Apx. 15 Assay results of tunnel L2 samples in Dong Pao F3 ore body (1964~1968)

Assay results of tunnel samples in Dong Pao F3 ore body

Tunnel L2

Sample No.	Thikness	Chemical Conposition (%)			Ore Class	Average of Chemical Conposition (%)			
		TR_2O_3	$BaSO_4$	CaF_2		TR_2O_3	$BaSO_4$	CaF_2	平均幅
501	1.00	13.26	22.45	52.39	I	16.24	37.99	34.70	1.16
502	1.00	8.76	22.77	54.09	I				
503	1.25	24.45	52.69	17.33	I				
504	1.35	20.34	54.46	16.70	I				
505	1.20	11.78	29.79	42.12	I				
506	1.20	5.52	17.11	59.17	III	4.15	34.99	30.99	1.11
507	1.25	2.67	18.16	64.32	III				
508	1.25	3.11	22.36	60.58	III				
509	1.25	3.39	47.57	35.10	III				
510	1.25	3.25	23.35	64.86	III				
511	1.00	2.83	25.96	59.27	III				
512	1.00	1.94	48.17	27.22	III				
513	1.00	3.39	33.72	38.93	III				
514	1.20	5.26	43.22	25.95	III				
515	1.30	7.74	53.74	10.61	III				
516	1.00	4.76	57.58	9.26	III				
517	1.00	6.53	47.39	18.12	III				
518	1.00	4.5	47.03	20.84	III				
519	1.00	3.3	43.94	32.52	III				
520	1.00	8.03	43.58	13.27	III				
521	1.00	5.07	46.10	21.76	III				
522	1.30	5.16	41.61	25.81	III				
523	0.90	6.19	35.76	29.12	III				
524	1.00	9.39	33.75	42.12	I	13.16	27.10	28.21	1.02
525	1.30	15.04	30.46	21.85	I				
526	1.00	9.82	33.86	17.39	I				
527	1.00	10.2	44.17	23.74	I				
528	1.00	11.59	34.64	34.79	I				
529	1.00	5.12	35.10	29.49	I				
530	1.00	4.88	43.75	19.79	I				
531	1.00	12.38	34.34	29.85	I				
532	1.00	12.65	20.97	29.74	I				
533	1.00	17.05	17.70	26.90	I				
534	1.00	20.61	25.53	20.12	I				
535	1.00	15.93	21.63	34.30	I				
536	1.00	34.48	14.78	13.81	I				
537	1.00	16.71	11.63	18.49	I				
538	1.00	8.32	17.20	51.59	I				
539	1.00	7.28	28.45	46.85	I				
540	1.00	10.38	25.88	32.47	I				
541	1.00	19	22.02	22.90	I				
542	1.00	6.85	31.15	34.86	III	4.68	33.75	25.06	1.11
543	1.00	2.16	19.45	21.84	III				
544	1.00	2.45	26.71	34.36	III				
545	1.00	5.32	13.83	34.12	III				
546	1.00	4.22	20.80	44.14	III				
547	1.00	9.41	20.62	25.67	III				
548	1.40	2.88	10.83	48.56	III				
549	1.10	11.44	39.37	20.38	III				
550	1.10	3.45	40.27	22.89	III				
551	1.00	8.19	46.98	24.83	III				
552	1.00	7.53	44.37	30.55	III				
553	1.00	4.85	60.32	19.15	III				
554	1.30	2.32	65.52	21.42	III				
555	1.20	2.77	65.07	20.05	III				
556	1.50	4.95	54.78	28.42	III				
557	1.15	4.29	39.01	13.63	III				
558	1.00	2.44	29.35	23.26	-				
559	1.00	2.07	28.83	9.63	-				
560	1.00	1.65	20.02	14.77	-				
561	1.00	2.71	51.46	28.82	-				
562	1.00	3.68	25.19	17.13	-				
563	1.40	0.42	6.58	5.00	-				
564	1.35	0.69	14.15	12.09	-				

Apx. 16 Assay results of pits (from G2 to G11) samples of in Dong Pao F3 ore body (1964~1968)

Assay results of pit samples in Dong Pao F3 ore body (1/4)

Pit G 2

Sample No.	Location of Samples			Chemical Conposition (%)			Ore Class	Average of Chemical Conposition (%)		
	From	To	Thikness	TR_2O_3	$BaSO_4$	CaF_2		TR_2O_3	$BaSO_4$	CaF_2
H 1	1.65	2.65	1.00	12.1	44.3	26.2	I	12.70	46.00	27.03
H 2	2.65	3.65	1.00	15.8	45.5	24.9	I			
H 3	3.65	4.65	1.00	10.2	48.2	30.0	I			
H 4	4.65	5.65	1.00	8.6	50.7	30.4	III	6.47	36.51	30.18
H 5	5.65	6.65	1.00	8.0	54.4	26.4	III			
H 6	6.65	7.65	1.00	8.7	46.0	31.0	III			
H 7	7.65	8.65	1.00	5.0	43.7	32.8	III			
H 8	8.65	9.65	1.00	8.7	39.8	29.4	III			
H 9	9.65	10.65	1.00	6.4	19.8	12.6	III			
H 10	10.65	11.65	1.00	9.7	26.6	23.2	III			
H 11	11.65	12.65	1.00	11.1	17.2	18.2	III			
H 12	12.65	13.65	1.00	4.2	20.7	36.6	III			
H 13	13.65	14.65	1.00	3.6	47.0	50.1	III			
H 14	14.65	15.65	1.00	2.1	58.4	32.3	III			
H 15	15.65	16.65	1.00	1.5	13.8	39.2	III			
H 16	16.65	17.65	1.00	1.4	13.7	24.2	Primary Ore	1.80	15.90	19.87
H 17	17.65	18.65	1.00	1.8	16.7	18.2	Primary Ore			
H 18	18.65	19.65	1.00	2.2	17.3	17.2	Primary Ore			
				9.5						

Pit G 3

6.7

Sample No.	Location of Samples			Chemical Conposition (%)			Ore Class	Average of Chemical Conposition (%)		
	From	To	Thikness	TR_2O_3	$BaSO_4$	CaF_2		TR_2O_3	$BaSO_4$	CaF_2
H 1	0.1	1.1	1.00	13.4	66.1	0.7	I	20.92	46.29	14.91
H 2	1.1	2.1	1.00	8.9	69.9	4.3	I			
H 3	2.1	3.1	1.00	10.9	51.6	20.5	I			
H 4	3.1	4.1	1.00	20.7	41.8	17.5	I			
H 5	4.1	5.1	1.00	39.2	33.3	1.8	I			
H 6	5.1	6.1	1.00	31.3	41.2	6.2	I			
H 7	6.1	7.1	1.00	35.2	37.9	15.2	I			
H 8	7.1	8.1	1.00	25.0	39.3	24.8	I			
H 9	8.1	9.1	1.00	27.3	33.9	20.5	I			
H 10	9.1	10.1	1.00	9.1	46.7	23.2	I			
H 11	10.1	11.1	1.00	9.1	47.5	29.3	I			
H 12	11.1	12.1	1.00	4.9	33.4	51.1	III	3.73	38.50	45.02
H 13	12.1	13.1	1.00	5.0	30.2	54.3	III			
H 14	13.1	14.1	1.00	2.3	45.2	42.5	III			
H 15	14.1	15.1	1.00	2.7	42.6	37.4	III			
H 16	15.1	16.1	1.00	4.5	42.3	39.9	III			
H 17	16.1	17.1	1.00	3.0	37.3	44.9	III			
H 18	17.1	18.1	1.00	9.1	36.0	40.1	I	8.66	46.20	29.42
H 19	18.1	19.1	1.00	8.9	45.7	27.7	I			
H 20	19.1	20.1	1.00	7.3	42.5	40.5	I			
H 21	20.1	21.1	1.00	7.8	51.5	53.2	I			
H 22	21.1	22.1	1.00	11.1	48.5	22.2	I			
H 23	22.1	23.1	1.00	6.8	35.0	17.0	I			
H 24	23.1	24.1	1.00	9.9	51.9	20.5	I			
H 25	24.1	25.1	1.00	8.5	50.4	22.6	I			
H 26	25.1	26.1	1.00	8.5	54.3	21.0	I			
H 27	26.1	27.1	1.00	6.3	52.6	28.2	III	5.75	51.90	28.78
H 28	27.1	28.1	1.00	4.7	48.5	32.9	III			
H 29	28.1	29.1	1.00	6.5	57.1	27.0	III			
H 30	29.1	30.0	0.90	5.5	49.4	27.0	III			
				11.8						

Pit G 4

Sample No.	Location of Samples			Chemical Conposition (%)			Ore Class	Average of Chemical Conposition (%)		
	From	To	Thikness	TR_2O_3	$BaSO_4$	CaF_2		TR_2O_3	$BaSO_4$	CaF_2
H 1	2.8	3.8	1.00	5.9	25.2	3.9	II	7.50	41.48	8.37
H 2	3.8	4.8	1.00	9.0	53.9	4.6	II			
H 3	4.8	5.8	1.00	7.2	43.9	20.0	II			
H 4	5.8	6.8	1.00	3.6	51.3	14.4	II			
H 5	6.8	7.8	1.00	14.2	49.5	3.1	II			
H 6	7.8	8.8	1.00	5.1	25.1	4.2	II			
H 7	8.8	9.9	1.00	<0.5	10.0	2.0	Primary Ore	0.37	14.17	4.20
H 8	9.9	10.8	1.00	1.1	18.6	5.4	Primary Ore			
H 9	10.8	11.8	1.00	<0.5	13.9	5.2	Primary Ore			

Assay results of pit samples in Dong Pao F3 ore body (2/4)

Pit G 5

Sample No.	Location of Samples			Chemical Conposition (%)			Ore Class	Average of Chemical Conposition (%)		
	From	To	Thikness	TR_2O_3	$BaSO_4$	CaF_2		TR_2O_3	$BaSO_4$	CaF_2
H 1	1.5	2.5	1.0	7.9	74.8	<0.2	I	14.56	58.62	1.21
H 2	2.5	3.5	1.0	17.5	63.4	<0.2	I			
H 3	3.5	4.5	1.0	15.4	61.0	<0.2	I			
H 4	4.5	5.5	1.0	7.7	76.3	<0.2	I			
H 5	5.5	6.5	1.0	19.5	57.4	0.3	I			
H 6	6.5	7.5	1.0	13.6	66.1	0.2	I			
H 7	7.5	8.5	1.0	18.8	62.0	0.2	I			
H 8	8.5	9.5	1.0	12.7	60.7	0.3	I			
H 9	9.5	10.5	1.0	10.1	72.1	0.8	I			
H 10	10.5	11.5	1.0	16.6	59.7	1.4	I			
H 11	11.5	12.5	1.0	20.0	58.2	1.7	I			
H 12	12.5	13.5	1.0	25.0	57.0	2.4	I			
H 13	13.5	14.5	1.0	17.7	55.3	5.7	I			
H 14	14.5	15.5	1.0	15.9	55.3	5.2	I			
H 15	15.5	16.5	1.0	11.2	72.7	2.6	I			
H 16	16.5	17.5	1.0	7.5	67.2	4.7	II	5.18	44.07	4.10
H 17	17.5	18.5	1.0	6.6	60.0	3.7	II			
H 18	18.5	19.5	1.0	6.3	60.9	5.0	II			
H 19	19.5	20.5	1.0	5.0	45.4	4.2	II			
H 20	20.5	21.5	1.0	3.0	16.1	3.7	II			
H 21	21.5	22.5	1.0	2.7	14.8	3.3	II			

Pit G 6

Sample No.	Location of Samples			Chemical Conposition (%)			Ore Class	Average of Chemical Conposition (%)		
	From	To	Thikness	TR_2O_3	$BaSO_4$	CaF_2		TR_2O_3	$BaSO_4$	CaF_2
H 1	0.75	1.70	0.95	11.6	49.1	24.1	I	9.90	47.50	27.00
H 2	1.70	2.65	0.95	11.0	44.7	29.6	I			
H 3	2.65	3.60	0.95	7.5	47.4	28.2	I			
H 4	3.60	4.55	0.95	8.5	47.5	29.3	I			
H 5	4.55	5.50	0.95	9.1	47.0	28.9	I			
H 6	5.50	6.45	0.95	7.8	48.3	28.1	I			
H 7	6.45	7.40	0.95	9.4	50.9	24.8	I			
H 8	7.40	8.35	0.95	12.9	48.1	24.8	I			
H 9	8.35	9.30	0.95	11.3	44.5	25.2	I			
H 10	9.30	10.25	0.95	6.9	57.9	34.7	III	5.47	40.23	30.77
H 11	10.25	11.20	0.95	4.9	54.5	33.1	III			
H 12	11.20	12.15	0.95	4.5	26.2	27.0	III			
H 13	12.15	13.10	0.95	5.4	35.6	38.8	III			
H 14	13.10	14.05	0.95	6.3	36.4	31.1	III			
H 15	14.05	15.00	0.95	4.8	30.8	19.9	III			
H 16	15.00	16.00	1.00	0.6	5.0	2.0	clay	0.12	2.24	1.22
H 17	16.00	17.00	1.00	<0.5	2.1	4.1	clay			
H 18	17.00	18.00	1.00	<0.5	2.0	0.7	clay			
H 19	18.00	19.00	1.00	<0.5	1.9	0.7	clay			
H 20	19.00	20.00	1.00	<0.5	2.2	0.2	clay			
H 21	20.00	21.00	1.00	<0.5	1.5	0.2	clay			
H 22	21.00	22.00	1.00	<0.5	1.8	0.6	clay			
H 23	22.00	23.00	1.00	0.3	2.0	1.4	clay			
H 24	23.00	24.00	1.00	0.2	1.7	1.1	clay			
H 25	24.00	25.00	1.00	5.6	17.5	4.9	Primary Ore	10.78	23.40	8.50
H 26	25.00	26.00	1.00	10.7	23.2	8.4	Primary Ore			
H 27	26.00	27.00	1.00	11.4	22.5	8.4	Primary Ore			
H 28	27.00	28.00	1.00	15.4	30.4	12.3	Primary Ore			

Assay results of pit samples in Dong Pao F3 ore body (3/4)

Pit G 7

Sample No.	Location of Samples			Chemical Conposition (%)			Ore Class	Average of Chemical Conposition (%)		
	From	To	Thikness	TR_2O_3	$BaSO_4$	CaF_2		TR_2O_3	$BaSO_4$	CaF_2
H 1	1.7	2.7	1.0	15.8	50.7	0.3	I	12.86	40.63	21.01
H 2	2.7	3.7	1.0	15.2	56.9	1.1	I			
H 3	3.7	4.7	1.0	19.5	52.5	0.4	I			
H 4	4.7	5.7	1.0	14.9	44.3	20.3	I			
H 5	5.7	6.7	1.0	6.2	20.6	60.3	I			
H 6	6.7	7.7	1.0	10.2	33.5	35.0	I			
H 7	7.7	8.7	1.0	8.2	25.9	29.7	I			
H 8	8.7	9.7	1.0	7.5	37.9	30.2	III	5.25	27.78	41.68
H 9	9.7	10.7	1.0	7.3	34.8	29.7	III			
H 10	10.7	11.7	1.0	2.7	19.2	39.7	III			
H 11	11.7	12.7	1.0	3.5	19.2	67.1	III			
H 12	12.7	13.7	1.0	9.2	36.0	43.8	I	12.676	40.488	38.371
H 13	13.7	14.7	1.0	7.8	36.7	50.3	I			
H 14	14.7	15.7	1.0	15.8	45.7	33.5	I			
H 15	15.7	16.7	1.0	10.7	38.5	46.4	I			
H 16	16.7	17.7	1.0	18.5	41.5	37.6	I			
H 17	17.7	18.7	1.0	14.5	38.0	39.2	I			
H 18	18.7	19.7	1.0	8.4	36.1	37.5	I			
H 19	19.7	20.7	1.0	11.2	48.1	34.8	I			
H 20	20.7	21.7	1.0	3.7	21.2	69.7	I			
H 21	21.7	22.7	1.0	21.4	47.7	23.0	I			
H 22	22.7	23.7	1.0	13.1	43.8	36.3	I			
H 23	23.7	24.7	1.0	11.0	41.2	35.2	I			
H 24	24.7	25.7	1.0	20.5	38.5	24.2	I			
H 25	25.7	26.7	1.0	11.2	36.2	39.5	I			
H 26	26.7	27.7	1.0	7.9	53.2	42.9	I			
H 27	27.7	28.7	1.0	15.0	42.0	30.8	I			
H 28	28.7	29.7	1.0	15.6	43.9	27.6	I			

Pit G 8

Sample No.	Location of Samples			Chemical Conposition (%)			Ore Class	Average of Chemical Conposition (%)		
	From	To	Thikness	TR_2O_3	$BaSO_4$	CaF_2		TR_2O_3	$BaSO_4$	CaF_2
H 1	0.5	1.5	1	8.9	42.5	14.9	III	5.38	28.00	10.98
H 2	1.5	2.5	1.00	7.2	38.6	18.0	III			
H 3	2.5	3.5	1.00	3.1	22.1	7.1	III			
H 4	3.5	4.5	1.00	2.7	9.2	0.9	III			
H 5	4.5	5.5	1.00	5.0	27.6	14.0	III			
H 6	5.5	6.5	1.00	15.1	25.3	17.1	I	17.08	26.03	15.98
H 7	6.5	7.5	1.00	15.6	25.4	14.1	I			
H 8	7.5	8.5	1.00	20.4	30.8	19.3	I			
H 9	8.5	9.5	1.00	17.2	22.6	13.4	I			
H 10	9.5	10.5	1.00	17.0	19.6	14.1	Primary Ore	15.87	19.82	14.80
H 11	10.5	11.5	1.00	17.7	22.8	15.7	Primary Ore			
H 12	11.5	12.5	1.00	14.0	19.9	14.6	Primary Ore			
H 13	12.5	13.5	1.00	14.4	19.4	13.9	Primary Ore			
H 14	13.5	14.5	1.00	15.7	19.9	15.3	Primary Ore			
H 15	14.5	15.5	1.00	16.4	17.3	15.2	Primary Ore			
				12.7						

Pit G 9

Sample No.	Location of Samples			Chemical Conposition (%)			Ore Class	Average of Chemical Conposition (%)		
	From	To	Thikness	TR_2O_3	$BaSO_4$	CaF_2		TR_2O_3	$BaSO_4$	CaF_2
H 1	2.0	3.0	1.0	<0.5	9.7	<0.2	Syenite	0.38	6.89	0.06
H 2	3.0	4.0	1.0	<0.5	9.3	<0.2	Syenite			
H 3	4.0	5.0	1.0	<0.5	11.5	<0.2	Syenite			
H 4	5.0	6.0	1.0	<0.5	8.0	<0.2	Syenite			
H 5	6.0	7.0	1.0	0.5	6.5	0.2	Syenite			
H 6	7.0	8.0	1.0	<0.5	7.9	<0.2	Syenite			
H 7	8.0	9.0	1.0	0.7	6.2	<0.2	Syenite			
H 8	9.0	10.0	1.0	1.0	9.5	<0.2	Syenite			
H 9	10.0	11.0	1.0	1.4	7.5	<0.2	Syenite			
H 10	11.0	12.0	1.0	1.4	10.7	<0.2	Syenite			
H 11	12.0	13.0	1.0	1.0	7.2	0.2	Syenite			
H 12	13.0	14.0	1.0	0.9	6.0	<0.2	Syenite			
H 13	14.0	15.0	1.0	<0.5	2.7	0.2	Syenite			
H 14	15.0	16.0	1.0	<0.5	2.7	<0.2	Syenite			
H 15	16.0	17.0	1.0	<0.5	4.5	<0.2	Syenite			
H 16	17.0	18.0	1.0	<0.5	5.0	<0.2	Syenite			
H 17	18.0	19.0	1.0	<0.5	5.5	<0.2	Syenite			
H 18	19.0	20.0	1.0	<0.5	5.3	<0.2	Syenite			
H 19	20.0	21.0	1.0	<0.5	6.0	<0.2	Syenite			
H 20	21.0	22.0	1.0	<0.5	5.5	<0.2	Syenite			
H 21	22.0	23.0	1.0	1.0	8.5	0.2	Syenite			
H 22	23.0	24.0	1.0	0.6	8.8	0.2	Syenite			
H 23	24.0	25.0	1.0	0.6	5.5	0.3	Syenite			
H 24	25.0	26.0	1.0	0.5	5.9	<0.2	Syenite			
H 25	26.0	27.0	1.0	<0.5	5.6	<0.2	Syenite			
H 26	27.0	28.0	1.0	<0.5	2.1	<0.2	Syenite			
H 27	28.0	29.0	1.0	<0.5	9.9	0.3	Syenite			
H 28	29.0	30.0	1.0	0.9	9.5	0.2	Syenite			

Assay results of pit samples in Dong Pao F3 ore body (4/4)

Pit G 10

Sample No.	Location of Samples			Chemical Conposition (%)			Ore Class	Average of Chemical Conposition (%)		
	From	To	Thikness	TR_2O_3	$BaSO_4$	CaF_2		TR_2O_3	$BaSO_4$	CaF_2
H 1	4.0	5.0	1.0	2.4	62.5	<0.2	Barite Ore	1.23	56.55	0.05
H 2	5.0	6.0	1.0	0.7	65.1	<0.2	Barite Ore			
H 3	6.0	7.0	1.0	0.7	49.8	<0.2	Barite Ore			
H 4	7.0	8.0	1.0	1.1	48.8	0.2	Barite Ore			
H 5	8.0	9.0	1.0	2.1	34.0	0.2	II	5.074	56.658	7.074
H 6	9.0	10.0	1.0	2.4	39.4	0.3	II			
H 7	10.0	11.0	1.0	1.0	23.8	<0.2	II			
H 8	11.0	12.0	1.0	4.2	62.4	0.2	II			
H 9	12.0	13.0	1.0	6.3	58.7	0.2	II			
H 10	13.0	14.0	1.0	5.5	64.4	<0.2	II			
H 11	14.0	15.0	1.0	7.9	75.2	<0.2	II			
H 12	15.0	16.0	1.0	7.3	71.9	0.4	II			
H 13	16.0	17.0	1.0	3.1	58.6	0.3	II			
H 14	17.0	18.0	1.0	5.1	64.4	5.8	II			
H 15	18.0	19.0	1.0	5.7	61.8	10.9	II			
H 16	19.0	20.0	1.0	5.7	64.4	11.4	II			
H 17	20.0	21.0	1.0	9.0	53.5	18.6	II			
H 18	21.0	22.0	1.0	7.6	55.7	18.8	II			
H 19	22.0	23.0	1.0	3.8	64.0	20.2	II			
H 20	23.0	24.0	1.0	5.1	60.7	7.3	II			
H 21	24.0	25.0	1.0	3.9	49.6	13.0	II			
H 22	25.0	26.0	1.0	3.6	54.8	13.5	II			
H 23	26.0	27.0	1.0	7.1	59.2	13.3	II			
H 24	27.0	28.0	1.0	10.9	46.1	17.5	I	17.767	39.800	16.600
H 25	28.0	29.0	1.0	33.6	26.5	8.3	I			
H 26	29.0	30.0	1.0	8.8	46.8	24.0	I			

Pit G 11

Sample No.	Location of Samples			Chemical Conposition (%)			Ore Class	Average of Chemical Conposition (%)		
	From	To	Thikness	TR_2O_3	$BaSO_4$	CaF_2		TR_2O_3	$BaSO_4$	CaF_2
H 1	0.0	1.0	1.0	<0.5	43.1	<0.2	Barite Ore	1.20	58.48	0.00
H 2	1.0	2.0	1.0	0.9	57.4	<0.2	Barite Ore			
H 3	2.0	3.0	1.0	3.8	65.4	<0.2	Barite Ore			
H 4	3.0	4.0	1.0	1.5	48.5	<0.2	Barite Ore			
H 5	4.0	5.0	1.0	1.0	61.6	<0.2	Barite Ore			
H 6	5.0	6.0	1.0	<0.5	74.9	<0.2	Barite Ore			
H 7	6.0	7.0	1.0	1.6	78.7	<0.2	II	4.18	72.23	5.05
H 8	7.0	8.0	1.0	1.9	66.6	<0.2	II			
H 9	8.0	9.0	1.0	1.9	77.1	<0.2	II			
H 10	9.0	10.0	1.0	0.8	84.6	<0.2	II			
H 11	10.0	11.0	1.0	3.9	80.4	<0.2	II			
H 12	11.0	12.0	1.0	2.4	82.7	<0.2	II			
H 13	12.0	13.0	1.0	4.6	80.1	<0.2	II			
H 14	13.0	14.0	1.0	4.7	78.4	<0.2	II			
H 15	14.0	15.0	1.0	2.7	70.6	<0.2	II			
H 16	15.0	16.0	1.0	4.2	74.1	<0.2	II			
H 17	16.0	17.0	1.0	3.6	65.4	17.6	II			
H 18	17.0	18.0	1.0	1.9	66.4	21.7	II			
H 19	18.0	19.0	1.0	4.1	63.7	14.5	II			
H 20	19.0	20.0	1.0	5.7	69.7	4.0	II			
H 21	20.0	21.0	1.0	10.3	68.6	<0.2	II			
H 22	21.0	22.0	1.0	6.7	71.4	<0.2	II			
H 23	22.0	23.0	1.0	8.8	71.3	<0.2	II			
H 24	23.0	24.0	1.0	6.3	77.8	<0.2	II			
H 25	24.0	25.0	1.0	3.3	44.7	38.2	II			
H 26	25.0	26.0	1.0	16.0	58.2	<0.2	I	12.00	65.45	0.00
H 27	26.0	27.0	1.0	8.0	72.7	<0.2	I			
H 28	27.0	28.0	1.0	6.3	44.9	17.9	II	6.3	44.9	17.9
H 29	28.0	29.0	1.0	-	-	-		-	-	-
H 30	29.0	30.0	1.0	-	-	-				

Apx. 17 Sample list

Sample List (1/2)

Sample Name	Coordination		Rock Type	W	A	T (rock)	T (ore)	X	Fl	H
	Easting	Northing								
1219-N02			limestone with fl(1<1mm)			1				
1219-U03	350750	2466123	catacrastic limestone			1				
1219-U04	350750	2466120	Barite, limestone		1		1			
1219-U05	350750	2466060	Barite, limestone							1
1220-U06	348805	2467700	Barite + REE		1					
1222-U07	350452	2466005	alt limestone (incl fl)			1				
1223-N03			limestone			1				
1223-U08	350340	2465604	fluorite veinlet			1				
1228-U09	350805	2466680	REE (fluorite)		1					
1228-U10	350805	2466680	REE (fluorite)		1					
1228-U11	350805	2466680	REE (fluorite)		1					
0101-U01	349195	2467530	alt limestone (with fluorite)			1				1
0101-U02	349275	2467675	wtd alt syenite			1				
0101-U03	349380	2467860	wtd alt trachyte			1				
0101-U04	349530	2467875	alt limestone (epidote, fluorite)			1				
0104-U01	351398	2468787	wtd alt syenite		1					
0104-U02	351442	2468761	REE (alt syenite)		1			1		1
0104-U03	351460	2468761	REE Ore		1		1	1		
0104-U04	351557	2468440	gr fluorite						1	1
0104-U05	351700	2468200	limestone, dismd by py	1		1				
0107-U01	350375	3466210	wtd alt syenite	1	1		1			
0108-U01	350620	2465615	pink limestone, fine		1	1				
0112-U02	350605	2469000	alt syenite, REE		1		1			
0112-U03	350675	2469110	REE, qz vein		1				1	1
0112-U04	350460	2469160	syenite incl limestone		1		1			
0112-U05			pohy trachyte	1		1				
0115-N01	351829	2466357	pink limestone, fine		1	1				
0115-N02	351390	2466330	lt br - grey, wtd syenite	1	1	1				
0115-U01	351615	2466225	pale yellow, wtd syenite		1	1				
0115-U02	351652	2466345	lt grey, syenite incl fluorite	1		1				
0115-U03	351800	2466427	pink - lt grey, limestone, m-c		1	1				
0115-U04	351405	2466255	reddish br, wtd syenite							
0115-U05	351110	2466110	lt grey - pale yel, wtd syenite	1	1	1				
0115-U06			grey and pink(kf<2mm), syenite	1						
0115-U07	350843	2466880	dk br, stgy wtd syenite		1					
0115-U08	350844	2466873	dk br, stgy wtd syenite and barite		1					
0115-U09	350855	2466764	pale yel - wht, stgy wtd syenite		1					
0115-U10	350875	2466650	lt br with wht, stgy wtd syenite and barite		1					
0115-U11	350765	2466653	dk vio and wht, wtd fluorite with barite		1					
0115-U12	350745	2466651	lt br, wtd syenite (fine)	1	1	1				
0115-U13	351557	2466425	dk br - br, wtd syenite		1					
0115-U14	351555	2466435	dk br, wtd syenite and ba		1					
0116-U01	353855	2465483	grey, trachy andesite tbr			1				1
0116-U02	351354	2468028	dk br		1					
0116-U03	351376	2468024	dk br with wht(ba)		1					
0116-U04	351442	2468038	dk br with pale yellow		1					
F1-N01	350780	2466930	vio fluorite		1					
F1-N02			vio - br, fluorite and REE		1					
F1-N03			vio fluorite		1					
F1-N04			pale yel - br, stgy wtd syenite		1					
F1-U01	350760	2466930	pale yellow, stgy wtd syenite		1					
F1-U02	350760	2466930	pale yellow, stgy wtd syenite and ba		1					
F4-U01	351030	2467900	dk blue fluorite, v fine		1					
F4-U02	351030	2467900	br with wht, incl ba		1					
F4-U03	351030	2467900	fluorite with ba and REE		1					
F4-U04	351030	2467900	green and vio fluorite							
F4-U05	351025	2467875	pale yellow, stg wtd sy		1					
F4-U06	351025	2467875	br with wht		1					
H-01	350291	2468115	pohy trachyte			1				
H-02	349944	2468243	wtd trachyte	1						

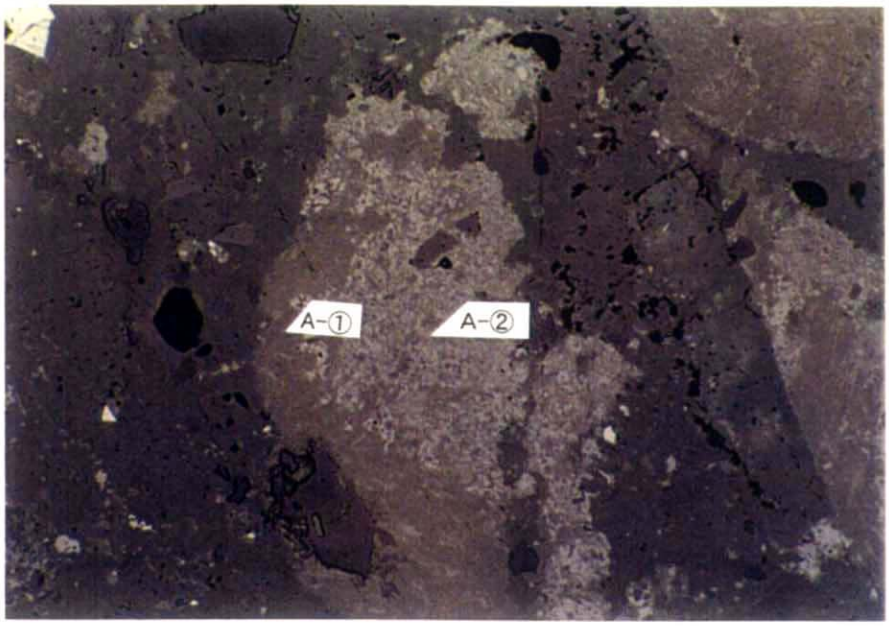
Sample List (2/2)

Sample Name	Coordination		Rock Type	W	A	T (rock)	T (ore)	X	FI	H
	Easting	Northing								
MJVD-01-25.30			mineralized limestone				1			
MJVD-01-47.05			breccia of cyenite				1			
MJVD-01-73.50			barite and rare earth				1			
MJVD-04-87.85			fluorite and barite ore				1			
MJVD-05-45.75			minette				1			
MJVD-05-91.70			syenite				1			
MJVD-05-94.50			fluorite, barite, bastnaesite					1		
MJVD-08-53.70			rare earth ore				1			
MJVD-09-83.40			fluorite and barite ore						1	
MJVD-10-41.10			barite				1			
MJVD-10-47.40			REE Ore					1		1
MJVD-10-73.10			bk Mineral					1		
MJVD-10-73.85			rd Mineral					1		
MJVD-10-77.95			barite and rare earth				1			
MJVD-10-93.10			bastnaesite					1		
MJVD-10-96.40			barite and yellow rare earth				1			
MJVD-11-57.40			limestone				1			
MJVD-11-70.40			syenite				1			
MJVD-11-70.40			syenite (mineralized)	1						
MJVD-13-07.65			pale orange REE ore					1		
MJVD-16-71.20			bk ore					1		
P1b-01			vio fluorite						1	
P1b-02			gr - trl fluorite						1	
P1b-03			fluorite, ba				1			
P1b-04			fluorite, ba, REE		1					
P2-300			lt br ore		1			1		
P2-330			bk ore		1			1		
P2-415			dk br ore		1			1		
P2-430			dk br ore		1			1		
P2-480			pale yellow - grey ore		1			1		
P3-380			reddish br ore		1			1		
P3-470			bk ore		1			1		
P3-540			pale yellow ore		1			1		
P3-550			primary ore		1		1		1	

W : Whole Rock
A : Ore Analysis
T (rock) : Rock Thin Section
T (ore) : Ore Thin Section
X : X-ray
FI : FI
H : Hand specimen

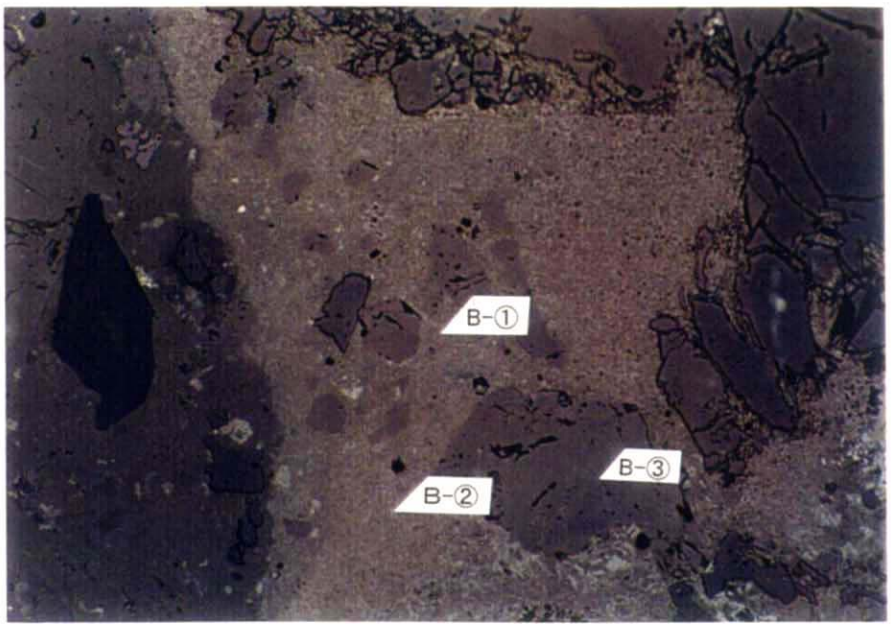
Apx. 18　EPMA analysis of ore test samples

Polished section Photo A



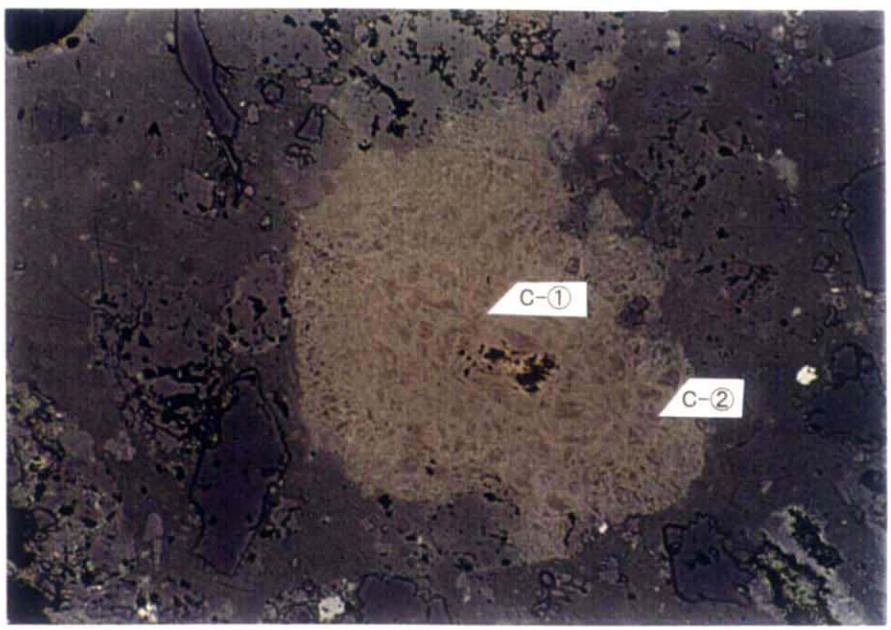
50μm
180×

Polished section Photo B



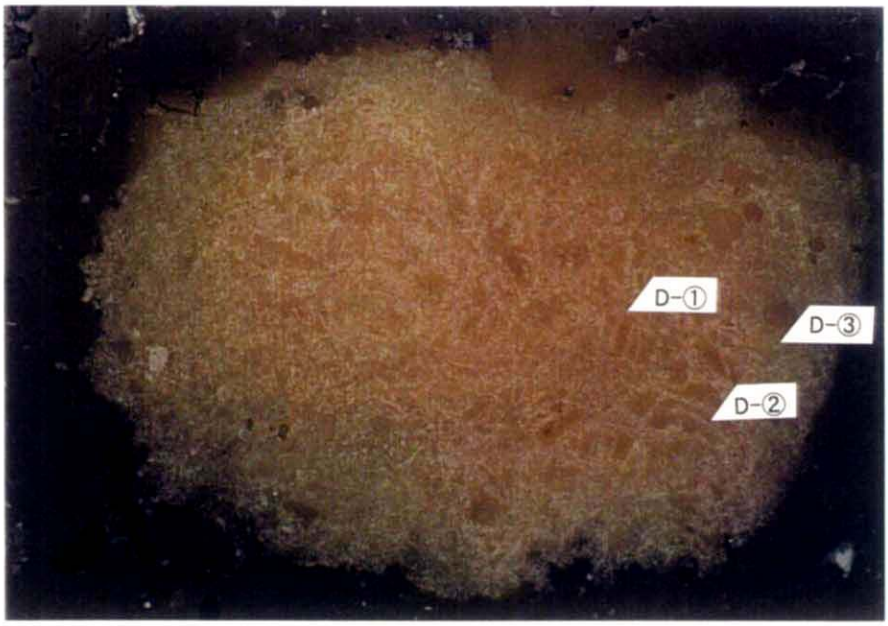
50μm
180×

Polished section Photo C

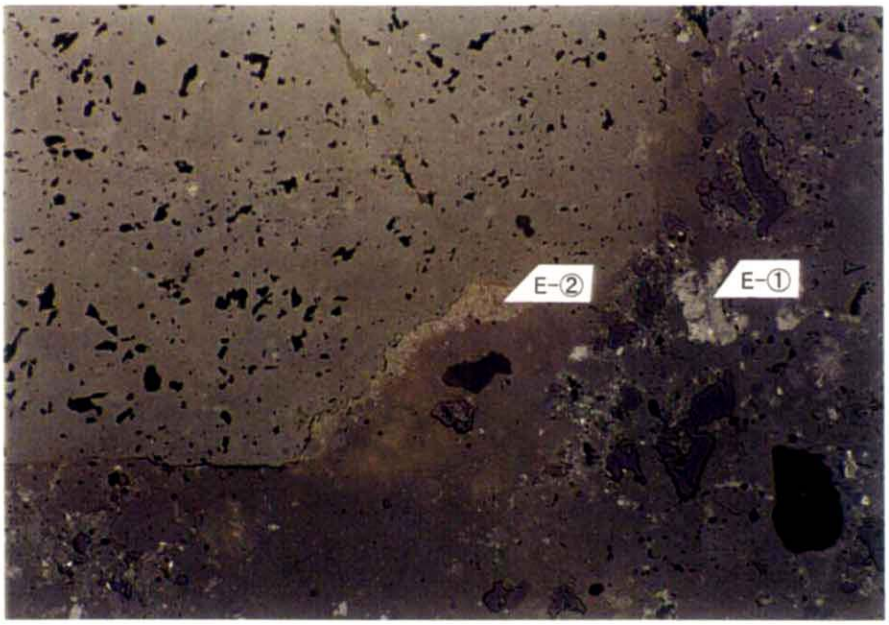


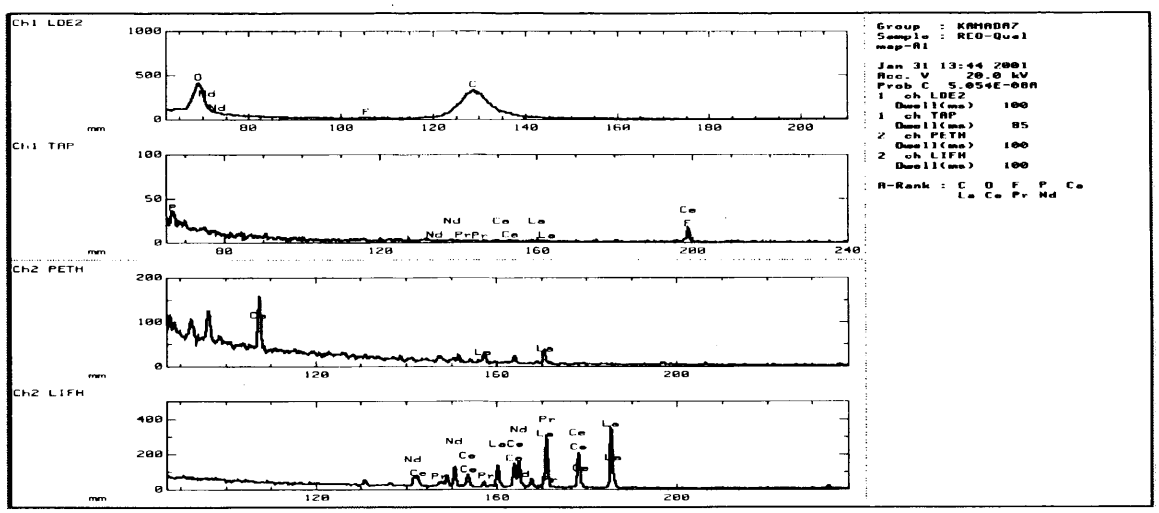
50μm
180×

Polished section Photo D

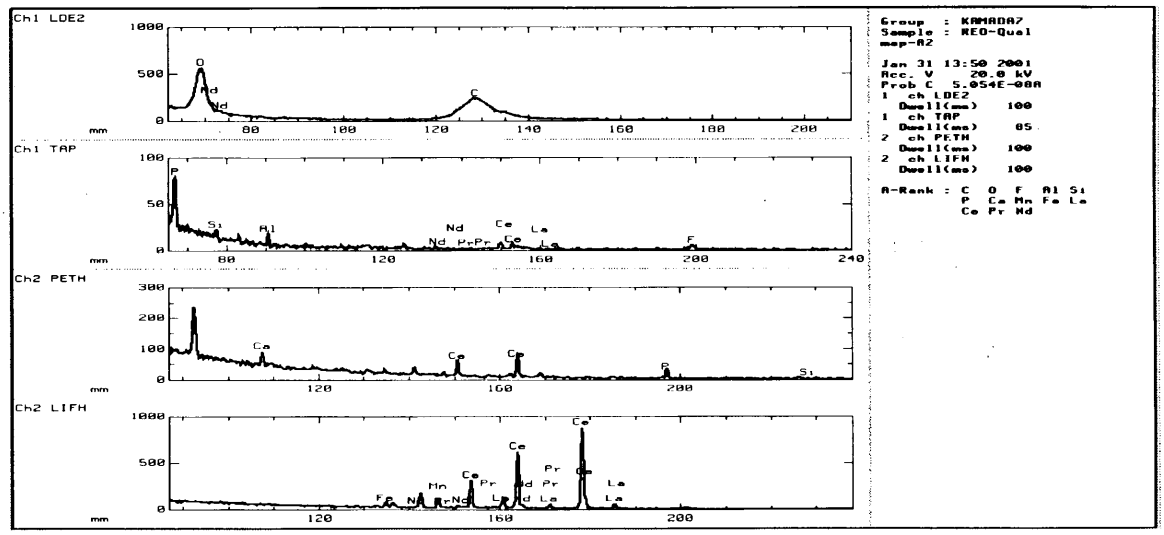


Polished section Photo E

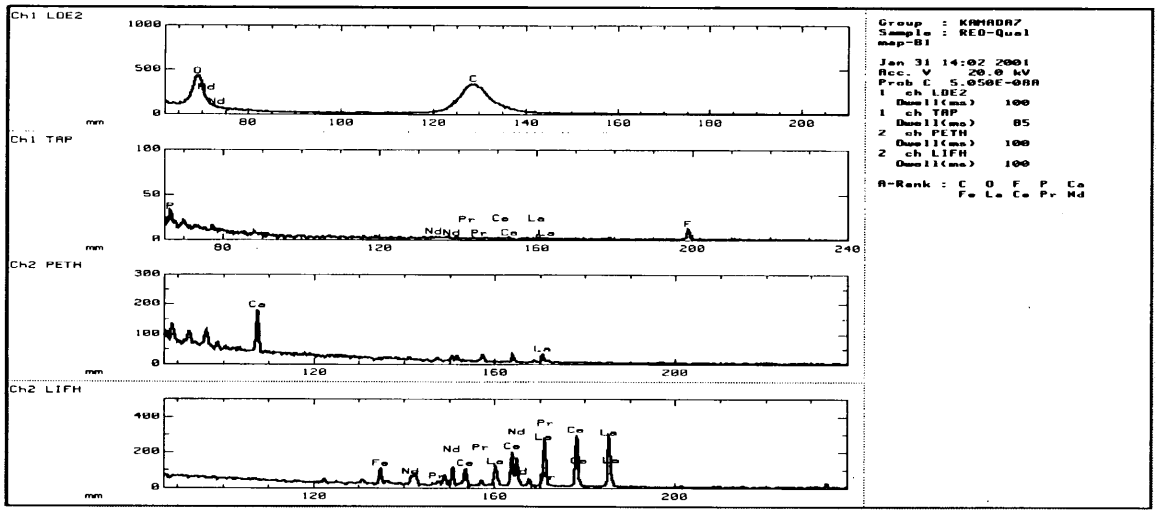




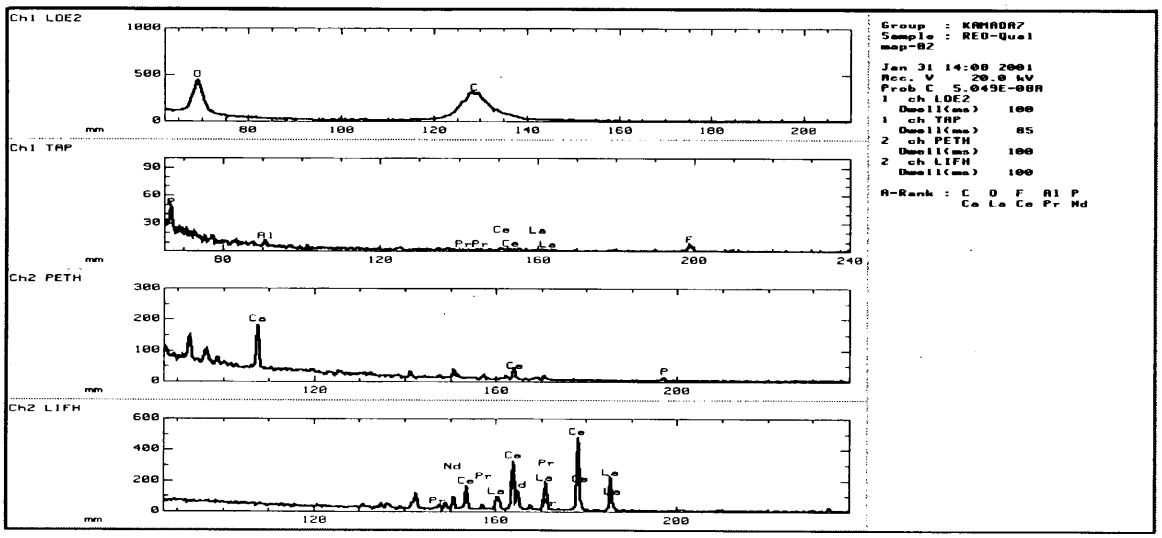
Qualitative analysis spectrum of photo A-1



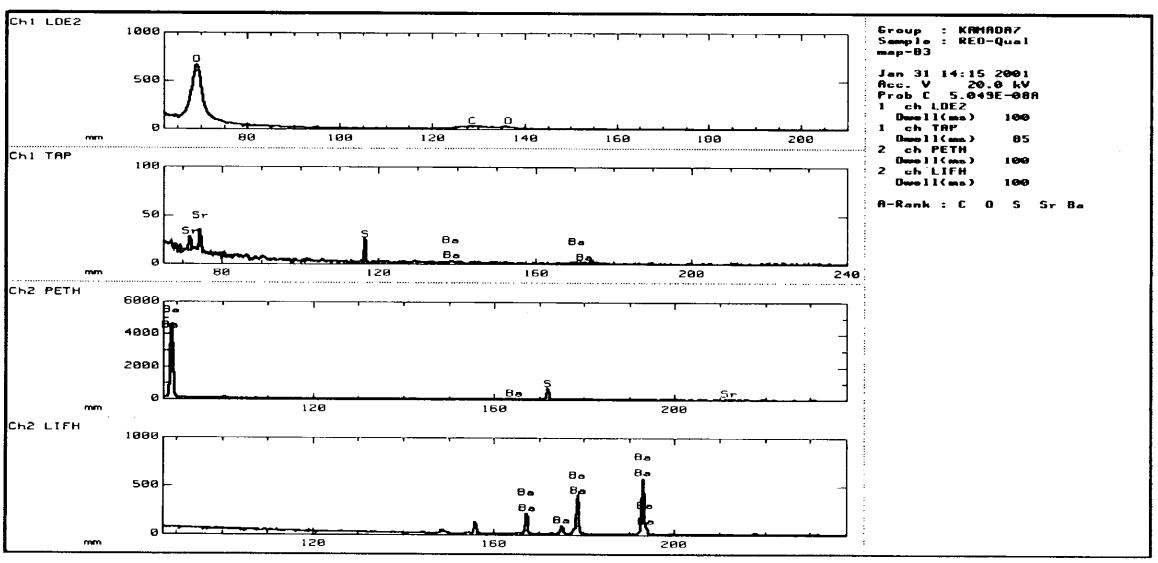
Qualitative analysis spectrum of photo A-2



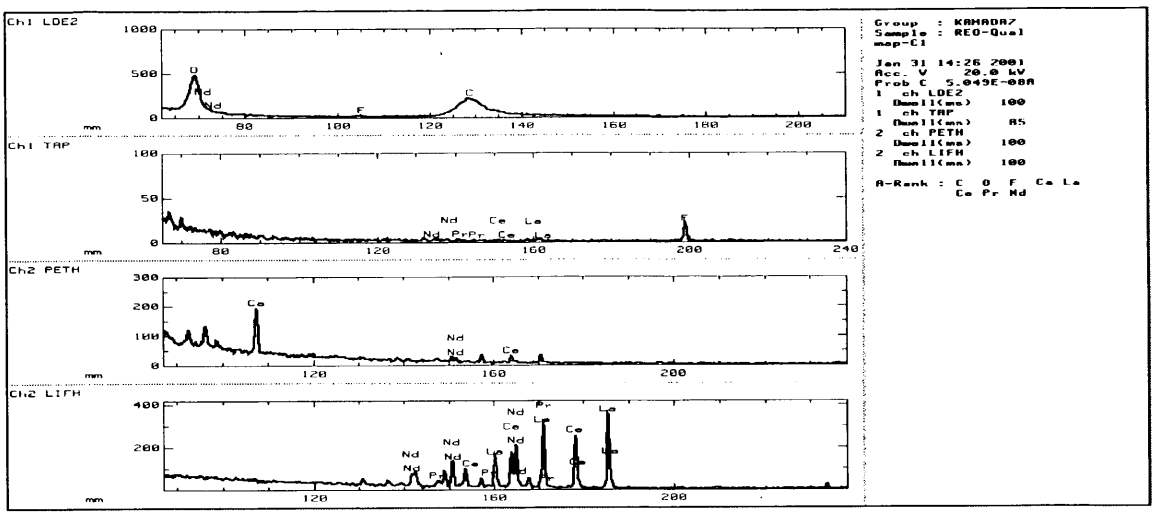
Qualitative analysis spectrum of photo B-1



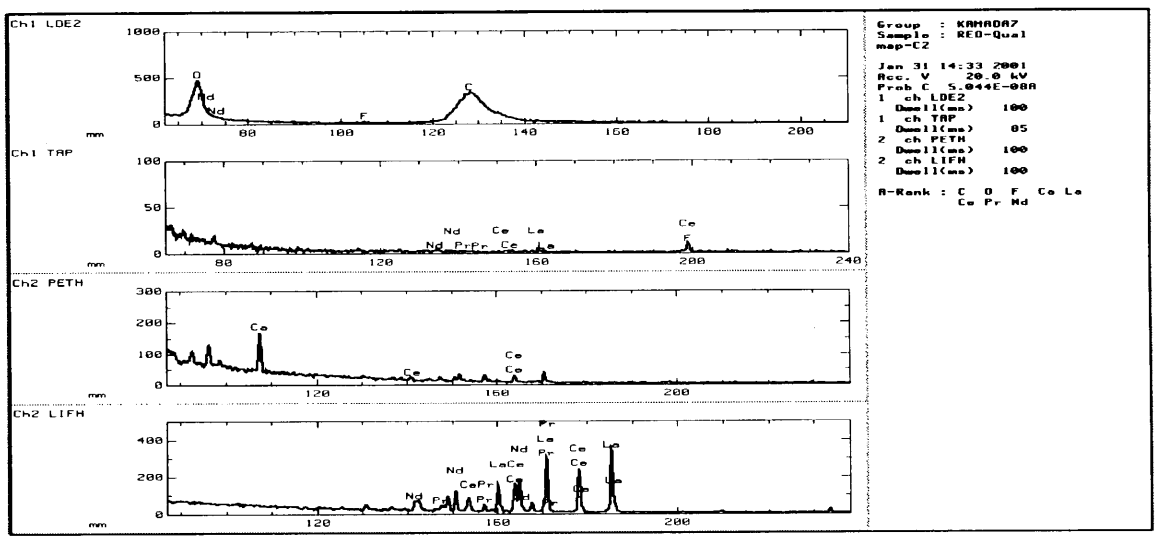
Qualitative analysis spectrum of photo B-2



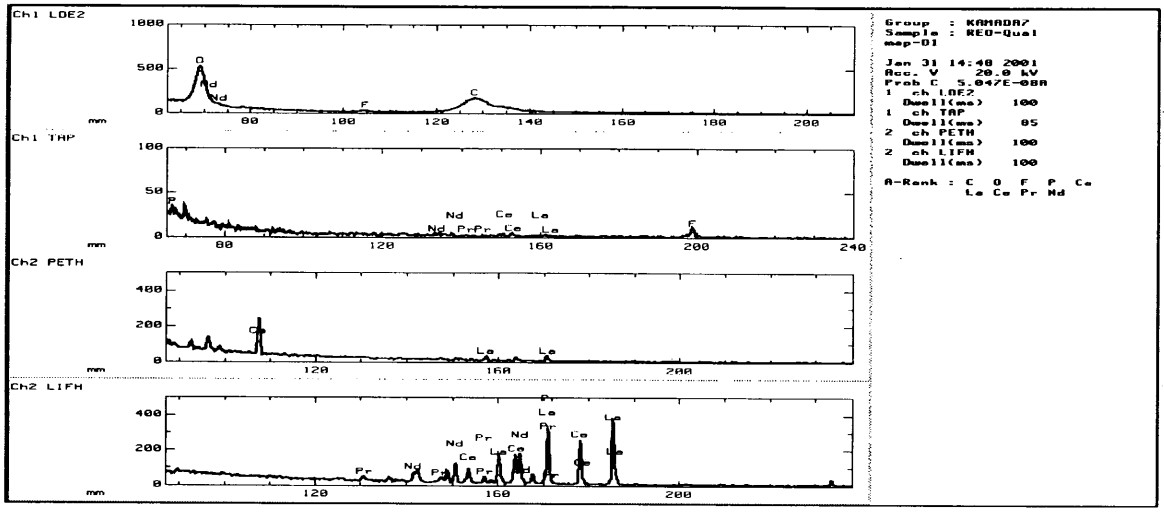
Qualitative analysis spectrum of photo B-3



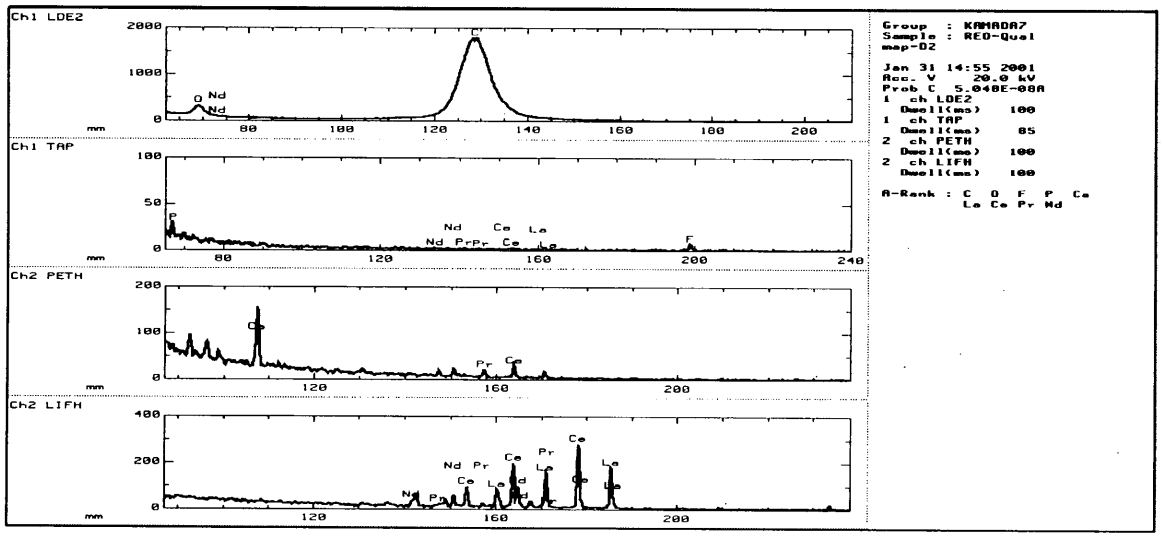
Qualitative analysis spectrum of photo C-1



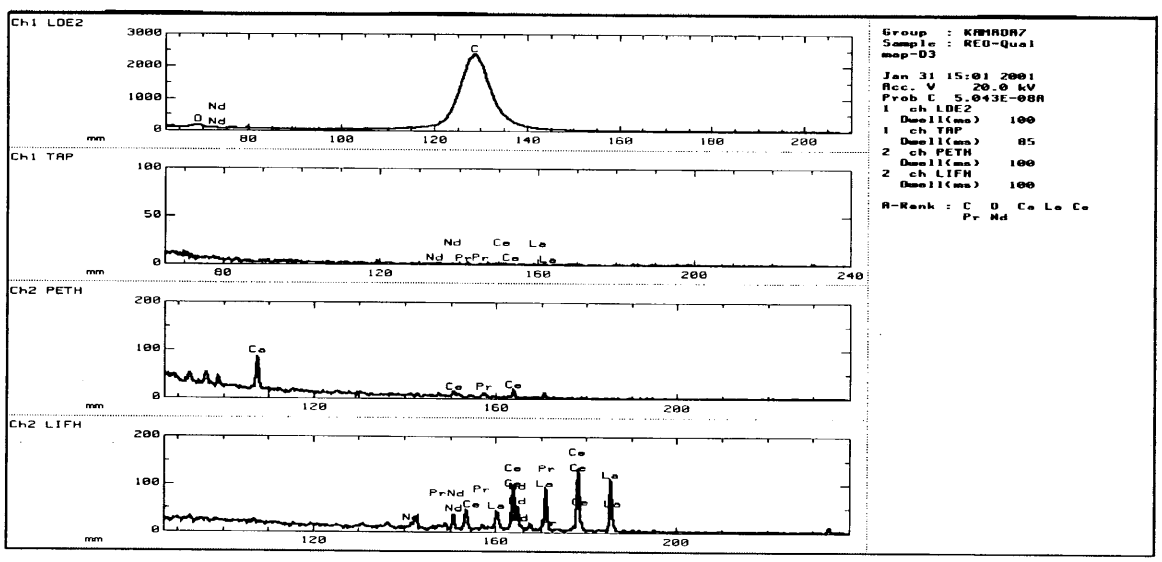
Qualitative analysis spectrum of photo C-2



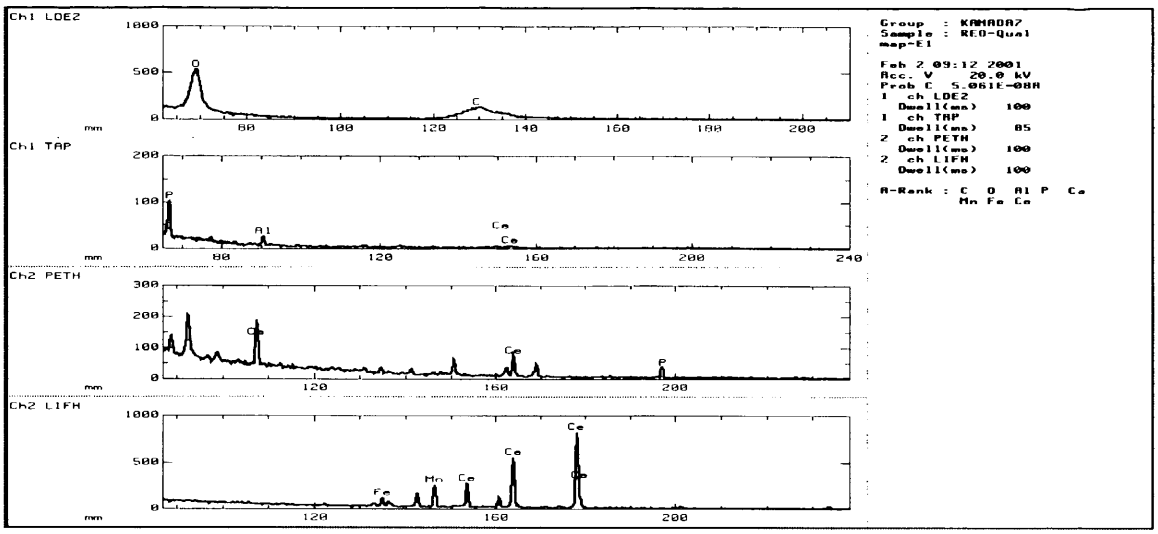
Qualitative analysis spectrum of photo D-1



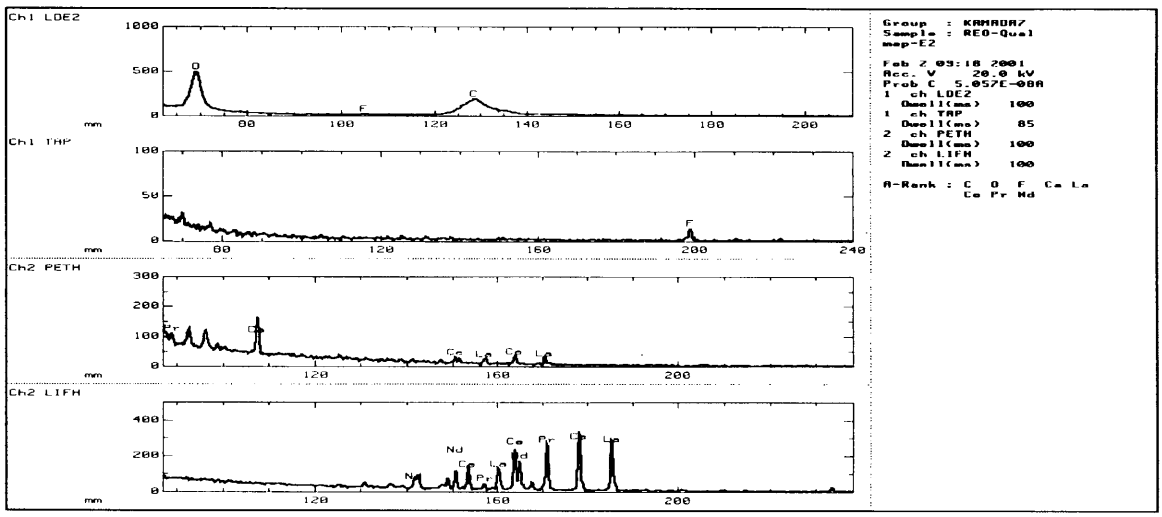
Qualitative analysis spectrum of photo D-2



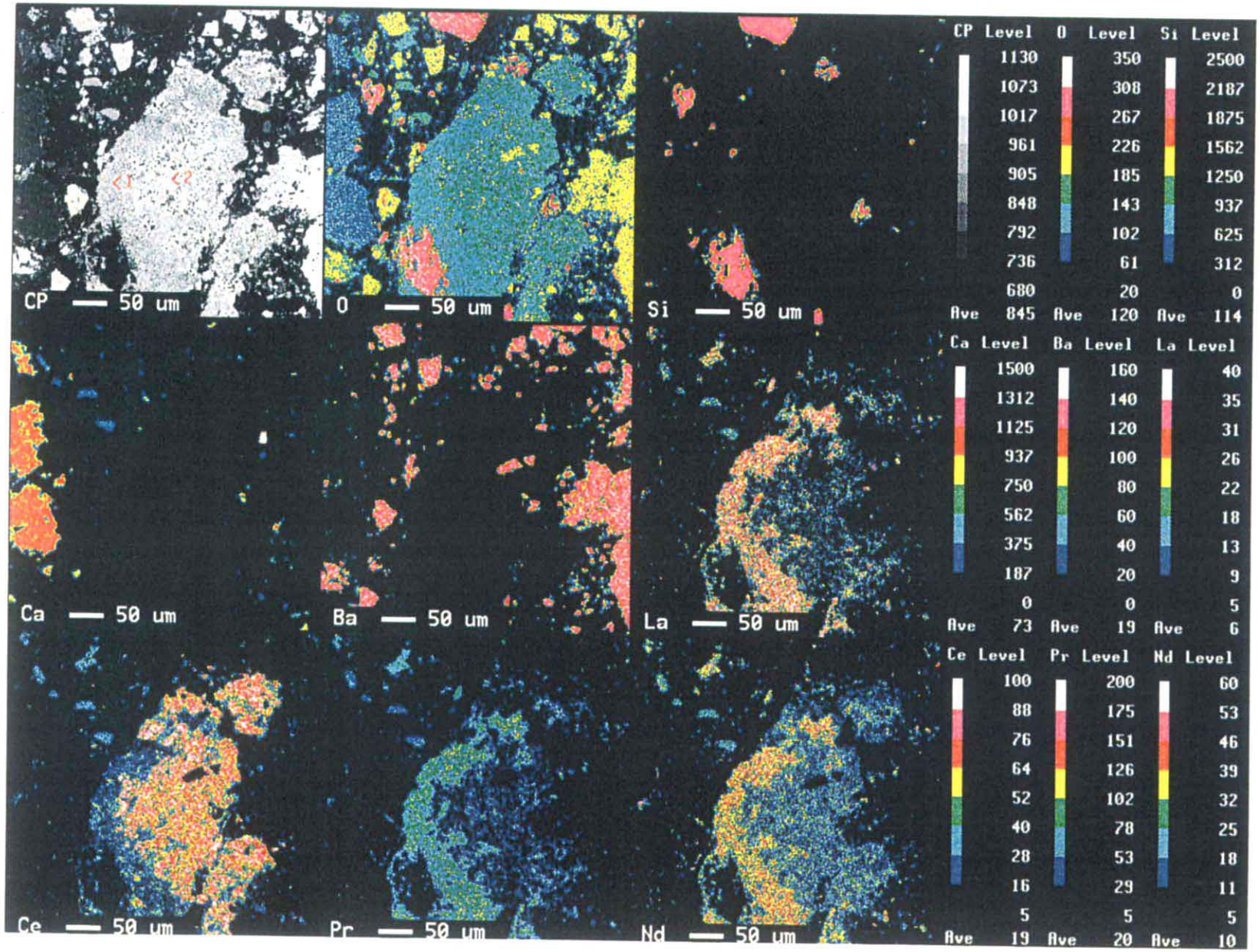
Qualitative analysis spectrum of photo D-3



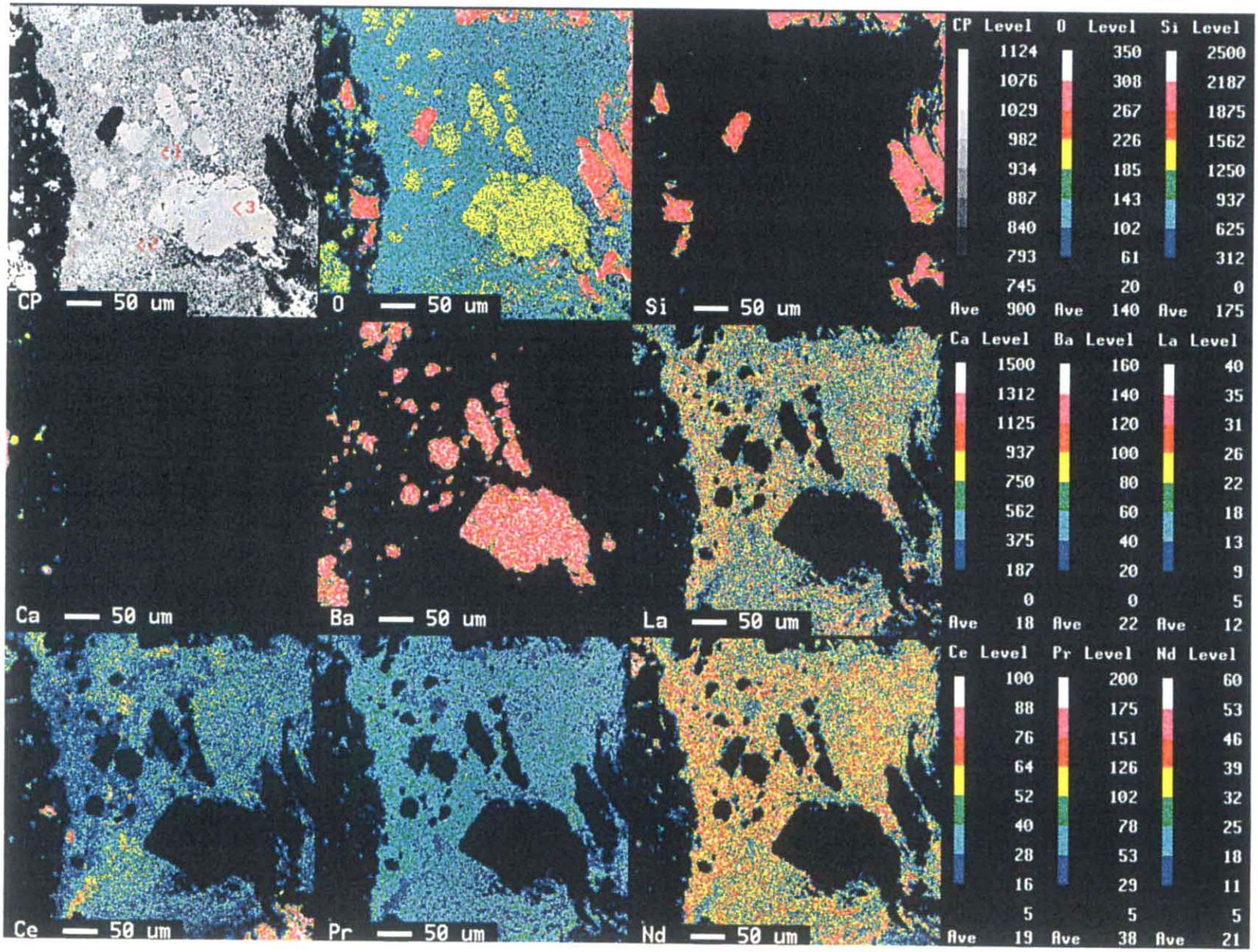
Qualitative analysis spectrum of photo E-1



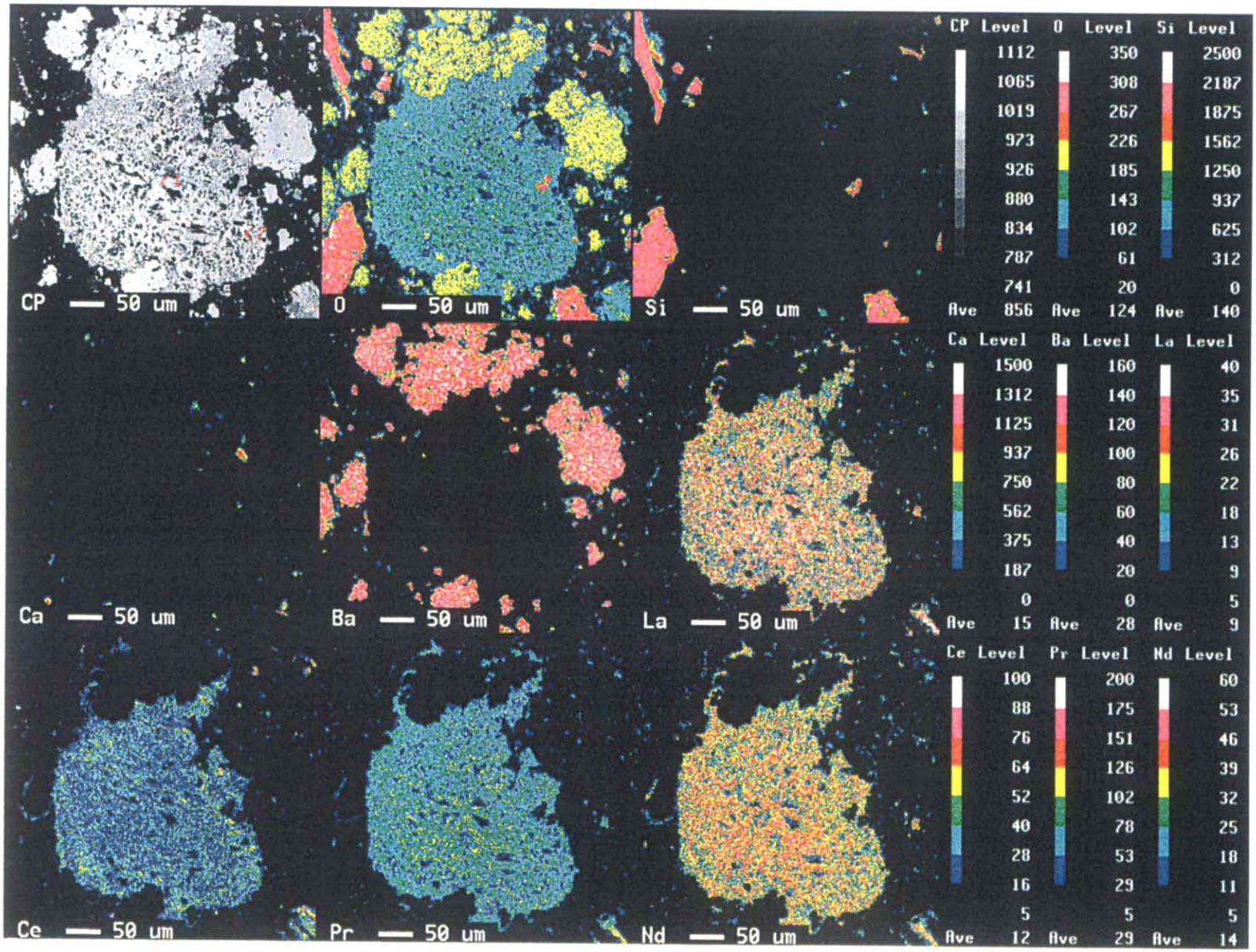
Qualitative analysis spectrum of photo E-2



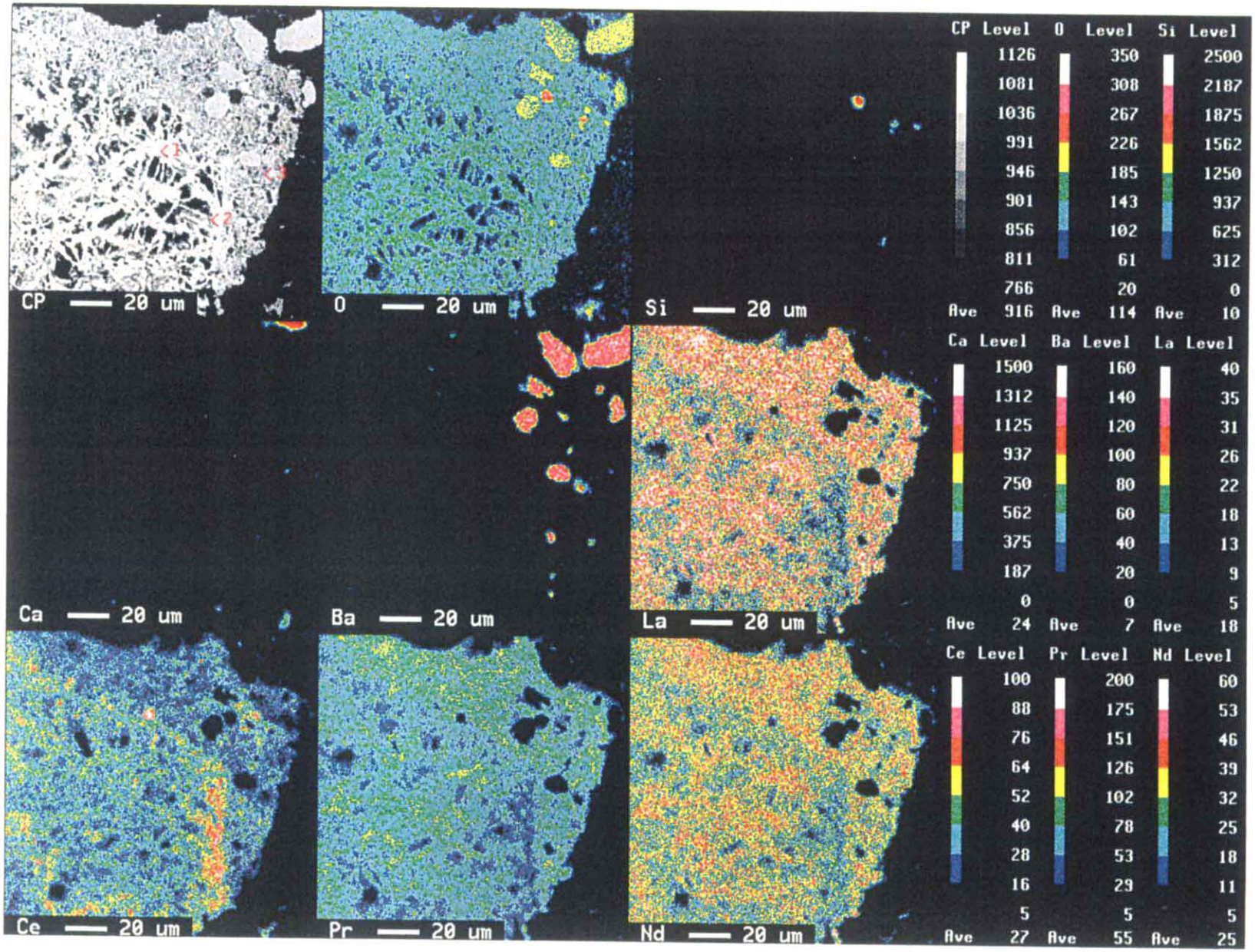
EPMA quantitative element image of photo A



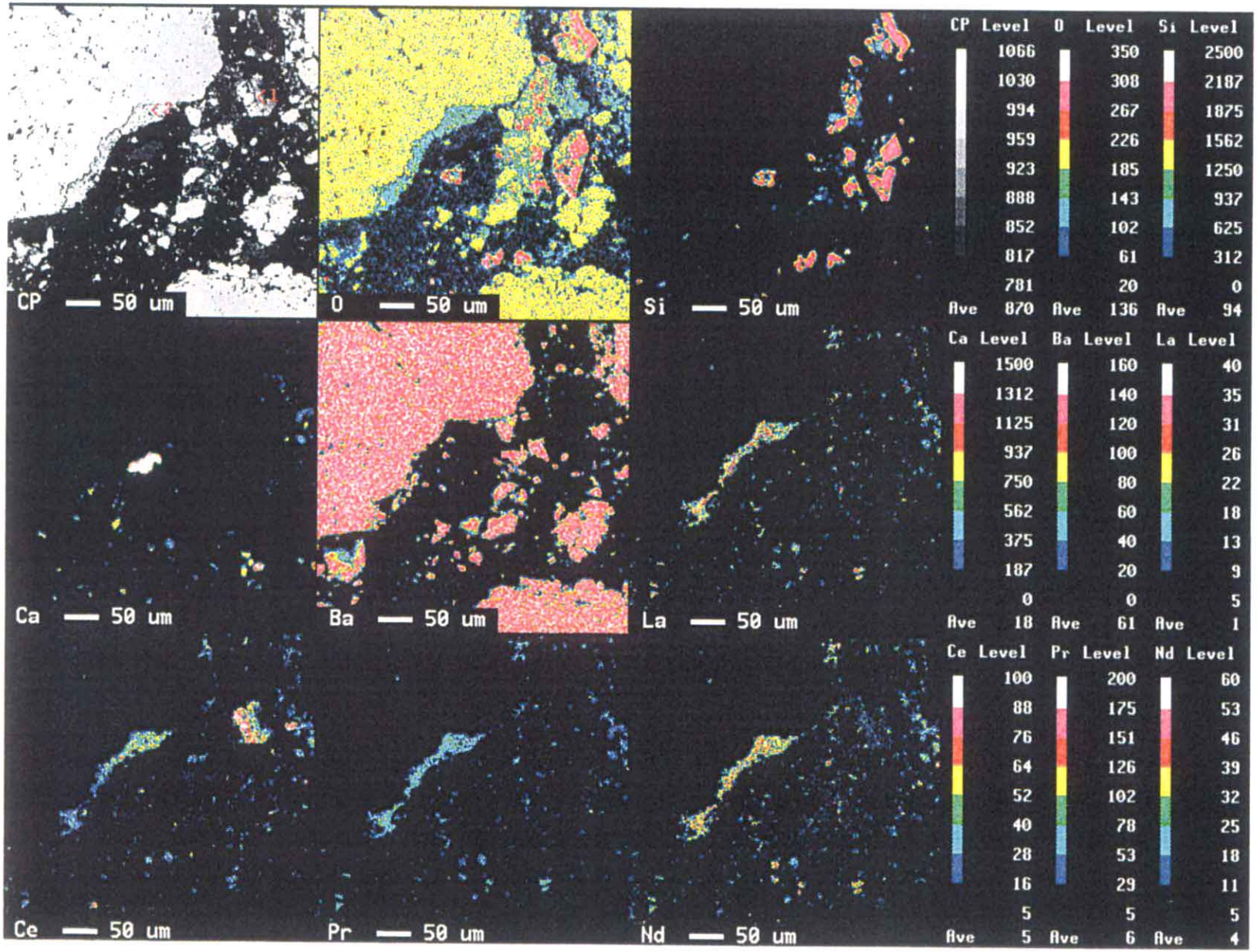
EPMA quantitative element image of photo B



EPMA quantitative element image of photo C



EPMA quantitative element image of photo D



EPMA quantitative element image of photo E

Results of quantitative analysis

Position	O	F	P	Ca	La	Ce	Pr	Nd	Al	Si	Mn	Fe	S	Sr	Ba
A-1	16.5	10.2	0.5	0.7	39.1	18.6	3.0	11.4	–	–	–	–	–	–	–
A-2	19.0	3.2	1.3	<0.5	4.7	65.1	0.9	2.7	0.5	<0.5	1.7	0.9	–	–	–
B-1	17.2	8.4	0.5	1.0	30.0	27.4	2.5	11.2	–	–	–	1.8	–	–	–
B-2	16.8	5.9	0.8	0.9	22.5	42.0	2.6	8.5	<0.5	–	–	–	–	–	–
B-3	29.2	–	–	–	–	–	–	–	–	–	–	–	13.9	1.4	55.5
C-1	16.6	10.9	–	0.8	34.1	21.6	2.8	13.2	–	–	–	–	–	–	–
C-2	18.4	6.5	–	0.8	38.0	19.9	3.4	13.0	–	–	–	–	–	–	–
D-1	19.8	7.4	<0.5	1.2	36.5	20.7	3.1	11.3	–	–	–	–	–	–	–
D-2	15.3	9.9	0.6	1.3	25.8	36.0	1.9	9.2	–	–	–	–	–	–	–
D-3	15.8	–	–	1.5	34.1	33.3	3.4	11.9	–	–	–	–	–	–	–
E-1	21.1	–	1.8	0.9	–	38.6	–	–	0.9	–	4.8	1.9	–	–	–
E-2	18.4	8.6	–	0.7	27.8	29.9	2.8	11.8	–	–	–	–	–	–	–

Apx. 19 Results of flotation ore test

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A PRELIMINARY INVESTIGATION

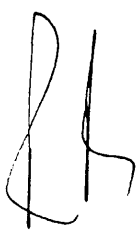
INTO THE DIFFERENTIAL FLOTATION

OF RARE EARTH OXIDES,

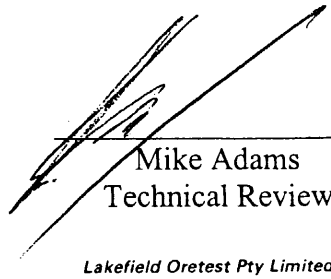
BARITE, & FLUORITE

CLIENT: Sumitomo Metal Mining Co Ltd

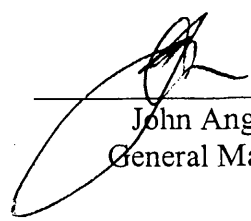
JOB No.: 8677



Rob Burger
Author



Mike Adams
Technical Review



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SUMMARY

A flotation testwork programme was undertaken on a sample of ore from the Dong Pao deposit in Vietnam.

The head assay of the sample was as follows:

HEAD ASSAY

TLnO %	$BaSO_4$ %	CaF_2 %	ThO_2 ppm	U_3O_8 ppm	S %	Moisture %	True Rel Density
9.25	62.7	4.7	139	117	8.85	7.57	3.89

An ICP scan of the ore gave the following results:

HEAD ICP SCAN

Au ppm	Ag ppm	Al %	As %	B ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm
<5	<10	0.62	<0.1	<50	36.9	<10	10	4.3	<10

Ce %	Cr %	Cs ppm	Cu %	Dy ppm	Er ppm	Eu ppm	F %	Fe %	Ga ppm
3.42	<0.02	0.48	<0.05	147	44	194	2.3	1.94	<1

Gd ppm	Hf ppm	Ho ppm	In ppm	K %	La %	Li ppm	Lu ppm	Mg %	Nb ppm
388	2	18	<0.1	0.05	2.78	41	2	0.05	153

Nd ppm	P %	Pb ppm	Pd ppm	Pr ppm	Pt ppm	Rb ppm	Re ppm	S %	Sb ppm
9635	0.21	0.28	1	3133	<0.5	6.8	<0.1	8.85	42

Sc ppm	Se %	Si %	Sm ppm	Sn ppm	Sr ppm	Ta ppm	Tb ppm	Te ppm	Th ppm
<20	<0.02	4.4	911	<20	5194	<1	53.4	<10	122

Ti %	Tl ppm	U ppm	Tm ppm	V ppm	W ppm	Y ppm	Yb ppm	Zn %	Zr ppm
0.06	5	99	4	87	57	565	19	0.06	<200

A quantitative XRD analysis showed the following mineral abundances:

QUANTITATIVE XRD RESULTS

Mineral	Wt (%)
Barite	74.1
Bastnaesite -Ce	1.2
Bastnaesite -La	1.1
Calcite	1.5
Celestine	3.4
Finnemanite	0.5
Fluorite	4.2
Mordenite	5.5
Perloffite	3.5
Quartz	4.1
Synchysite	0.3

These results show the following:

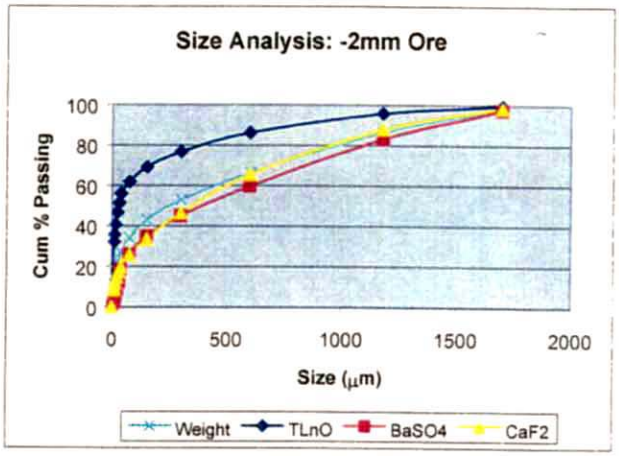
- Barite is the dominant mineral in this ore.
- Minerals containing rare-earth oxides include bastnaesite and synchysite.

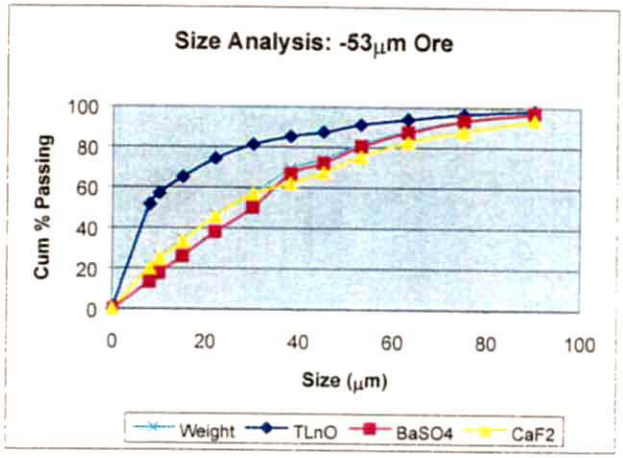
A mineralogical examination revealed the following:

- Barite was found to be the dominant mineral in the ore, occurring mainly as liberated crystals ranging between 200μm and 2000μm in size.
- The major rare-earth mineral, bastnaesite, was found to occur predominantly as liberated, rounded masses – often exceeding 1mm in size.
- Bastnaesite was also found to be frequently associated with barite, and occasionally associated with fluorite, quartz, and apatite.

Size analyses were conducted on the ore after crushing to pass 2mm, and after milling to 80% passing 53μm. The results obtained are shown graphically overleaf.

SIZE ANALYSES





The following comments may be made concerning these results:

- The fine fractions in both tests were enriched in rare earth oxides, eliminating desliming as a form of treatment.
- The ore mineral distributions were such that classification would not be considered an acceptable method of beneficiation.

A number of batch flotation tests were performed with the intention of producing separate concentrates of rare earth oxides, barite, and fluorite. The results obtained are summarised below:

SUMMARY OF BATCH FLOTATION RESULTS

Test No.	Test Conditions	$BaSO_4$ Concentrate* Recoveries (%)			REO Concentrate Recoveries (%)		
		$BaSO_4$	REO	CaF_2	$BaSO_4$	REO	CaF_2
RB 2819	Ba/Ca Bulk Float, Followed by REO Float	43.2	20.9	20.9	11.7	31.7	15.5
RB 2843	Similar, Increased Ba/Ca Collectors	95.8	67.6	75.3	4.0	27.9	23.1
RB 2844	REO Float, Followed by Ba/Ca Float	59.7	54.8	78.3	40.1	40.7	19.8
RB 2845	REO Float, Followed by CaF2 Float & BaSO4 Float	59.1	48.9	72.5	40.7	45.4	25.5
RB 2889	Similar to RB 2819, Increased Ba/Ca Collectors & REO depressant.	98.1	87.3	95.3	1.5	9.8	3.5
RB 2890	Repeat at Finer Grind	95.6	84.0	92.7	4.1	14.6	6.5
RB 2891	REO Float, Followed by Ba/Ca Float, Finer Grind	40.9	45.2	57.4	58.8	52.6	41.4
RB 2892	REO/CaF2 Float Followed by BaSO4 Float, Finer Grind	15.9	19.8	25.7	81.5	64.4	66.4
RB 2893	REO Float Followed by CaF2 Float, Different Reagents, Finer Grind	41.5	65.0	66.5	58.5	35.0	33.5
RB 2895	Pre-Size, Float +32um, +10um, Std Grind	90.6	59.5	84.2	1.2	1.8	0.8
PD321	Similar to RB 2889, Heat to 60 C	99.7	98.1	99.2	0.2	1.8	0.7
PD326	Repeat, Increase REO Depressant	99.8	98.3	99.3	0.2	1.7	0.7
PD327	Repeat, Decrease Collector Addition	99.6	97.2	98.8	0.4	2.8	1.2

* Combined CaF_2 and $BaSO_4$ Concentrates where produced separately

The following comments may be made concerning these results:

- The order in the flotation of the ore minerals was varied.
- The effect of finer grinding was evaluated.
- Reagent type and dosages were varied.
- Flotation of pre-sized ore was tried.
- Flotation at elevated temperature was evaluated.
- In all instances it was found that differential flotation was unsuccessful.

A series of magnetic separation tests were performed to determine whether a REO concentrate could be collected, leaving a barite and fluorite rich tailing. The summarised results obtained are shown overleaf.

These results show the following:

- The testwork was performed on unmilled (-2mm) material.
- The samples were prescreened at 38μm, and, where shown, the +38μm fraction was pulverized before processing.
- Two magnetic separators were utilized, i.e. a WHIMS (Wet, High Intensity Magnetic Separator) and an Induced Roll (a dry separator).
- In all cases the beneficiation of REO's by screening at 38μm exceeded the beneficiation by magnetic separation.

SUMMARY OF MAGNETIC SEPARATION TESTWORK

Magnetic Separation	+38 µm Pulverised	Magnetics						
		Mass (%)	REO (%)		$BaSO_4$ (%)		CaF_2 (%)	
			Grade	Rec	Grade	Rec	Grade	Rec
WHIMS	YES	3.7	6.6	2.7	41.0	2.4	4.5	3.5
IND ROLL	NO	13.0	21.3	30.6	25.7	5.3	4.5	12.3
IND ROLL	YES	12.6	14.5	19.8	48.9	9.8	4.7	12.0

The following comments may be made concerning the testwork performed:

- The objective of the exercise was to differentially recover rare earth oxides, barite, and fluorite. This objective has not been achieved.

- Mineralogical investigation has shown that a little over half of the rare earth oxides were liberated, with approximately 40% associated with mainly barite and fluorite.

- Mineralogical examination also revealed that while the barite grains were predominantly liberated, this mineral also occurred in composite grains with bastnaesite, fluorite, and silicates. Bastnaesite rims were also observed on barite grains.

- These observations, added to the similarity in flotation response of the ore minerals, indicate that successful separation of these minerals will be difficult by physical means.

- It is recommended that further testwork be undertaken evaluating combinations of sizing, flotation, and magnetic separation.

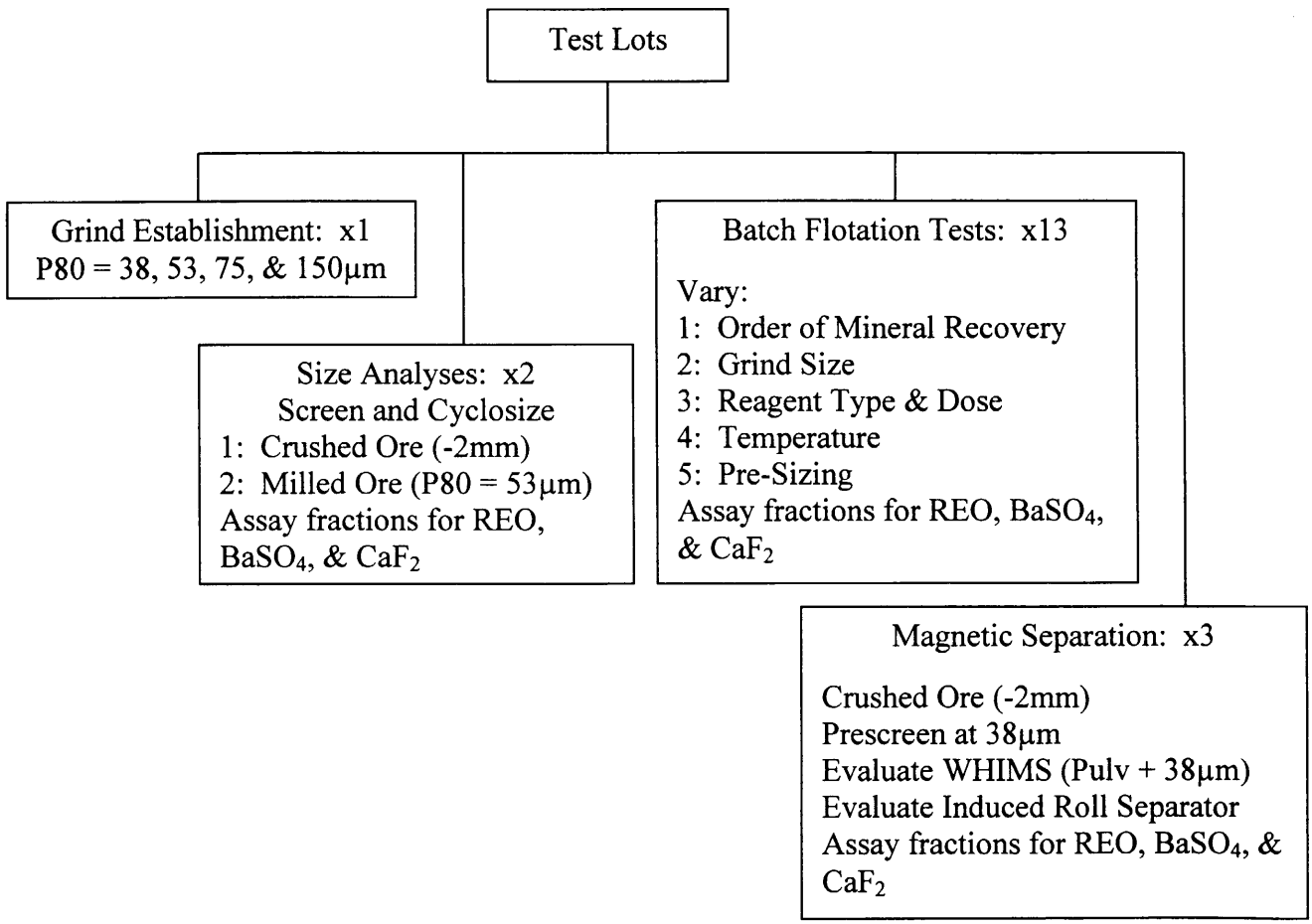
- It is further recommended that sighter tests be undertaken to assess the potential of hydrometallurgical processing to extract the rare earth oxides.

1. INTRODUCTION

Mr Akeo Onishi, of Sumico Consultants Co. Ltd, requested Lakefield Oretest Pty Ltd to perform a number of tests on a sample of Dong Pao ore from Vietnam.

The testwork programme is shown in Figure 1:

FIGURE 1: TESTWORK PROGRAMME



The aim of the testwork was to differentially recover Rare Earth Oxides (REO or TLnO), barite ($BaSO_4$), and fluorite (CaF_2).

All assays were conducted by Genalysis of Maddington and Ultra Trace of Canning Vale, Western Australia, using the following methods:

Genalysis:

Multi elemental analysis	ICP – MS/OES
S	Leco Combustion

Ultra Trace:
REO, CaO, BaO, & F XRF

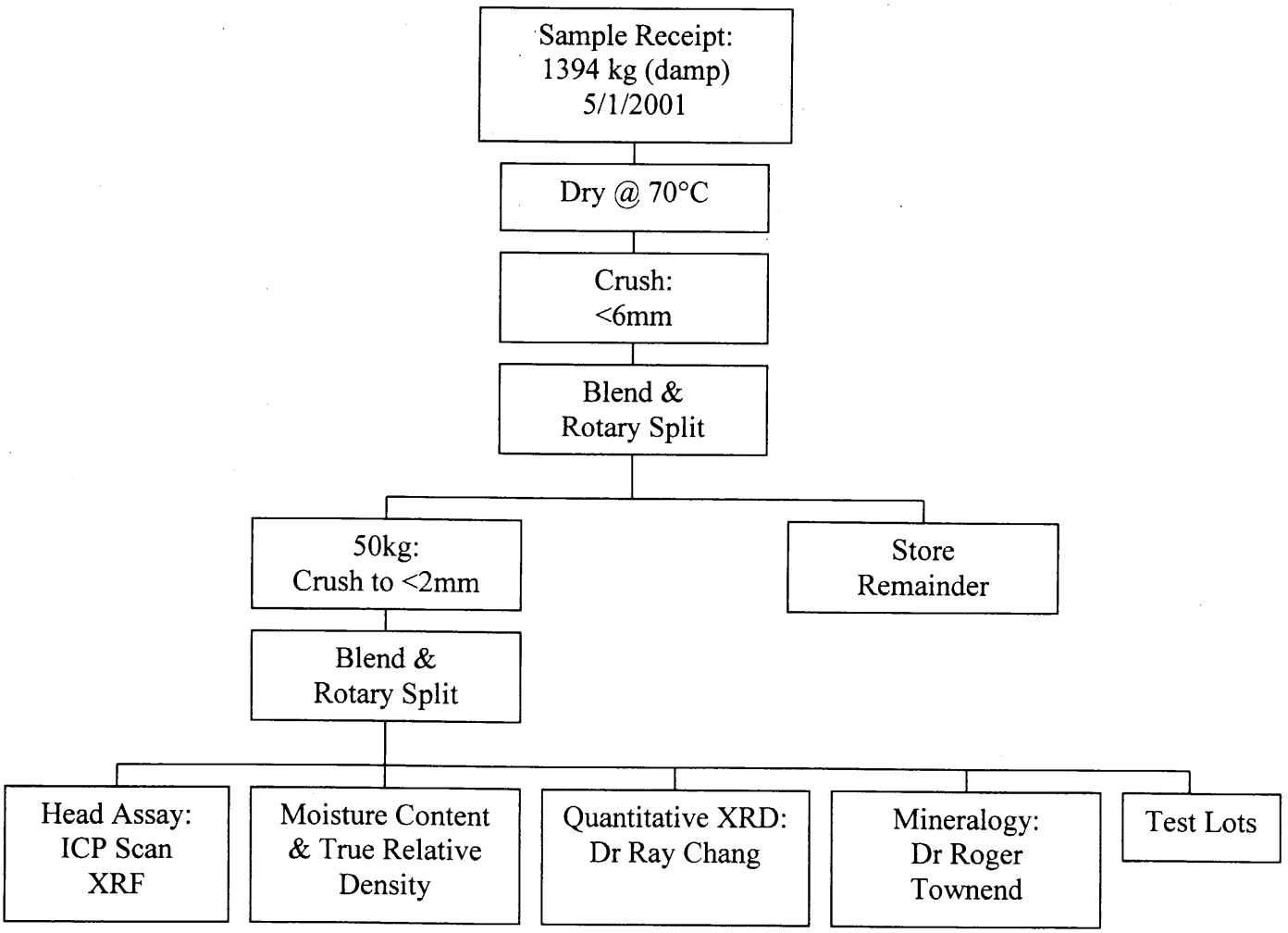
The detailed assay results are shown in Table 7 in Section 4. Sample preparation of solid samples was conducted at Lakefield Oretest's laboratory sample preparation facility.

All tests were conducted in Perth tap water.

2. SAMPLES / SAMPLE PREPARATION

A 1.4t damp sample was delivered to Lakefield Oretest on 5th January 2001. The sample was prepared according to the flowsheet shown in Figure 2:

FIGURE 2: SAMPLE PREPARATION



2.1 HEAD ASSAY

The following head assays were obtained on this sample:

TABLE 1: HEAD ASSAY

TLnO %	$BaSO_4$ %	CaF_2 %	ThO_2 ppm	U_3O_8 ppm	S %	Moisture %	True Rel Density
9.25	62.7	4.7	139	117	8.85	7.57	3.89

The detailed data for the True relative density determination is given in Table 8 in Section 4.

2.2 ICP SCAN

The results of the ICP scan are given in Table 2:

TABLE 2: HEAD ICP SCAN

Au Ppm	Ag ppm	Al %	As %	B ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm
<5	<10	0.62	<0.1	<50	36.9	<10	10	4.3	<10

Ce %	Cr %	Cs ppm	Cu %	Dy ppm	Er ppm	Eu ppm	F %	Fe %	Ga ppm
3.42	<0.02	0.48	<0.05	147	44	194	2.3	1.94	<1

Gd ppm	Hf ppm	Ho ppm	In ppm	K %	La %	Li ppm	Lu ppm	Mg %	Nb ppm
388	2	18	<0.1	0.05	2.78	41	2	0.05	153

Nd ppm	P %	Pb ppm	Pd ppm	Pr ppm	Pt ppm	Rb ppm	Re ppm	S %	Sb ppm
9635	0.21	0.28	1	3133	<0.5	6.8	<0.1	8.85	42

Sc ppm	Se %	Si %	Sm ppm	Sn ppm	Sr ppm	Ta ppm	Tb ppm	Te ppm	Th ppm
<20	<0.02	4.4	911	<20	5194	<1	53.4	<10	122

Ti %	Tl ppm	U ppm	Tm ppm	V ppm	W ppm	Y ppm	Yb ppm	Zn %	Zr ppm
0.06	5	99	4	87	57	565	19	0.06	<200

2.3 QUANTITATIVE XRD

A quantitative X-Ray Diffraction analysis was performed on the ore sample. The detailed report is shown in Appendix 1, while a summary of the mineral abundances is given in Table 3:

TABLE 3: QUANTITATIVE XRD RESULTS

Mineral	Wt (%)
Barite	74.1
Bastnaesite -Ce	1.2
Bastnaesite -La	1.1
Calcite	1.5
Celestine	3.4
Finnemanite	0.5
Fluorite	4.2
Mordenite	5.5
Perloffite	3.5
Quartz	4.1
Synchysite	0.3

These results show the following:

- Barite was the dominant mineral in this ore, and for test purposes it has been assumed that all barium occurs as barite. Alternative Ba-minerals have, however, been detected (celestine, perloffite).
- Similarly, the fluorite grades have been derived from fluorine assays, despite alternative fluorine-bearing minerals being present (bastnaesite, synchysite).
- Bastnaesite and Synchysite are the main rare-earth minerals.

2.4 MINERALOGY

The mineralogical reports prepared by Dr Roger Townend are shown in Appendix 2. The following points summarise the observations made:

- The dominant mineral was barite, which mainly occurred as liberated crystals ranging between 200µm and 2000µm in size.
- Minor amounts of barite were found to form coarse composites with quartz and fluorite.
- Barite associations with bastnaesite were found to be quite common.

- Bastnaesite, the major rare-earth mineral, was found to occur predominantly as liberated, rounded masses that often exceeded 1mm in size.

- Coarse grains of bastnaesite were observed to include barite.

- Bastnaesite was observed to form rims to coarse barite.

- Observation of approximately 50 rare earth mineral grains showed 54% to be liberated, 39% to be associated with barite, and 2% to be associated with fluorite. The remainder was associated with quartz or apatite.

- Fluorite was found as discrete crystals to 1.5mm, as coarse composites with barite and calcite, and as fine fluorite associated with coarse barite.

3. TESTWORK PROCEDURES AND RESULTS

3.1 PROCEDURES

The following standard procedures were utilised:

- True Relative Density
- Grind Establishment
- Size Analysis
- Cyclosizing
- Batch Flotation
- WHIMS
- Induced Roll Magnetic Separator

These procedures are shown in detail in Appendix 3.

3.2 RESULTS AND DISCUSSION

3.2.1 Grind Establishment

This test was performed to determine the milling parameters to achieve the required grind size. This information is shown in Table 4:

TABLE 4: GRIND ESTABLISHMENT

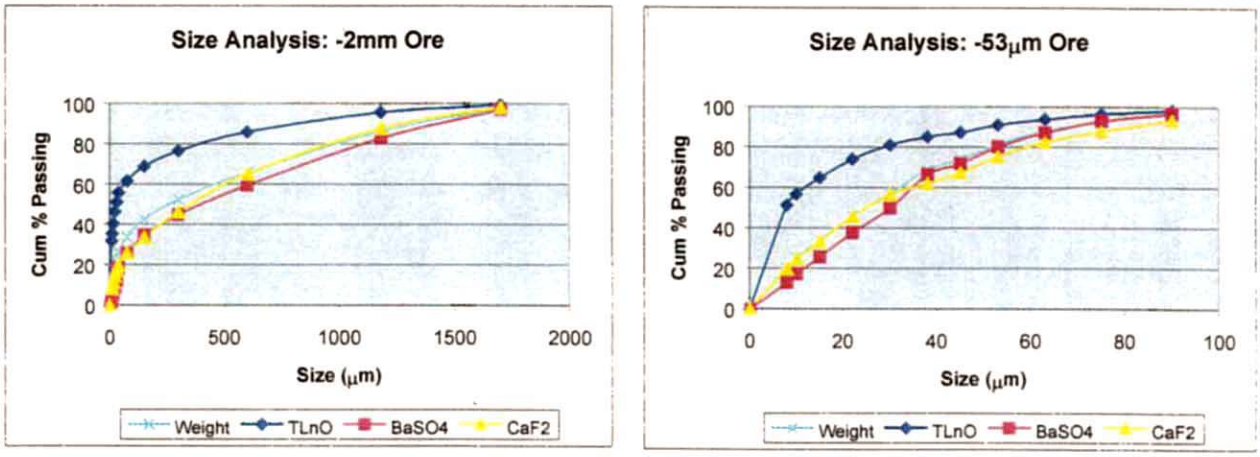
Grind Size µm, P80	Milling Time (mins : sec)
38	10 : 20
53	7 : 06
75	4 : 30
150	1 : 12

These results are indicative of a fairly soft ore.

3.2.3 Size Analyses

Size analyses were performed on crushed ore (<2mm) and milled ore (P80 = 53µm). The detailed data is given in Tables 9 and 10 in Section 4, and the results are illustrated graphically in Figure 3:

FIGURE 3: SIZE ANALYSES



The following comments may be made concerning these results:

- In both instances, the fine fractions were enriched in rare earth oxides and slightly depleted in barite and fluorite. Desliming prior to treatment would therefore not be considered an option.

- The ore minerals were, however, distributed through all size ranges to the extent that classification would not be considered an acceptable means of beneficiation.

3.2.4 Batch Flotation

A number of batch flotation tests were performed in an attempt to differentially recover the REO's, barite, and fluorite. The detailed test data is given in Tables 11 to 25, while the results obtained are summarised below:

TABLE 5: SUMMARY OF BATCH FLOTATION RESULTS

Test No.	Test Conditions	$BaSO_4$ Concentrate* Recoveries (%)			REO Concentrate Recoveries (%)		
		$BaSO_4$	REO	CaF_2	$BaSO_4$	REO	CaF_2
RB 2819	Ba/Ca Bulk Float, Followed by REO Float	43.2	20.9	20.9	11.7	31.7	15.5
RB 2843	Similar, Increased Ba/Ca Collectors	95.8	67.6	75.3	4.0	27.9	23.1
RB 2844	REO Float, Followed by Ba/Ca Float	59.7	54.8	78.3	40.1	40.7	19.8
RB 2845	REO Float, Followed by CaF2 Float & BaSO4 Float	59.1	48.9	72.5	40.7	45.4	25.5
RB 2889	Similar to RB 2819, Increased Ba/Ca Collectors & REO depressant.	98.1	87.3	95.3	1.5	9.8	3.5
RB 2890	Repeat at Finer Grind	95.6	84.0	92.7	4.1	14.6	6.5
RB 2891	REO Float, Followed by Ba/Ca Float, Finer Grind	40.9	45.2	57.4	58.8	52.6	41.4
RB 2892	REO/CaF2 Float Followed by BaSO4 Float, Finer Grind	15.9	19.8	25.7	81.5	64.4	66.4
RB 2893	REO Float Followed by CaF2 Float, Different Reagents, Finer Grind	41.5	65.0	66.5	58.5	35.0	33.5
RB 2895	Pre-Size, Float +32um, +10um, Std Grind	90.6	59.5	84.2	1.2	1.8	0.8
PD321	Similar to RB 2889, Heat to 60 C	99.7	98.1	99.2	0.2	1.8	0.7
PD326	Repeat, Increase REO Depressant	99.8	98.3	99.3	0.2	1.7	0.7
PD327	Repeat, Decrease Collector Addition	99.6	97.2	98.8	0.4	2.8	1.2

* Combined CaF_2 and $BaSO_4$ Concentrates where produced separately

The following comments may be made concerning these results:

- Various configurations were evaluated where the order of floating the ore minerals was changed.
- The effect of finer grinding was evaluated.
- Reagent type and dosages were varied.
- Desliming and flotation of sized fractions was evaluated.
- Flotation at elevated temperature was attempted.
- The differential recovery of the ore minerals proved to be unsuccessful in all cases.

The following reagents were utilised:

Reagent	Action	Supplier
Sodium Silicate	Regulator, Dispersant	AJAX Chemicals
Oleic Acid	Collector	Aldrich Chemicals
AP 845	Collector	Cytec
Sodium Carbonate	Regulator	Rowe Scientific
Aluminium Chloride	Depressant	Rowe Scientific
Citric Acid	Depressant	Univar Reagents
MIBC	Frother	CLARIANT
Lead Nitrate	Activator	Rowe Scientific
Quebracho	Depressant	IMTRADE
Caustic Starch	Depressant	Starch Australia
Emigol	Collector, Emulsifier	Clariant
H 2875	Collector	Clariant
V 2711	Collector	Clariant
CLA020	Collector	Clariant
FS2	Collector	Clariant
H54	Frother	Clariant

3.2.5 Magnetic Separation

Bastnaesite is considered to be paramagnetic, and a number of high intensity magnetic separation tests were performed in an attempt to recovery this mineral. Two magnetic separators were evaluated, viz an Eriez WHIMS and an Induced Roll magnetic separator.

The testwork was performed on crushed ore (-2mm) after screening at 38μm. In some tests the +38μm fraction was pulverised to approximately 30μm before testing. The following table gives the results obtained:

TABLE 6: MAGNETIC SEPARATION

Ferrous Wheel Magnetic Separator.

Products	Mass			REO (%)				$BaSO_4$ (%)				CaF_2 (%)			
	(g)	(%)	Cum (%)	Grade	Distrib.	Cum Grade	Cum Dist.	Grade	Distrib.	Cum Grade	Cum Dist.	Grade	Distrib.	Cum Grade	Cum Dist.
Mags: (+38um, pulv)	28.6	2.9	2.9	3.8	1.2	3.8	1.2	41.9	1.9	41.9	1.9	4.7	2.8	4.7	2.8
Mags (-38um)	8.2	0.8	3.7	16.4	1.5	6.6	2.7	37.7	0.5	41.0	2.4	3.9	0.7	4.5	3.5
Non-Mags: (+38um, pulv)	718.1	72.5	76.2	5.7	44.6	5.7	47.3	70.2	81.8	68.8	84.2	5.1	76.3	5.1	79.8
Non-Mags (-38um)	236.2	23.8	100.0	20.4	52.7	9.2	100.0	41.2	15.8	62.2	100.0	4.1	20.2	4.8	100.0
Total	991.1	100.0	182.8	9.2	100.0			62.2	100.0			4.8	100.0		
Assayed Heads				9.3				62.7				4.7			

Induced Roll Magnetic Separator (Unpulverised).

Products	Mass			REO (%)				$BaSO_4$ (%)				CaF_2 (%)			
	(g)	(%)	Cum (%)	Grade	Distrib.	Cum Grade	Cum Dist.	Grade	Distrib.	Cum Grade	Cum Dist.	Grade	Distrib.	Cum Grade	Cum Dist.
Mags: (+38um)	74.0	7.5	7.5	18.9	15.6	18.9	15.6	21.8	2.6	21.8	2.6	4.5	7.0	4.5	7.0
Mags: (-38um)	54.6	5.5	13.0	24.5	14.9	21.3	30.6	30.9	2.7	25.7	5.3	4.6	5.3	4.5	12.3
Mids: (+38um)	191.6	19.3	32.3	8.1	17.3	13.4	47.8	65.9	20.3	49.7	25.6	4.9	19.7	4.8	32.0
Mids: (-38um)	41.4	4.2	36.5	14.8	6.8	13.5	54.7	54.3	3.6	50.3	29.2	3.4	3.0	4.6	35.0
Non-Mags: (+38um)	481.0	48.5	85.0	2.3	12.4	7.1	67.1	78.5	60.7	66.4	89.9	5.2	52.6	4.9	87.5
Non-Mags (-38um)	148.4	15.0	100.0	19.9	32.9	9.0	100.0	42.3	10.1	62.8	100.0	4.0	12.5	4.8	100.0
Total	991.0	100.0	274.3	9.0	100.0			62.8	100.0			4.8	100.0		
Assayed Heads				9.3				62.7				4.7			

Induced Roll Magnetic Separator (Pulverised).

Products	Mass			REO (%)				$BaSO_4$ (%)				CaF_2 (%)			
	(g)	(%)	Cum (%)	Grade	Distrib.	Cum Grade	Cum Dist.	Grade	Distrib.	Cum Grade	Cum Dist.	Grade	Distrib.	Cum Grade	Cum Dist.
Mags: (+38um, Pulv.)	69.9	7.1	7.1	6.6	5.1	6.6	5.1	62.9	7.1	62.9	7.1	4.7	6.8	4.7	6.8
Mags: (-38um)	54.6	5.5	12.6	24.5	14.7	14.5	19.8	30.9	2.7	48.9	9.8	4.6	5.2	4.7	12.0
Mids: (+38um, Pulv.)	82.2	8.3	20.9	5.3	4.8	10.8	24.6	69.3	9.2	57.0	19.0	5.1	8.7	4.8	20.7
Mids: (-38um)	41.4	4.2	25.0	14.8	6.7	11.5	31.3	54.3	3.6	56.5	22.6	3.4	2.9	4.6	23.6
Non-Mags: (+38um, Pulv.)	594.6	60.0	85.0	5.6	36.3	7.3	67.6	70.3	67.3	66.2	89.9	5.2	64.1	5.0	87.7
Non-Mags (-38um)	148.4	15.0	100.0	19.9	32.4	9.2	100.0	42.3	10.1	62.7	100.0	4.0	12.3	4.9	100.0
Total	991.1	100.0	250.5	9.2	100.0			62.7	100.0			4.9	100.0		
Assayed Heads				9.3				62.7				4.7			

In all cases, the beneficiation of REO's by screening at 38μm exceeded the beneficiation achieved by magnetic separation. The best results were achieved by passing unpulverised material through the Induced Roll magnetic separator (30% REO recovery, along with 5% of the barite and 12% of the fluorite).

3.3 COMMENTS AND CONCLUSIONS

The following comments can be made about the testwork performed:

- The objective of the exercise was to differentially recover the rare earth oxides, barite, and fluorite. This objective was not achieved.
- Mineralogical examination revealed that slightly more than half the rare earth oxides were liberated, with approximately 40% associated with barite and fluorite.
- Mineralogical examination also showed that, while the barite grains were predominantly liberated, this mineral also occurred in composite grains with bastnaesite, fluorite, and silicates. Bastnaesite rims were also detected on barite grains.
- The ore minerals show a similar response to most reagents. Along with the mineralogical associations and fineness of the rare earth minerals, this would render the differential flotation of the ore minerals a difficult task.
- It is recommended that further testwork be undertaken evaluating combinations of sizing, flotation, and magnetic separation.
- It is further recommended that sighter tests be undertaken utilising hydrometallurgical techniques to extract the rare earth oxides.

4. DETAILED TEST DATA

Table 7:	**Detailed Assay Results**
Table 8:	**True Relative Density**
Tables 9 & 10:	**Sizings**
Tables 11 to 25:	**Batch Flotation**

Table 7: Detailed Assay Results

Product	TLnO %	CeO2 %	Dy2O3 %	Er2O3 %	Eu2O3 %	Gd2O3 %	Ho2O3 %	La2O3 %	Lu2O3 %	Nd2O3 %	Pr6O11 %	Sm2O3 %	Tb4O7 %	Tm2O3 %	Y2O3 %	Yb2O3 %	BaSO4 %	CaF2 %
Head	9.25	4.20	0.0168	0.0050	0.0225	0.0448	0.0021	3.27	0.00020	1.120	0.379	0.1056	0.0063	0.0005	0.0718	0.002	62.7	4.7
-2mm: +1700	2.31	0.94	0.0046	0.0016	0.0059	0.0122	0.0005	0.88	0.00000	0.303	0.107	0.0276	0.0016	0.0000	0.0208	0.000	72.1	3.9
1180	2.96	1.25	0.0054	0.0019	0.0076	0.0156	0.0006	1.10	0.00010	0.385	0.135	0.0359	0.0020	0.0000	0.0229	0.001	73.3	4.3
600	4.31	1.82	0.0073	0.0026	0.0104	0.0209	0.0009	1.63	0.00000	0.544	0.188	0.0491	0.0028	0.0000	0.0318	0.001	68.5	5.3
300	6.38	2.73	0.0099	0.0035	0.0105	0.0302	0.0013	2.43	0.00010	0.771	0.271	0.0702	0.0040	0.0002	0.0447	0.001	64.7	6.8
150	7.02	3.11	0.0115	0.0042	0.0158	0.0315	0.0014	2.60	0.00020	0.827	0.290	0.0759	0.0045	0.0003	0.0485	0.001	61.0	6.2
75	7.31	3.44	0.0113	0.0038	0.0164	0.0326	0.0014	2.57	0.00020	0.813	0.289	0.0758	0.0044	0.0004	0.0462	0.001	59.1	4.1
38	7.20	3.44	0.0105	0.0034	0.0159	0.0313	0.0013	2.50	0.00010	0.789	0.282	0.0730	0.0042	0.0003	0.0456	0.001	59.6	3.9
Cone 1	8.41	4.34	0.0127	0.0039	0.0181	0.0353	0.0014	2.71	0.00020	0.854	0.302	0.0823	0.0049	0.0003	0.0483	0.002	72.7	2.3
Cone 2	10.94	5.53	0.0168	0.0055	0.0235	0.0483	0.0020	3.58	0.00020	1.150	0.402	0.1086	0.0065	0.0004	0.0647	0.002	55.5	3.3
Cone 3	13.14	6.64	0.0214	0.0067	0.0296	0.0586	0.0024	4.29	0.00030	1.380	0.486	0.1322	0.0082	0.0006	0.0800	0.003	50.4	3.5
Cone 4	16.11	8.05	0.0281	0.0087	0.0383	0.0756	0.0033	5.30	0.00040	1.710	0.605	0.1704	0.0101	0.0007	0.1024	0.003	45.9	3.5
Cone 5	18.28	8.81	0.0335	0.0104	0.0446	0.0947	0.0038	6.23	0.00050	2.000	0.707	0.2004	0.0126	0.0009	0.1260	0.004	39.3	3.7
Slime	32.46	14.20	0.0725	0.0237	0.0884	0.1909	0.0087	11.67	0.00100	4.040	1.440	0.4021	0.0250	0.0021	0.2879	0.010	14.1	4.5
P80=53um: +90	4.92	2.10	0.0079	0.0026	0.0115	0.0220	0.0009	1.89	0.00000	0.586	0.207	0.0530	0.0032	0.0002	0.0355	0.001	56.5	10.1
75	4.53	2.02	0.0071	0.0026	0.0100	0.0208	0.0008	1.68	0.00000	0.526	0.185	0.0482	0.0026	0.0000	0.0305	0.001	61.4	7.2
63	4.15	1.89	0.0066	0.0023	0.0093	0.0190	0.0007	1.50	0.00010	0.478	0.169	0.0437	0.0026	0.0000	0.0266	0.001	66.1	4.9
53	4.00	1.85	0.0062	0.0021	0.0089	0.0178	0.0007	1.44	0.00000	0.450	0.159	0.0406	0.0024	0.0000	0.0252	0.001	66.2	5.5
45	4.16	1.93	0.0061	0.0021	0.0094	0.0192	0.0007	1.48	0.00000	0.471	0.166	0.0427	0.0025	0.0000	0.0275	0.000	65.7	5.1
38	4.21	2.00	0.0067	0.0020	0.0091	0.0186	0.0007	1.47	0.00010	0.463	0.165	0.0428	0.0027	0.0000	0.0280	0.001	64.5	5.3
Cone 1	2.89	1.48	0.0044	0.0012	0.0063	0.0119	0.0005	0.92	0.00000	0.307	0.108	0.0293	0.0017	0.0000	0.0168	0.000	82.1	2.1
Cone 2	5.72	2.77	0.0084	0.0027	0.0126	0.0247	0.0010	1.97	0.00010	0.612	0.220	0.0574	0.0034	0.0002	0.0340	0.001	67.3	4.9
Cone 3	6.89	3.37	0.0104	0.0034	0.0148	0.0302	0.0013	2.35	0.00020	0.734	0.265	0.0691	0.0042	0.0003	0.0403	0.001	61.2	5.1
Cone 4	8.44	4.13	0.0142	0.0045	0.0193	0.0384	0.0016	2.86	0.00020	0.906	0.319	0.0870	0.0053	0.0004	0.0518	0.002	57.7	4.9
Cone 5	10.08	4.78	0.0175	0.0053	0.0243	0.0490	0.0020	3.50	0.00020	1.120	0.399	0.1097	0.0065	0.0004	0.0672	0.002	53.3	4.7
Slime	22.08	9.51	0.0460	0.0157	0.0581	0.1219	0.0055	8.14	0.00070	2.750	0.956	0.2658	0.0163	0.0013	0.1871	0.006	38.8	4.7
RB 2819: REO Conc1	17.67	7.64	0.0355	0.0118	0.0464	0.0959	0.0042	6.51	0.00040	2.200	0.759	0.2106	0.0127	0.0009	0.1393	0.004	56.7	4.5
REO Conc2	23.53	10.86	0.0448	0.0134	0.0585	0.1202	0.0056	8.16	0.00070	2.820	0.974	0.2661	0.0163	0.0013	0.1818	0.006	41.8	6.2
REO Tail	8.17	3.85	0.0141	0.0045	0.0187	0.0387	0.0016	2.84	0.00020	0.927	0.324	0.0878	0.0052	0.0003	0.0557	0.002	53.1	5.8
BaSO4 Conc	5.17	2.13	0.0101	0.0032	0.0136	0.0275	0.0012	1.98	0.00010	0.669	0.230	0.0629	0.0037	0.0003	0.0406	0.001	78.8	3.9
CaF2 Conc	2.31	1.00	0.0043	0.0013	0.0068	0.0117	0.0005	0.84	0.00000	0.298	0.102	0.0295	0.0017	0.0000	0.0176	0.000	88.7	2.3
CaF2 Tail	9.09	3.97	0.0180	0.0061	0.0247	0.0504	0.0022	3.26	0.00020	1.150	0.410	0.1120	0.0071	0.0005	0.0784	0.002	78.2	3.3
RB2843: Ba/Ca Conc 1	5.80	2.59	0.0040	0.0020	0.0200	0.0400	0.0030	2.08	0.00000	0.650	0.240	0.0700	0.0030	0.0090	0.0880	0.005	81.7	3.8
Ba/Ca Conc 2	8.98	4.14	0.0060	0.0030	0.0300	0.0500	0.0040	3.19	0.00000	0.970	0.350	0.1100	0.0020	0.0080	0.1120	0.006	70.2	5.3
Ba/Ca Conc 3	12.75	6.00	0.0100	0.0040	0.0500	0.0700	0.0060	4.45	0.00000	1.360	0.500	0.1500	0.0040	0.0060	0.1320	0.010	47.5	8.3
REO Conc1	20.00	9.52	0.0160	0.0050	0.0800	0.1100	0.0029	6.95	0.00000	2.140	0.760	0.2200	0.0060	0.0040	0.1740	0.011	24.5	12.7
REO Conc2	15.06	6.93	0.0200	0.0040	0.0700	0.0900	0.0090	5.35	0.00000	1.670	0.600	0.1600	0.0060	0.0040	0.1400	0.010	8.7	3.8
REO Tail	11.43	4.69	0.0110	0.0040	0.0500	0.0800	0.0070	4.46	0.00000	1.380	0.490	0.1300	0.0050	0.0020	0.1100	0.008	3.7	2.3
RB2844: REO Conc1	8.93	3.72	0.0050	0.0030	0.0400	0.0500	0.0040	3.41	0.00000	1.060	0.380	0.1200	0.0030	0.0090	0.1190	0.003	80.2	2.2
REO Conc 2	13.06	5.54	0.0080	0.0040	0.0500	0.0700	0.0060	4.95	0.00000	1.530	0.560	0.1700	0.0030	0.0080	0.1550	0.006	71.2	3.0
REO Conc 3	15.86	7.07	0.0100	0.0040	0.0700	0.0800	0.0070	5.80	0.00000	1.790	0.650	0.1900	0.0020	0.0070	0.1730	0.007	60.4	5.3
Ba/Ca Conc 1	6.45	3.11	0.0500	0.0030	0.0200	0.0400	0.0030	2.15	0.00000	0.660	0.240	0.0700	0.0020	0.0080	0.0850	0.007	70.6	6.9
Ba/Ca Conc 2	18.93	9.11	0.0120	0.0050	0.0700	0.0900	0.0080	6.53	0.00000	1.990	0.700	0.2200	0.0040	0.0050	0.1800	0.010	39.6	10.0
Ba/Ca Conc 3	12.75	6.00	0.0160	0.0040	0.0500	0.0800	0.0070	4.47	0.00000	1.370	0.480	0.1400	0.0050	0.0040	0.1190	0.009	18.7	4.1
Ba/Ca Conc 4	17.23	8.75	0.0110	0.0040	0.0700	0.1100	0.0090	5.50	0.00000	1.770	0.630	0.1900	0.0000	0.0030	0.1730	0.011	12.1	3.8
Ba/Ca Tail	10.96	5.22	0.0080	0.0040	0.0500	0.0800	0.0070	3.72	0.00000	1.200	0.430	0.1200	0.0010	0.0020	0.1090	0.009	3.5	2.5
RB 8545: REO Conc1	8.13	3.30	0.0040	0.0020	0.0400	0.0500	0.0040	3.14	0.00000	1.000	0.350	0.1100	0.0020	0.0090	0.1170	0.002	83.1	1.6
REO Conc 2	18.45	7.82	0.0120	0.0040	0.0800	0.0900	0.0080	7.05	0.00000	2.160	0.770	0.2400	0.0040	0.0060	0.1940	0.007	59.7	4.2
REO Conc 3	11.68	5.41	0.0080	0.0030	0.0500	0.0600	0.0050	4.11	0.00000	1.270	0.460	0.1500	0.0030	0.0080	0.1360	0.007	66.7	5.6
CaF2 Conc1	5.51	2.65	0.0030	0.0020	0.0200	0.0300	0.0020	1.88	0.00000	0.560	0.200	0.0700	0.0020	0.0090	0.0770	0.007	76.8	7.0
CaF2 Conc2	11.24	5.37	0.0070	0.0030	0.0400	0.0600	0.0050	3.90	0.00000	1.160	0.430	0.1300	0.0040	0.0070	0.1170	0.009	55.4	7.0
CaF2 Conc3	11.46	5.92	0.0150	0.0030	0.0500	0.0800	0.0080	3.53	0.00000	1.180	0.420	0.1200	0.0020	0.0040	0.1200	0.010	9.3	3.3
BaSO4 Conc	9.93	4.93	0.0190	0.0040	0.0400	0.0700	0.0080	3.22	0.00000	1.050	0.370	0.1000	0.0030	0.0030	0.0990	0.009	3.2	2.5
BaSO4 Tail	11.41	5.28	0.0130	0.0040	0.0500	0.0800	0.0070	3.99	0.00000	1.270	0.470	0.1200	0.0030	0.0030	0.1140	0.009	2.4	2.2
RB2889: Ba/Ca Conc 1	8.25	3.64	0.0020	0.0120	0.0200	0.0500	0.0040	2.97	0.00000	0.970	0.360	0.1000	0.0020	0.0000	0.1110	0.004	72.7	5.8
Ba/Ca Conc 2	7.57	3.49	0.0000	0.0120	0.0200	0.0400	0.0040	2.64	0.00000	0.850	0.320	0.0900	0.0040	0.0000	0.0970	0.004	72.4	5.3
Ba/Ca Conc 3	16.44	7.59	0.0110	0.0100	0.0400	0.0900	0.0080	5.77	0.00000	1.860	0.680	0.2000	0.0020	0.0000	0.1700	0.008	39.4	4.2
REO Conc 1-3	17.08	8.69	0.0150	0.0070	0.0400	0.1000	0.0100	5.35	0.00000	1.830	0.660	0.1900	0.0000	0.0000	0.1760	0.008	17.5	3.3
Tail	4.73	2.08	0.0000	0.0030	0.0000	0.0300	0.0040	1.70	0.00000	0.590	0.210	0.0500	0.0000	0.0000	0.0550	0.004	4.0	1.1
RB2890: Ba/Ca Conc 1	9.18	4.04	0.0020	0.0120	0.0200	0.0500	0.0040	3.36	0.00000	1.070	0.390	0.1100	0.0020	0.0000	0.1170	0.006	69.4	5.7
Ba/Ca Conc 2	7.53	3.42	0.0020	0.0120	0.0200	0.0400	0.0040	2.66	0.00000	0.850	0.320	0.0900	0.0040	0.0000	0.0990	0.004	74.3	5.5
Ba/Ca Conc 3	12.14	5.65	0.0050	0.0100	0.0300	0.0600	0.0050	4.23	0.00000	1.360	0.500	0.1500	0.0000	0.0000	0.1340	0.006	58.0	4.6
REO Conc 1-3	12.34	6.31	0.0110	0.0070	0.0300	0.0800	0.0080	3.83	0.00000	1.310	0.480	0.1300	0.0000	0.0000	0.1370	0.010	23.3	3.0
Tail	3.73	1.68	0.0000	0.0020	0.0100	0.0300	0.0030	1.29	0.00000	0.460	0.160	0.0400	0.0000	0.0000	0.0500	0.004	5.1	1.2
RB2891: REO Conc1	9.37	4.07	0.0020	0.0130	0.0300	0.0500	0.0040	3.42	0.00000	1.120	0.400	0.1300	0.0020	0.0000	0.1220	0.002	76.1	3.2
REO Conc2	9.78	4.38	0.0030	0.0130	0.0300	0.0500	0.0060	3.48	0.00000	1.140	0.420	0.1300	0.0020	0.0000	0.1240	0.004	73.2	3.7
REO Conc3	9.42	4.40	0.0020	0.0120	0.0200	0.0500	0.0040	3.24	0.00000	1.060	0.390	0.1100	0.0040	0.0000	0.1170	0.006	68.2	5.0
Ba/Ca Conc 1	8.49	4.00	0.0030	0.0110	0.0100	0.0500	0.0040	2.93	0.00000	0.930	0.340	0.1000	0.0020	0.0000	0.1020	0.006	62.7	6.6
Ba/Ca Conc 2	13.90	6.46	0.0110	0.0060	0.0400	0.0900	0.0080	4.83	0.00000	1.580	0.570	0.1500	0.0000	0.0000	0.1430	0.010	19.2	4.6
Ba/Ca Conc 3	15.04	6.93	0.0080	0.0060	0.0400	0.1000	0.0080	5.28	0.00000	1.720	0.630	0.1600	0.0000	0.0000	0.1500	0.008	14.1	4.1
Tail	4.93	2.40	0.0010	0.0020	0.0000	0.0400	0.0050	1.61	0.00000	0.560	0.200	0.0500	0.0000	0.0000	0.0580	0.006	4.6	1.4
RB2892: REO/Ca Conc1	7.25	3.21	0.0000	0.0120	0.0200	0.0400	0.0030	2.60	0.00000	0.860	0.310	0.0900	0.0000	0.0000	0.1010	0.002	76.7	4.1
REO/Ca Conc2	8.67	3.86	0.0020	0.0130	0.0200	0.0500	0.0050	3.10	0.00000	1.010	0.380	0.1100	0.0000	0.0000	0.1140	0.004	74.7	4.1
REO/Ca Conc3	8.72	3.99	0.0020	0.0120	0.0200	0.0500	0.0040	3.08	0.00000	0.980	0.370	0.1000	0.0000	0.0000	0.1090	0.004	71.4	4.6
REO/Ca Conc4	9.25	4.30	0.0030	0.0110	0.0200	0.0500	0.0040	3.20	0.00000	1.030	0.390	0.1200	0.0020	0.0000	0.1110	0.004	67.6	5.8
Ba Conc 1	9.76	4.48	0.0030	0.0110	0.0200	0.0500	0.0040	3.44	0.00000	1.100	0.410	0.1200	0.0020	0.0000	0.1170	0.006	56.9	7.2
Ba Conc 2	12.19	5.56	0.0050	0.0060	0.0300	0.0800	0.0070	4.28	0.00000	1.420	0.520	0.1400	0.0020	0.0000	0.1340	0.010	20.6	4.8
Ba Conc 3	11.71	5.25	0.0050	0.0050	0.0200	0.0800	0.0050	4.24	0.00000	1.370	0.490	0.1200	0.0020	0.0000	0.1180	0.008	18.0	4.6
Tail	12.98	6.25	0.0130	0.0060	0.0300	0.0900	0.0090	4.34	0.00000	1.440	0.520	0.1400	0.0020	0.0000	0.1350	0.008	14.2	3.5
RB2893: REO Conc1	6.11	2.74	0.0000	0.0130	0.0000	0.0400	0.0030	2.17	0.00000	0.710	0.270	0.0700	0.0000	0.0000	0.0930	0.002	80.4	3.1
REO Conc2	7.27	3.27	0.0010	0.0120	0.0200	0.0400	0.0030	2.56	0.00000	0.850	0.320	0.0900	0.0000	0.0000	0.1020	0.004	77.8	4.0
REO Conc3	8.54	3.84	0.0020	0.0120	0.0200	0.0500	0.0040	3.05	0.00000	0.990	0.360	0.1000	0.0000	0.0000	0.1100	0.004	72.7	4.2
Ca Conc 1	11.20	5.21	0.0060	0.0110	0.0200	0.0600	0.0050	3.91	0.00000	1.250	0.450	0.1400	0.0040	0.0000	0.1290	0.006	58.9	8.2
Ca Conc 2	13.41	6.30	0.0100	0.0090	0.0300	0.0800	0.0070	4.67	0.00000	1.490	0.530	0.1400	0.0020	0.0000	0.1380	0.008	36.1	3.8
Ca Conc 3	6.27	2.86	0.0000	0.0050	0.0200	0.0400	0.0040	2.19	0.00000	0.730	0.270	0.0700	0.0000	0.0000	0.0780	0.006	24.2	1.2
Tail	3.77	1.76	0.0000	0.0030	0.0000	0.0300	0.0020	1.28	0.00000	0.440	0.160	0.0400	0.0000	0.0000	0.0490	0.004	8.4	2.0

Table 7: Detailed Assay Results continued

Product	TLnO %	CeO2 %	Dy2O3 %	Er2O3 %	Eu2O3 %	Gd2O3 %	Ho2O3 %	La2O3 %	Lu2O3 %	Nd2O3 %	Pr6O11 %	Sm2O3 %	Tb4O7 %	Tm2O3 %	Y2O3 %	Yb2O3 %	BaSO4 %	CaF2 %
RB2895: Ba/Ca Conc1	4.50	2.10	0.0020	0.0120	0.0000	0.0300	0.0030	1.52	0.00000	0.480	0.200	0.0700	0.0020	0.0000	0.0640	0.020	74.7	6.0
Ba/Ca Conc2	9.72	4.56	0.0130	0.0100	0.0200	0.0500	0.0070	3.36	0.00000	1.050	0.410	0.1200	0.0020	0.0000	0.1020	0.012	44.3	3.1
REO Conc 1	4.62	2.35	0.0080	0.0040	0.0000	0.0300	0.0050	1.42	0.00000	0.490	0.190	0.0600	0.0000	0.0000	0.0550	0.008	79.5	1.3
REO Conc 2	1.55	0.67	0.0000	0.0010	0.0000	0.0000	0.0000	0.57	0.00000	0.220	0.070	0.0000	0.0000	0.0000	0.0210	0.002	1.4	0.5
Tail	0.98	0.40	0.0000	0.0010	0.0000	0.0000	0.0000	0.36	0.00000	0.150	0.050	0.0000	0.0000	0.0000	0.0150	0.002	1.8	0.6
RB2896: Ba/Ca Conc1	8.35	3.72	0.0000	0.0130	0.0100	0.0500	0.0050	3.01	0.00000	0.930	0.370	0.1200	0.0040	0.0000	0.0980	0.020	74.4	4.3
Ba/Ca Conc 2	15.28	7.30	0.0060	0.0120	0.0300	0.0800	0.0070	5.18	0.00000	1.650	0.650	0.2000	0.0040	0.0000	0.1510	0.014	53.0	5.3
Ba/Ca Conc 3	18.72	9.58	0.0090	0.0090	0.0400	0.1000	0.0090	5.88	0.00000	1.930	0.740	0.2300	0.0000	0.0000	0.1780	0.012	24.7	4.2
REO Conc	17.64	9.78	0.0080	0.0060	0.0300	0.1000	0.0090	4.96	0.00000	1.700	0.650	0.2200	0.0000	0.0000	0.1630	0.012	13.0	3.4
Tail	9.78	5.74	0.0030	0.0040	0.0200	0.0600	0.0060	2.51	0.00000	0.900	0.330	0.1000	0.0000	0.0000	0.1010	0.010	5.8	1.8
Cyclone O/F (-10um)	25.19	11.00	0.0130	0.0120	0.0600	0.1300	0.0110	9.20	0.00000	3.080	1.040	0.3100	0.0020	0.0000	0.3260	0.010	36.8	5.1
Cyclone U/F (-32+10um)	10.80	5.05	0.0030	0.0110	0.0200	0.0600	0.0050	3.78	0.00000	1.190	0.410	0.1300	0.0000	0.0000	0.1380	0.006	61.8	4.1
+32um	4.11	2.12	0.0020	0.0110	0.0000	0.0300	0.0030	1.59	0.00000	0.050	0.170	0.0500	0.0020	0.0000	0.0790	0.006	70.5	4.8
Cyclone O/F Grav. Conc.	9.16	4.47	0.0030	0.0130	0.0300	0.0500	0.0040	3.02	0.00000	0.990	0.350	0.1100	0.0000	0.0000	0.1070	0.010	71.8	2.9
Cyclone O/F Grav. Tail	25.43	11.30	0.0130	0.0110	0.0800	0.1400	0.0120	9.05	0.00000	3.140	1.070	0.3200	0.0000	0.0000	0.2820	0.010	33.9	5.2
PD 321 Ba/Ca Conc 1	9.31	4.14	0.0020	0.0130	0.0300	0.0500	0.0050	3.35	0.00000	1.100	0.380	0.1200	0.0040	0.0000	0.1140	0.004	71.8	5.9
Ba/Ca Conc 2	9.25	4.35	0.0030	0.0130	0.0300	0.0500	0.0040	3.15	0.00000	1.040	0.370	0.1200	0.0040	0.0000	0.1110	0.004	67.7	4.9
Ba/Ca Conc 3	10.48	5.09	0.0070	0.0070	0.0300	0.0700	0.0070	3.42	0.00000	1.200	0.410	0.1200	0.0000	0.0000	0.1130	0.008	19.6	2.2
REO Conc	7.50	4.03	0.0000	0.0040	0.0300	0.0600	0.0050	2.14	0.00000	0.790	0.270	0.0800	0.0000	0.0000	0.0860	0.006	6.8	1.6
REO Tail	1.82	0.85	0.0000	0.0010	0.0000	0.0100	0.0000	0.60	0.00000	0.240	0.080	0.0200	0.0000	0.0000	0.0180	0.000	0.8	0.4
PD 326 Ro. Conc 1	9.78	4.32	0.0020	0.0130	0.0300	0.0600	0.0040	3.55	0.00000	1.160	0.400	0.1200	0.0040	0.0000	0.1150	0.004	69.6	7.0
Ro. Conc 2	8.88	4.16	0.0020	0.0120	0.0300	0.0500	0.0040	3.04	0.00000	1.010	0.350	0.1100	0.0020	0.0000	0.1090	0.004	67.9	4.2
Ro. Conc 3	10.37	5.11	0.0060	0.0060	0.0300	0.0700	0.0060	3.33	0.00000	1.170	0.400	0.1200	0.0000	0.0000	0.1140	0.008	20.2	2.4
Ro. Tail	5.35	2.97	0.0000	0.0030	0.0200	0.0400	0.0050	1.45	0.00000	0.540	0.190	0.0600	0.0000	0.0000	0.0630	0.008	4.5	1.2
PD 327 Ro. Conc 1	10.41	4.53	0.0020	0.0130	0.0300	0.0600	0.0050	3.82	0.00000	1.250	0.440	0.1300	0.0040	0.0000	0.1240	0.004	70.8	5.9
Ro. Conc 2	9.00	4.16	0.0020	0.0130	0.0300	0.0500	0.0040	3.12	0.00000	1.020	0.370	0.1100	0.0020	0.0000	0.1110	0.004	70.3	5.3
Ro. Conc 3	11.69	5.78	0.0100	0.0090	0.0300	0.0700	0.0070	3.77	0.00000	1.300	0.440	0.1400	0.0000	0.0000	0.1290	0.008	35.5	3.2
Ro. Tail	4.56	2.56	0.0010	0.0030	0.0200	0.0300	0.0050	1.21	0.00000	0.460	0.160	0.0500	0.0000	0.0000	0.0510	0.008	4.1	1.0
RMS +38µm Mags	18.90	8.94	0.0290	0.0080	0.0500	0.1100	0.0120	6.55	0.00000	2.100	0.740	0.2000	0.0060	0.0000	0.1460	0.008	21.8	4.5
RMS +38µm Mids	8.08	3.52	0.0020	0.0120	0.0200	0.0500	0.0040	2.97	0.00000	0.960	0.340	0.1000	0.0040	0.0000	0.0970	0.004	65.9	4.9
RMS +38µm N/Mags	2.31	0.99	0.0000	0.0120	0.0100	0.0200	0.0010	0.81	0.00000	0.290	0.100	0.0200	0.0020	0.0000	0.0560	0.002	78.5	5.2
RMS +38µm Pulv. Mags	6.63	3.06	0.0100	0.0110	0.0200	0.0400	0.0050	2.30	0.00000	0.750	0.270	0.0800	0.0020	0.0000	0.0810	0.004	62.9	4.7
RMS +38µm Pulv. Mids	5.28	2.39	0.0010	0.0120	0.0200	0.0300	0.0030	1.87	0.00000	0.610	0.220	0.0500	0.0000	0.0000	0.0730	0.004	69.3	5.1
RMS +38µm Pulv. N/Mags	5.56	2.49	0.0010	0.0120	0.0200	0.0400	0.0030	1.97	0.00000	0.650	0.230	0.0600	0.0020	0.0000	0.0760	0.004	70.3	5.2
RMS -38µm Mags	24.51	11.60	0.0100	0.0110	0.0700	0.1300	0.0110	8.33	0.00000	2.840	0.960	0.3000	0.0000	0.0000	0.2440	0.008	30.9	4.6
RMS -38µm Mids	14.80	7.04	0.0040	0.0120	0.0400	0.0800	0.0070	4.96	0.00000	1.700	0.590	0.1900	0.0000	0.0000	0.1690	0.006	54.3	3.4
RMS -38µm N/Mags	19.87	9.40	0.0070	0.0110	0.0600	0.1000	0.0090	6.74	0.00000	2.290	0.790	0.2400	0.0000	0.0000	0.2130	0.006	42.3	4.0
FW +38µm Pulv. Conc	3.83	1.79	0.0310	0.0100	0.0200	0.0200	0.0090	1.24	0.00000	0.440	0.160	0.0300	0.0000	0.0000	0.0590	0.018	41.9	4.7
FW +38µm Pulv. Tail	5.67	2.56	0.0010	0.0120	0.0200	0.0300	0.0030	2.01	0.00000	0.650	0.240	0.0600	0.0020	0.0000	0.0760	0.004	70.2	5.1
FW -38µm Conc.	16.44	7.85	0.0090	0.0120	0.0600	0.0900	0.0090	5.48	0.00000	1.880	0.640	0.2100	0.0000	0.0000	0.1820	0.014	37.7	3.9
FW -38µm Tail	20.38	9.67	0.0080	0.0110	0.0600	0.1100	0.0090	6.89	0.00000	2.330	0.820	0.2500	0.0020	0.0000	0.2170	0.006	41.2	4.1

TABLE 8

True Specific Gravity Determinations

CLIENT NAME :	Sumiko Consultants
SAMPLE DESCRIPTION :	Dong Pao Ore
JOB NUMBER :	8677
DATE :	36903

SAMPLE	M1	M2	M3	M4	SG	Ave SG
Ore	20.1 20.2	58.6 58.7	43.0 43.0	49.8 49.8	3.91 3.88	**3.89**

TABLE 9

CLIENT NAME:	Sumiko Consultants
SAMPLE DESCRIPTION:	Ore: Crushed to -2mm
JOB NUMBER:	8677
DATE:	31-Jan

HEAD - SIZE AND METAL DISTRIBUTION ANALYSIS

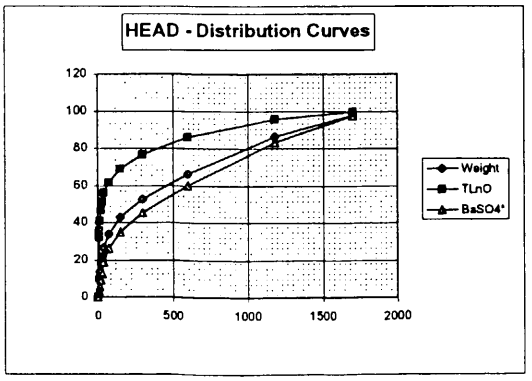
SIZE (µm)	Weight		Cum. % Weight		TLnO		Cum Grade (%)	Cum. % TLnO Passing	BaSO4*		Cum Grade %	Cum. % BaSO4 Passing
	(g)	(%)	Passing	Retained	Assay (%)	Dist (%)			Assay (%)	Dist (%)		
1700	21.6	2.2	97.8	2.2	2.31	0.6	9.20	99.4	72.1	2.6	59.1	97.4
1180	116.2	11.6	86.2	13.8	2.96	3.8	10.04	95.6	73.3	14.4	57.2	83.0
600	202.3	20.2	66.0	34.0	4.31	9.6	11.80	86.0	68.5	23.3	53.7	59.7
300	134.0	13.4	52.6	47.4	6.38	9.4	13.18	76.6	64.7	14.6	50.9	45.1
150	98.6	9.9	42.7	57.3	7.02	7.6	14.60	68.9	61.0	10.1	48.5	34.9
75	90.4	9.0	33.7	66.3	7.31	7.3	16.55	61.6	59.1	9.0	45.7	25.9
38	72.2	7.2	26.5	73.5	7.20	5.7	19.10	55.9	59.6	7.3	41.9	18.7
30	49.8	5.0	21.5	78.5	8.41	4.6	21.58	51.2	72.7	6.1	34.7	12.6
22	39.0	3.9	17.6	82.4	10.94	4.7	23.94	46.5	55.5	3.6	30.1	8.9
15	40.6	4.1	13.5	86.5	13.14	5.9	27.18	40.6	50.4	3.4	24.1	5.5
10	28.7	2.9	10.7	89.3	16.11	5.1	30.16	35.5	45.9	2.2	18.2	3.3
8	17.3	1.7	8.9	91.1	18.28	3.5	32.46	32.0	39.3	1.1	14.1	2.1
0	89.3	8.9	0.0	100.0	32.46	32.0		0.0	14.1	2.1		0.0
Total	1,000.0	100.0			9.05	100.0			59.4	100.0		
Assay					9.25				62.7			

* BaSO4 Calc'd from Ba Grade

HEAD - SIZE AND METAL DISTRIBUTION ANALYSIS

SIZE (µm)	Weight		Cum. % Weight		CaF2#		Cum Grade (%)	Cum. % CaF2 Passing
	(g)	(%)	Passing	Retained	Assay (%)	Dist (%)		
1700	21.6	2.2	97.8	2.2	3.9	1.8	4.8	98.2
1180	116.2	11.6	86.2	13.8	4.3	10.4	4.9	87.8
600	202.3	20.2	66.0	34.0	5.3	22.4	4.7	65.4
300	134.0	13.4	52.6	47.4	6.8	19.1	4.2	46.3
150	98.6	9.9	42.7	57.3	6.2	12.8	3.8	33.5
75	90.4	9.0	33.7	66.3	4.1	7.7	3.7	25.8
38	72.2	7.2	26.5	73.5	3.9	5.9	3.6	19.9
30	49.8	5.0	21.5	78.5	2.3	2.4	3.9	17.5
22	39.0	3.9	17.6	82.4	3.3	2.7	4.0	14.8
15	40.6	4.1	13.5	86.5	3.5	3.0	4.2	11.8
10	28.7	2.9	10.7	89.3	3.5	2.1	4.4	9.7
8	17.3	1.7	8.9	91.1	3.7	1.3	4.5	8.4
0	89.3	8.9	0.0	100.0	4.5	8.4		0.0
Total	1000.0	100.0			4.8	100.0		
Assay					4.7			

CaF2 Calc'd from F Grade



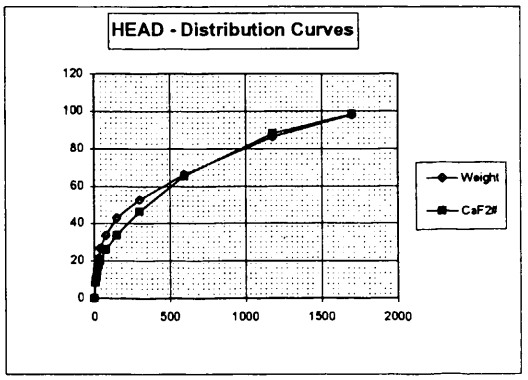


TABLE 10

CLIENT NAME:	Sumiko Consultants
SAMPLE DESCRIPTION:	Ore: Milled to P80 = 53µm
JOB NUMBER:	8677
DATE:	31-Jan

HEAD - SIZE AND METAL DISTRIBUTION ANALYSIS

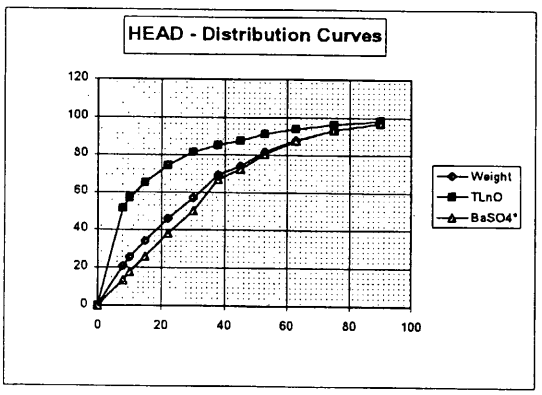
SIZE (µm)	Weight (g)	Weight (%)	Cum. % Weight Passing	Cum. % Weight Retained	TLnO Assay (%)	TLnO Dist (%)	Cum Grade (%)	Cum. % TLnO Passing	BaSO4* Assay (%)	BaSO4* Dist (%)	Cum Grade %	Cum. % BaSO4 Passing
90	31.6	3.2	96.8	3.2	4.92	1.8	9.01	98.2	56.5	3.0	60.2	97.0
75	38.1	3.8	93.0	7.0	4.53	1.9	9.19	96.3	61.4	3.9	60.1	93.1
63	51.7	5.2	87.9	12.1	4.15	2.4	9.49	93.9	66.1	5.7	59.8	87.4
53	63.9	6.4	81.5	18.5	4.00	2.9	9.92	91.0	66.2	7.0	59.3	80.4
45	76.3	7.6	73.8	26.2	4.16	3.6	10.51	87.4	65.7	8.3	58.6	72.0
38	48.9	4.9	69.0	31.1	4.21	2.3	10.96	85.1	64.5	5.3	58.2	66.8
30	122.3	12.2	56.7	43.3	2.89	4.0	12.70	81.1	82.1	16.7	53.0	50.1
22	108.0	10.8	45.9	54.1	5.72	7.0	14.34	74.2	67.3	12.1	49.6	38.0
15	119.1	11.9	34.0	66.0	6.89	9.2	16.95	64.9	61.2	12.1	45.6	25.8
10	85.0	8.5	25.5	74.5	8.44	8.1	19.79	56.9	57.7	8.2	41.6	17.7
8	48.7	4.9	20.6	79.4	10.08	5.5	22.08	51.3	53.3	4.3	38.8	13.3
0	206.4	20.6	0.0	100.0	22.08	51.3		0.0	38.8	13.3		0.0
Total	1,000.0	100.0			8.88	100.0			60.0	100.0		
Assay					9.25				62.7			

* BaSO4 Calc'd from Ba Grade

HEAD - SIZE AND METAL DISTRIBUTION ANALYSIS

SIZE (µm)	Weight (g)	Weight (%)	Cum. % Weight Passing	Cum. % Weight Retained	CaF2# Assay (%)	CaF2# Dist (%)	Cum Grade (%)	Cum. % CaF2 Passing
90	31.6	3.2	96.8	3.2	10.1	6.6	4.7	93.4
75	38.1	3.8	93.0	7.0	7.2	5.6	4.6	87.8
63	51.7	5.2	87.9	12.1	4.9	5.2	4.6	82.6
53	63.9	6.4	81.5	18.5	5.5	7.2	4.5	75.3
45	76.3	7.6	73.8	26.2	5.1	8.0	4.4	67.3
38	48.9	4.9	69.0	31.1	5.3	5.3	4.4	62.0
30	122.3	12.2	56.7	43.3	2.1	5.3	4.9	56.7
22	108.0	10.8	45.9	54.1	4.9	10.9	4.8	45.8
15	119.1	11.9	34.0	66.0	5.1	12.5	4.7	33.3
10	85.0	8.5	25.5	74.5	4.9	8.6	4.7	24.7
8	48.7	4.9	20.6	79.4	4.7	4.7	4.7	20.0
0	206.4	20.6	0.0	100.0	4.7	20.0		0.0
Total	1000.0	100.0			4.9	100.0		
Assay					4.7			

CaF2 Calc'd from F Grade



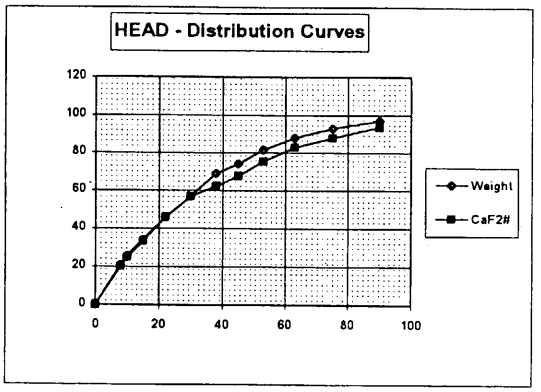


TABLE : 11 BATCH FLOTATION

CLIENT NAME:	Sumiko Consultants
SAMPLE DESCRIPTION :	Dong Pao Ore
JOB NUMBER :	8677
TEST DESCRIPTION:	Batch Flotation
TEST NUMBER :	RB 2819
DATE :	18-Jan-01

OBJECTIVES

Differential flotation to recover REO's, CaF_2, and $BaSO_4$.

Mill Size, P80 (μm): 75

COMMENTS

			Scraper	
Stage	Cell Size	Rotor	Size	Freq.
	litre	RPM	mm	sec
Ba-Ca	2.5	900	50	10
$BaSO_4$	1.5	800	50	10

MASS AND METAL BALANCES

PRODUCT	MASS		Cum	REO		Cum		$BaSO_4$*		Cum		CaF_2#		Cum	
	g	%	%	%	%dist	%	%dist	%	%dist	%	%dist	%	%dist	%	%dist
Feed	1000														
REO Conct 1	84.3	8.5	8.5	17.7	16.5	17.7	16.5	56.7	7.7	56.7	7.7	4.5	7.9	4.5	7.9
REO Conct 2	58.2	5.9	14.4	23.5	15.2	20.1	31.7	41.8	3.9	50.6	11.7	6.2	7.6	5.2	15.5
REO Tail	524.0	52.9	67.2	8.2	47.4	10.7	79.1	53.1	45.1	52.6	56.8	5.8	63.6	5.7	79.1
$BaSO_4$ Conct	71.0	7.2	7.2	5.2	4.1	5.2	4.1	78.8	9.1	78.8	9.1	3.9	5.8	3.9	5.8
CaF_2 Conct	115.4	11.6	11.6	2.3	3.0	2.3	3.0	88.7	16.6	88.7	16.6	2.3	5.6	2.3	5.6
CaF_2 Tail	138.3	14.0	25.6	9.1	13.9	6.0	16.9	78.2	17.5	83.0	34.1	3.3	9.6	2.8	15.1
Calc'd Head	991.2	100.0		9.1	100.0			62.2	100.0			4.8	100.0		
Assay Head				9.3				62.7				4.7			
$BaSO_4$ Tail	253.7	25.6		6.0	16.9			83.0	34.1			2.8	15.1		
Ba-Ca Conct	324.7	32.8		5.8	20.9			82.1	43.2			3.1	20.9		
Overall Tail	662.3	66.8		8.4	61.3			58.3	62.6			5.3	73.2		

* $BaSO_4$ Calc'd from Ba Grade # CaF_2 Calc'd from F Grade

SCHEDULE OF REAGENTS **WATER:** Tap

Operation	Time (min)		Na2SiO3 (g/t)	Oleic Acid (g/t)	H2SO4 (g/t)	AP 845 (g/t)	Na2CO3 (g/t)	AlCL3 (g/t)	Citric Acid (g/t)	MIBC (g/t)	pH	mV (Sat AgCl)
	Condtn.	Float (frth rmvl)										
Grind 1 kg	4.5										7.73	121
Ba-Ca Float	2		400								8.3	109
	5	6		320						11	7.96	156
Reo Float 1	2		320		2000						6.01	207
	5	5				800					7.34	164
REO Float 2	5	4			1200	480					7.13	176
$BaSO_4$ Float	8	3.5	320				960	800	960	11	7.77	119
CaF_2 Float	5	3		200							7.88	106
TOTALS	36.5	21.5	1040	520	3200	1280	960	800	960	22		

TABLE : 12 BATCH FLOTATION

CLIENT NAME:	Sumiko Consultants
SAMPLE DESCRIPTION :	Dong Pao Ore
JOB NUMBER :	8677
TEST DESCRIPTION:	Batch Flotation
TEST NUMBER :	RB 2843
DATE :	15-Feb-01

OBJECTIVES
Increase Ba-Ca recovery in initial bulk float, increase REO recovery in subsequent float.

Mill Size, P80 (µm): 75

COMMENTS

			Scraper	
Stage	Cell Size	Rotor	Size	Freq.
	litre	RPM	mm	sec
All	2.5	900	50	10

MASS AND METAL BALANCES

PRODUCT	MASS		Cum	REO		Cum		$BaSO_4$*		Cum		CaF_2#		Cum	
	g	%	%	%	%dist	%	%dist	%	%dist	%	%dist	%	%dist	%	%dist
Feed	1000														
Ba/Ca Conct 1	398.3	40.0	40.0	5.8	24.6	5.8	24.6	81.7	52.8	81.7	52.8	3.8	28.6	3.8	28.6
Ba/Ca Conct 2	310.8	31.2	71.3	9.0	29.7	7.2	54.2	70.2	35.4	76.7	88.2	5.3	31.1	4.5	59.7
Ba/Ca Conct 3	99.0	9.9	81.2	12.8	13.4	7.9	67.6	47.5	7.6	73.1	95.8	8.3	15.5	4.9	75.3
REO Conct 1	73.4	7.4	88.6	20.0	15.6	8.9	83.3	24.5	2.9	69.0	98.7	12.7	17.6	5.6	92.9
REO Conct 2	76.5	7.7	96.3	15.1	12.2	9.4	95.5	8.7	1.1	64.2	99.8	3.8	5.5	5.4	98.4
Tail	37.0	3.7	100.0	11.4	4.5	9.5	100.0	3.7	0.2	62.0	100.0	2.3	1.6	5.3	100.0
Calc'd Head	995.0	100.0		9.5	100.0			62.0	100.0			5.3	100.0		
Assay Head				9.3				62.7				4.7			

* $BaSO_4$ Calc'd from Ba Grade # CaF_2 Calc'd from F Grade

SCHEDULE OF REAGENTS **WATER:** Tap

Operation	Time (min)		Na2SiO3	Pb(NO3)2	Oleic Acid	Quebracho	A845	AlCl3	MIBC	H2SO4	pH	mV
	Condtn.	Float (frth rmvl)	(g/t)	(g/t)	(g/t)	(g/t)	(g/t)	(g/t)	(g/t)	(g/t)		(Sat AgCl)
Grind 1 kg	4.5										7.72	135
Ba-Ca Float 1	2		100									
	5				500							
	2	4				50			11		7.72	148
Ba-Ca Float 2	2			100								
	5	3			500				11		7.66	147
Ba-Ca Float 3	2	2		100	500						7.52	157
REO Float 1	2		200									
	5						1000					
	5	3						500			7.4	159
REO Float 2	2									1000	5.8	206
	5	3					1000				6.88	183
TOTALS	41.5	15	300	200	1500	50	2000	500	22	1000		

client tables

TABLE : 13 BATCH FLOTATION

CLIENT NAME:	Sumiko Consultants
SAMPLE DESCRIPTION :	Dong Pao Ore
JOB NUMBER :	8677
TEST DESCRIPTION:	Batch Flotation
TEST NUMBER :	RB 2844
DATE :	15-Feb-01

OBJECTIVES
Initial REO float, Followed by bulk Ba-Ca float.

Mill Size, P80 (µm): 75

COMMENTS

Stage	Cell Size	Rotor	Scraper Size	Scraper Freq.
	litre	RPM	mm	sec
All	2.5	900	50	10

MASS AND METAL BALANCES

PRODUCT	MASS		Cum	REO		Cum		$BaSO_4$*		Cum		CaF_2#		Cum	
	g	%	%	%	%dist	%	%dist	%	%dist	%	%dist	%	%dist	%	%dist
Feed	1000														
REO Conct 1	169.0	17.0	17.0	8.9	15.8	8.9	15.8	80.2	22.0	80.2	22.0	2.2	7.1	2.2	7.1
REO Conct 2	95.8	9.6	26.6	13.1	13.1	10.4	28.9	71.2	11.1	76.9	33.1	3.0	5.5	2.5	12.6
REO Conct 3	71.0	7.1	33.8	15.9	11.8	11.6	40.7	60.4	7.0	73.4	40.1	5.3	7.2	3.1	19.8
Ba/Ca Conct 1	470.8	47.4	81.1	6.5	31.8	8.6	72.6	70.6	54.0	71.8	94.1	6.9	62.2	5.3	82.1
Ba/Ca Conct 2	39.5	4.0	85.1	18.9	7.8	9.1	80.4	39.6	2.5	70.3	96.6	10.0	7.6	5.5	89.6
Ba/Ca Conct 3	96.9	9.7	94.9	12.8	12.9	9.4	93.4	18.7	2.9	65.0	99.5	4.1	7.6	5.4	97.3
Ba/Ca Conct 4	12.0	1.2	96.1	17.2	2.2	9.5	95.5	12.1	0.2	64.3	99.8	3.8	0.9	5.4	98.1
Tail	39.0	3.9	100.0	11.0	4.5	9.6	100.0	3.5	0.2	61.9	100.0	2.5	1.9	5.3	100.0
Calc'd Head	994.0	100.0		9.6	100.0			61.9	100.0			5.3	100.0		
Assay Head				9.3				62.7				4.7			

* $BaSO_4$ Calc'd from Ba Grade # CaF_2 Calc'd from F Grade

SCHEDULE OF REAGENTS **WATER:** Tap

Operation	Time (min) Condtn.	Time (min) Float (frth rmvl)	AlCl3 (g/t)	A845 (g/t)	Caustic Starch (g/t)	Oleic Acid (g/t)	Emigol (g/t)	Pb(NO3)2 (g/t)	NaOH (g/t)	MIBC (g/t)	pH	mV (Sat AgCl)
Grind 1 kg	4.5										7.74	162
REO Float 1	2.0		1000									
	5.0	2.0		500						11	7.25	169
REO Float 2	5.0	2.5		500							7.41	170
REO Float 3	2.0		200									
	5.0	3.0		200							7.41	176
Ba-Ca Float 1	5.0				100							
	5.0					500						
	2.0	2.5					50				7.44	160
Ba-Ca Float 2	2.0	2.0						100			7.00	182
Ba-Ca Float 3	5.0	1.5				200	20	100			7.30	172
Ba-Ca Float 4	5.0	1.5		200		200			175	11	9.02	113
TOTALS	47.5	15.0	1200	1400	100	900	70	200	175	22		

TABLE : 14 BATCH FLOTATION

CLIENT NAME:	Sumiko Consultants
SAMPLE DESCRIPTION :	Dong Pao Ore
JOB NUMBER :	8677
TEST DESCRIPTION:	Batch Flotation
TEST NUMBER :	RB 2845
DATE :	15-Feb-01

OBJECTIVES
Initial REO float, Followed by CaF2 float, and then BaSO4 float.

Mill Size, P80 (µm): 75

COMMENTS

Stage	Cell Size	Rotor	Scraper Size	Scraper Freq.
	litre	RPM	mm	sec
All	2.5	900	50	10

MASS AND METAL BALANCES

PRODUCT	MASS		Cum	REO		Cum		$BaSO_4$*		Cum		CaF_2#		Cum	
	g	%	%	%	%dist	%	%dist	%	%dist	%	%dist	%	%dist	%	%dist
Feed	1000														
REO Conct 1	128.9	12.9	12.9	8.1	11.1	8.1	11.1	83.1	17.3	83.1	17.3	1.6	3.9	1.6	3.9
REO Conct 2	89.5	9.0	21.9	18.5	17.4	12.4	28.5	59.7	8.6	73.5	25.9	4.2	7.1	2.7	11.0
REO Conct 3	137.3	13.8	35.7	11.7	16.9	12.1	45.4	66.7	14.8	70.9	40.7	5.6	14.5	3.8	25.5
CaF2 Conct 1	344.9	34.6	70.3	5.5	20.1	8.9	65.5	76.8	42.8	73.8	83.6	7.0	45.6	5.4	71.1
CaF2 Conct 2	174.2	17.5	87.8	11.2	20.7	9.3	86.1	55.4	15.6	70.1	99.2	7.0	23.0	5.7	94.1
CaF2 Conct 3	28.3	2.8	90.7	11.5	3.4	9.4	89.5	9.3	0.4	68.2	99.6	3.3	1.8	5.6	95.9
BaSO4 Conct	45.1	4.5	95.2	9.9	4.7	9.4	94.3	3.2	0.2	65.1	99.8	2.5	2.1	5.5	98.0
Tail	47.7	4.8	100.0	11.4	5.7	9.5	100.0	2.4	0.2	62.1	100.0	2.2	2.0	5.3	100.0
Calc'd Head	995.9	100.0		9.5	100.0			62.1	100.0			5.3	100.0		
Assay Head				9.3				62.7				4.7			

* $BaSO_4$ Calc'd from Ba Grade # CaF_2 Calc'd from F Grade

SCHEDULE OF REAGENTS **WATER:** Tap

Operation	Time (min) Condtn.	Time (min) Float (frth rmvl)	Na2SiO3 (g/t)	AlCl3 (g/t)	A845 (g/t)	H2SO4 (g/t)	Oleic Acid (g/t)	Emigol (g/t)	Quebracho (g/t)	NaOH (g/t)	Pb(NO3)2 (g/t)	MIBC (g/t)	pH	mV (Sat AgCl)
Grind 1 kg	4.5													
REO Float 1	2.0		500										7.69	170
	2.0			1000										
	5.0	2.5			200							11	7.35	171
REO Float 2	5.0				200									
	2.0	3.0				1000							7.17	173
REO Float 3	5.0	3.5			500								7.44	172
CaF2 Float 1	2.0		100											
	5.0						200	50						
	1.0	2.0							50				7.49	172
CaF2 Float 2	2.0									425				
	5.0	2.5					200	50					9.15	100
CaF2 Float 3	2.0				500									
	5.0	1.5					500						8.36	122
BaSO4 Float	5.0										50			
	2.0				500									
	2.0						500							
	2.0	1.5							100				7.53	123
TOTALS	58.5	16.5	600	1000	1900	1000	1400	100	150	425	50	11		

TABLE : 15 BATCH FLOTATION

CLIENT NAME:	Sumiko Consultants
SAMPLE DESCRIPTION :	Dong Pao Ore
JOB NUMBER :	8677
TEST DESCRIPTION:	Batch Flotation
TEST NUMBER :	RB 2889
DATE :	9-Mar-01

OBJECTIVES
Initial Ba-Ca float, Followed by REO float,

Mill Size, P80 (μm): 75

COMMENTS

			Scraper	
Stage	Cell Size	Rotor	Size	Freq.
	litre	RPM	mm	sec
All	2.5	900	50	10

MASS AND METAL BALANCES

PRODUCT	MASS		Cum	REO		Cum		$BaSO_4$*		Cum		CaF_2#		Cum	
	g	%	%	%	%dist	%	%dist	%	%dist	%	%dist	%	%dist	%	%dist
Feed	1000														
Ba/Ca Conct 1	344.8	34.6	34.6	8.3	31.1	8.3	31.1	72.7	40.7	72.7	40.7	5.8	40.2	5.8	40.2
Ba/Ca Conct 2	426.1	42.8	77.4	7.6	35.3	7.9	66.4	72.4	50.1	72.5	90.7	5.3	45.4	5.5	85.5
Ba/Ca Conct 3	115.7	11.6	89.0	16.4	20.8	9.0	87.3	39.4	7.4	68.2	98.1	4.2	9.8	5.4	95.3
REO Conct 1-3	52.3	5.3	94.3	17.1	9.8	9.4	97.0	17.5	1.5	65.4	99.6	3.3	3.5	5.2	98.7
Tail	57.2	5.7	100.0	4.7	3.0	9.2	100.0	4.0	0.4	61.9	100.0	1.1	1.3	5.0	100.0
Calc'd Head	996.1	100.0		9.2	100.0			61.9	100.0			5.0	100.0		
Assay Head				9.3				62.7				4.7			

* $BaSO_4$ Calc'd from Ba Grade # CaF_2 Calc'd from F Grade

SCHEDULE OF REAGENTS **WATER:** Tap

Operation	Time (min)		Na2SiO3	Oleic Acid	Emigol	Caustic Starch	A845	AlCl3	MIBC	H2SO4	Pb(NO3)2	pH	mV
	Condtn.	Float (frth rmvl)	(g/t)	(g/t)	(g/t)	(g/t)	(g/t)	(g/t)	(g/t)	(g/t)	(g/t)		(Sat AgCl)
Grind 1 kg	4.5											7.85	173
Ba/Ca Float 1	2.0		100									7.93	141
	5.0			500	100								
	2.0	5.0				100						7.91	150
Ba/Ca Float 2	2.0		50									7.93	134
	3.0			500	50								
	2.0	3.0				50						7.91	145
Ba/Ca Float 3	2.0		25									7.93	130
	3.0			300	25								
	2.0	2.0				25						7.91	149
REO Float 1	2.0									1000	100	3.76	287
	3.0						500					4.03	259
	2.0	5.0						250	22			4.46	218
REO Float 2	2.0						1000				100	4.08	238
	2.0	2.0						250				4.17	231
REO Float 3	3.0	2.0					1000	100			50	4.16	231
TOTALS	41.5	19.0	175	1300	175	175	2500	600	22	1000	250		

TABLE : 16 BATCH FLOTATION

CLIENT NAME:	Sumiko Consultants
SAMPLE DESCRIPTION :	Dong Pao Ore
JOB NUMBER :	8677
TEST DESCRIPTION:	Batch Flotation
TEST NUMBER :	RB 2890
DATE :	8-Mar-01

OBJECTIVES
Initial Ba-Ca float, Followed by REO float,

Mill Size, P80 (µm): 38

COMMENTS

			Scraper	
Stage	Cell Size	Rotor	Size	Freq.
	litre	RPM	mm	sec
All	2.5	900	50	10

MASS AND METAL BALANCES

PRODUCT	MASS		Cum	REO		Cum		$BaSO_4$*		Cum		CaF_2#		Cum	
	g	%	%	%	%dist	%	%dist	%	%dist	%	%dist	%	%dist	%	%dist
Feed	1000														
Ba/Ca Concl 1	320.1	32.1	32.1	9.2	32.1	9.2	32.1	69.4	35.8	69.4	35.8	5.7	36.6	5.7	36.6
Ba/Ca Concl 2	378.2	37.9	70.1	7.5	31.2	8.3	63.3	74.3	45.3	72.1	81.1	5.5	41.7	5.6	78.3
Ba/Ca Concl 3	155.6	15.6	85.7	12.1	20.7	9.0	84.0	58.0	14.5	69.5	95.6	4.6	14.4	5.4	92.7
REO Concl 1-3	108.3	10.9	96.5	12.3	14.6	9.4	98.6	23.3	4.1	64.3	99.7	3.0	6.5	5.1	99.2
Tail	34.6	3.5	100.0	3.7	1.4	9.2	100.0	5.1	0.3	62.2	100.0	1.2	0.8	5.0	100.0
Calc'd Head	996.8	100.0		9.2	100.0			62.2	100.0			5.0	100.0		
Assay Head				9.3				62.7				4.7			

* $BaSO_4$ Calc'd from Ba Grade # CaF_2 Calc'd from F Grade

SCHEDULE OF REAGENTS **WATER:** Tap

Operation	Time (min)		Na2SiO3	Oleic Acid	Emigol	Caustic Starch	A845	AlCl3	MIBC	H2SO4	Pb(NO3)2	pH	mV
	Condtn.	Float (frth rmvl)	(g/t)	(g/t)	(g/t)	(g/t)	(g/t)	(g/t)	(g/t)	(g/t)	(g/t)		(Sat AgCl)
Grind 1 kg	10.3											7.84	135
Ba/Ca Float 1	2.0		100									7.84	131
	5.0			500	100								
	2.0	5.0				100						7.91	153
Ba/Ca Float 2	2.0		50									7.91	126
	3.0			500	50								
	2.0	3.0				50						7.90	129
Ba/Ca Float 3	2.0		25									7.92	120
	3.0			300	25								
	2.0	2.0				25						7.92	135
REO Float 1	2.0									1000	100	4.89	234
	3.0						500					4.96	229
	2.0	5.0						250	22			6.16	188
REO Float 2	2.0						1000				100	4.51	230
	2.0	2.0						250				4.83	226
REO Float 3	3.0	2.0					1000	100			50	4.94	222
TOTALS	47.3	19.0	175	1300	175	175	2500	600	22	1000	250		

client tables

TABLE : 17 BATCH FLOTATION

CLIENT NAME:	Sumiko Consultants
SAMPLE DESCRIPTION :	Dong Pao Ore
JOB NUMBER :	8677
TEST DESCRIPTION:	Batch Flotation
TEST NUMBER :	RB 2891
DATE :	8-Mar-01

OBJECTIVES

Initial REO float, Followed by bulk Ba-Ca float.

Mill Size, P80 (µm): 38

COMMENTS

			Scraper	
Stage	Cell Size	Rotor	Size	Freq.
	litre	RPM	mm	sec
All	2.5	900	50	10

MASS AND METAL BALANCES

PRODUCT	MASS		Cum	REO		Cum		$BaSO_4$*		Cum		CaF_2#		Cum	
	g	%	%	%	%dist	%	%dist	%	%dist	%	%dist	%	%dist	%	%dist
Feed	1000														
REO Conct 1	159.0	16.0	16.0	9.4	16.3	9.4	16.3	76.1	19.5	76.1	19.5	3.2	10.3	3.2	10.3
REO Conct 2	153.7	15.5	31.4	9.8	16.4	9.6	32.7	73.2	18.1	74.7	37.6	3.7	11.5	3.4	21.9
REO Conct 3	193.2	19.4	50.9	9.4	19.9	9.5	52.6	68.2	21.2	72.2	58.8	5.0	19.6	4.0	41.4
Ba/Ca Conct 1	387.0	38.9	89.8	8.5	35.9	9.1	88.5	62.7	39.1	68.1	97.9	6.6	51.8	5.1	93.3
Ba/Ca Conct 2	55.0	5.5	95.3	13.9	8.4	9.4	96.9	19.2	1.7	65.2	99.6	4.6	5.1	5.1	98.4
Ba/Ca Conct 3	5.4	0.5	95.9	15.0	0.9	9.4	97.8	14.1	0.1	65.0	99.7	4.1	0.4	5.1	98.8
Tail	41.0	4.1	100.0	4.9	2.2	9.2	100.0	4.6	0.3	62.5	100.0	1.4	1.2	5.0	100.0
Calc'd Head	994.3	100.0		9.2	100.0			62.5	100.0			5.0	100.0		
Assay Head				9.3				62.7				4.7			

* $BaSO_4$ Calc'd from Ba Grade

CaF_2 Calc'd from F Grade

SCHEDULE OF REAGENTS **WATER:** Tap

Operation	Time (min)		H2SO4	Pb(NO3)2	A845	AlCl3	Na2SiO3	Oleic Acid	Emigol	Caustic Starch	MIBC	pH	mV
	Condtn	Float (frth rmvl)	(g/t)	(g/t)	(g/t)	(g/t)	(g/t)	(g/t)	(g/t)	(g/t)	(g/t)		(Sat AgCl)
Grind 1 kg	10.3											7.80	159
REO Float 1	8.0	3.0	1000	100	1000	1000					11	7.00	178
REO Float 2	8.0	3.0	500	100	500	500						7.02	82
REO Float 3	8.0	5.0	500	100	500	100						7.16	154
Ba/Ca Float 1	7.0	3.0					100	500	100	100		7.37	158
Ba/Ca Float 2	7.0	3.0					50	500	50	50		7.55	146
Ba/Ca Float 3	7.0	5.0					25	300	25	25		7.55	142
TOTALS	55.3	19.0	2000	300	2000	1600	175	1300	175	175	11		

client tables

TABLE : 18 BATCH FLOTATION

CLIENT NAME:	Sumiko Consultants
SAMPLE DESCRIPTION :	Dong Pao Ore
JOB NUMBER :	8677
TEST DESCRIPTION:	Batch Flotation
TEST NUMBER :	RB 2892
DATE :	8-Mar-01

OBJECTIVES
Initial REO float, Followed by bulk Ba-Ca float.

Mill Size, P80 (µm): 38

COMMENTS

Stage	Cell Size	Rotor	Scraper Size	Scraper Freq.
	litre	RPM	mm	sec
All	2.5	900	50	10

MASS AND METAL BALANCES

PRODUCT	MASS		Cum	REO		Cum		$BaSO_4$*		Cum		CaF_2#		Cum	
	g	%	%	%	%dist	%	%dist	%	%dist	%	%dist	%	%dist	%	%dist
Feed	1000														
REO/CaF2 Conct 1	166.5	16.7	16.7	7.3	13.0	7.3	13.0	76.7	20.6	76.7	20.6	4.1	13.7	4.1	13.7
REO/CaF2 Conct 2	164.1	16.5	33.1	8.7	15.3	8.0	28.4	74.7	19.8	75.7	40.3	4.1	13.5	4.1	27.1
REO/CaF2 Conct 3	151.9	15.2	48.4	8.7	14.3	8.2	42.7	71.4	17.5	74.4	57.8	4.6	14.0	4.3	41.1
REO/CaF2 Conct 4	217.7	21.8	70.2	9.3	21.7	8.5	64.4	67.6	23.7	72.3	81.5	5.8	25.3	4.7	66.4
BaSO4 Conct 1	167.5	16.8	87.0	9.8	17.6	8.8	82.0	56.9	15.4	69.3	96.9	7.2	24.1	5.2	90.5
BaSO4 Conct 2	12.2	1.2	88.2	12.2	1.6	8.8	83.6	20.6	0.4	68.6	97.3	4.8	1.2	5.2	91.7
BaSO4 Conct 3	4.6	0.5	88.7	11.7	0.6	8.8	84.2	18.0	0.1	68.4	97.4	4.6	0.4	5.2	92.1
Tail	112.8	11.3	100.0	13.0	15.8	9.3	100.0	14.2	2.6	62.2	100.0	3.5	7.9	5.0	100.0
Calc'd Head	997.3	100.0		9.3	100.0			62.2	100.0			5.0	100.0		
Assay Head				9.3				62.7				4.7			

* $BaSO_4$ Calc'd from Ba Grade

CaF_2 Calc'd from F Grade

SCHEDULE OF REAGENTS

WATER: Tap

Operation	Time (min) Condtn.	Time (min) Float (frth rmvl)	H2SO4 (g/t)	Pb(NO3)2 (g/t)	AlCl3 (g/t)	Oleic Acid (g/t)	Emigol (g/t)	A845 (g/t)	Na2SiO3 (g/t)	Caustic Starch (g/t)	pH	mV (Sat AgCl)
Grind 1 kg	10.3										7.83	141
REO/CaF2 Float 1	8.0	3.0	1000	200	1000	250	50	500			7.16	168
REO/CaF2 Float 2	8.0	3.0		100	500	100	25	250			7.19	164
REO/CaF2 Float 3	8.0	5.0		50	250	100	25	100			7.21	157
REO/CaF2 Float 4	7.0	3.0		25	250	100	25	100			7.30	161
BaSO4 Float 1	7.0	3.0							200	200	7.54	146
BaSO4 Float 2	7.0	5.0							200	200	7.74	139
BaSO4 Float 3									200	200	7.94	127
TOTALS	55.3	19.0	1000	375	2000	550	125	950	600	600		

client tables

TABLE : 19 BATCH FLOTATION

CLIENT NAME:	Sumiko Consultants
SAMPLE DESCRIPTION :	Dong Pao Ore
JOB NUMBER :	8677
TEST DESCRIPTION:	Batch Flotation
TEST NUMBER :	RB 2893
DATE :	8-Mar-01

OBJECTIVES
Initial REO float, Followed by CaF2 float.

Mill Size, P80 (µm): 38

COMMENTS

			Scraper	
Stage	Cell Size	Rotor	Size	Freq.
	litre	RPM	mm	sec
All	2.5	900	50	10

MASS AND METAL BALANCES

PRODUCT	MASS		Cum	REO		Cum		$BaSO_4$*		Cum		CaF_2#		Cum	
	g	%	%	%	%dist	%	%dist	%	%dist	%	%dist	%	%dist	%	%dist
Feed	1000														
REO Conct 1	232.0	23.4	23.4	6.1	15.4	6.1	15.4	80.4	30.1	80.4	30.1	3.1	14.4	3.1	14.4
REO Conct 2	135.3	13.6	37.1	7.3	10.7	6.5	26.1	77.8	17.0	79.4	47.1	4.0	10.9	3.4	25.3
REO Conct 3	96.6	9.7	46.8	8.5	9.0	7.0	35.0	72.7	11.3	78.0	58.5	4.2	8.2	3.6	33.5
CaF2 Conct 1	324.2	32.7	79.5	11.2	39.4	8.7	74.4	58.9	30.8	70.2	89.3	8.2	53.4	5.5	86.9
CaF2 Conct 2	154.8	15.6	95.1	13.4	22.5	9.5	96.9	36.1	9.0	64.6	98.3	3.8	11.8	5.2	98.7
CaF2 Conct 3	39.5	4.0	99.1	6.3	2.7	9.3	99.6	24.2	1.5	62.9	99.9	1.2	1.0	5.0	99.6
Tail	8.9	0.9	100.0	3.8	0.4	9.3	100.0	8.4	0.1	62.5	100.0	2.0	0.4	5.0	100.0
Calc'd Head	991.3	100.0		9.3	100.0			62.5	100.0			5.0	100.0		
Assay Head				9.3				62.7				4.7			

* $BaSO_4$ Calc'd from Ba Grade # CaF_2 Calc'd from F Grade

SCHEDULE OF REAGENTS **WATER:** Tap

Operation	Time (min)		H 2875 (g/t)	AlCl3 (g/t)	V2711 (g/t)	CLA020 FS2 (1:2) (g/t)	Caustic Starch (g/t)	H54 (g/t)	pH	mV (Sat AgCl)
	Condtn.	Float (frth rmvl)								
Grind 1 kg	10.3								7.81	153
REO Float 1	5.0		200						7.07	188
	2.0	3.0		200				15	7.32	184
REO Float 2	5.0		200						6.97	186
	2.0	3.0		100					7.30	188
REO Float 3	5.0		200						6.92	187
	2.0	3.0		100					7.32	189
CaF2 Float 1	5.0				200				6.94	184
	2.0	5.0					100		7.46	181
CaF2 Float 2	5.0				200				6.90	187
	2.0	2.5					50		7.42	171
CaF2 Float 3	5.0					200			6.75	175
	2.0	2.5					50		7.44	170
TOTALS	52.3	19.0	600	400	400	200	200	15		

TABLE : 20 BATCH FLOTATION

CLIENT NAME:	Sumiko Consultants
SAMPLE DESCRIPTION :	Dong Pao Ore (Pre-Sized)
JOB NUMBER :	8677
TEST DESCRIPTION:	Batch Flotation
TEST NUMBER :	RB 2895
DATE :	22-Mar-01

OBJECTIVES

Size at 10 and 32um

Mill Size, P80 (µm): 75

COMMENTS

			Scraper	
Stage	Cell Size	Rotor	Size	Freq.
	litre	RPM	mm	sec
All	2.5	900	50	10

MASS AND METAL BALANCES

PRODUCT	MASS		Cum	REO		Cum		$BaSO_4$*		Cum		CaF_2#		Cum	
	g	%	%	%	%dist	%	%dist	%	%dist	%	%dist	%	%dist	%	%dist
Feed	2000														
+32um:Ba/Ca Conct 1	874.9	45.2	45.2	4.5	21.8	4.5	21.8	74.7	55.1	74.7	55.1	6.0	54.5	6.0	54.5
+32um:Ba/Ca Conct 2	58.2	3.0	48.2	9.7	3.1	4.8	24.9	44.3	2.2	72.8	57.3	3.1	1.9	5.8	56.4
+32um:REO Conct 1	14.6	0.8	49.0	4.6	0.4	4.8	25.3	79.5	1.0	72.9	58.3	1.3	0.2	5.7	56.6
+32um:REO Conct 2-3	48.5	2.5	51.5	1.6	0.4	4.7	25.7	1.4	0.1	69.4	58.3	0.5	0.3	5.5	56.8
+32um: Tail	19.3	1.0	52.5	1.0	0.1	4.6	25.8	1.8	0.0	68.1	58.4	0.6	0.1	5.4	56.9
+10um:Ba/Ca Conct 1	420.9	21.8	74.2	8.4	19.4	5.7	45.3	74.4	26.4	70.0	84.8	4.3	18.8	5.1	75.7
+10um:Ba/Ca Conct 2	140.1	7.2	81.5	15.3	11.8	6.5	57.1	53.0	6.3	68.5	91.0	5.3	7.7	5.1	83.4
+10um:Ba/Ca Conct 3	31.3	1.6	83.1	18.7	3.2	6.8	60.3	24.7	0.7	67.6	91.7	4.2	1.4	5.1	84.8
+10um:REO Conct 1-3	10.6	0.5	83.6	17.6	1.0	6.9	61.4	13.0	0.1	67.3	91.8	3.4	0.4	5.1	85.2
+10um: Tail	54.3	2.8	86.4	9.8	2.9	6.9	64.3	5.8	0.3	65.3	92.1	1.8	1.0	5.0	86.2
-10um: Falcon Conct	13.5	0.7	87.1	9.2	0.7	7.0	65.0	71.8	0.8	65.3	92.9	2.9	0.4	4.9	86.6
-10um: Falcon Tail	248.7	12.9	99.3	25.4	35.0	9.4	99.3	33.9	7.1	61.7	99.2	5.2	13.4	5.0	99.6
Calc'd Head	1934.9	100.0		9.3	100.0			61.3	100.0			5.0	100.0		
Assay Head				9.3				62.7				4.7			

* $BaSO_4$ Calc'd from Ba Grade

\# CaF_2 Calc'd from F Grade

client tables

TABLE : 21 BATCH FLOTATION

CLIENT NAME:	Sumiko Consultants
SAMPLE DESCRIPTION :	Dong Pao Ore+32um
JOB NUMBER :	8677
TEST DESCRIPTION:	Batch Flotation
TEST NUMBER :	RB 2895
DATE :	22-Mar-01

OBJECTIVES
Deslime, screen O/S at 32um, float fractions

Mill Size, P80 (μm): 75

COMMENTS

Stage	Cell Size	Rotor	Scraper Size	Scraper Freq.
	litre	RPM	mm	sec
All	2.5	900	50	10

MASS AND METAL BALANCES

PRODUCT	MASS		Cum	REO		Cum		$BaSO_4$*		Cum		CaF_2#		Cum	
	g	%	%	%	%dist	%	%dist	%	%dist	%	%dist	%	%dist	%	%dist
Feed	970														
Ba/Ca Conct 1	834.8	86.2	86.2	4.5	84.4	4.5	84.4	74.7	94.5	74.7	94.5	6.0	95.7	6.0	95.7
Ba/Ca Conct 2	55.5	5.7	91.9	9.7	12.1	4.8	96.5	44.3	3.7	72.8	98.2	3.1	3.3	5.8	99.0
REO Conct 1	13.9	1.4	93.3	4.6	1.4	4.8	98.0	79.5	1.7	72.9	99.9	1.3	0.3	5.7	99.3
REO Conct 2-3	46.3	4.8	98.1	1.6	1.6	4.7	99.6	1.4	0.1	69.4	99.9	0.5	0.4	5.5	99.8
Tail	18.4	1.9	100.0	1.0	0.4	4.6	100.0	1.8	0.1	68.1	100.0	0.6	0.2	5.4	100.0
Calc'd Head	968.9	100.0		4.6	100.0			68.1	100.0			5.4	100.0		
Assay Head				4.1				70.5				4.8			

* $BaSO_4$ Calc'd from Ba Grade # CaF_2 Calc'd from F Grade

SCHEDULE OF REAGENTS **WATER:** Tap

Operation	Time (min) Condtn.	Time (min) Float (frth rmvl)	Na2SiO3 (g/t)	Oleic Acid (g/t)	Emigol (g/t)	Caustic Starch (g/t)	A845 (g/t)	AlCl3 (g/t)	MIBC (g/t)	H2SO4 (g/t)	Pb(NO3)2 (g/t)	pH	mV (Sat AgCl)
Grind 1 kg	4.5											8.34	142
Ba/Ca Float 1	2.0		100									8.48	112
	5.0			500	100								
	2.0	5.0				100						8.04	155
Ba/Ca Float 2	2.0		50									7.63	131
	3.0			500	50								
	2.0	3.0				50						7.70	151
REO Float 1	2.0									1000	100	2.34	443
	3.0						500						
	2.0	5.0						250	22			2.41	447
REO Float 2	2.0						1000				100	2.38	426
	2.0	2.0						250				2.37	422
REO Float 3	3.0	2.0					1000	100			50	2.50	399
TOTALS	34.5	17.0	150	1000	150	150	2500	600	22	1000	250		

TABLE : 22 BATCH FLOTATION

CLIENT NAME:	Sumiko Consultants
SAMPLE DESCRIPTION :	Dong Pao Ore-32um+10um
JOB NUMBER :	8677
TEST DESCRIPTION:	Batch Flotation
TEST NUMBER :	RB 2896
DATE :	22-Mar-01

OBJECTIVES
Deslime, screen at 32um, float fractions

Mill Size, P80 (μm): 75

COMMENTS

			Scraper	
Stage	Cell Size	Rotor	Size	Freq.
	litre	RPM	mm	sec
All	2.5	900	50	10

MASS AND METAL BALANCES

PRODUCT	MASS		Cum	REO		Cum		$BaSO_4$*		Cum		CaF_2#		Cum	
	g	%	%	%	%dist	%	%dist	%	%dist	%	%dist	%	%dist	%	%dist
Feed	610														
Ba/Ca Concl 1	389.8	64.0	64.0	8.4	50.5	8.4	50.5	74.4	78.3	74.4	78.3	4.3	64.2	4.3	64.2
Ba/Ca Concl 2	129.8	21.3	85.4	15.3	30.8	10.1	81.3	53.0	18.6	69.1	96.9	5.3	26.4	4.5	90.6
Ba/Ca Concl 3	29.0	4.8	90.1	18.7	8.4	10.5	89.7	24.7	1.9	66.7	98.9	4.2	4.7	4.5	95.3
REO Concl 1-3	9.8	1.6	91.7	17.6	2.7	10.7	92.4	13.0	0.3	65.8	99.2	3.4	1.3	4.5	96.5
Tail	50.3	8.3	100.0	9.8	7.6	10.6	100.0	5.8	0.8	60.8	100.0	1.8	3.5	4.3	100.0
Calc'd Head	608.7	100.0		10.6	100.0			60.8	100.0			4.3	100.0		
Assay Head				10.8				61.8				4.1			

* $BaSO_4$ Calc'd from Ba Grade # CaF_2 Calc'd from F Grade

SCHEDULE OF REAGENTS **WATER:** Tap

Operation	Time (min)		Na2SiO3	Oleic Acid	Emigol	Caustic Starch	A845	AlCl3	MIBC	H2SO4	Pb(NO3)2	pH	mV
	Condtn.	Float (frth rmvl)	(g/t)	(g/t)	(g/t)	(g/t)	(g/t)	(g/t)	(g/t)	(g/t)	(g/t)		(Sat AgCl)
Grind 1 kg	4.5												
Ba/Ca Float 1	2.0		100										
	5.0			500	100								
	2.0	5.0				100							
Ba/Ca Float 2	2.0		50										
	3.0			500	50								
	2.0	3.0				50							
Ba/Ca Float 3	2.0		25										
	3.0			300	25								
	2.0	2.0				25							
REO Float 1	2.0									1000	100		
	3.0						500						
	2.0	5.0						250	22				
REO Float 2	2.0						1000				100		
	2.0	2.0						250					
REO Float 3	3.0	2.0					1000	100			50		
TOTALS	41.5	19.0	175	1300	175	175	2500	600	22	1000	250		

client tables

TABLE : 23 BATCH FLOTATION

CLIENT NAME:	Sumiko Consultants
SAMPLE DESCRIPTION :	Dong Pao Ore
JOB NUMBER :	8677
TEST DESCRIPTION:	Batch Flotation
TEST NUMBER :	PD321
DATE :	29-Mar-01

OBJECTIVES
Examine the effect of hot flotation on REO grade and recovery

Mill Size, P80 (μm): 75

COMMENTS

Stage	Cell Size	Rotor	Scraper Size	Scraper Freq.
	litre	RPM	mm	sec
All	2.5	800	50	10

MASS AND METAL BALANCES

PRODUCT	MASS		Cum	REO		Cum		$BaSO_4$*		Cum		CaF_2#		Cum	
	g	%	%	%	%dist	%	%dist	%	%dist	%	%dist	%	%dist	%	%dist
Ba/Ca Con1	334.2	33.6	33.6	9.3	33.8	9.3	33.8	71.8	38.8	71.8	38.8	5.7	40.6	5.7	40.6
Ba/Ca Con2	528.8	53.2	86.8	9.2	52.8	9.2	86.6	67.7	57.8	69.3	96.6	4.8	54.1	5.1	94.7
Ba/Ca Con3	100.7	10.1	96.9	10.5	11.5	9.4	98.1	19.6	3.2	64.1	99.7	2.1	4.5	4.8	99.2
REO Con1+2	21.6	2.2	88.9	7.5	1.8	10.4	99.8	6.8	0.2	70.0	100.0	1.6	0.7	5.3	99.9
Tail	9.4	0.9	89.9	1.8	0.2	10.3	100.0	0.8	0.0	69.3	100.0	0.4	0.1	5.2	100.0
Calc'd Head	994.7	100.0		9.3	100.0			62.3	100.0			4.7	100.0		
Assay Head				9.3				62.7				4.7			

* $BaSO_4$ Calc'd from Ba Grade # CaF_2 Calc'd from F Grade

SCHEDULE OF REAGENTS **WATER:** Tap

Operation	Time (min)		Na2SiO3 (g/t)	Oleic Acid (g/t)	Emigol (g/t)	Caustic Starch (g/t)	A845 (g/t)	AlCl3 (g/t)	MIBC (g/t)	H2SO4 (g/t)	Pb(NO3)2 (g/t)	Temp (C)	pH		mV Sat
	Condtion	Flotation											Start	Finish	Start
Grind 1 kg	4.5											55		7.56	
Ba/Ca Float 1	2.0	5.0	100									58	7.32		175
	5.0			500	100									7.82	
	2.0					100									
Ba/Ca Float 2	2.0	3.0	50									58	7.71		141
	3.0			500	50									8.10	
	2.0					50									
Ba/Ca Float 3	2.0	2.0	25									60	8.00		160
	3.0			300	25									8.15	
	2.0					25									
REO Float 1	2.0									1000	100	57	8.15	2.12	143
	3.0	2.0					500	250							456
REO Float 2	2.0						1000				100	58	2.21	2.23	
	2.0	2.0						250				57		2.45	
TOTALS	36.5	9.0	175	1300	175	175	1500	500	0	1000	200				

TABLE : 24 BATCH FLOTATION

CLIENT NAME:	Sumiko Consultants
SAMPLE DESCRIPTION :	Dong Pao Ore
JOB NUMBER :	8677
TEST DESCRIPTION:	Batch Flotation
TEST NUMBER :	PD326
DATE :	2-Apr-01

OBJECTIVES

Repeat RB2889, Vary Oleic acid, and caustic starch addition at 60C

Mill Size, P80 (µm): 75

COMMENTS

Stage	Cell Size	Rotor	Scraper Size	Scraper Freq.
	litre	RPM	mm	sec
All	2.5	800	50	10

MASS AND METAL BALANCES

PRODUCT	MASS		Cum	REO		Cum		$BaSO_4$*		Cum		CaF_2#		Cum	
	g	%	%	%	%dist	%	%dist	%	%dist	%	%dist	%	%dist	%	%dist
Ba/Ca Con1	325.2	32.7	32.7	9.8	34.7	9.8	34.7	69.5	36.6	69.5	36.6	6.8	47.0	6.8	47.0
Ba/Ca Con2	548.8	55.2	87.9	8.9	53.2	9.2	88.0	67.9	60.2	68.5	96.8	4.1	47.8	5.1	94.8
Ba/Ca Con3	91.3	9.2	97.1	10.4	10.4	9.3	98.3	20.2	3.0	63.9	99.8	2.3	4.5	4.8	99.3
Tail	28.9	2.9	90.8	5.3	1.7	10.2	89.6	4.5	0.2	68.5	97.0	1.2	0.7	5.2	95.5
Calc'd Head	994.2	100.0		9.2	100.0			62.2	100.0			4.7	100.0		
Assay Head				9.3				62.7				4.7			

* $BaSO_4$ Calc'd from Ba Grade # CaF_2 Calc'd from F Grade

SCHEDULE OF REAGENTS **WATER:** Tap

Operation	Time (min)		Na2SiO3 (g/t)	Oleic Acid (g/t)	Emigol (g/t)	Caustic Starch (g/t)	Temp (C)	pH		mV Sat AgCl	
	Condtion	Flotation						Start	Finish	Start	Finish
Grind 1 kg	4.5								7.67		170
Ba/Ca Float 1	2.0		100				58	7.67		177	
	5.0			500	100						
	2.0	3.0				200			8.05		175
Ba/Ca Float 2	2.0		50				60	7.74		153	
	5.0			500	50						
	2.0	3.0				150			8.01		161
Ba/Ca Float 3	2.0		25				61	7.98		163	
	5.0			300	25						
	2.0	2.0				100			8.30		166
TOTALS	31.5	8.0	175	1300	175	450					

client tables

TABLE : 25 BATCH FLOTATION

CLIENT NAME:	Sumiko Consultants
SAMPLE DESCRIPTION :	Dong Pao Ore
JOB NUMBER :	8677
TEST DESCRIPTION:	Batch Flotation
TEST NUMBER :	PD327
DATE :	2-Apr-01

OBJECTIVES

Repeat RB2889, Vary Oleic acid, and caustic starch addition at 60 C

Mill Size, P80 (µm): 75

COMMENTS

			Scraper	
Stage	Cell Size	Rotor	Size	Freq.
	litre	RPM	mm	sec
All	2.5	800	50	10

MASS AND METAL BALANCES

PRODUCT	MASS		Cum	REO		Cum		$BaSO_4$*		Cum		CaF_2#		Cum	
	g	%	%	%	%dist	%	%dist	%	%dist	%	%dist	%	%dist	%	%dist
Ba/Ca Con1	209.0	21.0	21.0	10.4	23.3	10.4	23.3	70.7	23.8	70.7	23.8	5.7	24.9	5.7	24.9
Ba/Ca Con2	606.6	60.9	81.9	9.0	58.4	9.4	81.7	70.3	68.7	70.4	92.5	5.2	65.9	5.3	90.8
Ba/Ca Con3	124.0	12.5	94.4	11.7	15.5	9.7	97.2	35.5	7.1	65.8	99.6	3.1	8.0	5.0	98.8
Tail	55.9	5.6	87.5	4.6	2.8	10.7	84.5	4.1	0.4	71.2	92.9	1.0	1.2	5.5	92.0
Calc'd Head	995.5	100.0		9.4	100.0			62.3	100.0			4.8	100.0		
Assay Head				9.3				62.7				4.7			

* $BaSO_4$ Calc'd from Ba Grade # CaF_2 Calc'd from F Grade

SCHEDULE OF REAGENTS **WATER:** Tap

Operation	Time (min)		Na2SiO3	Oleic Acid	Emigol	Caustic Starch	Temp	pH		mV Sat AgCl	
	Condtion	Flotation	(g/t)	(g/t)	(g/t)	(g/t)	(C)	Start	Finish	Start	Finish
Grind 1 kg	4.5								7.79		179
Ba/Ca Float 1	2.0		150				60	7.73		184	
	5.0			400	50						
	2.0	3.0				200			7.93		165
Ba/Ca Float 2	2.0		100				61	7.88		170	
	5.0			400	50						
	2.0	2.5				150			8.10		186
Ba/Ca Float 3	2.0		50				59	7.95		174	
	5.0			400	50						
	2.0	3.0				100			8.30		220
TOTALS	31.5	8.5	300	1200	150	450					

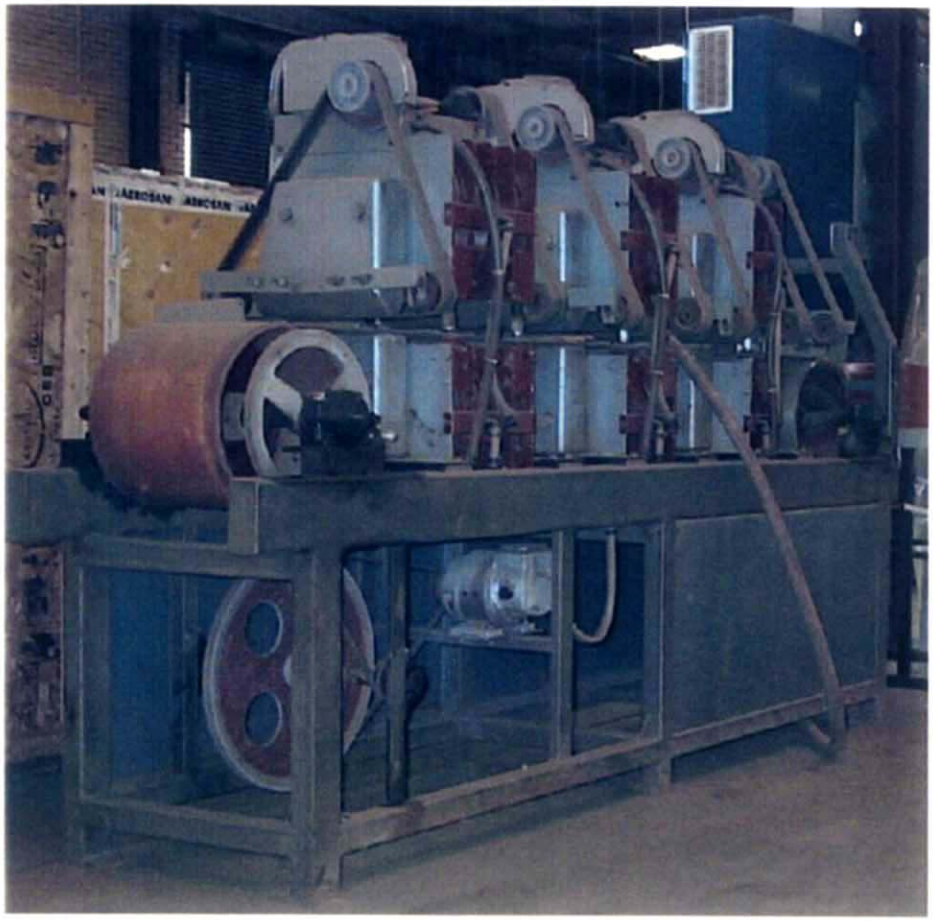
client tables

Apx. 20 Photograph of ore test works

Ball mill

Collection of pre slimes

Bach flotation test



Magnetic separation

Photograph of Ore test (2/2)

Apx. 21 Bond ball mill graindability results

TABLE

DRAFT

BOND BALL MILL GRINDABILITY RESULTS

SAMPLE:	*Dong Pao*	**DATE:**	*30-May-01*
CLIENT:	*Sumitomo Metal Mining*	**CLOSING SCREEN µm**	*106*
JOB No:	*8766*		

CYCLE No.	MILL REVS	TOTAL MILL CHARGE (g)	MASS OF NEW FEED (g)	MASS OF OVERSIZE EX MILL (g)	MASS OF UNDERSIZE EX MILL (g)	NET MASS UNDERSIZE EX MILL (g)	NET GMS UNDERSIZE PER REV	CIRC.'G LOAD (%)	MASS FRESH FEED FOR NEXT CYCLE (g)	MASS OF UNDERSIZE IN FEED TO NEXT CYCLE
1	0	1623.2	1623.2	1057.6	565.6	0.0	0.000	187.0	565.6	197.1
2	100	1623.2	565.6	1046.6	576.6	379.5	3.795	181.5	576.6	200.9
3	69	1623.2	576.6	1164.7	458.5	257.6	3.733	254.0	458.5	159.8
4	81	1623.2	458.5	1156.1	467.1	307.3	3.794	247.5	467.1	162.8
5	79	1623.2	467.1	1159.4	463.8	301.0	3.811	250.0	463.8	161.6
6	79	1623.2	463.8	1159.4	463.8	302.2	3.825	250.0	463.8	161.6
	79		463.8							

BULK DENSITY OF MILL FEED (t/m^3)	2.32		
AVERAGE % CIRC. LOAD OF CYCLE NO.'S	5,6	250	% PRODUCT IN FEED = 34.8
AVERAGE GMS/REV OF CYCLE NO.'S	5,6	3.818	
			TARGET NEW FEED (g) = 463.8
80% PASSING FEED SIZE (µm), F_{80}	1447		
80% PASSING PRODUCT SIZE (µm), P_{80}	81		

BOND BALL MILL WORK INDEX (kilowatt hours/tonne) = 6.60

TABLE

BOND BALL MILL SIZE DISTRIBUTION RESULTS

CLIENT NAME:	Sumitomo Metal Mining
SAMPLE DESCRIPTION:	Dong Pao
JOB NUMBER:	8766
DATE:	30-May

DRAFT

SIZE ANALYSIS OF FEED

SIZE	Mass		Cum. % Mass	
(microns)	g	%	Passing	Retained
2800	67.1	4.1	95.9	4.1
2000	152.3	9.4	86.5	13.5
1400	139.8	8.6	77.9	22.1
1000	150.0	9.2	68.6	31.4
600	166.6	10.3	58.4	41.6
425	96.5	5.9	52.4	47.6
300	76.0	4.7	47.7	52.3
150	142.0	8.7	39.0	61.0
106	67.3	4.1	34.8	65.2
-106	565.6	34.8	0.0	100.0
Total	1623.2	100.0		

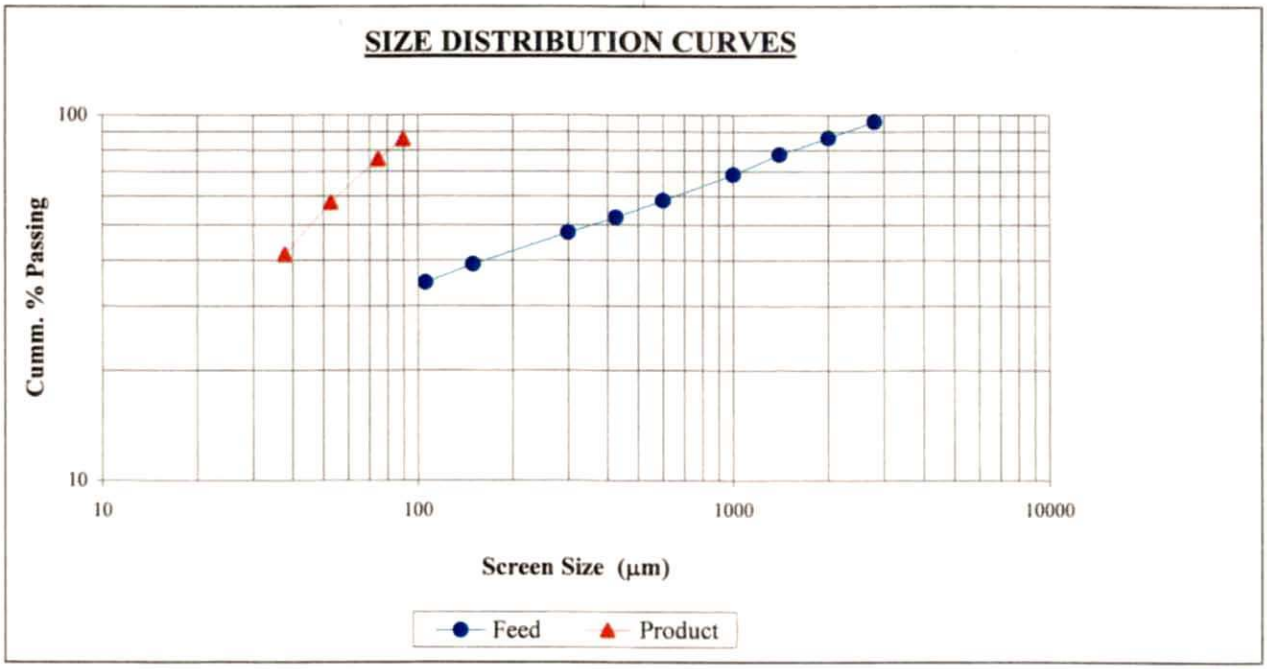
Initial Wt = 1625 **F80 (um) = 1447**

SIZE ANALYSIS OF PRODUCT

SIZE	Mass		Cum. % Mass	
(microns)	g	%	Passing	Retained
90	65.2	14.1	85.9	14.1
75	46.5	10.0	75.9	24.1
53	84.4	18.2	57.7	42.3
38	74.7	16.1	41.6	58.4
-38	193.0	41.6	0.0	100.0
Total	463.8	100.0		

Initial Wt = 465 **P80 (um) = 81**

SIZE DISTRIBUTION CURVES



COMMENTS :

Email:XLS

Apx. 22 Reference list

収 集 資 料 一 覧 表

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＜図表＞

Dong Pao のレアーアース, Fluorite-Barite No FIV　鉱床図　(縮尺 1/500)
GRADE 1 鉱石　鉱量計算図　(ＦⅢ鉱体)
Ｆ１　鉱床図　(縮尺 1/200)
ガンマー線図　(コンター図) 1/10,000
ガンマー線　測定図　1/10,000
ＦＶ鉱床図　(縮尺 1:100)
ＦⅡ鉱床図　縮尺 1/100
Line A-B, C-D の地質断面図　縮尺 1/500
ＸＬラインの地質断面図および鉱量計算　(ＦⅢ鉱体)
探鉱作業と鉱量計算の位置図　(ＦⅢ鉱体) 1/1,000
ＸＬ１ラインの地質断面及び鉱量計算　(ＦⅢ鉱体)
ＸＸＸⅨラインの地質断面及び鉱量計算図　(ＦⅢ鉱体) 縮尺 1:500
探鉱作業と鉱量計算の位置図　(ＦⅢ鉱体)　1/1,000
DONG PAO レアーアース地区位置図
DONG PAO 第Ⅲ鉱体レアーアース鉱床付近の地質図　(×10m コンター)
ＸＸＸⅧラインの地質断面図および鉱量計算　(ＦⅢ鉱体)　Ｌ２トンネル
ＸＬⅢラインの地質断面及び鉱量計算　(ＦⅢ鉱体)
ＸＬⅡラインの地質断面と鉱量計算　(ＦⅢ鉱体)
GRADEⅡおよびⅢ鉱石の鉱量計算図　(ＦⅢ鉱体)
Line A-B, C-D の地質断面図　縮尺 1/500

ＦⅢ鉱体鉱床図　（トレンチの分析結果）

ＦⅢ鉱体付近の地形図　（トレンチ位置）　縮尺 1/1,000

Pit No. 2　Scale 1:100　分析柱状図

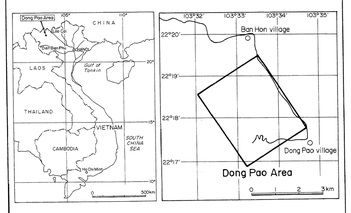
1/50,000　地形図

1/10,000　地質図

Plate 1

REPORT ON
THE MINERAL EXPLORATION
IN THE DONG PAO AREA,
THE SOCIALIST REPUBLIC OF VIETNAM
Phase 1

Geological map of Dong Pao Area



JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
MARCH 2001

Scale 1 : 5,000

0 100 200 300 400 500m

LEGEND

- Quaternary
- Paleogene alkaline volcanics
- Paleogene syenite and quartz syenite
- Upper triassic shale and sandstone
- Ladinian sericitic shale interbeded with limestene, calcareous shale, sandstone
- Anisian limestone, marble
- Minette dike
- F F F F — Fluorite - rare earths ore
- F3 — Rare earths ore
- Lineament
- Fault