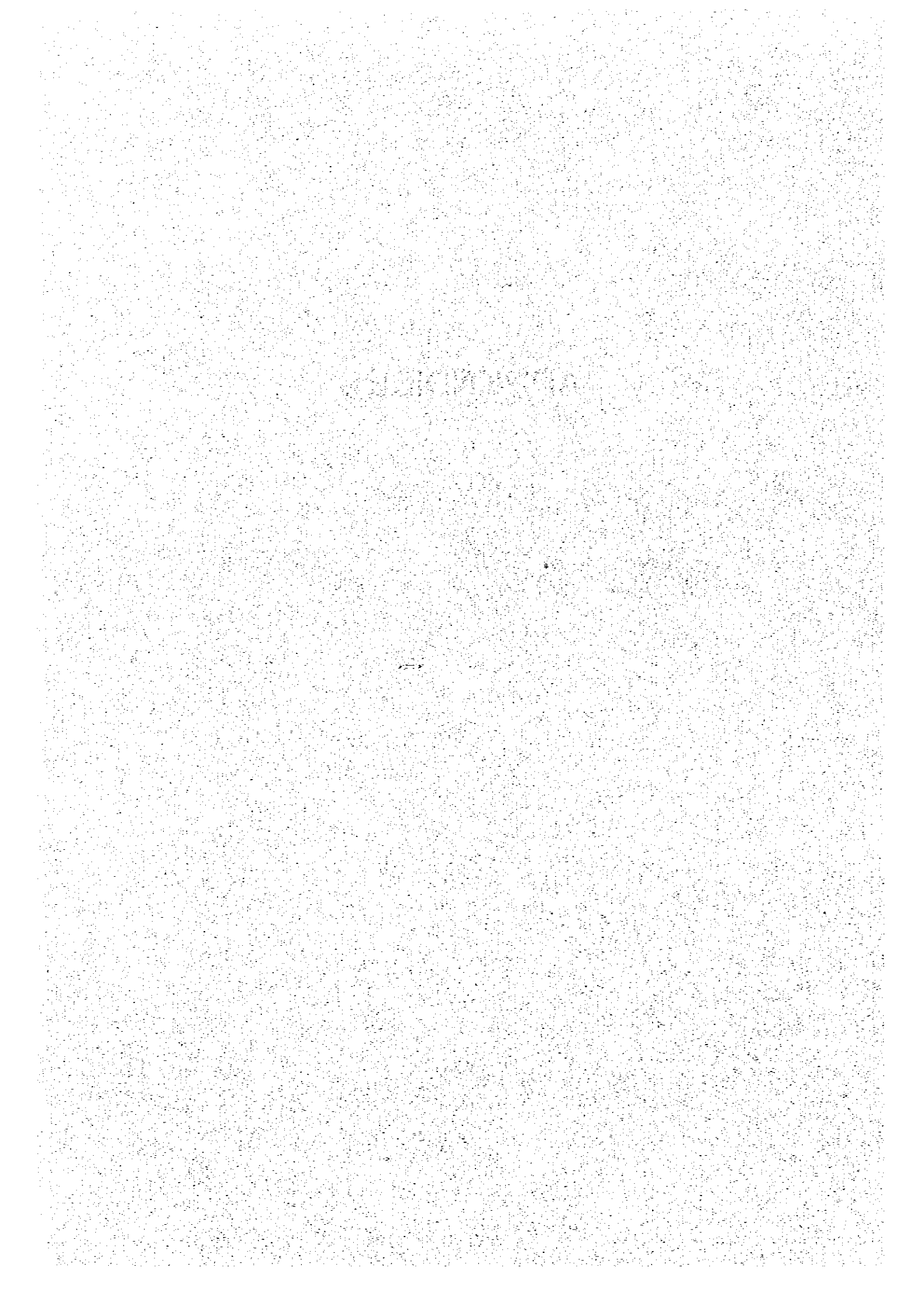


APPENDICES



AII-1 Detail of Projected Personnel of Administration Department

Item	Salary Worker	Daily Labor	Total	Item	Salary Worker	Daily Labor	Total
General Affairs Sec.				Social Welfare Sec.			
Staffs	2	—	2	Staff	3		
Admin. of Club	}	1	6	Admin. of Company's	7	20 (-2)	
Dispatch and Receipt of Message				House and Equipments for Social Welfare			
Data Arrangement				Sanitation			
Radio	}	1	11	Subtotal	12	20	32
Telephone Exchange				Pulperia Sec.			
Admin. of Fixed Assets	}	36	40	Staff	4		4
Watchman Cleaner				Warehouse for Pulperia	4	4	8
Subtotal	21	38	59	Pulperia	18 (-2)	6	24
Account Sec.				Bakery	1	2	3
Staff	2	1		Meat factory	2		2
Finance	4			Greengrocery's Shop			
Cashier	2			Subtotal	29	12	41
Cost	}			Education Sec.			
Budget and Settlement				3			Staff
Subtotal	11	1	12	Admin. of Employ.	1		1
Computer Sec.				Admin. of Material	1	2	3
Staff	2	1	3	Primary School	40 (-2)	9	49
Operator	6		6	Secondary School	36	6	42
Subtotal	8	1	9	Subtotal	80	17	97
Business Sec.				Medical Sec.			
Staff	4		4	Staff	3		3
Warehouse	5	14	19	Admin. of Medical	1		1
Printing House	1	2	3	Staff			
Delivery and Reception of Mineral	}	6	18	Medical Material	1	1	2
Transportation and Movement of Vehicles				Admin. of Hospitals and Clinics	40	15	55
Loading	4	24	28	Admin. of Nurse			
Subtotal	26	46	72	School	5	2	7
Labor Sec.				Subtotal	50	18	68
Staff	2		2	Executive Members	6		6
Personnel Records	}		4	Staff	18		18
Retirement and Employment				Subtotal	24	24	
Salary Calculation	5		5	Total	277	159	436
Admin. of Time Card and Labor Record	5 (-5)	6	11	- (Medical Sec.)	50	18	68
Subtotal	16	6	22	- (Loading)	4	24	28
				Total of Cost Calculation	223	117	340

Note: () Indicates a reduction of staff in the case of operation since the 8th year at 10,000 t/day

A II-2 Details of Construction Costs of Administration Department

o	Vehicles			
	Jeeps	3	@ \$ 15,000	\$ 45,000
	Small cars	5	@ \$ 13,000	\$ 65,000
	Small pick-ups	7	@ \$ 10,000	\$ 70,000
	Total	15	av. @ \$ 12,000	\$180,000
o	Business and Telecommunication Machines			
	Copiers	5	av. @ \$ 5,000	\$ 25,000
	Small computers	6	av. @ \$ 20,000	\$120,000
	Telecommunications system			\$ 50,000
	* one each for Mining Maintenance and Construction Section, and two for office			
o	Office Improvements			\$100,000
	Total			\$455,000

A II-3 Changes in Net Income Per Ton of Crude Ore by Grades, and Changes in Quotation by US\$ 1.00/lb (10,000 t/day base)

	Grade of crude ore (%)	0.36	0.34	0.32	0.30	0.28	0.26
(1)	For high-grade concentrate						
	Grade of concentrate (%)	50	50	50	50	48	45
	For \$ 1 of quotation ^{*1} (\$)	4.38	4.06	3.76	3.46	3.06	2.67
(-)	For insurance bill ^{*2} (\$)	0.01	0.01	0.01	0.01	0.01	0.00
	Net income (\$) :	4.37	4.05	3.75	3.45	3.05	2.67
(2)	For low-grade concentrate						
	Grade of concentrate (%)	4.1	4.1	4.1	4.1	4.2	4.4
	For \$ 1 of quotation (\$) :	0.08	0.08	0.07	0.07	0.08	0.10
(3)	Total (S)	4.45	4.13	3.82	3.52	3.13	2.77

*1 : (metal content) x 0.97 x 2.20462 x 1

*2 : x 0.1683 %

A II-4 Net Income Per Ton of Crude Ore by Grades, 10,000 t/day Base

1.	Grade of crude ore (%)		0.36	0.34	0.32	0.30	0.28	0.26
2.	High-grade ore							
	Tin content (k)		3.6	3.4	3.2	3.0	2.8	2.6
	Net yield rate (%)		57	56	55	54	51	48
	Net tin yield (k)		2.05	1.90	1.76	1.62	1.43	1.25
	Grade of conc. (%)		50	50	50	50	48	45
	Conc. (dry) (k)		4.10	3.80	3.52	3.24	2.98	2.78
	Moisture (%)		2.8	2.8	2.8	2.8	3.0	3.0
	Conc. (wet) (k)		4.22	3.91	3.62	3.33	3.07	2.87
	Quotation (US\$/lb)		6.00	6.00	6.00	6.00	6.00	6.00
	Value (US\$)		27.12	25.13	23.28	21.43	18.92	16.53
	Refining cost (A) "		0.81	0.75	0.70	0.64	0.61	0.59
	(B) "		3.30	3.06	2.84	2.61	2.40	2.24
	Selling cost (A) "		0.13	0.13	0.12	0.11	0.10	0.09
	(B) "		0.43	0.40	0.37	0.34	0.30	0.26
	(C) "		0.04	0.04	0.03	0.03	0.03	0.02
	(Total) "		4.71	4.38	4.06	3.73	3.44	3.20
	Net income (US\$)		22.41	20.75	19.22	17.70	15.48	13.33
3.	Low-grade ore							
	Tin content (k)		3.6	3.4	3.2	3.0	2.8	2.6
	Net yield rate (%)		5	5	5	5	6	7.9
	Net tin yield (k)		0.18	0.17	0.16	0.15	0.17	0.21
	Grade of conc. (%)		4.10	4.10	4.10	4.10	4.20	4.40
	Conc. (dry) (k)		4.39	4.15	3.90	3.65	4.05	4.77
	Moisture (%)		2.5	2.5	2.5	2.5	2.5	2.5
	Conc. (wet) (k)		4.50	4.26	4.00	3.74	4.15	4.89
	Quotation (US\$/lb)		6.00	6.00	6.00	6.00	6.00	6.00
	Value (US\$)		2.38	2.25	2.16	1.98	2.25	2.78
	Refining cost "		1.95	1.84	1.78	1.62	1.84	2.25
	Selling cost "		0.15	0.14	0.13	0.12	0.14	0.16
	Net income "		0.28	0.27	0.25	0.24	0.27	0.37
4.	Total (US\$)		22.69	21.02	19.47	17.94	15.75	13.70

A II-5 Bases for Calculation of Revenue

The following data are used as bases for the calculation of revenue on 9,000 and 8,000 t/day treatment amounts.

	(Ore)	(Grade)	(Tin)	(Yield rate)	(Moisture)
(A) Production Plan for 9,000 t/day Treatment					
Mining					
Underground	2,500 t	0.41	10.25 t		
Dump	6,500 t	0.27	17.55 t		
Total	9,000 t	0.31	27.80 t		
Concentrate					
High-grade (dry)	30.58 t	50.0	15.29 t	55%	
(wet)	31.46 t				2.8%
Low-grade (dry)	33.90 t	4.10	1.39 t	5%	
(wet)	34.77 t				2.5%
Total tin yield rate : 60%					
Total tin yield : 16.68 t/day					
(B) Production Plan for 8,000 t/day Treatment					
Mining					
Underground	2,500 t	0.41	10.25 t		
Dump	5,500 t	0.27	14.85 t		
Total	8,000 t	0.314	25.10 t		
Concentrate					
High-grade (dry)	27.61 t	50.0	18.805 t	55%	
(wet)	28.41 t				2.8%
	(812 bags)				
Low-grade (dry)	30.61 t	4.10	1.255 t	5%	
(wet)	31.39 t				2.5%
	(628 bags)				
Total tin yield rate : 60%					
Total tin yield : 15.06 t/day					

Note: Records at Calavi Mine

Average Jan. to Dec. 1981 - 11.46 t/day

Average Jan. to June 1982 - 10.16 t/day

A II-6 Bases for Calculation of Selling Cost-Loading Cost

(1) Labor Costs for Loading

Foreman	4 persons (month)	(checking of shipping quantities arrangement of lots, etc.)
Stuffing concentrates into bags	10 " (day)	
Sampling	3 " "	
Seaming bag mouths	2 " "	(with portable sewing machines)
Loading onto freight cars	9 " "	(with portable conveyors)
Total	28 persons x @\$8 = \$224	} = \$229
	others = \$ 5	

Note :

Treatment per day	10,000 t	9,000 t	8,000 t
	(1st - 7th)	(8th - 10th)	
	76.2 t	76.5 t	59.8 t
	1,834 bags	1,785 bags	1,440 bags
Actual labor (6 hr)	12.9 t	12.8 t	9.9 t/hr
Number of bags	306	298	240 /hr
Labor cost (\$)	229	230	179

(2) $\$ 229 \div 76.2 \text{ t} = 3.00 (\$/\text{t})$

A II-7 Calculation of Amount of Interest during Construction

(A) For 10,000 t/day Treatment

		(Interest rate)				
		12%	10%	8%	6%	4%
Outstanding debt 3 years before stand up	51,258	6,151	5,126	4,101	3,075	2,050
" 2 "	80,509	9,661	8,051	6,441	4,831	3,220
" 1 "	116,325	13,959	11,633	9,306	6,980	4,653
(Total)	(248,092)	29,771	24,810	19,848	14,886	9,923
		(4,961)	(4,962)	(4,962)	(4,962)	(4,963)

(B) For 9,000 t/day Treatment

Outstanding debt 3 years before stand up	47,706	5,725	4,771	3,816	2,862	1,908
" 2 "	80,445	9,653	8,045	6,436	4,827	3,218
" 1 "	108,092	12,971	10,809	8,647	6,486	4,324
(Total)	(236,243)	28,349	23,625	18,899	14,175	9,450

(C) For 8,000 t/day Treatment

Outstanding debt 3 years before stand up	44,870	5,384	4,487	3,590	2,692	1,795
" 2 "	75,711	9,085	7,571	6,057	4,543	3,028
" 1 "	101,744	12,209	10,174	8,140	6,105	4,070
(Total)	(222,325)	26,678	22,232	17,787	13,340	8,893
		(4,446)	(4,445)	(4,447)	(4,447)	

Note : All figures other than interest rates are in thousand dollars.

A II-8 Calculation of Interest (Total for 10 years)

(A) For 10,000 t/day Treatment

(1) Construction funds

1.	132,211			
2.	118,090			
3.	104,965			
4.	91,848			
5.	78,727			
6.	65,606			
7.	52,485	$642,932 \times 6\% =$	4,800	
			<u>38,576</u>	
8.	39,364			} 43,300
9.	26,243		4,200	
			<u>14,000</u>	
10.	13,127	$78,729 \times 6\% =$	4,724	
				<u>57,300</u>

(\$ 1.910 /ton of crude ores)

(2) Working capital

$279,922 \times 0.5 \times 10\% = 14,000$

Total remainder : 861,622

(3) Increment of 1% in interest rate : 8,616 (\$0.287/t)

(B) For 9,000 t/day Treatment

(1) $122,267 \times 11/2 \times 6\% = 40,348$

(2) $256,700 \times 0.5 \times 10\% = 12,835$ = 58,183
(\$ 1.970/ton of crude ores)

Total remainder : 800,819

(3) Increment of 1% in interest rate : 8,008 (\$0.297/t)

(C) For 8,000 t/day Treatment

(1) $115,084 \times 11/2 \times 6\% = 37,978$

(2) $237,440 \times 0.5 \times 10\% = 11,872$ = 49,850
(\$ 2.077/ton of crude ores)

Total remainder : 751,682

(3) Increment of 1% in interest rate : 7,517 (\$ 0.313/t)

Note : All figures without any unit indication are in thousand dollars.

A II-9 Construction Cost by Amount of Interest

(A) For 10,000 t/day Treatment

		116,325	Total cost
Construction cost			-
Interest rate during term	(12%)	29,771	146,096
"	(10%)	24,810	141,135
"	(8%)	19,848	136,173
"	(6%)	14,886	131,211
"	(4%)	9,923	126,248

(Note : Increment by 1%-up of interest rate = 2,481)

(B) For 9,000 t/day Treatment

Construction cost		108,092	-
Interest rate during term	(12%)	28,349	136,441
"	(10%)	23,625	131,717
"	(8%)	18,899	126,991
"	(6%)	14,175	122,267
"	(4%)	9,450	117,542

(Note : Increment by 1%-up of interest rate = 2,362.4)

(C) For 8,000 t/day Treatment

Construction cost		101,744	-
Interest rate during term	(12%)	26,678	128,422
"	(10%)	22,232	123,976
"	(8%)	17,787	119,531
"	(6%)	13,340	115,084
"	(4%)	8,893	110,637

Note : Increment of 1% in interest rate = 2,223)

Note : All figures other than interest rates are in thousand dollars.

A II-10 Detail of Construction Cost (In the case of 10,000 t/day Treatment)
In 1,000 US\$

	Years			Total
	3 years before start up	2 years before start up	1 year before start up	
1. Mining Equipment				
Development	739	1,052	900	2,691
Heavy machinery	1,360	1,360	1,361	4,081
(Sub total)	2,099	2,412	2,261	6,772
2. Concentration equipment				
Machinery	23,432	13,004	13,004	49,440
Construction equipment	9,451	7,061	2,737	19,249
Electrical equipment	3,189	3,189	3,190	9,568
(Sub total)	36,072	23,254	18,931	78,257
3. Service water equipment				
Machinery	885	886	886	2,657
Construction equipment	78	77		155
Electrical equipment	241	241	240	722
(Sub total)	1,204	1,204	1,126	3,534
4. Waste heap equipment				
Heavy Machinery	1,898	-	-	1,898
Construction of waste heap	141	286	286	713
Drainage equipment	341	680	680	1,701
Hydraulic tailing transportation	-	180	180	360
Construction of roads	60	-	-	60
(Sub total)	2,440	1,146	1,146	4,732
5. Building and Houses	653	653	327	1,633
6. Equipment of Administration	180	137	138	455
7. Other Expenses				
Supervision	1,142	1,142	1,143	3,427
Reserve	2,524	1,344	1,040	4,908
Engineering fees	2,104	1,119	865	4,088
Miscellaneous expenses	2,804	2,840	2,839	8,519
(Sub total)	8,610	6,445	5,887	20,942
Total	51,258	35,251	29,816	116,325

A II-11 Details of Construction Costs (In the case of 9,000 t/day Treatment)

In 1,000 US\$

	Years			Total
	3 years before start up	2 years before start up	1 year before start up	
Mining equipment	1,745	1,995	1,872	5,612
Concentration, water and dam equipment	36,973	23,843	19,734	80,550
Buildings and house equipment for administration	833	790	465	2,088
Other expenses	8,155	6,111	5,576	19,842
Total	47,706	32,739	27,647	108,092

A II-12 Details of Construction Costs (In the case of 8,000 t/day Treatment)

In 1,000 US\$

	Years			Total
	3 years before start up	2 years before start up	1 year before start up	
Mining equipment	1,687	1,937	1,812	5,436
Concentration, water and dam equipment	34,669	22,358	18,505	75,532
Buildings and houses equipment for administration	883	790	465	2,088
Other expenses	7,681	5,756	5,251	18,688
Total	44,870	30,841	26,033	101,744

A II-13 Construction Cost for Mineral Concentration and Water Equipment and Their Detail

(1,000 US\$)

Capacity		10,000 t/D	9,000 t/D	8,000 t/D	Note
Costs					
1.	Mineral Concentration Equipment	78,257	73,209	67,961	See following page for detail
	Machinery	49,440	46,411	43,245	
	Construction	19,249	17,816	16,347	
	Electric Equipment	9,568	8,982	8,369	
2.	Water Equipment	3,533	3,318	3,092	See following page for detail
	Machinery	2,657	2,494	2,324	
	Construction	155	146	136	
	Electric Equipment	721	678	632	
3.	Other Expenses	20,942	19,842	18,688	
	Supervisor	3,427	3,427	3,427	
	Reserve	4,908	4,592	4,262	
	Engineering Fee	4,088	3,827	3,554	
	Overhead Expenses	8,519	7,996	7,446	
	Total	102,732	96,369	89,741	

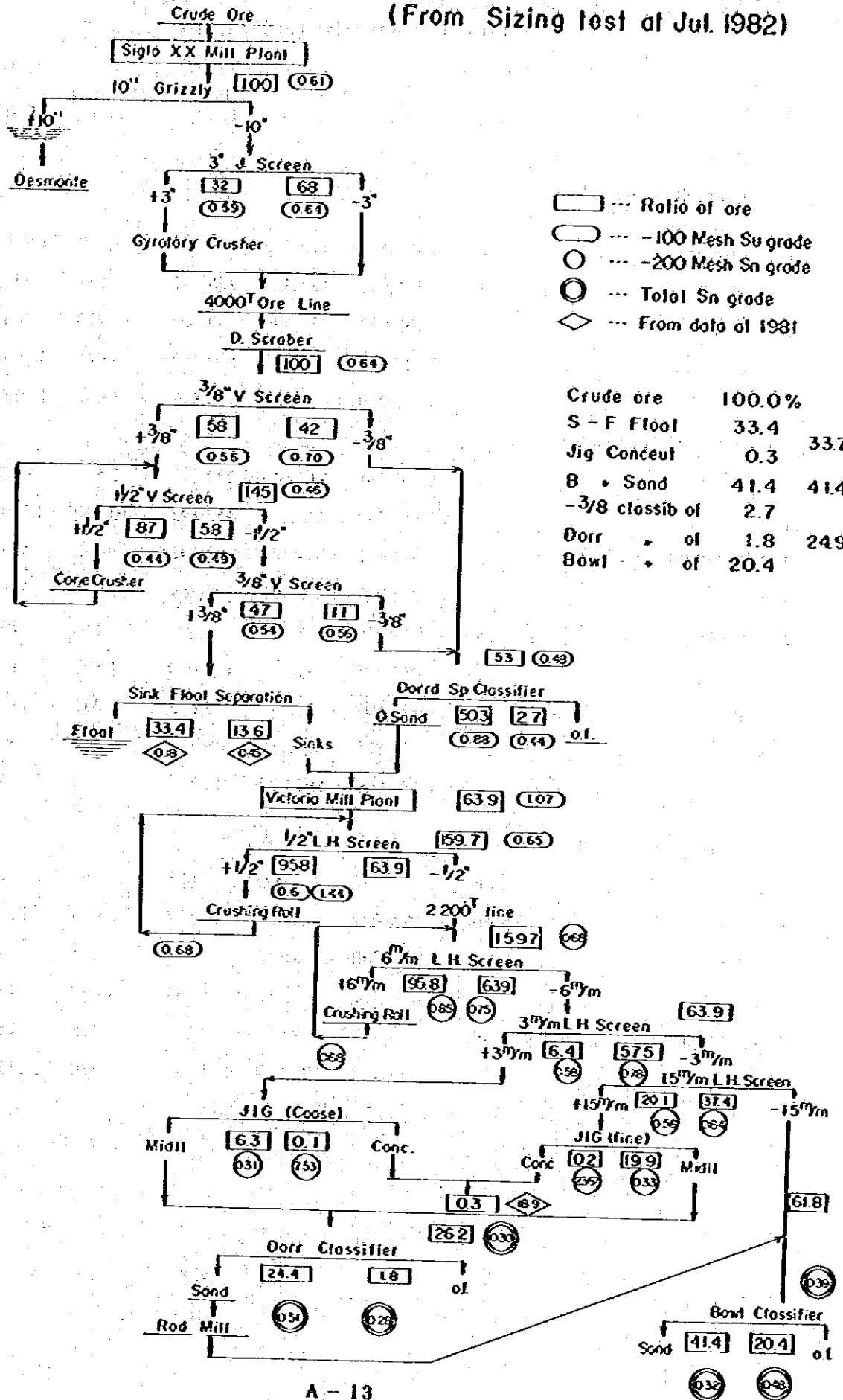
1. The construction cost is recent one and is not considered price escalation in future.
2. An amount of reserve has been calculated following equation : $(1 + 2) \times 0.06$
3. Engineering fee : $(1 + 2) \times 0.05$
4. Overhead Expenses : $(1 + 2 + 3) \times 0.1$
5. Detail casts of mineral concentration and water equipment are shown as following pages.

A II-14 Office Construction Cost

Building Name	Area of Building (m ²)	Costs	1,000 US\$
Mill Plant Office Mineral Concentration	330	158,000	
Laboratory	600	135,000	
Engineering Work Office	150	72,000	
Mechanic Repair Shop	2,000	500,000	
Electric Repair Shop *	400	92,000	
Wood Working Shop *	500	135,000	
Vehicle Maintenance *			
Shop for Mining	200	58,000	
Shop for Dam	200	58,000	
Shop for General Use	150	48,000	
Material Storehouse	1,000	250,000	
Chemical Analysis Laboratory	300	127,000	
Total	5,830	1,633,000	

Note : * Mark shows that the instruments will be removed from the present shop.

Alt-15 Balance Sheet of Crushing of Siglo XX and Victoria Mill Plant (From Sizing test at Jul. 1982)



- ... Ratio of ore
- ... -100 Mesh Sn grade
- ... -200 Mesh Sn grade
- ... Total Sn grade
- ◇ ... From dato of 1981

Crude ore	100.0%	
S - F Float	33.4	33.7
Jig Conccnt	0.3	
B + Sand	41.4	41.4
-3/8 classib of	2.7	
Dorr . of	1.8	24.9
Bowl . of	20.4	

A II-16 Cost of Mill Plant (10,000 T/D)

No. 1

No.	Name of Equipment	No. of Q'ty	F.O.B. Cost	Maritime Transport.	Inland Transport.	Mounting Cost	U.S. \$	
							Total	Note
Machinery								
1. Receiving Ore and Titration Process								
1-1	Crusher	5	1,571,577	179,000	198,346	1,569	1,950,492	
1-2	Screen	9	1,345,692	133,462	155,731	831	1,635,716	
1-3	Scrubber	1	182,692	30,500	30,000	923	244,115	
1-4	Conveyers	46	1,822,269	724,000	599,769	60,646	3,206,684	
			4,922,230	1,066,962	983,846	63,969	7,037,007	
2. Grinding Process								
2-1	Rod Mill	4	1,565,385	213,846	222,692	5,538	2,007,461	
2-2	Ball Mill	6	3,340,769	425,269	453,192	10,800	4,230,030	
2-3	Raked Classifier	5	333,077	60,731	58,192	462	452,462	
2-4	Screen	22	214,077	19,192	23,269	2,031	258,569	
2-5	Cyclone	28	59,230	5,192	6,308	116	70,846	
2-6	Conveyers	21	444,385	141,346	121,000	4,592	711,323	
2-7	Pump	34	153,692	16,731	18,885	231	189,539	
2-8	Tanks	11	36,385	10,615	9,192	3,162	59,354	
			6,147,000	892,922	912,730	26,932	7,979,584	
3. Primary Slime Treatment Process								
3-1	Cyclone	6	25,962	2,000	2,615	69	30,646	
3-2	Table	66	760,077	92,038	104,577	3,046	959,738	
3-3	Pump	7	64,500	6,885	7,708	138	79,331	
3-4	Tank	11	9,462	3,615	3,038	1,662	17,777	
3-5	Distributor	9	21,923	2,962	3,115	415	28,415	
			881,924	107,500	121,153	5,330	1,115,907	

No.	Name of Equipment	No. of Qty	F.O.B. Cost	Maritime Transport.	Inland Transport.	Mounting Cost	Total	No. 2 Note
4. Routher Table Process								
4-1	Raked Classifier	4	631,231	132,808	123,231	277	887,547	
4-2	Hydraulic Table	10	87,269	5,923	6,731	185	100,108	
4-3	Table	529	6,068,692	674,731	798,346	24,415	7,566,184	
4-4	Cyclone	126	187,692	13,000	17,692	1,316	219,700	
4-5	Pump	29	178,731	18,923	21,500	254	219,408	
4-6	Tank	7	12,385	4,731	3,962	1,937	23,015	
			7,166,000	850,116	971,462	28,384	9,015,962	
5. Middling Treatment Process								
5-1	Ball Mill	1	618,462	76,692	82,576	1,800	779,530	
5-2	30 ^m Thickener (Rake)	1	70,384	30,962	25,308	231	126,885	
5-3	Cyclone	42	64,807	4,577	6,231	162	75,777	
5-4	Table	100	1,150,538	136,846	156,769	4,615	1,448,768	
5-5	Pump	14	78,192	8,423	9,500	531	96,646	
5-6	Tank	39	49,385	19,269	16,000	7,431	92,085	
5-7	Distributor	62	150,962	21,115	21,769	407	194,253	
			2,182,730	297,884	318,153	15,177	2,813,944	
6. Slime Treatment Process								
6-1	55 ^m Thickener	1	180,269	73,846	60,885	346	315,346	
6-2	Cyclone	84	96,923	4,962	7,923	415	110,223	
6-3	Table	341	3,932,846	563,154	594,000	15,738	5,105,738	
6-4	Pump	11	85,885	8,192	9,692	139	103,908	
6-5	Tank	23	40,692	15,615	12,846	3,923	73,076	
6-6	Distributor	19	50,770	8,192	8,115	162	67,239	
			4,387,385	673,961	693,461	20,723	5,775,530	

No.	Name of Equipment	No. of Qty	F.O.B. Cost	Maritime Transport.	Inland Transport.	Mounting Cost	Total	No. 3 Note
7. Desulphuring Flotation Process								
7-1	Table	31	348,154	19,077	33,923	1,431	402,585	
7-2	Cyclone	1	1,154	77	115	23	1,369	
7-3	Ball Mill	1	37,615	5,923	5,923	185	49,646	
7-4	20 ^m Thickener (Rake)	1	85,115	21,000	18,846	231	125,192	
7-5	Flotater	14	113,827	20,115	19,423	346	153,711	
7-6	Cone Tank	2	25,846	13,231	10,615	3,692	53,384	
7-7	Reagent Equipment	1	15,000	7,692	6,269	115	29,076	
7-8	Pump	10	27,538	2,577	3,077	92	33,284	
7-9	Tank	5	4,154	1,538	1,308	623	7,623	
7-10	Distributor	3	7,885	1,154	1,192	49	10,280	
			666,288	92,384	100,691	6,787	866,150	
8. De-iron Magnetic Separation Process								
8-1	Magnetic Separator	1	12,692	731	1,077	46	14,546	
8-2	Cyclone	4	4,115	247	385	93	4,839	
8-3	Table	21	239,077	21,731	28,500	969	290,277	
8-4	Pump	10	10,615	615	1,116	46	12,392	
8-5	Tank	7	6,769	3,154	2,577	1,015	13,515	
8-6	Distributor	3	4,616	731	769	69	6,185	
			277,884	27,208	34,424	2,238	341,754	
9. Concentration Treatment Process								
9-1	8 ^m Thickener (Rake)	1	38,308	9,423	8,461	231	56,423	
9-2	12 ^m Thickener (Rake)	1	54,192	13,000	11,731	231	79,154	
9-3	Drag classifier	2	37,308	7,308	6,884	369	51,869	
9-4	Pump	5	6,577	577	692	46	7,892	
9-5	Cone Tank	2	12,847	6,577	5,269	1,846	26,539	
9-6	Thickener	2	22,308	11,384	9,154	3,346	46,192	
9-7	Tank		1,231	461	385	185	2,762	
			172,771	48,730	42,546	6,254	270,331	

No.	Name of Equipment	No. of Q'ty	F.O.B. Cost	Maritime Transport.	Inland Transport.	Mounting Cost	Total	No. 4 Note
10. Water Recycling Tailing Treatment Process								
10-1	96 ^{mp} Thickener	1	365,384	120,481	102,500	577	588,942	
10-2	Pump	20	1,109,539	78,769	67,539	670	1,256,518	
10-3	Tank	8	81,846	31,461	26,154	11,608	151,069	
10-4	Cyclone	18	238,846	39,231	38,769	416	317,262	
			1,795,615	269,942	234,962	13,271	2,352,251	
11. Common Equipment								
11-1	Overhead Traveling Crane	19	826,923	225,385	198,231	5,192	1,255,731	
11-2	Incline	1	146,154	18,577	19,846	692	185,269	
11-3	Piping	1	2,153,846	1,101,923	884,231	323,077	4,463,077	
11-4	Working Floor Stand	1	669,231	342,308	274,769	100,384	1,386,692	
11-5	Chut, Conduit	1	961,539	491,923	396,615	144,231	1,992,308	
			4,757,693	2,180,116	1,771,692	573,576	9,283,077	
12. Construction Machine								
12-1	100t Wrecker	2	846,154	95,692	64,077	0	1,005,923	
12-2	Bending Roll	3	92,308	5,192	8,192	0	105,692	
12-3	Welding Machine	20	26,923	3,808	3,961	0	34,692	
			965,385	104,692	76,230	0	1,146,307	
	1 ~ 12 Sub Total		34,322,905	6,612,417	6,299,841	762,640	47,997,803	
	Spares	1					1,442,307	
	Machinery Total						49,440,110 = 49,440,000	
2. Electric								
2-1	66 KV Power Transmission Line	1	186,731	37,308	35,038	144,231	403,508	
2-2	Substation Equipment	1	1,128,192	127,192	141,500	61,154	1,458,038	
2-3	Power Receiving Equipment	1	241,423	33,654	34,885	6,346	316,308	
2-4	Crushing Milling Equipment	1	859,923	135,769	135,615	84,693	1,216,000	
2-5	Table Equipment	1	3,043,308	518,230	506,885	348,231	4,416,654	
2-6	Illumination Equipment	1	234,769	39,231	38,577	28,808	341,385	
2-7	Telephone Equipment	1	79,000	4,115	6,462	11,538	101,115	
2-8	ITV Equipment	1	60,308	4,846	6,154	5,769	77,077	

No.	Name of Equipment	No. of	F.O.B. Cost	Maritime Transport	Inland Transport	Mounting Cost	Total	No. 5 Note
2-9	Instrumentation	1	400,192	29,269	38,885	39,000	507,346	
2-10	Equipment for Dam	1	230,346	101,192	82,692	38,077	452,307	
			6,464,192	1,030,806	1,026,693	767,847	9,289,538	
	Spares						278,692	
	Electric Sub Total						9,568,230	9,568,000
	3. Construction							
3-1	Crushing Milling Building	1	1,364,577	373,461	311,385	924,923	2,974,346	
3-2	Table, Concentration Building	1	2,749,500	745,539	627,192	2,446,000	6,568,231	
3-3	Ore Receiving Building	1	16,038	4,462	3,731	14,231	38,462	
3-4	Site Creation	1	152,192	70,500	54,000	2,064,558	2,341,250	
3-5	Thickener	1	350,962	141,769	110,769	1,840,000	2,443,500	
3-6	Bin	1	48,462	23,461	17,885	253,538	343,346	
3-7	Base of Receiving Ore, Crushing Equipment	1	131,385	61,038	46,769	731,500	970,692	
3-8	Base of Milling Equip.	1	174,000	68,846	53,961	1,131,500	1,428,307	
3-9	Base of Rougher and Others	1	146,231	57,923	45,385	946,396	1,195,935	
3-10	Water Recycling Tank Base	2	60,885	28,192	21,654	324,069	434,800	
3-11	Road for Construction Work	1	—	—	—	383,500	383,500	
3-12	Construction of Outside of Substation	1	56,500	15,346	12,846	42,231	126,923	
	Construction Sub Total		5,250,732	1,590,537	1,305,577	11,102,446	19,249,292	
	Electric Construction Total						19,249,292	19,249,000

A II-17 Cost of Water Equipment

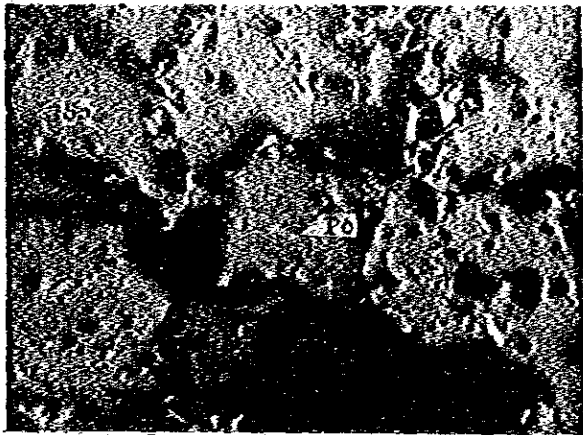
No.	Name of Equipment	No. of Q'ty	F.O.B. Cost	Maritime Transport.	Inland Transport.	Mounting Cost	Total	Note
1. Machinery								
1-1	Pump	7	657,154	32,923	53,000	484	743,561	
1-2	Piping	1	923,077	473,077	379,038	138,462	1,913,654	
			1,580,231	506,000	432,038	138,946	2,657,215 ÷ 2,657,000	
2. Electric								
2-1	Catini	1	112,461	21,808	20,615	8,654	163,538	
2-2	Lagua Lagua	1	276,654	137,808	110,923	32,884	558,269	
			389,115	159,616	131,538	41,538	721,807 ÷ 721,000	
3. Construction								
3-1	Water Receiving Equipment	1	30,500	7,884	6,654	52,654	97,692	
3-2	Building for Pump	1	22,885	6,385	5,308	23,115	57,693	
			53,385	14,269	11,962	75,769	155,385 ÷ 155,000	
	Machinery Electric Construction Total						3,534,407 ÷ 3,533,000	

A III-1 Micrograph of Polish Section and EPMA

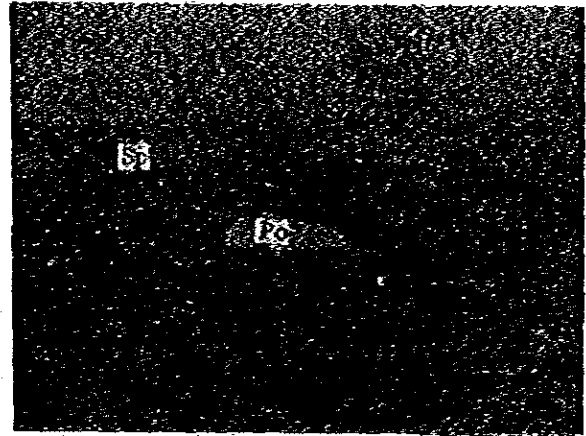
No.	Sample No.	Locality	Mineral Name
P- 1	1	San Florencio mine	Cs
P- 2	8	Huanuni mine	Cs, Py
P- 6	20	Morococala mine	Oxide Ore
P- 7	21	"	Sp
P-10	24	" L250	Sp, Cs
P-11	25	" "	Sp
P-12	27	Santa Fé mine	Py, Sp, Cs
P-13	32	Japó mine	Oxide Ore

Sign

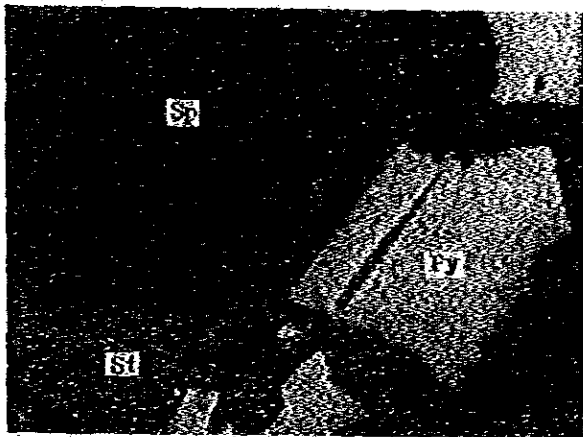
Asp	:	Arsenopyrite
Rt	:	Rutile
Py	:	Pyrite
Gn	:	Galena
Sp	:	Sphalerite
St	:	Stannite
Hm	:	Hematite
Gt	:	Goethite
Po	:	Pyrrhotite



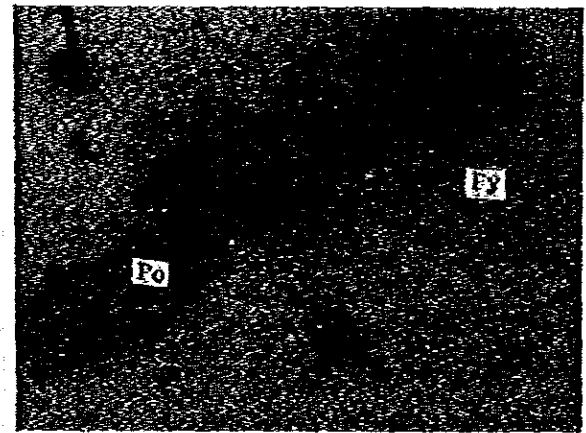
P-1 0.5 mm Open nicol



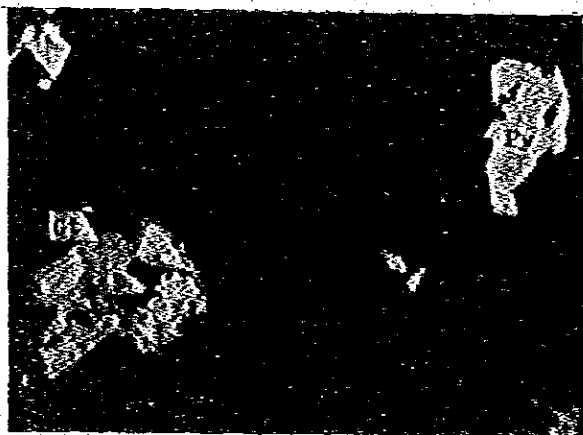
P-1 0.1 mm Open nicol



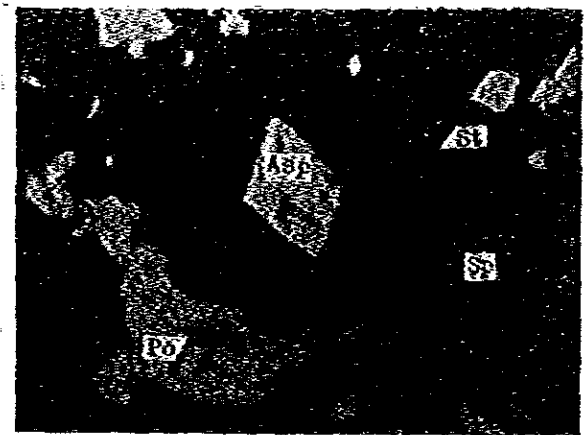
P-2 0.1 mm Open nicol



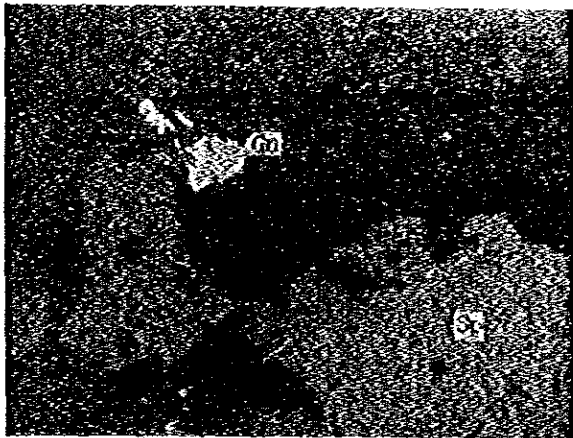
P-2 0.1 mm Open nicol



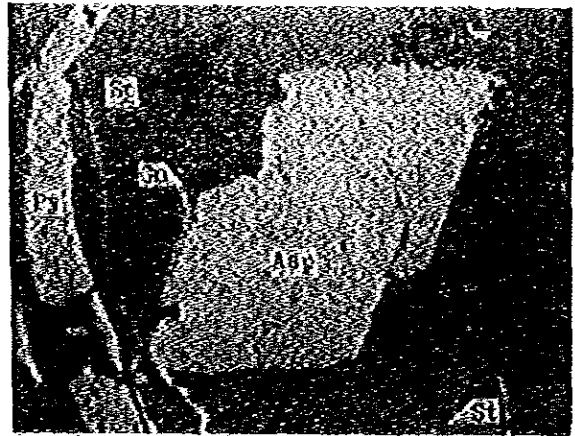
P-6 0.1 mm Open nicol



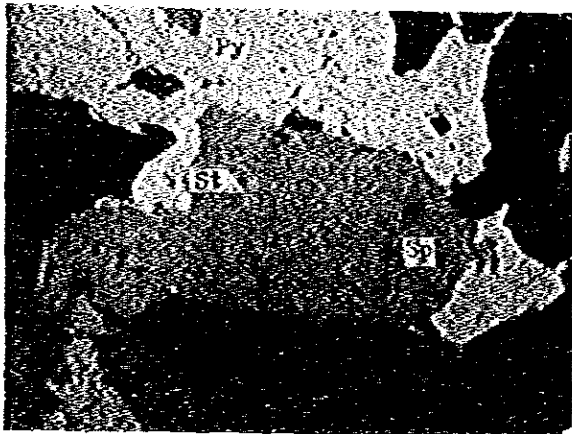
P-7 0.1 mm Open nicol



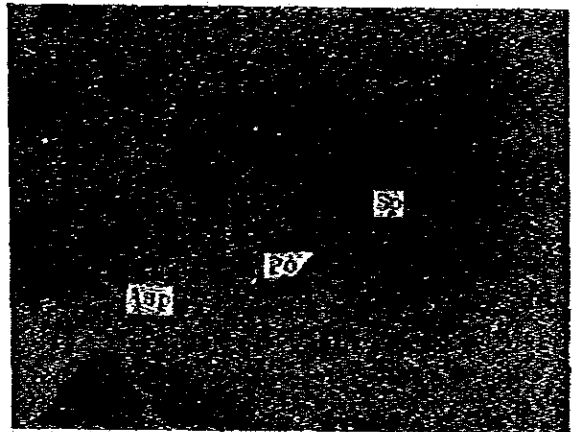
P-10 0.1mm Open nicol



P-11 0.1mm Open nicol



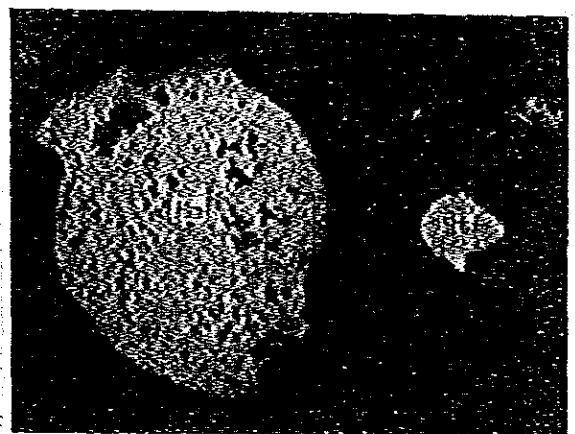
P-11 0.1mm Open nicol



P-12 0.1mm Open nicol.

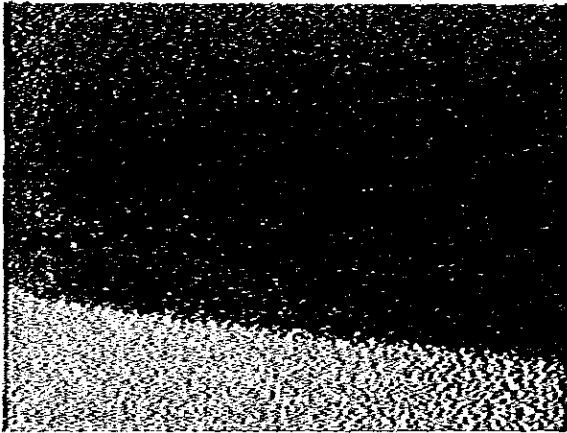


P-13 0.5mm Open nicol

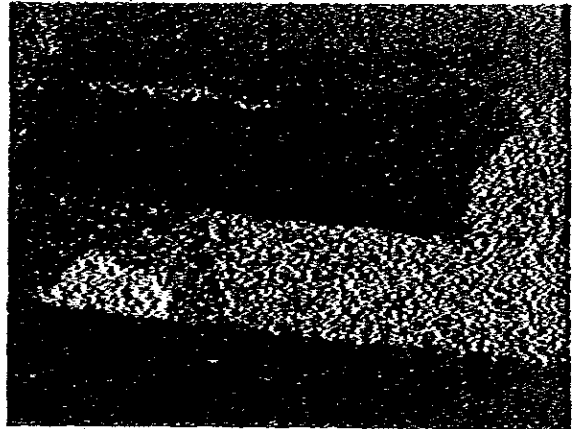


P-13 0.1mm Open nicol

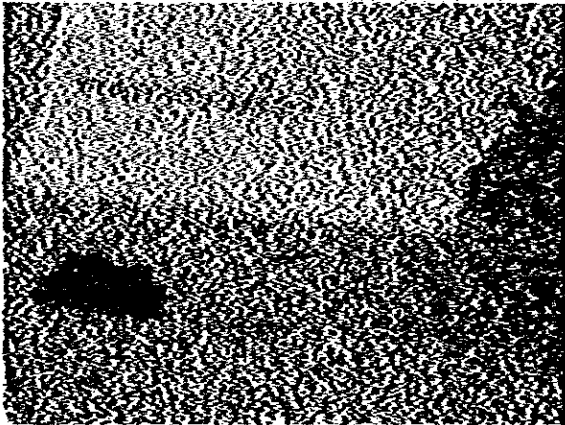
P-2



Zn



Sn



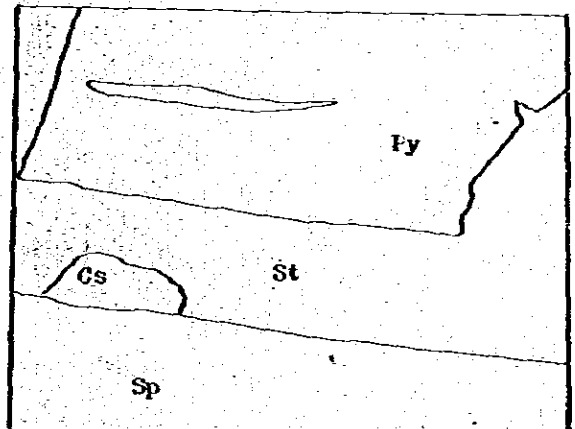
S



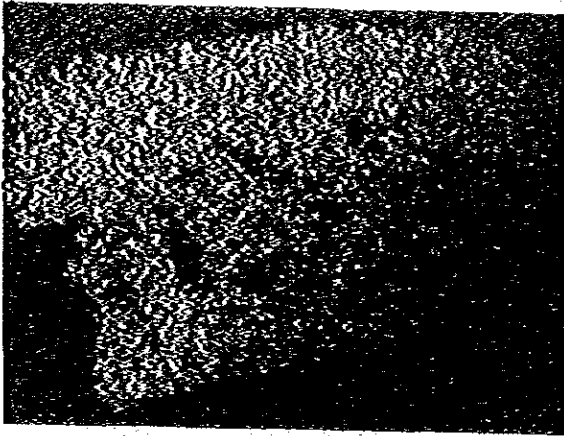
Fe



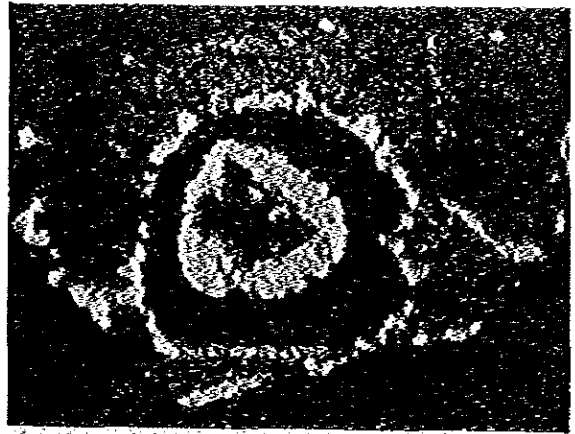
Ag



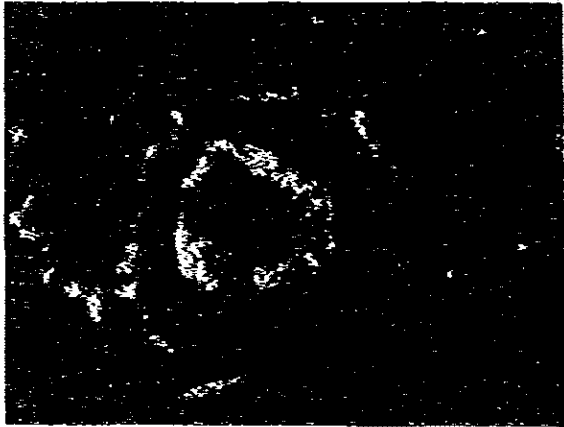
0.03 mm



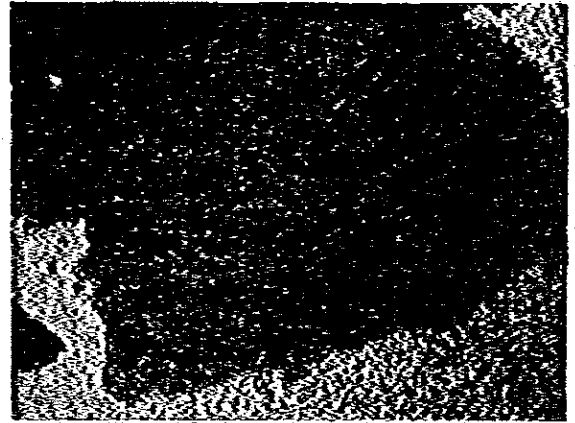
Zn



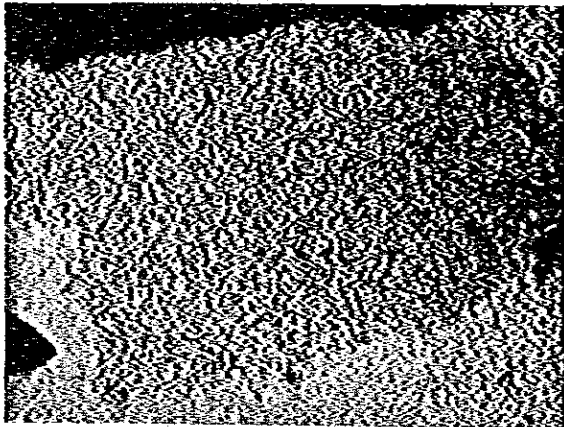
Sn



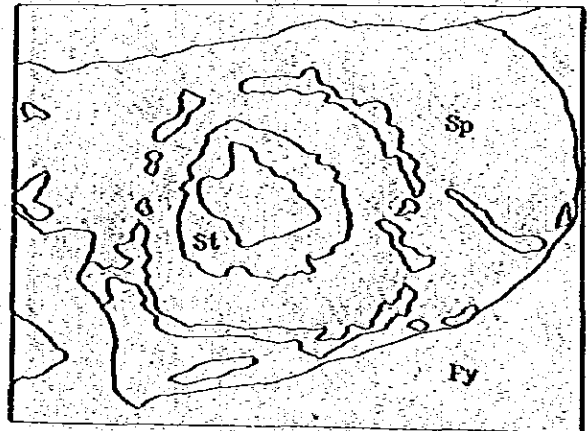
Cu



Fe



S



0.01 mm

A III-2 Microscopic Observation of Polished Sections

Sample No.	Principal Mineral	Accessory Mineral	Observation
P- 1	Sphalerite Pyrite	Marcasite Galena Pyrrhotite Stannite	Sphalerite is coarse-grained aggregate and it cements coarse-grained aggregates of pyrite. Marcasite and Ag-Bi-galena occur as small grains in pyrite and sphalerite. Pyrrhotite and stannite are included in sphalerite.
P- 2	Pyrite Marcasite Sphalerite	Stannite Pyrrhotite	Pyrite is coarse-grained aggregate and it includes lenticular marcasite and lath-shaped pyrrhotite. Stannite replaces pyrite and sphalerite veined by Pyrite-marcasite veinlet.
P- 3	Cassiterite	Pyrite Pyrrhotite Stannite	Cassiterite forms massive aggregate, and small grains of pyrrhotite and stannite are included in cassiterite. Pyrite occurs as idiomorphic grains in quartz, as interstitial grains in cassiterite aggregate, and as veinlets cutting cassiterite.
P- 4	Cassiterite	Pyrite Rutile	Cassiterite occurs as the coarse-grained spots in gangue. Pyrite is small grain in gangue. Rutile is rare.
P- 5	Arsenopyrite Pyrite		This section shows banding texture. Ore bands consists of aggregate of idiomorphic arsenopyrite and pyrite. Some of ore bands are fractured along the boundary.
P- 6	Goethite Hematite	Pyrite	Pyrite is scattered in gangue, and it is replaced by goethite and hematite.
P- 7	Sphalerite	Pyrrhotite	Massive aggregate of coarse-grained sphalerite includes other ore minerals. Arsenopyrite and pyrite include pyrrhotite, pyrite and pyrrhotite include chalcopryite and stannite. Marcasite is included in pyrite and quartz, and it associates with pyrrhotite.
P- 8	Goethite Hematite	Pyrite Rutile	Goethite and hematite are abundant. These minerals replace pyrite, Rutile occur as aggregate of fine-grained crystals.
P- 9	Goethite		Goethite is more abundant and smaller than hematite grains.
P-10	Cassiterite Sphalerite	Galena Pyrite	Cassiterite occurs as massive aggregates and fibrous aggregates. Sphalerite is coarse-grained spots associating with pyrite, and galena is fine-grained spots in gangue.

Sample No.	Principal Mineral	Accessory Mineral	Observation
P-11 -A	Pyrite Sphalerite Marcasite	Arsenopyrite Stannite Galena	Pyrite-marcasite, sphalerite and gangue mineral form banding ore. Some of pyrite-marcasite veins cut sphalerite. Arsenopyrite is idiomorphic grain in sphalerite. Galena is included in pyrite and sphalerite. Stannite occurs as irregular-shaped grains and concentric aggregates in sphalerite.
P-11 -B	Sphalerite Arsenopyrite Pyrite	Pyrrhotite	Spotted pyrite is contained in sphalerite, but pyrite-marcasite veinlet cuts arsenopyrite and sphalerite. Pyrrhotite is included in arsenopyrite.
P-12	Sphalerite Arsenopyrite Pyrite	Pyrrhotite	Sphalerite is brecciated and is filled by mosaic aggregates of pyrite and arsenopyrite. Pyrrhotite is replaced by pyrite, and sometimes it is spot in sphalerite.
P-13	Goethite Hematite	Rutile	Irregular-shaped and rounded aggregates of goethite and hematite are scattered. Rutile occurs as free spot and it contacts with hematite.
P-14	Pyrite Covellite	Arsenopyrite Pyrrhotite	Pyrite, arsenopyrite and covellite are spotted. Pyrrhotite is included in pyrite.
P-15	Cassiterite	Pyrite Rutile	Cassiterite forms irregular-shaped aggregate containing rounded rutile, and it associates with pyrite.
P-16	Arsenopyrite Marcasite	Rutile	Coarse-grained arsenopyrite forms massive aggregate associating with fine-grained marcasite. Arsenopyrite and rutile are scattered.
P-17	Cassiterite	Rutile Pyrite	Cassiterite forms irregular-shaped aggregates containing rutile.
P-18	Hematite Goethite		Hematite shows colloform texture, and goethite is powdery aggregate.
P-19	Cassiterite	Pyrite Arsenopyrite Pb-Bi-Sb-S Sphalerite Stannite Wolframite	Cassiterite is coarse-grained aggregates containing small grains of pyrite, arsenopyrite, Pb-Bi-(Ag)-Sb-S mineral, sphalerite, stannite, and wolframite.
P-20	Cassiterite	Pyrite Marcasite Stannite Pyrrhotite Chalcopyrite	Cassiterite is coarse-grained aggregates containing small grains of pyrite-marcasite, and stannite. Pyrrhotite-arsenopyrite and chalcopyrite-cassiterite grains contain rarely in gangue minerals.

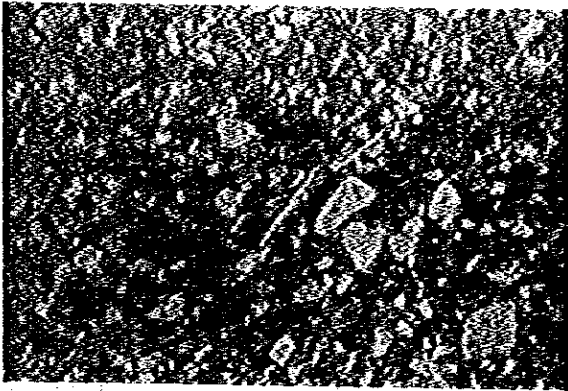
A III-3 Micrograph of Thinsection

No.	Sample No.	Locality	Rock Name
S- 3	4	Huanuni mine	Sandstone
S- 5	6	"	Sandy slate
S- 8	12	Catavi mine	Quartz porphyry
S-11	16	Road to Morococala	Rhyolite
S-12	17	"	Sandstone
S-15	28	Santa Fé mine	Rhyolite
S-17	30	Japo mine	Quartz porphyry
S-20	40	Agua caliente	Sandstone

Sign

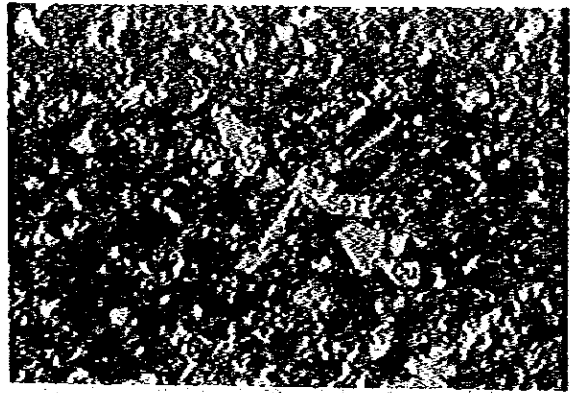
Ser : Sericite
 Qu : Quartz
 Ep : Epidote
 Bio : Biotite

Open nicol

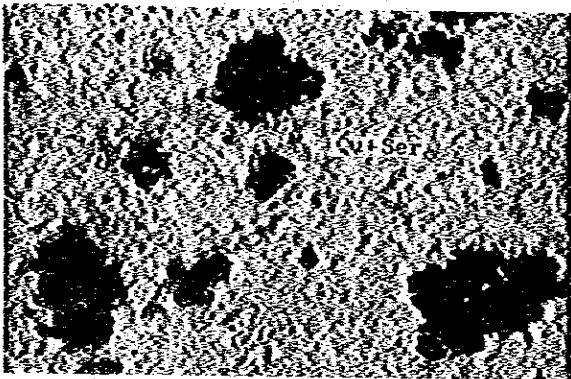


S-3

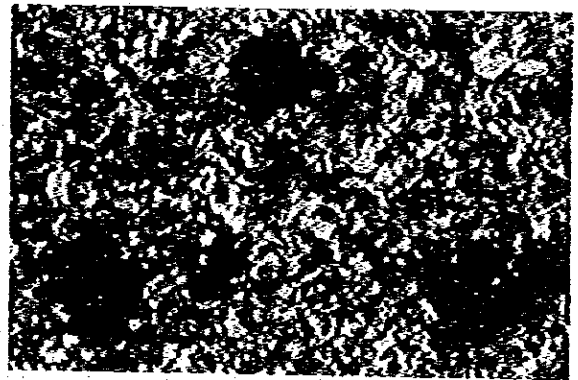
Close nicol



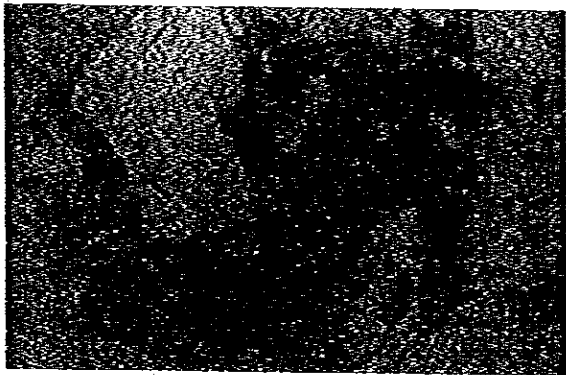
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S-5



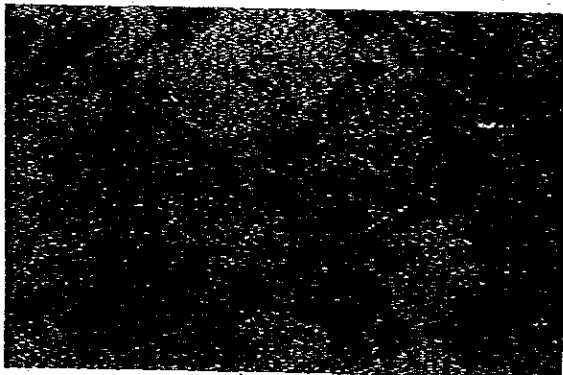
0.5 mm



S-8



0.5 mm



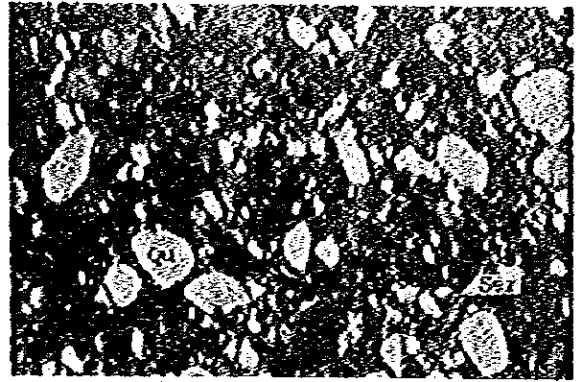
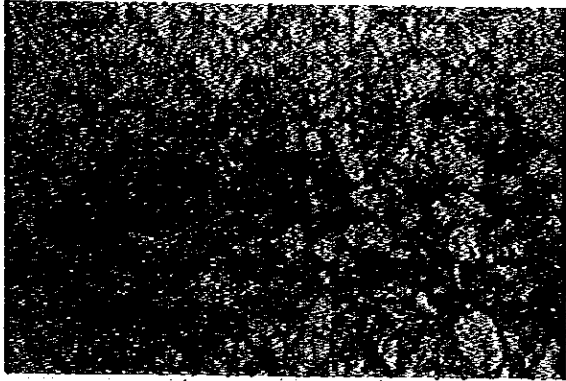
S-11



0.5 mm

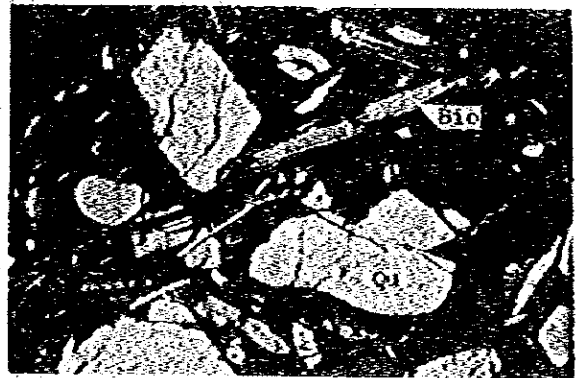
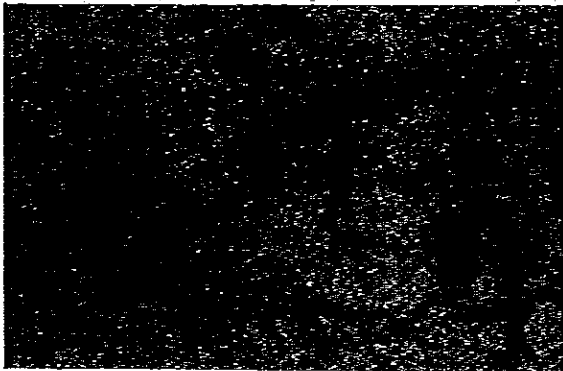
Open nicol

Close nicol



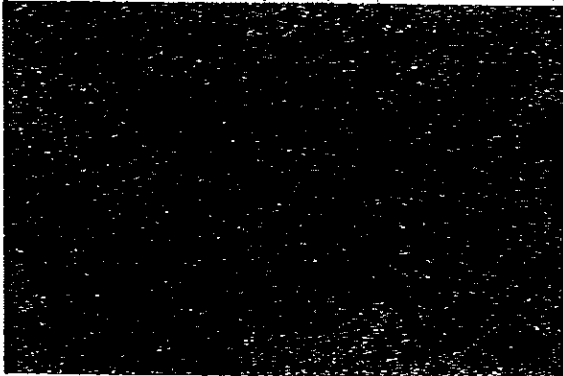
S-12

0.5 mm



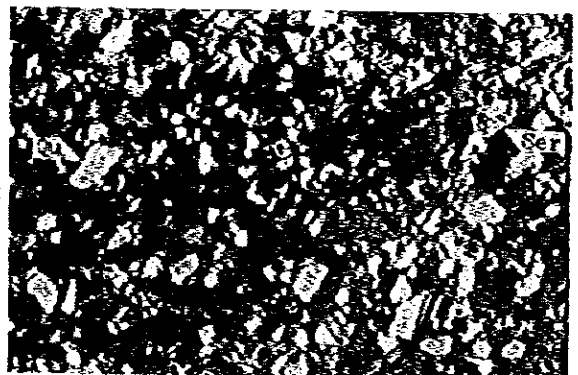
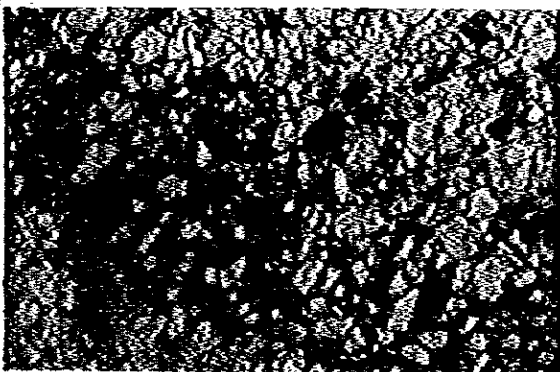
S-15

0.5 mm



S-17

0.5 mm



S-20

0.5 mm

A III-4 Microscopic Observation of Thin Sections

Sample No.	Rock Name	Principal minerals	Accessory minerals	Observation
S-1	Sandstone	Quartz Sericitc	Plagioclase Biotite chlorite(?) Ore mineral	Sand particle (0.1 - 0.3mm) are angular-shaped quartz, tabular sericite, angular-shaped plagioclase and tabular biotite. Matrix consists of fine-grained sericite, chlorite (?) and iron minerals.
S-2	Rhyolite or Welded Tuff	Quartz Plagioclase Biotite	Apatite Pyroxene (?) Ore mineral	Phenocrysts (1 - 3mm) are sub-hedral and crashed quartz, sub-hedral plagioclase and tabular biotite. Fragments (max. 10mm) of rhyolite, altered groundmass of volcanic rock, mudstone, and sandstone are contained. Ground mass is glassy, and contain five-grained crystals of the above-mentioned minerals, monoclinic pyroxene(?) apatite and ore mineral.
S-3	Sandstone	Quartz Sericitc	Biotite(?) Chlorite(?) Ore mineral	Sand partides (0.1 - 0.3mm) are angular-shaped quartz, fabular sericite (muscovite), and altered biotite(?). Matrix consists of fine-grained sericite, chlorite(?), quartz, and ore mineral.
S-4	Rhyolite	Quartz Sericitc	Yellow mineral Kaolin(?) Ore mineral	Phenocrysts (1 - 3mm) are euhedral or corroded quartz, plagioclase(?), biotite(?), and other mafic mineral(?). The latter minerals are replaced by sericite, quartz, unknown yellow mineral, Kaolin(?) and opaque mineral. Groundmass consists of fine-grained sericite, quartz and ore mineral (0.01 - 0.1mm).
S-5	Siltstone	Quartz Sericitc Ore mineral	Feldspar Chlorite	Sand particles (0.03 - 0.08mm) are angular-shaped quartz and sericite. Feldspar grain is rare. Ore mineral spots (0.5mm) are aggregates of cubic crystal (0.03mm). Matrix consist of fine-grained sericite, quartz and chlorite.

Sample No.	Rock Name	Principal Mineral	Accessory Mineral	Observation
S-6	Rhyolite	Plagioclase Biotite Quartz	Apatite Ore mineral	Phenocrysts (1 - 4mm) are euhedral plagioclase, tabular biotite, and corroded quartz. Groundmass consists of glass showing pearly texture and micro-crystals of plagioclase biotite, apatite, and ore minerals.
S-7	Sandstone	Quartz Sericitic	Cassiterite(?) Ore mineral	Sand particles (0.2mm) are angular-shaped quartz and tabular sericite, and they form mosaic aggregates. Ground-mass of fine-grained sericite, fragmental quartz and silicification quartz. A few opaque mineral and cassiterite(?) are contained.
S-8	Quartz porphyry	Quartz sericite Kashin(?)	Ore mineral	Phenocrysts (1 - 3mm) are sub-hedral and corroded quartz, biotite(?) altered to fibrous mineral. Groundmass consists of fine-grained fibrous mineral, Kaolin (?), irregular-shaped quartz, and ore mineral. Fragments (5mm) of sandstone and chert(?) are contained
S-9	Siltstone	Quartz Sericitic Carbonate	Hematite(?) Chlorite Ore mineral	Sand particles (0.03 - 0.08mm) are angular-shaped quartz and tabular sericite. Matrix consists of irregular-shaped carbonate, fine-grained hematite aggregate, and opaque mineral.
S-10	Sandstone	Quartz Sericitic Chlorite	Brown mineral Ore mineral	Sand particle (0.03mm - 0.1mm) are angular-shaped quartz, tabular sericite, aggregates of fibrous chlorite. Matrix consists of these minerals. Brown mineral aggregates and ore mineral are scattered.
S-11	Rhyolite or Welded Tuff	Quartz Plagioclase Biotite Muscovite	Apatite Ore mineral	Phenocryst (1 - 3mm) are sub-hedral or crashed quartz, subhedral plagioclase, tabular muscovite, Groundmass consists of glass, the above-mentioned minerals, and ore mineral. Apatite is contained in phenocryst and groundmass.

Sample No.	Rock Name	Principal Mineral	Accessory Mineral	Observation
S-12	Sandstone	Quartz Sericate	Brown mineral Chlorite Ore mineral	Sand particles (0.2 - 0.8mm) is rounded quartz. Matrix consists of fine-grained quartz, tabular or fibrous sericite, yellow or brown mineral aggregates, fibrous chlorite, and ore mineral.
S-13	Sandstone	Quartz Sericate	Ore mineral	Sand particles (0.2 - 0.4mm) is angular-shaped quartz rimmed by diagenetic enlargement. Matrix consists of fine-grained quartz and sericite. Ore mineral and fragment of sericitized rock are contained.
S-14	Sandstone	Quartz Sericate	Ore mineral	Sand particles are angular or rounded quartz of poor-sorting of (0.05 - 0.3mm) and tabular sericite. Matrix is abundant, and it consists of silicification of recrystallization quartz and sericite. Cubic ore mineral, may be pyrite, are spotted and chained.
S-15	Rhyolite	Quartz Plagioclase Biotite	Apatite Ore mineral	Phenocrysts (1 - 3mm) are sub-hedral and crushed quartz, plagioclase, and tabular biotite. Biotite is warped. Groundmass is glassy. Apatite, ore mineral and rock-fragments are contained in the glass.
S-16	Sandstone	Quartz Sericate	Cassiterite(?) ore mineral	Sand particles (0.2 - 0.6mm) are angular or rounded quartz and tabular sericite. This rock is somewhat foliated and sheared. Matrix consists of fine-grained sericite and quartz which is recrystallized. Ore mineral, may be cubic pyrite, and a few cassiterite(?) are scattered. Fragments of silicified siltstone and cherty rock are contained.
S-17	Quartz porphyry	Quartz Sericate	Epidote Ore mineral	Phenocrysts (1 - 4mm) are corroded quartz, plagioclase(?) altered to epidote, sericite and quartz, and biotite(?) replaced by sericite and ore mineral. Groundmass is microcrystalline.

Sample No.	Rock Name	Principal Mineral	Accessory Mineral	Observation
S-18	Sandstone	Quartz Sericite	Feldspar Goethite(?)	Sand particles (0.1 -- 0.3mm) are angular quartz and tabular sericite. Feldspar is few. Matrix consists of fine-grained sericite, quartz, goethite(?), and ore mineral.
S-19	Slate	Sericite Quartz Graphite(?)	Ore mineral	Foliation is distinct. It consists of angular-shaped quartz (0.03 -- 0.05mm), film-like aggregates of fine-grained graphite(?), lenticular aggregates of fine-grained sericite and quartz, and ore mineral. It is veined by quartz veinlet.
S-20	Sandstone	Quartz Sericite	Goethite chlorite Ore mineral	Sand particles (0.1 -- 0.4mm) are angular-shaped or rounded quartz and tabular sericite. Matrix consists of those fine grained crystals, goethite, chlorite, and opaque mineral.

A III-5 Sample List

Sample No.	Sample Name	Location	Note	Section	Polish	Chemical Analysis	Density	Ultrasonic wave velocity	Resistivity	I. P.	Magnetic Susceptibility	Residual Magnetization
1	Ore	San Florencio mine	Zn, Cu, Py.		○	○						
2	Sandstone	"	Llallagua F. mass green									○
3	Rhyolite	"	mass. tuffaceous Cu rich									○
4	Sandstone	Huanuni mine	Llallagua F. mass green-grey									○
5	Quartz	"	blue pale-grey									○
6	Sandy slate	"	Uñola F. mass pale-green									○
7	Rhyolite	"	mass dark-grey greenly									○
8	Ore	" L160	Cu, Py, Cu.									
9	Sandstone	"	mass grey siliceous									
10	Ore	"	Cu, Cu, Py.									
11	Ore	"	Cu, Cu.									
12	Quartz	Catali mine	La Salvadora									
13	Sandstone	Andernivelque	Oncaosous reddish-brown									○
14	"	"	Uñola F. mass grey-green									○
15	"	Road to Morococla	Llallagua F. mass grey									○
16	Rhyolite	"	mass grey									○
17	Sandstone	"	Cunachipi F. mass grey									○
18	"	"	Llallagua F. ore, mass grey									○
19	Ore	San Luis mine	Cu, Sb, Py.									○
20	Oxide ore	Morococla mine	Gravo Santa rosa									
21	Ore	"	Zn.									
22	Oxide ore	"	Gravo firmat.									
23	"	Vilacollo mine										
24	Ore	Morococla mine	Zn, Cu, Chocore vein									
25	"	"	Zn, Py, Cu.									
26	Sandstone	"	Country rock dugay									○
27	Ore	Santa Hermine	Py, Zn, Cu, Roysafota vein									○
28	Rhyolite	"	Grey tuffaceous									
29	Greywacke	"	Country rock									
30	Quartz	Japo mine	Cerro San Pablo									
31	Sandstone	"	Llallagua F. mass grey									○
32	Oxide ore	"	Aur. Py, L230									○
33	"	"	Py, Cu, L270									
34	Ore	Vilacollo mine	Concentrated ore									
35	"	Huanuni mine	Cu.									
36	"	"	Py, Cu.									
37	"	"	Zn, Cu.									
38	"	Chauri	Lim.									
39	Slate	"	blast facility									
40	Sandstone	Ausa caliente	Llallagua F.									○
41	Ore	San Florencio mine	Artificial pale-grey									○
42	"	Huanuni mine	Zn, Cu.									
43	"	"	"									

A.III-6 List of Result of Chemical Analysis

No.	No.	Sample name	Location	Sn %	WO ₃ %	Ag %	Cu %	Pb %	Zn %	Bi %	Sb %	Note
1	1	Cs. Sp. Py	San Florencio mine	0.12	Tr	30	Tr	—	Tr	—	—	
2	8	Cs. Py. Qu.	Huanuni mine	33.22	Tr	9	—	—	0.29	0.02	—	
3	10	Cs. Qu. Py	"	21.25	Tr	10	—	Tr	0.43	—	—	
4	11	Cs. Qu.	"	5.11	Tr	0	—	Tr	Tr	—	—	
5	19	Qu. Sb. Py	San Luis mine	0.04	Tr	0	Tr	—	—	—	0.82	
6	20	Oxide ore	Morococala mine	0.53	Tr	70	—	—	Tr	Tr	—	
7	21	Sp.	"	0.56	Tr	107	—	—	42.52	—	0.05	
8	22	Oxide ore	"	0.11	Tr	24	—	Tr	0.19	—	—	
9	23	"	Vilacollo mine	1.22	Tr	0	—	Tr	0.02	—	—	
10	24	Zn. Cs	Morococala mine L250	34.53	Tr	647	0.06	—	22.88	—	—	
11	25	Zn. Py. Cs.	"	0.13	Tr	0	Tr	—	5.74	—	—	
12	27	Py. Zn. Cs.	Santa Fé mine	0.18	Tr	254	0.02	—	24.83	—	—	
13	32	Oxide ore	Japo mine L-30	0.20	Tr	477	0.07	—	0.05	—	—	
14	33	"	" L-70	0.58	Tr	8	0.02	—	0.03	—	—	
15	34	Cs.	Vilacollo mine	7.72	Tr	49	—	—	0.02	—	0.03	
16	35	"	Huanuni mine L160	31.43	Tr	29	—	—	0.04	—	0.04	
17	36	Cs. Py.	"	7.45	Tr	40	0.09	—	0.96	—	—	
18	37	Cs. Sp.	"	12.75	Tr	0	—	—	6.84	0.74	—	
19	38	Oxide ore	Chauriri	0.08	Tr	19	0.28	—	0.03	—	—	
20	41	Powder ore	San Florencio mine	0.56	Tr	10	Tr	—	Tr	—	—	