of Software Costs	
Overall Conception	1.4MB F.P. 60 MB H.P. RAM 1MB CPU 32 Bit 15" color Dis. 15" Serial Printer x two units 20,000		7,000	7,000	
Account of Ore Price		Software for accounts of multi-murpose tables 700	2,700	2,700	
Account of Materials Costs			2,700	2,700	
Materials Receipts and Payments Table			2,700	3,400	
Stock Receipts and Payments Table		700	-	700	
Wage Accounts		700	-	700	
Property Tax Ledger		700	-	700	
Account of Depreciation		700	-	700	
		700	-	700	
Statement of Profit and Loss		700	-	700	
Total	(1) 20,000	4,900	15,100	(2) 20,000	(1) + (2) 40,000

Software is prepared by Mexican engineers.

Table 8.4.1 Metallurgical Results of Barones Beneficiation Plant after Improvement

Product	Weight (t/M)	Grade			Content			Distribution		
		Au(g/t)	Ag(g/t)	Pb(%)	Au (g)	Ag (Kg)	Pb (t)	Au	Ag	Pb
Bulk Flotation -Cyanidation Feed	3,600.0	0.60	171	—	2,160	615.6	—	100.0	100.0	—
Bulk Conc.	34.1	13.99	9,122	—	477	310.9	—	22.1	50.5	—
Au・Ag Residue	214kg	0.06 %	47.1 %	—	119	101.0	—	5.5	16.4	—
Tailings	3,565.7	0.44	57	—	1,564	203.7	—	72.4	33.1	—
Recovery								(27.6)	(66.9)	
Bulk Flotation Feed	5,456.0	0.38	177	—	2,073	965.7	—	100.0	100.0	—
Bulk Flotation	58.6	6.83	9,122	—	400	535.0	—	19.3	55.4	—
Tailing	5,397.4	0.31	80	—	1,673	430.7	—	80.7	44.6	—
Recovery								(19.3)	(55.4)	
Total Feed	9,056.0	0.47	175	—	4,233	1,581.3	—	100.0	100.0	—
Bulk Conc.	92.7	9.46	9,122	—	877	845.9	—	20.7	53.5	—
Au・Ag Residue	214kg	0.06 %	47.1 %	—	119	101.0	—	2.8	6.4	—
Tailings	8,963.1	0.36	71	—	3,237	634.4	—	76.5	40.1	—
Recovery								(23.5)	(59.9)	

Table 8.4.2 Net Sales of Concentrates After Improvement, Barones Plant

BULK-CONC.		BARONES GRADE	CONTENTS	RECOVERY	REC. METAL	VALUE	R/C	PENALTY	SUB TOTAL	M.P.TAX	SUB TOTAL	I.V.A.	US$ TOTAL
DMT T 92.700	PB	3.80 %	3.523 T	1.5UL&90 %	0.000 T	0	0		0	0	0		0
	AU	9.46 G/T	876.9 G	100 %	876.9 G	10,011			10,011	701	9,310		9,310
	AG	9,122.00 G/T	845.609 KG	100 %	845.609 KG	145,561			145,561	10,189	135,372		135,372
	CU	0.50 %	0.464 T	5 KGL	0.000 T	0	0		0	0	0		0
	T/C	77.03 $/DT					7,141		-7,141		-7,141		-7,141
	INSOLUBLE	30.00 %						348	-348		-348		-348
	S	20.00 %						232	-232		-232		-232
	AS	2.00 %						93	-93		-93		-93
	H2O	%											0
	I.V.A.											22,164	22,164
	TOTAL					155,572	7,141	673	147,758	10,890	136,868	22,164	159,032

AU-AG PRECIPITATION		BARONES GRADE	CONTENTS	RECOVERY	REC. METAL	VALUE	R/C	PENALTY	SUB TOTAL	M.P.TAX	SUB TOTAL	I.V.A	US$ TOTAL
DMT T 0.214	PB	0.00 %	0.000 T	1.5UL&90 %	0.000 T	0	0		0	0	0		0
	AU	600.00 G/T	128.4 G	100 %	128.4 G	1,466			1,466	103	1,363		1,363
	AG	471,000.00 G/T	100.794 KG	100 %	100.794 KG	17,350			17,350	1,215	16,135		16,135
	CU	0.00 %	0.000 T		0.000 T	0	0		0	0	0		0
	T/C	77.03 $/DT					16		-16		-16		-16
	INSOLUBLE	0.00 %						0	0		0		0
	S	0.00 %						0	0		0		0
	AS	0.00 %						0	0		0		0
	H2O	%											0
	I.V.A.											2,820	2,820
	TOTAL					18,816	16	0	18,800	1,318	17,482	2,820	20,302

Table 8.5.1 Net Sales of Concentrates, Barones New Plant

CU-CONC.		BARONES GRADE		CONTENTS	RECOVERY	REC. METAL	VALUE	R/C	PENALTY	SUB TOTAL	M.P.TAX	SUB TOTAL	I.V.A	US$ TOTAL
	CU	19.00	%	10.906 T	90 %	9.815 T	28,552	1,945		26,607	1,330	25,277		25,277
DMT T	AU	6.50	G/T	373.1 G	100 %	373.1 G	4,260			4,260	298	3,962		3,962
57.400	AG	3,153.00	G/T	180.928 KG	100 %	180.982 KG	31,154			31,154	2,181	28,973		28,973
	PB	5.90		3.387 T	45 %	1.515 T	960	913		47	2	45		45
WMT T	T/C	79.83	$/DT					4,582		-4,582		-4,582		-4,582
	INSOLUBLE	3.00	%						17	-17		-17		-17
	ZN	6.40	%						0	0		0		0
H30 %	AS	1.00	%						29	-29		-29		-29
	H20		%											0
	I.V.A.												8,616	8,616
	TOTAL						64,926	7,440	46	57,440	3,811	53,629	8,616	62,245

PB-CONC.		BARONES GRADE		CONTENTS	RECOVERY	REC. METAL	VALUE	R/C	PENALTY	SUB TOTAL	M.P.TAX	SUB TOTAL	I.V.A.	US$ TOTAL
	PB	43.00	%	19.307 T	1.5UL&90 %	16.770 T	10,631	1,830		8,801	440	8,361		8,361
DMT T	AU	14.60	G/T	655.5 G	100 %	655.5 G	7,484			7,484	524	6,960		6,960
44.900	AG	5.143.00	G/T	230.921 KG	100 %	230.921 KG	39,750			39,750	2,783	36,967		36,967
	CU	5.60	%	2.514 T	90 %	2.263 T	6,583	1,517		5,066	253	4,813		4,813
WMT T	T/C	77.03	$/DT					3,459		-3,459		-3,459		-3,459
	INSOLUBLE	10.00	%						56	-56		-56		-56
	S	28.00	%						112	-112		-112		-112
H20 %	AS	2.00	%						45	-45		-45		-45
	H20		%											
	I.V.A.												8,614	8,614
	TOTAL						64,448	6,806	213	57,429	4,000	53,429	8,614	62,043

ZN-CONC.		BARONES GRADE		CONTENTS	RECOVERY	REC. METAL	VALUE	R/C	PENALTY	SUB TOTAL	M.P.TAX	SUB TOTAL	I.V.A.	US$ TOTAL
	ZN	50.00	%	42.400 T	8 UL	35.616 T	58,325			58,325	2,916	55,409		55,409
DMT T	AG	736	G/T	62.4 KG	93.3GLES*65%	35.4 KG	6,094			6,094	427	5,667		5,667
84.800	T/C	266.96	$/DT					22,638		-22,638		-22,638		-22,638
	PE	6.50	%						0	0				0
H20 %														
	I.V.A.												6,267	6,267
	TOTAL									41,781	3,343	38,438	6,267	44,705

Table 8.6.1 P/L between Modernization Plan and Present at Parral Plant

(Peso/t)	standard case (Ag=569.281 ¢/oz)			10% up case (Ag=630¢/oz)			10% dawn case (Ag=510¢/oz)			
	modernization plan	Present	Differnce	modernization plan	Present	Differnce	modernization plan	Present	Differnce	
Net Sales	108,220	103,067	5,153	117,598	111,999	5,599	98,841	94,135	4,706	Treatment t/Montn 6,400
Mining Expenses	37,600	37,600	0	37,600	37,600	0	37,600	37,600	0	Peso／$ 2,650
Mill Expenses	24,896	25,262	-366	24,896	25,262	-366	24,896	25,262	-366	amount of investment 563
Depreciation	2,256	421	1,835	2,256	421	1,835	2,256	421	1,835	
Sub-Total of (ost of Goods Sold)	64,752	63,283	1,469	64,752	63,283	1,469	64,752	63,283	1,469	
Gross Profit on Sales	43,468	39,784	3,684	52,846	48,716	4,130	34,089	30,852	3,237	
Selling Expenses	452	452	0	452	452	0	452	452	0	
Administrative Expenses	2,939	3,296	-357	2,939	3,296	-357	2,939	3,296	-357	
Non-Operating Incone	282	282	0	282	282	0	282	282	0	
Non-Operating Experses	485	0	485	485	0	485	485	0	485	
Net Income	39,874	36,318	3,556	49,252	45,250	4,002	30,495	27,386	3,109	
($/year)										
Difference of Production			149,340			162,265			136,385	
Difference of Expenses			-20,953			-20,953			-20,953	
Difference of Depreciation			53,180			53,180			53,180	

Table 8.6.2 Cashflow on Modernization of Existing Facilities at Parral Plant (Case of standard Ag price)

PARRAL AG=569.281 (1000 US DOLLAR)

YEAR		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	TOTAL
+)NET REVENUE			149	149	149	149	149	149	149	149	149	149							1.490
-)OPERATING COST			-21	-21	-21	-21	-21	-21	-21	-21	-21	-21							-210
OPERATING PROFIT			170	170	170	170	170	170	170	170	170	170							1.700
-)DEPRECIATION			53	53	53	53	53	53	53	53	53	53							532
-)INTEREST 5%			28	23	17	11	5	0	0	0	0	0							84
PROFIT BEFORE TAX			89	94	100	106	112	117	117	117	117	117							1.084
-)INCOME TAX 35%			31	33	35	37	39	41	41	41	41	41							380
PROFIT AFTER TAX			58	61	65	69	73	76	76	76	76	76							704
-)INITIAL INVESTMENT		563																	563
-)WORKING CAPITAL																		0	0
+)PRIMARY BANK LOANS		563																	563
-)LOAN REPAYMENT			111	114	118	122	98	0	0	0	0	0	0	0	0	0	0	0	563
SURPLUS			0	0	0	0	28	129	129	129	129	129	0	0	0	0	0	0	673
DEBT OUTSTANDING		563	452	338	220	98	0	0	0	0	0	0	0	0	0	0	0	0	0
BEFORE INTEREST NET CASH FLOW		-563	139	137	135	133	131	129	129	129	129	129	0	0	0	0	0	0	757
NET PRESENT VALUES OF N.C.F. AT DISCOUNT RARES:	6%	-531	124	115	107	99	92	86	81	76	72	68	0	0	0	0	0	0	389
	8%	-521	119	109	99	90	83	75	70	65	60	55	0	0	0	0	0	0	303
	10%	-512	115	103	92	83	74	66	60	55	50	45	0	0	0	0	0	0	230
	12%	-503	111	97	86	75	66	58	52	47	42	37	0	0	0	0	0	0	169
	14%	-494	107	92	80	69	60	52	45	40	35	31	0	0	0	0	0	0	116
	16%	-485	103	88	75	63	54	46	39	34	29	25	0	0	0	0	0	0	71

INTERNAL RATE OF RETURN: 19.9 %

Table 8.6.3 Cashflow on Modernization of Existing Facilities at Parral Plant (Case of 10% up Ag price)

PARRAL AG=630 (1000 US DOLLAR)

YEAR		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	TOTAL
+)NET REVENUE			162	162	162	162	162	162	162	162	162	162							1.623
-)OPERATING COST			-21	-21	-21	-21	-21	-21	-21	-21	-21	-21							-210
OPERATING PROFIT			183	183	183	183	183	183	183	183	183	183							1.832
-)DEPRECIATION			53	53	53	53	53	53	53	53	53	53							532
-)INTEREST 5%			28	22	16	10	3	0	0	0	0	0							79
PROFIT BEFORE TAX			102	108	114	120	127	130	130	130	130	130							1.221
-)INCOME TAX 35%			36	38	40	42	44	46	46	46	46	46							430
PROFIT AFTER TAX			66	70	74	78	83	84	84	84	84	84							791
-)INITIAL INVESTMENT		563																	563
-)WORKING CAPITAL																		0	0
+)PRIMARY BANK LOANS		563																	563
-)LOAN REPAYMENT			119	123	127	131	62	0	0	0	0	0	0	0	0	0	0	0	563
SURPLUS			0	0	0	0	74	137	137	137	137	137	0	0	0	0	0	0	760
DEBT OUTSTANDING		563	444	321	193	62	0	0	0	0	0	0	0	0	0	0	0	0	0
BEFORE INTEREST																			
NET CASH FLOW		-563	147	145	143	141	139	137	137	137	137	137	0	0	0	0	0	0	839
	6%	-531	131	122	113	106	98	91	86	81	77	72	0	0	0	0	0	0	446
NET PRESENT VALUES	8%	-521	126	115	105	96	88	80	74	69	64	59	0	0	0	0	0	0	355
OF N.C.F. AT	10%	-512	122	109	98	88	79	70	64	58	53	48	0	0	0	0	0	0	277
DISCOUNT RARES:	12%	-503	117	103	91	80	71	62	55	49	44	39	0	0	0	0	0	0	210
	14%	-494	113	98	85	73	63	55	48	42	37	32	0	0	0	0	0	0	154
	16%	-485	109	93	79	67	57	49	42	36	31	27	0	0	0	0	0	0	105

INTERNAL RATE OF RETURN: 21.7 %

Table 8.6.4 Cashfolw on Modernization of Existing Facilities at Parral Plant (Case of 10% down Ag price)

PARRAL AG=510 (1000 US DOLLAR)

YEAR		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	TOTAL
+)NET REVENUE			136	136	136	136	136	136	136	136	136	136							1,360
-)OPERATING COST			-21	-21	-21	-21	-21	-21	-21	-21	-21	-21							-210
OPERATING PROFIT			157	157	157	157	157	157	157	157	157	157							1,570
-)DEPRECIATION			53	53	53	53	53	53	53	53	53	53							532
-)INTEREST 5%			28	23	18	12	7	1	0	0	0	0							89
PROFIT BEFORE TAX			76	81	86	92	97	103	104	104	104	104							949
-)INCOME TAX 35%			27	28	30	32	34	36	36	36	36	36							331
PROFIT AFTER TAX			49	53	56	60	63	67	68	68	68	68							618
-)INITIAL INVESTMENT		563																	563
-)WORKING CAPITAL																		0	0
+)PRIMARY BANK LOANS		563																	563
-)LOAN REPAYMENT			102	106	109	113	116	17	0	0	0	0	0	0	0	0	0	0	563
SURPLUS			0	0	0	0	0	103	121	121	121	121	0	0	0	0	0	0	587
DEBT OUTSTANDING		563	461	355	246	133	17	0	0	0	0	0	0	0	0	0	0	0	0
BEFORE INTEREST																			
NET CASH FLOW		-563	130	129	127	125	123	121	121	121	121	121	0	0	0	0	0	0	676
	6%	-531	116	108	101	93	87	80	76	72	68	64	0	0	0	0	0	0	333
NET PRESENT VALUES	8%	-521	111	102	93	85	77	71	65	61	56	52	0	0	0	0	0	0	253
OF N.C.F. AT	10%	-512	107	97	87	78	69	62	56	51	47	42	0	0	0	0	0	0	185
DISCOUNT RARES:	12%	-503	104	92	81	71	62	55	49	44	39	35	0	0	0	0	0	0	127
	14%	-494	100	87	75	65	56	48	42	37	33	29	0	0	0	0	0	0	78
	16%	-485	97	83	70	59	50	43	37	32	27	24	0	0	0	0	0	0	36

INTERNAL RATE OF RETURN: 18.0 %

Table 8.6.5 P/L between Modernization Plan and Present at Guanacevi Plant

(Peso/t)	standard case (Ag=569.281 ¢/oz)			10% up case (Ag=630¢/oz)			10% dawn case (Ag=510¢/oz)			
	modernization plan	Present	Differnce	modernization plan	Present	Differnce	modernization plan	Present	Differnce	
Net Sales	119,263	115,790	3,473	127,775	124,054	3,721	110,750	107,525	3,225	Treatment t/Montn 7,751
Mining Expenses	45,300	45,300	0	45,300	45,300	0	45,300	45,300	0	Peso／$ 2,650
Mill Expenses	25,142	27,574	-2,432	25,142	27,574	-2,432	25,142	27,574	-2,432	amount of investment 306
Depreciation	1,265	438	827	1,265	438	827	1,265	438	827	
Sub-Total of (ost of Goods Sold)	71,707	73,312	-1,605	71,707	73,312	-1,605	71,707	7,312	-1,605	
Gross Profit on Sales	47,556	42,478	5,078	56,068	50,742	5,326	39,043	34,213	4,830	
Selling Expenses	500	500	0	500	500	0	500	500	0	
Administrative Expenses	2,295	2,590	-295	2,295	2,590	-295	2,295	2,590	-295	
Non-Operating Incone	549	549	0	549	549	0	549	549	0	
Non-Operating Experses	921	703	218	921	703	218	921	703	218	
Net Income	44,389	39,234	5,155	52,901	47,498	5,403	35,876	30,969	4,907	
($/year)										
Difference of Production			121,898			130,603			113,194	
Difference of Expenses			-95,715			-95,715			-95,715	
Difference of Depreciation			29,027			29,027			29,027	

Table 8.6.6 Cashflow on Modernization of Existing Facilities at Guanacevi Plant (Case of Standard Ag price)

GUANACEVI AG=569.281 (1000 US DOLLAR)

YEAR		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	TOTAL
+)NET REVENUE			122	122	122	122	122	122	122	122	122	122							1.220
-)OPERATING COST			-96	-96	-96	-96	-96	-96	-96	-96	-96	-96							-960
OPERATING PROFIT			218	218	218	218	218	218	218	218	218	218							2.180
-)DEPRECIATION			29	29	29	29	29	29	29	29	29	29							290
-)INTEREST 5%			15	8	1	0	0	0	0	0	0	0							24
PROFIT BEFORE TAX			174	181	188	189	189	189	189	189	189	189							1.866
-)INCOME TAX 35%			61	63	66	66	66	66	66	66	66	66							652
PROFIT AFTER TAX			113	118	122	123	123	123	123	123	123	123							1.214
-)INITIAL INVESTMENT		306																	306
-)WORKING CAPITAL																		0	0
+)PRIMARY BANK LOANS		306																	306
-)LOAN REPAYMENT			142	147	17	0	0	0	0	0	0	0	0	0	0	0	0	0	306
SURPLUS			0	0	134	152	152	152	152	152	152	152	0	0	0	0	0	0	1.198
DEBT OUTSTANDING		306	164	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BEFORE INTEREST																			
NET CASH FLOW		-306	157	155	152	152	152	152	152	152	152	152	0	0	0	0	0	0	1.222
	6%	-289	140	130	120	114	107	101	95	90	85	80	0	0	0	0	0	0	774
NET PRESENT VALUES	8%	-283	135	123	112	103	96	89	82	76	70	65	0	0	0	0	0	0	668
OF N.C.F. AT	10%	-278	130	116	104	94	86	78	71	64	59	53	0	0	0	0	0	0	577
DISCOUNT RARES:	12%	-273	125	110	97	86	77	69	61	55	49	44	0	0	0	0	0	0	500
	14%	-268	121	105	90	79	69	61	53	47	41	36	0	0	0	0	0	0	433
	16%	-264	117	99	84	72	62	54	46	40	34	30	0	0	0	0	0	0	375

INTERNAL RATE OF RETURN: 49.5 %

Table 8.6.7 Cashflow on Modernization of Existing Facilities at Guanacevi Plant (Case of 10% up Ag price)

GUANACEVI AG=630 (1000 US DOLLAR)

YEAR		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	TOTAL
+)NET REVENUE			131	131	131	131	131	131	131	131	131	131							1.310
-)OPERATING COST			-96	-96	-96	-96	-96	-96	-96	-96	-96	-96							-960
OPERATING PROFIT			227	227	227	227	227	227	227	227	227	227							2.270
-)DEPRECIATION			29	29	29	29	29	29	29	29	29	29							290
-)INTEREST 5%			15	8	0	0	0	0	0	0	0	0							23
PROFIT BEFORE TAX			183	190	198	198	198	198	198	198	198	198							1.957
-)INCOME TAX 35%			64	67	69	69	69	69	69	69	69	69							683
PROFIT AFTER TAX			119	123	129	129	129	129	129	129	129	129							1.274
-)INITIAL INVESTMENT		306																	306
-)WORKING CAPITAL																		0	0
+)PRIMARY BANK LOANS		306																	306
-)LOAN REPAYMENT			148	152	6	0	0	0	0	0	0	0	0	0	0	0	0	0	306
SURPLUS			0	0	152	158	158	158	158	158	158	158	0	0	0	0	0	0	1.258
DEBT OUTSTANDING		306	158	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BEFORE INTEREST NET CASH FLOW		-306	163	160	158	158	158	158	158	158	158	158	0	0	0	0	0	0	1.281
NET PRESENT VALUES OF N.C.F. AT DISCOUNT RARES:	6%	-289	145	134	125	118	111	105	99	94	88	83	0	0	0	0	0	0	815
	8%	-283	140	127	116	108	100	92	85	79	73	68	0	0	0	0	0	0	704
	10%	-278	135	120	108	98	89	81	74	67	61	55	0	0	0	0	0	0	610
	12%	-273	130	114	100	90	80	71	64	57	51	45	0	0	0	0	0	0	529
	14%	-268	125	108	94	82	72	63	55	49	43	37	0	0	0	0	0	0	460
	16%	-264	121	103	87	75	65	56	48	42	36	31	0	0	0	0	0	0	400

INTERNAL RATE OF RETURN: 51.5 %

Table 8.6.8 Cashflow on Modernization of Existing Facilities at Guanacevi Plant (Case of 10% down Ag price)

GUANACEVI AG=510 (1000 US DOLLAR)

YEAR		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	TOTAL
+)NET REVENUE			113	113	113	113	113	113	113	113	113	113							1.130
-)OPERATING COST			-96	-96	-96	-96	-96	-96	-96	-96	-96	-96							-960
OPERATING PROFIT			209	209	209	209	209	209	209	209	209	209							2.090
-)DEPRECIATION			29	29	29	29	29	29	29	29	29	29							290
-)INTEREST 5%			15	9	2	0	0	0	0	0	0	0							26
PROFIT BEFORE TAX			165	171	178	180	180	180	180	180	180	180							1.774
-)INCOME TAX 35%			58	60	62	63	63	63	63	63	63	63							621
PROFIT AFTER TAX			107	111	116	117	117	117	117	117	117	117							1.153
-)INITIAL INVESTMENT		306																	306
-)WORKING CAPITAL																		0	0
+)PRIMARY BANK LOANS		306																	306
-)LOAN REPAYMENT			136	140	30	0	0	0	0	0	0	0	0	0	0	0	0	0	306
SURPLUS			0	0	115	146	146	146	146	146	146	146	0	0	0	0	0	0	1.137
DEBT OUTSTANDING		306	170	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BEFORE INTEREST																			
NET CASH FLOW		-306	151	149	147	146	146	146	146	146	146	146	0	0	0	0	0	0	1.163
	6%	-289	134	125	116	109	103	97	92	86	82	77	0	0	0	0	0	0	733
NET PRESENT VALUES	8%	-283	129	118	108	99	92	85	79	73	68	63	0	0	0	0	0	0	631
OF N.C.F. AT	10%	-278	125	112	100	91	82	75	68	62	56	51	0	0	0	0	0	0	544
DISCOUNT RARES:	12%	-273	120	106	93	83	74	66	59	53	47	42	0	0	0	0	0	0	470
	14%	-268	116	101	87	76	67	58	51	45	39	35	0	0	0	0	0	0	406
	16%	-264	112	95	81	70	60	52	45	38	33	29	0	0	0	0	0	0	351

INTERNAL RATE OF RETURN: 47.5 %

Table 8.6.9 P/L between Modernization Plan and Present at Barones Plant

(Peso/t)	standard case (Ag=569.281 ¢/oz)			10% up case (Ag=630 ¢/oz)			10% dawn case (Ag=510 ¢/oz)			
	modernization plan	Present	Differnce	modernization plan	Present	Differnce	modernization plan	Present	Differnce	
Net Sales	52,170	49,099	3,071	54,636	51,420	3,216	49,704	46,779	2,925	Treatment t/Montn 9,056
Mining Expenses	38,100	38,100	0	38,100	38,100	0	38,100	38,100	0	Peso/$ 2,650
Mill Expenses	23,861	24,800	-939	23,861	24,800	-939	23,861	224,800	-939	amount of investment 231
Depreciation	760	226	534	760	226	534	760	226	534	
Sub-Total of (ost of Goods Sold)	62,721	63,126	-405	62,721	63,126	-405	62,721	63,126	-405	
Gross Profit on Sales	-10,551	-14,027	3,476	-8,085	-11,706	3,621	-13,017	-16,347	3,330	
Selling Expenses	1,307	1,307	0	1,307	1,307	0	1,307	1,307	0	
Administrative Expenses	1,704	1,956	-252	1,704	1,956	-252	1,704	1,956	-252	
Non-Operating Incone	306	306	0	306	306	0	306	306	0	
Non-Operating Experses	142	0	142	142	0	142	142	0	142	
Net Income	-13,398	-16,984	3,586	-10,932	-14,663	3,731	-15,864	-19,304	3,440	
($/year)										
Difference of Production			125,936			131,883			119,919	
Difference of Expenses			-48,841			-48,841			-48,841	
Difference of Depreciation			21,898			21,898			21,898	

Table 8.6.10 Cashflow on Modernization of Existing Facilities at Barones Plant (Case of standard Ag price)

BARONES AG=569.281 (1000 US DOLLAR)

YEAR		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	TOTAL
+)NET REVENUE			126	126	126	126	126	126	126	126	126	126							1.260
-)OPERATING COST			-49	-49	-49	-49	-49	-49	-49	-49	-49	-49							-490
OPERATING PROFIT			175	175	175	175	175	175	175	175	175	175							1.750
-)DEPRECIATION			22	22	22	22	22	22	22	22	22	22							220
-)INTEREST 5%			12	6	0	0	0	0	0	0	0	0							18
PROFIT BEFORE TAX			141	147	153	153	153	153	153	153	153	153							1.512
-)INCOME TAX 35%			49	51	54	54	54	54	54	54	54	54							532
PROFIT AFTER TAX			92	96	99	99	99	99	99	99	99	99							980
-)INITIAL INVESTMENT		231																	231
-)WORKING CAPITAL																		0	0
+)PRIMARY BANK LOANS		231																	231
-)LOAN REPAYMENT			114	117	0	0	0	0	0	0	0	0	0	0	0	0	0	0	231
SURPLUS			0	1	121	121	121	121	121	121	121	121	0	0	0	0	0	0	969
DEBT OUTSTANDING		231	117	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BEFORE INTEREST																			
NET CASH FLOW		-231	126	124	121	121	121	121	121	121	121	121	0	0	0	0	0	0	987
	6%	-218	112	104	96	90	85	80	76	72	68	64	0	0	0	0	0	0	629
NET PRESENT VALUES	8%	-214	108	98	89	82	76	71	65	61	56	52	0	0	0	0	0	0	545
OF N.C.F. AT	10%	-210	104	93	83	75	68	62	56	51	47	42	0	0	0	0	0	0	472
DISCOUNT RARES:	12%	-206	100	88	77	69	61	55	49	44	39	35	0	0	0	0	0	0	410
	14%	-203	97	84	72	63	55	48	42	37	33	29	0	0	0	0	0	0	357
	16%	-199	94	79	67	58	50	43	37	32	27	24	0	0	0	0	0	0	311

INTERNAL RATE OF RETURN: 52.7 %