PART III Conclusions and Recommendations

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Chapter 1 Conclusions

The Survey of during the first year leads the following conclusions.

There are three main prospects in the Survey area; the La Guanaca, the Rinconada, and the Central Prospects. These prospects may represent parts of the zonation related to a porphyry copper style mineralized system. Deeper parts of a zoned porphyry copper mineralized system could be expected at deeper levels of the La Guanaca prospect and in the deep parts of the Rinconada prospect.

Therefore, the areas around the three main prospects are the targets for the next stage of the Survey.

Chapter 2 Recommendations

Based on the conclusions summarized above for the first years Survey, the following drilling program is recommended for the second phase of the Survey.

1. Drilling of the deeper parts of the Rinconada Prospect.
2. Drilling of the deeper parts of the Central Prospect.
3. Drilling of the deeper parts and around the La Guanaca Prospect.

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List of Figures, Tables, Appendixes, and Plates

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APENDICES

Appendix 1 Existing data list

[Documents]

- P.Cornejo P., C.Mpodozis M., C.F.Ramirez R., and A.J.Tomlinson(1993): ESTUDIO GEOLOGICO DE LA REGION DE PORTERILLOS Y EL SALVADOR(26°-27°Lat.S). SERVICIO NACIONAL DE GEOLOGIA Y MINERIA,CORPORACION NACIONAL DEL COBRE DE CHILE.pp.469.
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[maps]

- Geographical map 1:500,000;COPIAPO 2600-6815 2 sheets
- Geographical map 1:250,000;EL SALVADOR 2600-6900
- Geographical map 1:50,000;MOSTAZAL 2630-6930
- Geographical map 1:50,000;PORTAL DEL INCA 2615-6930

· Geographical map 1:50,000;SAN ANDRES 2645-6930(original)
· Geographical map 1:50,000;LLANO SAN PEDRO DE CACHIYOYO 2630-6945
· Geographical map 1:50,000;ESTACION LLANTA 2615-6945
· Geographical map 1:50,000;INCA DE ORO 2645-6945
· Mining concession map 1:50,000;
· Trail map of aerial photograph 1:250,000

[Photographs]
· aerial photographs 1:40,000 prints
· aerial photographs 1:40,000 photographic possitive film
· Landsat image
· JERS-1dataOPS358
· JERS-1dataOPS678

Appendix 2 Bulk composition of rock

sample No.	255A	255B	271A	271B	103021	137509	137515	137616
rock name	Ga	Ga	And	And	Gd3	Gd3	Gd3	Ba
major(%)								
Si02	57.74	57.28	49.33	50.9	61.52	63.05	63.62	55.32
Ti02	0.8	0.83	0.86	0.83	0.67	0.59	0.61	1.15
Al203	16.74	16.91	14.61	14.27	16.64	16.43	16.2	16.93
Cr203	0	0	0.01	0.01	0	0	0	0
Fe203	6.65	6.55	7.45	7.12	5.82	4.98	4.97	7.77
MnO	0.2	0.2	0.12	0.14	0.09	0.1	0.12	0.09
MgO	2.15	2.31	6.7	6.67	2.51	2.09	2.12	3.2
CaO	4.14	3.8	6.07	6.53	4.06	4.43	4.23	4.3
Na20	3.45	3.11	3.72	3.65	3.5	3.83	3.56	4.5
K20	4.21	5.53	2.05	1.95	2.34	2.94	3	1.95
P205	0.24	0.23	0.31	0.29	0.17	0.15	0.15	0.3
LOI	2.23	1.69	7.21	7.44	1.51	0.65	1.03	3.02
Total	98.61	98.44	98.41	98.8	93.73	99.24	99.67	98.53
trace(ppm)								
Ba	1190	1625	550	570	700	990	800	440
Rb	124	142	86	82	88	94	94	96
Sr	430	438	572	586	458	452	416	302
Nb	8	8	6	6	18	14	14	8
Zr	192	201	114	111	120	165	150	150
Y	20	20	16	16	20	20	18	24
REE(ppm)								
La	no	no	no	no	18	22	19	no
Ce	no	no	no	no	42	45	42	no
Pr	no	no	no	no	4.6	5.6	5.2	no
Nd	no	no	no	no	21	22	22	no
Sm	no	no	no	no	3	4	4	no
Eu	no	no	no	no	1	1	1	no
Gd	no	no	no	no	3	3.8	3.6	no
Tb	no	no	no	no	0.7	0.6	0.5	no
Dy	no	no	no	no	3.5	3.5	3	no
Ho	no	no	no	no	0.6	0.6	0.6	no
Er	no	no	no	no	1.5	1.5	1.5	no
Tm	no	no	no	no	0.3	0.3	0.2	no
Yb	no	no	no	no	1.8	1.5	1.5	no
Lu	no	no	no	no	0.2	0.2	0.3	no
K	42100	55300	20500	19500	23400	29100	30000	19500
Norm(%)								
Q	10.42	7.41	0.1	2.05	18.47	17.78	19.77	8.54
C								0.32
or	24.88	32.68	12.11	11.52	13.83	17.37	17.73	11.52
ab	29.19	26.32	31.48	30.89	29.62	32.41	30.12	38.08
an	17.76	15.85	17.11	16.79	22.78	18.96	19.36	19.37
di			6.58	8.85		0.3		
wo			3.53	4.75		0.16		
en			3.05	4.1		0.14		
fs								
hy	5.36	5.75	13.64	12.51	6.25	5.07	5.28	7.97
en	5.36	5.75	13.64	12.51	6.25	5.07	5.28	7.97
il	0.43	0.43	0.26	0.3	0.19	0.21	0.26	0.19
hm	6.65	6.55	7.45	7.12	5.82	4.98	4.97	7.77
tn	0.86	1.06	1.78	1.65	0.5	1.17	0.45	
ru	0.23	0.17			0.36		0.29	1.05
ap	0.58	0.53	0.72	0.67	0.39	0.35	0.35	0.7
total	96.36	96.75	91.29	92.35	98.21	98.6	98.58	95.51

sample No.	137618	137620	137632	96110418	96110419	96110420	96110421	96110422
sample No.	Oa	M	DJ	Ag	Ad	Ad	Md	MJ
SiO2	53.58	61.36	74.56	68.44	59.81	59.76	57.21	58.06
TiO2	1.33	0.88	0.24	0.49	0.93	0.94	1.05	1.03
Al2O3	18.09	15.95	12.77	13.61	15.69	15.87	15.82	15.83
Cr2O3	0	0	0	0	0	0	0	0
Fe2O3	8.64	5.98	1.04	2.99	5.62	5.8	6.99	6.79
MnO	0.07	0.12	0.06	0.06	0.11	0.12	0.12	0.13
MgO	1.6	1.83	0.58	1.03	2.34	2.55	3.55	3.25
CaO	5.74	3.7	2.65	1.97	3.96	3.29	5.96	5.49
Na2O	3.26	3.8	1.68	1.98	3.72	3.19	3.23	3.76
K2O	3.35	3.88	4.25	6.33	4.32	4.59	3.04	3.71
P2O5	0.43	0.22	0.06	0.1	0.27	0.25	0.27	0.26
LOI	2.18	1.22	1.17	1.41	2.01	2.22	1.43	2.22
Total	98.27	98.94	99.06	98.41	98.78	98.58	98.67	98.52
Ba	570	935	675	620	650	705	600	555
Rb	132	114	126	340	196	208	122	178
Sr	334	276	290	128	404	414	402	374
Nb	10	12	20	18	14	14	16	14
Zr	276	309	189	318	246	237	270	264
Y	42	38	22	30	26	26	26	26
REE(ppm)								
La	no	no	no	167.57	8.11	200	86.49	72.97
Ce	no	no	no	134.38	8.33	159.38	68.75	62.5
Pr	no	no	no	107.14	9.23	157.14	57.14	52.14
Nd	no	no	no	91.55	8.45	122.54	46.48	42.25
Sm	no	no	no	54.35	10.43	77.83	24.35	23.91
Eu	no	no	no	24.44	7.78	50	14.44	14.44
Gd	no	no	no	50.65	9.35	47.74	20.32	19.03
Tb	no	no	no	46.67	10	33.33	15	13.33
Dy	no	no	no	50	9.21	26.05	13.16	13.95
Ho	no	no	no	50	8.89	22.22	11.11	8.89
Er	no	no	no	62	10	20	10	12
Tm	no	no	no	60	7.5	15	7.5	10
Yb	no	no	no	64.8	6.8	16.8	7.2	9.2
Lu	no	no	no	50	10	15	10	7.5
K	33500	38800	42500	63300	43200	45900	30400	37100
Norm								
Q	8.5	14.78	42.15	27.22	11.4	13.49	11.24	6.31
C			0.73	0.16		0.27		
or	19.8	22.93	25.12	37.41	25.53	27.13	17.97	21.93
ab	27.59	32.15	14.22	16.75	31.48	26.99	27.33	31.82
an	24.83	15	12.75	9.12	13.35	14.69	19.69	15.36
di					1.34		3.84	5.53
wo					0.72		2.06	2.97
en					0.62		1.78	2.56
fs								
hy	3.99	4.56	1.44	2.57	5.21	6.35	7.06	5.53
en	3.99	4.56	1.44	2.57	5.21	6.35	7.06	5.53
il	0.15	0.26	0.13	0.13	0.23	0.26	0.26	0.28
hm	8.64	5.98	1.04	2.99	5.62	5.8	6.99	6.79
tn	0.59	1.35			1.98		2.24	2.17
ru	1.01	0.19	0.17	0.42		0.8		
ap	1	0.51	0.14	0.23	0.63	0.58	0.63	0.6
total	96.1	97.71	97.89	97	96.77	96.36	97.25	96.32

Appendix 3 Modal composition of the granitoid rocks

	classification on the geological map	Qz	Pl	Kf	felsic total	Bio	Ho	Opx	Cpx	Cab	Maf	maffic total	silicate total	Opq	Total
137911	Md	77	1026	446	1549 79.89%	0	222	0	0	0 color index	168	390 20.11%	1939	61	2000
96110419	Ad	267	689	608	1564 80.16%	14	109	0	0	16 color index	248	387 19.84%	1951	49	2000
96110420	Ad	227	1092	411	1730 88.58%	26	69	0	2	4 color index	122	223 11.42%	1953	47	2000
96110421	Md	83	1126	378	1587 82.14%	49	24	2	102	2 color index	166	345 17.86%	1932	68	2000
96110422	Md	92	708	732	1532 79.30%	4	181	0	0	14 color index	201	400 20.70%	1932	68	2000
137946	Ad	218	881	660	1759 89.43%	24	104	0	6	0 color index	74	208 10.57%	1967	33	2000
G-1	Ag	560	370	972	1902 95.58%	0	0	0	0	0 color index	88	88 4.42%	1990	10	2000
G-3	Ag	511	342	1029	1882 94.91%	0	0	0	0	0 color index	101	101 5.09%	1983	17	2000
96110418	Ag	445	212	1037	1694 86.69%	3	0	0	0	0 color index	257	260 13.31%	1954	46	2000
137621	M	146	1073	324	1543 79.95%	0	105	0	0	0 color index	282	387 20.05%	1930	70	2000
137620	M	242	770	752	1764 91.88%	28	96	0	0	4 color index	28	156 8.13%	1920	80	2000
257	A	362	1118	214	1694 86.52%	154	106	1	0	0 color index	3	264 13.48%	1958	42	2000
137796	Gd1	422	1134	140	1696 86.57%	46	85	0	0	0 color index	132	263 13.43%	1959	41	2000
137762	Gd2	347	1037	121	1505 77.10%	168	220	0	2	0 color index	57	447 22.90%	1952	48	2000
137515	Gd3	438	988	259	1685 85.93%	136	117	0	0	0 color index	23	276 14.07%	1961	39	2000
G-8	Gd4	282	1157	162	1581 80.99%	152	213	0	0	0 color index	6	371 19.01%	1952	48	2000

Appendix 4 Results of chemical analysis of samples from geochemical survey

sample No	Au(ppb)	Ag(ppm)	As(ppm)	Cu(ppm)	Mo(ppm)	Pb(ppm)	Sb(ppm)	Zn(ppm)
137759	2.5	0.1	8	82	1	17	1.8	82
137836	2.5	0.1	1	29	1	24	0.6	52
137732	2.5	0.1	1	14	0.5	2	0.6	20
137758	2.5	0.1	14	12	3	0.5	1.2	6
137769	2.5	0.1	1	56	2	0.5	0.1	66
137776	2.5	0.1	6	17	1	6	2.6	50
137782	2.5	0.1	4	34	2	0.5	3.2	38
137784	2.5	0.1	1	26	1	3	0.4	28
137942	85	0.1	4	4	0.5	1	0.2	22
137950	25	0.2	6	215	2	44	1.8	230
137951	2.5	0.2	10	45	1	3	0.6	6
137955	5	0.1	14	137	2	1	0.4	38
137956	2.5	0.1	12	6	0.5	0.5	1	28
137958	2.5	0.2	12	5	0.5	0.5	0.6	30
137982	2.5	0.1	4	64	1	3	0.1	20
137991	2.5	0.1	14	44	0.5	9	3	40
137992	2.5	0.1	16	205	0.5	13	2.8	55
137993	2.5	0.1	42	108	1	32	2.4	60
137994	2.5	0.1	14	82	0.5	0.5	0.4	14
96102810	2.5	0.5	10	300	2	70	1	2450
96102813	2.5	0.6	4	235	1	348	0.2	5200
96102816	2.5	0.1	10	142	2	0.5	0.4	50
96102819	2.5	0.1	10	18	1	10	0.8	300
16	2.5	0.1	1	32	0.5	0.5	0.1	45
18	2.5	0.1	4	75	0.5	0.5	0.1	98
24	2.5	0.1	12	56	0.5	2	0.6	36
26	2.5	0.1	30	6	0.5	0.5	1.4	27
83	2.5	0.4	1	119	0.5	0.5	0.2	38
213	2.5	0.1	12	10	2	7	1.2	78
227	2.5	0.1	6	15	1	0.5	1.8	55
233	2.5	0.2	6	1650	19	102	0.1	2400
236	2.5	0.1	18	121	2	1	0.2	87
137504	2.5	0.1	8	177	0.5	0.5	0.4	12
137506	2.5	0.2	16	29	1	12	1.6	108
137507A	2.5	0.1	20	17	1	4	1.2	40
137525	2.5	0.1	1	25	1	14	1	62
137547	2.5	0.1	8	22	1	6	0.4	68
137552	2.5	0.2	6	12	2	0.5	0.4	44
137560	2.5	0.1	8	47	2	4	0.1	40
137607	2.5	0.1	10	5	0.5	2	3.8	57
137610	2.5	0.1	12	5	0.5	0.5	0.2	34
137614	2.5	0.1	6	5	0.5	0.5	0.4	52
137615	15	2.6	56	730	5	28	17.5	130
137617	2.5	0.2	14	25	1	2	0.4	110
137618	2.5	0.2	18	12	2	2	0.2	52
137626	2.5	0.2	64	33	1	16	3.6	90
137627	2.5	0.1	18	45	1	3	2	120
137629	2.5	0.1	12	3	2	5	0.2	19
137632	2.5	0.1	10	14	2	8	0.2	43
137634	2.5	0.1	26	51	2	14	1	92
137641	2.5	0.1	6	240	1	0.5	0.6	37
137643	2.5	0.1	38	23	1	0.5	2.2	36
137645	2.5	0.1	20	14	1	0.5	0.8	62
137646	2.5	0.4	12	176	1	8	1.6	94
137659	2.5	0.1	8	9	1	10	0.6	75

sample No	Au(ppb)	Ag(ppm)	As(ppm)	Cu(ppm)	Mo(ppm)	Pb(ppm)	Sb(ppm)	Zn(ppm)
137660	2.5	0.1	22	75	1	13	1.4	88
137662	2.5	0.1	18	81	1	8	0.8	78
137663	2.5	0.2	32	146	0.5	20	1	68
137665	2.5	0.2	16	15	1	5	1.4	60
137668	2.5	0.1	24	305	2	10	1.8	52
137675	2.5	0.1	16	30	4	30	2.2	54
137678	2.5	0.1	12	26	0.5	12	0.8	70
137679	2.5	0.1	10	33	1	10	0.4	55
137680	2.5	0.1	10	37	1	19	1	29
137681	2.5	0.1	4	13	0.5	6	0.4	25
137689	2.5	0.1	10	184	2	37	0.6	360
137701	2.5	0.6	4	830	2	0.5	0.6	48
137704	2.5	0.1	6	26	1	0.5	0.1	12
137710	2.5	0.1	20	63	1	20	3.2	135
137712	2.5	0.1	1	81	2	37	0.2	50
137714	2.5	0.1	6	46	1	0.5	0.6	28
137718	2.5	0.2	6	145	2	11	1	98
137730	2.5	0.1	10	22	1	2	1.8	86
137731	2.5	0.1	1	56	1	8	0.4	48
137824	2.5	0.1	18	10	1	12	1.6	50
137827	2.5	0.1	10	26	1	1	0.2	26
137828	2.5	0.1	10	16	1	3	3.8	68
78	2.5	0.1	1	35	1	33	0.6	70
137736	2.5	0.1	1	30	2	7	0.2	7
137738	2.5	0.1	1	48	1	0.5	0.4	48
137740	2.5	0.1	1	4	1	9	0.4	10
137741	2.5	0.1	6	52	2	2	0.8	36
147745	2.5	0.1	18	25	0.5	11	0.8	112
137748	2.5	0.1	16	21	2	12	1.6	68
137749	2.5	0.1	10	7	0.5	3	0.4	60
137741	2.5	0.1	1	8	2	6	0.8	65
137909	2.5	0.1	6	102	0.5	0.5	0.1	62
137910	2.5	0.1	24	9	0.5	3	1	53
137914	2.5	0.1	30	21	0.5	6	1	44
137920	2.5	0.1	1	100	0.5	14	0.4	145
137940	2.5	0.1	6	22	1	0.5	0.2	58
96102403	2.5	0.1	30	48	1	9	1	232
96102404	2.5	0.1	18	68	1	8	1.4	168
96102508	2.5	0.1	12	50	1	10	0.2	78
96102512	2.5	0.1	1	15	2	2	0.6	66
96102515	2.5	0.1	6	42	2	3	0.8	56
61	2.5	0.1	4	39	0.5	0.5	0.1	50
63	2.5	0.1	6	33	0.5	0.5	0.1	30
65	2.5	0.1	12	275	0.5	0.5	0.8	27
69	2.5	0.2	1	32	0.5	4	0.2	72
71	2.5	0.1	1	17	0.5	8	0.4	60
79	2.5	0.1	1	32	0.5	0.5	0.2	62
82	2.5	0.1	4	10	0.5	2	0.2	70
91	2.5	0.1	26	255	1	4	1.8	113
92	2.5	0.1	6	19	1	0.5	0.4	54
93	2.5	0.1	6	30	1	0.5	0.1	9
94	2.5	0.1	14	3	0.5	0.5	0.4	60
95	2.5	0.1	8	28	1	0.5	0.1	47
97	2.5	0.1	10	15	0.5	0.5	1.4	50
98	2.5	0.1	22	11	1	1	0.4	87

sample No	Au(ppb)	Ag(ppm)	As(ppm)	Cu(ppm)	Mo(ppm)	Pb(ppm)	Sb(ppm)	Zn(ppm)
99	2.5	0.1	8	26	1	87	0.2	125
257	2.5	0.2	4	57	1	12	0.1	15
259	2.5	0.1	4	88	2	31	0.2	56
262	2.5	0.1	4	8	1	0.5	0.1	17
264	2.5	0.1	1	59	1	5	0.1	150
267	2.5	0.1	54	21	1	0.5	0.8	23
278	2.5	0.1	1	300	0.5	3	0.1	27
300	2.5	0.1	1	9	1	0.5	0.1	55
137569	2.5	0.4	14	230	0.5	22	0.1	138
137577	2.5	0.1	6	184	1	0.5	0.1	170
137580	2.5	0.1	4	16	1	2	0.1	78
137581	2.5	0.1	10	210	0.5	17	0.1	150
137582	2.5	0.1	1	65	1	8	0.1	62
137583	2.5	0.1	1	52	1	0.5	0.1	53
137584	2.5	0.1	8	62	0.5	0.5	0.1	52
137585	2.5	0.1	12	70	0.5	11	0.1	120
137588	2.5	0.1	12	24	1	9	1	28
137594	2.5	0.1	1	8	0.5	0.5	0.1	15
137596	2.5	0.1	8	5	1	0.5	0.2	105
137597	2.5	0.1	14	9	2	3	0.8	94
137709	2.5	0.1	4	50	1	6	0.8	68
137713	2.5	0.1	1	6	2	0.5	0.4	105
137724	2.5	0.1	1	19	2	0.5	0.2	60
137728	2.5	0.2	1	63	1	60	6.4	90
137899	2.5	0.1	1	27	2	13	0.1	26
137931	70	0.4	6	600	2	98	0.8	276
137657	2.5	0.1	1	28	0.5	4	0.1	9
137677	2.5	0.1	10	67	0.5	7	0.2	24
285	2.5	0.2	10	116	1	24	0.8	74
286	2.5	0.1	8	83	2	32	0.6	83
137508	2.5	0.1	6	62	2	15	0.8	68
137624	2.5	0.1	18	157	2	18	1.2	78
137625	2.5	0.1	14	115	2	11	1	75
137636	2.5	0.1	18	116	2	14	0.8	100
137637	2.5	0.1	10	78	2	14	0.6	72
137638	2.5	0.1	12	90	1	12	0.6	82
137639	2.5	0.1	10	69	1	12	0.8	72
137640	2.5	0.1	16	129	2	10	0.8	58
137711	2.5	0.1	14	105	2	14	0.8	76
137734	2.5	0.1	14	153	2	15	1	72
137834	2.5	0.1	4	69	4	7	0.8	42
137695	2.5	0.1	20	38	2	14	0.6	50
137735	2.5	0.1	8	101	1	11	1	74
96110418	2.5	0.1	1	40	2	10	0.8	43
137554	2.5	0.1	4	175	2	13	0.1	48
137812	35	0.1	28	56	0.5	0.5	1.8	50
137818	10	0.1	18	54	0.5	0.5	0.6	30
137820	5	0.1	16	22	1	18	1	29
137838	10	0.1	8	92	2	0.5	0.4	33
137843	2.5	0.1	8	63	1	14	0.4	90
137844	15	0.1	12	26	0.5	4	0.6	43
137856	2.5	0.1	6	35	0.5	0.5	0.1	35
137858	2.5	0.1	6	27	2	0.5	0.1	24
137894	2.5	0.1	1	14	2	7	0.1	65
137895	2.5	0.1	1	74	3	7	0.2	30

sample No	Au(ppb)	Ag(ppm)	As(ppm)	Cu(ppm)	Mo(ppm)	Pb(ppm)	Sb(ppm)	Zn(ppm)
137526	2.5	0.1	4	26	1	15	0.4	50
137527	2.5	0.1	1	58	1	2	0.1	38
137752	2.5	0.1	6	8	1	5	0.4	31
137764	2.5	0.1	1	42	1	4	0.2	43
137765	2.5	0.1	1	33	0.5	7	0.2	33
137767	2.5	0.1	1	12	2	3	0.2	40
137773	2.5	0.1	1	50	2	10	0.2	75
137792	2.5	0.1	1	43	1	2	0.2	35
137795	2.5	0.1	1	8	1	5	0.2	90
137796	2.5	0.1	1	11	1	4	0.4	70
137797	2.5	0.1	1	16	1	4	0.2	65
137548	2.5	0.1	4	56	2	11	0.2	45
137912	2.5	0.1	6	32	0.5	0.5	0.2	18
137912H	2.5	0.1	6	50	0.5	0.5	0.2	21
137913	2.5	0.1	8	39	0.5	0.5	0.2	18
137924	2.5	0.2	1	153	1	3	0.2	40
137937	10	0.1	12	81	1	2	0.4	72
137941	2.5	0.1	14	107	0.5	7	0.8	68
137946	10	0.1	10	86	2	7	0.1	42
57	2.5	0.1	4	72	0.5	2	0.2	53
62	2.5	0.1	6	125	0.5	0.5	0.1	30
84	2.5	0.1	1	121	0.5	9	0.1	31
85	2.5	0.1	1	56	1	9	0.1	53
275	2.5	0.1	1	73	0.5	9	0.1	35
281	2.5	0.1	1	75	1	2	0.1	25
137557	2.5	0.1	10	89	2	5	0.1	40
137809	40	0.1	22	10	1	2	1.2	56
137871	2.5	0.1	20	196	2	11	0.2	68
137891	2.5	0.1	1	76	1	8	0.1	45
137840	2.5	0.1	8	81	0.5	21	0.2	76
137837	2.5	0.1	6	109	1	0.5	0.2	50
137563	2.5	0.1	6	51	2	2	0.1	41
137564	2.5	0.1	6	42	1	0.5	0.1	36
137823	2.5	0.1	10	16	2	6	0.2	7
137539	2.5	0.1	20	31	0.5	6	0.1	46
137544	2.5	0.1	44	58	1	3	2.4	28
137546	2.5	0.1	10	23	1	9	0.4	48
137670	2.5	0.1	1	52	2	12	0.1	30
137755	2.5	0.1	94	340	2	5	1.2	48
137757	2.5	0.1	1	2	1	0.5	0.2	25
137760	2.5	0.1	14	33	1	0.5	0.8	37
137761	2.5	0.1	1	4	1	0.5	0.1	31
137530	215	30	130	22700	15	145	5	125
137516	2.5	0.1	4	74	1	23	0.1	70
137517	2.5	0.1	20	13	1	5	0.8	35
137518	2.5	0.1	6	10	1	2	0.8	29
103006	2.5	1.2	4	7200	10	0.5	0.1	60
103008	2.5	2.8	4	9200	15	0.5	0.2	78
103013	2.5	0	0	0	0	0	0	0
103014	2.5	0.4	1	1300	3	0.5	0.1	37
103015	2.5	0.1	8	690	1	0.5	0.1	44
103021	2.5	0.1	1	92	2	0.5	0.1	34
103022	2.5	0.1	1	210	1	0.5	0.1	33
103024	2.5	0.2	4	850	1	0.5	0.1	34
103025	2.5	0.2	6	800	2	2	0.1	65

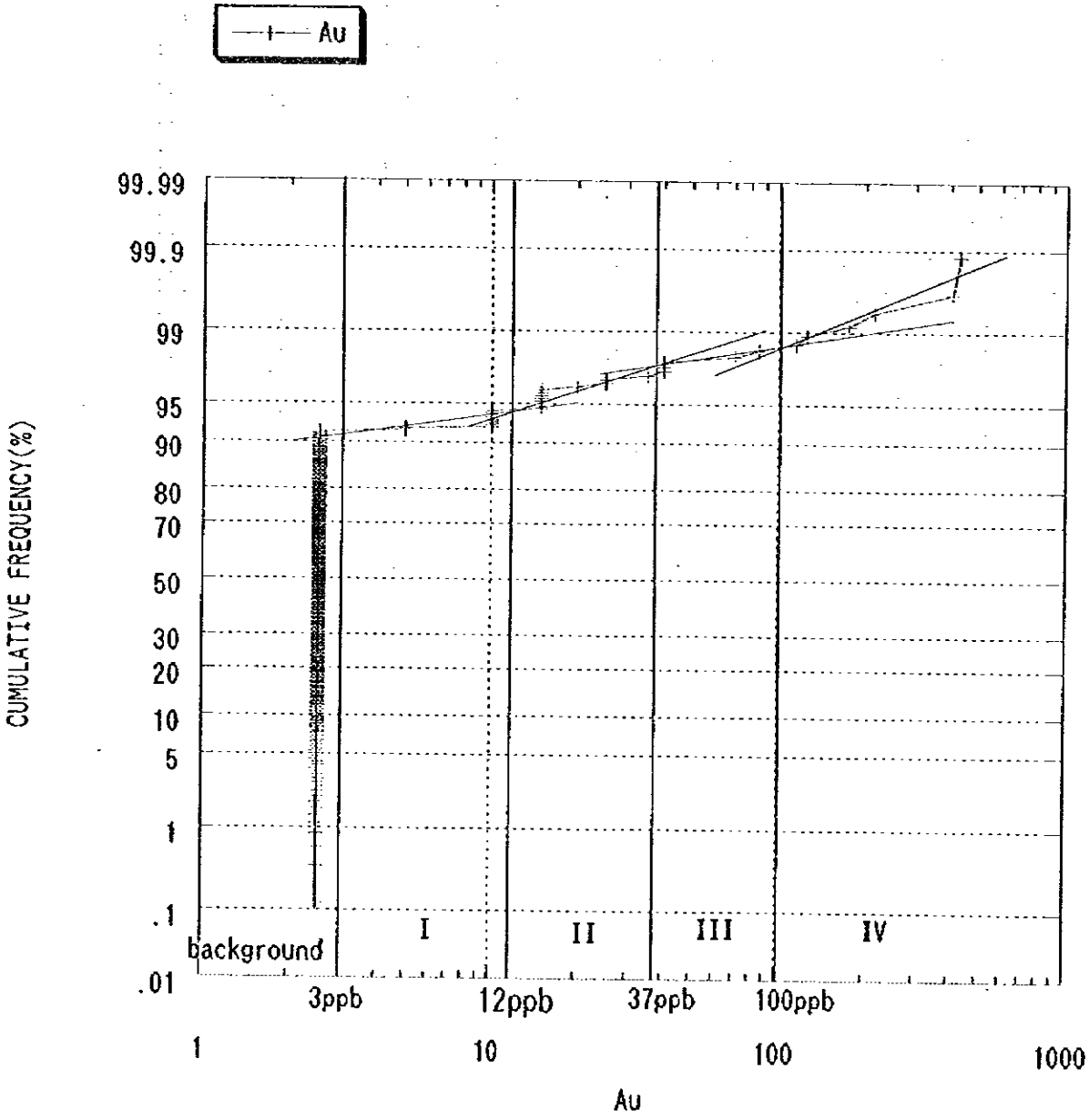
sample No	Au(ppb)	Ag(ppm)	As(ppm)	Cu(ppm)	Mo(ppm)	Pb(ppm)	Sb(ppm)	Zn(ppm)
103026	2.5	0.2	4	49	1	0.5	0.1	28
103032	2.5	0.8	8	2200	1	0.5	0.1	65
103034	2.5	3.2	18	770	385	2	0.2	3
103035	2.5	0.3	58	1050	146	0.5	4.6	9
137528	2.5	0.1	1	550	1	1	0.1	55
137529	2.5	0.1	1	45	1	0.5	0.1	27
137537	2.5	0.1	1	47	2	220	0.6	800
137762	2.5	0.1	1	91	2	0.5	0.1	46
137763	2.5	0.1	1	53	1	0.5	0.1	40
137543	2.5	0.1	1	200	2	6	0.1	47
137985	2.5	0.1	12	11	2	0.5	0.4	29
137954	15	0.1	18	240	2	4	0.2	50
96102815	2.5	0.2	10	15	1	11	1	178
137611	2.5	0.1	6	13	1	5	0.1	22
137612	2.5	0.1	14	19	2	0.5	0.2	43
137620	2.5	0.1	4	122	2	5	0.1	26
137621	2.5	0.1	10	26	1	12	0.4	66
137778	2.5	0.1	1	24	1	5	0.6	72
137779	2.5	0.1	1	26	2	0.5	0.2	32
137781	2.5	0.1	4	14	1	2	1.2	150
137783	2.5	0.1	1	18	2	12	0.2	18
137800	10	0.1	4	106	2	11	2.4	70
137906	2.5	0.1	6	9	0.5	52	1.2	206
137930	2.5	0.1	4	5	0.5	2	0.2	48
137932	40	0.2	1	11	1	6	0.4	48
137935	2.5	0.1	1	13	0.5	3	0.2	25
137939	125	0.1	18	38	1	7	0.6	96
137944	40	0.1	18	112	0.5	0.5	0.6	72
137949	15	0.1	10	126	0.5	9	1.2	95
137996	2.5	0.1	8	6	1	3	0.6	42
137998	2.5	0.1	8	215	0.5	0.5	0.2	63
96102501	2.5	0.1	1	7	0.5	3	0.1	7
96102504	2.5	0.1	6	8	0.5	0.5	0.2	2
96102505	2.5	0.1	6	23	2	4	0.2	22
96102506	2.5	0.1	8	7	3	5	0.1	11
96102507	2.5	0.1	18	7	2	3	0.2	8
96102509	2.5	0.1	14	27	4	6	0.2	22
96102510	2.5	0.1	6	5	4	1	0.4	4
96102513	15	0.1	6	17	6	26	0.2	19
96102514	2.5	0.1	6	38	1	5	0.4	75
137522	2.5	0.1	12	12	1	0.5	0.8	43
137523	2.5	0.1	14	18	1	5	1.8	45
137541	2.5	0.1	10	17	1	6	1	48
137542	2.5	0.1	1	24	2	0.5	0.2	24
137589	2.5	0.1	12	6	1	0.5	0.4	35
137595	2.5	0.1	10	12	0.5	2	0.1	30
137616	2.5	0.1	40	36	1	3	0.6	136
137682	2.5	0.1	1	15	0.5	5	0.4	32
137686	2.5	0.1	8	2	1	2	0.2	34
137691	2.5	0.1	8	12	0.5	7	0.1	35
137692	2.5	0.1	6	18	1	4	0.1	28
137693	2.5	0.1	8	7	1	4	0.2	27
137903	2.5	0.1	12	25	2	0.5	0.8	26
137907	2.5	0.3	22	255	0.5	11	1.2	100
137928	2.5	0.3	2	245	1	0.5	0.4	58

sample No	Au(ppb)	Ag(ppm)	As(ppm)	Cu(ppm)	Mo(ppm)	Pb(ppm)	Sb(ppm)	Zn(ppm)
137943	10	0.1	4	300	1	0.5	0.6	98
80	2.5	0.1	1	191	0.5	2	0.1	56
221	2.5	0.5	10	940	1	4	0.2	130
266	2.5	0.6	8	245	0.5	5	0.8	165
137770	2.5	0.1	1	27	3	10	0.2	6
137790	2.5	0.1	10	12	1	0.5	0.4	120
137801	2.5	0.2	1	147	2	20	0.2	52
137805	2.5	0.2	1	178	3	2	0.2	56
96110401	2.5	0.1	1	7	2	4	0.6	55
96110410	2.5	0.1	1	18	2	14	0.4	93
a-5	2.5	2.7	4	320	2	62	1	242
c-1-a	2.5	0.9	4	210	2	82	2	205
c-1-b	2.5	0.9	1	220	1	100	0	214
d-4	2.5	2	1	820	2	110	1.4	270
e	2.5	0.1	8	139	1	3	1	68
e-8	2.5	6.2	4	375	2	167	1.8	280
f-2	2.5	10.8	4	610	2	9650	0	212
g-1	2.5	6.5	1	1280	1	170	2.4	285
g-7	2.5	3.6	4	900	2	70	1.2	195
h-2	2.5	3.4	1	1050	1	140	1.2	206
h-3	25	2.8	1	1900	1	530	2.2	315
h0515	15	0.4	20	1100	2	13	2.2	110
Z-1	2.5	0.1	1	11	1	5	0.4	100
Z-2	2.5	0.2	1	25	2	4	0.4	83
Z-3	2.5	0.1	1	16	1	13	0.6	26
Z-7	2.5	0.1	1	19	1	3	0.2	70
Z-9	2.5	0.1	1	53	2	6	0.4	114
Z-10	2.5	0.1	1	20	2	6	0.8	80
Z-11	2.5	3.6	1	620	2	74	1.6	160
Z-13	2.5	0.1	2	26	2	6	0.2	65
Z-14	2.5	0.1	1	26	1	13	0.2	90
Z-17	2.5	0.1	2	30	1	25	0.2	63
Z-18	2.5	0.1	4	31	1	36	0.2	102
Z-19	2.5	0.1	1	39	2	32	1	58
Z-20	2.5	0.2	1	67	1	42	1.4	270
Z-24	2.5	0.1	1	17	1	3	2	96
Z-26	2.5	0.1	1	24	2	19	0.4	55
i-3	2.5	4.6	1	360	0.5	125	1.4	285
k-3	2.5	7.7	4	2800	0.5	120	1	60
L-4	2.5	13.6	2	1650	0.5	5300	1.4	215
N-4	2.5	0.8	1	92	0.5	166	2	170
RO-0	2.5	0.5	1	235	1	130	0.8	103
205	405	43	20	6690	5	560	5	260
206	430	3	20	365	2.5	95	5	190
0	2.5	0.1	1	101	0.5	5	0.1	64
2	2.5	0.1	1	48	0.5	0.5	0.1	44
H7	2.5	0.1	1	36	0.5	5	0.1	36
J9	2.5	0.1	1	26	0.5	8	0.1	50
GCA12A	2.5	0.1	4	78	0.5	3	0.1	28
GCA12B	2.5	0.1	1	121	0.5	8	0.4	420
54	2.5	0.1	6	34	0.5	19	1	50
55	2.5	0.1	6	61	0.5	2	1.2	51
81	2.5	0.1	1	4	0.5	0.5	0.2	66
86	2.5	0.1	1	31	1	5	0.4	40
87	2.5	0.1	4	27	1	11	0.1	41

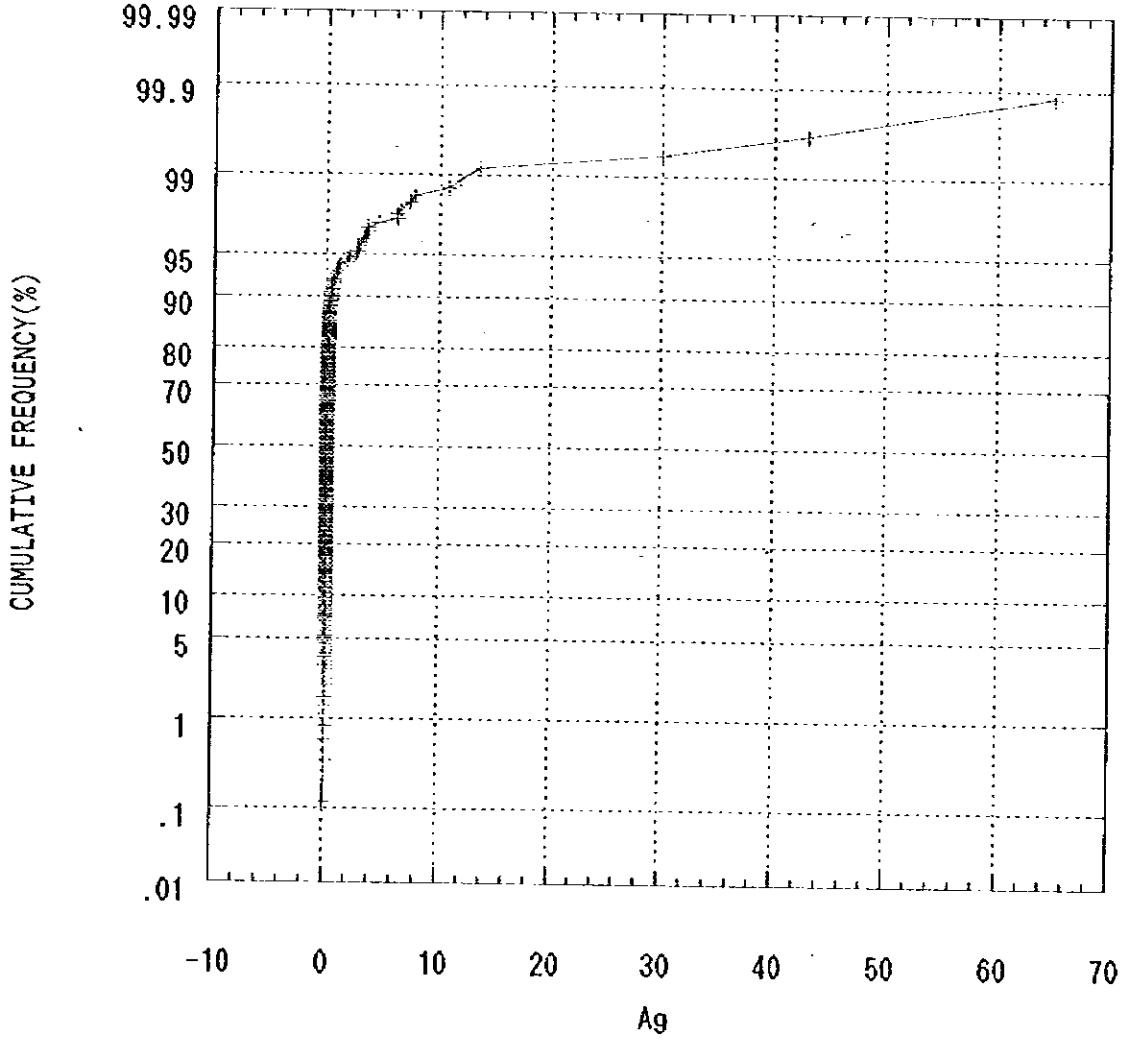
sample No	Au(ppb)	Ag(ppm)	As(ppm)	Cu(ppm)	Mo(ppm)	Pb(ppm)	Sb(ppm)	Zn(ppm)
88	2.5	0.1	1	22	0.5	7	0.1	37
89	2.5	0.1	4	23	0.5	0.5	0.2	116
90	115	0.1	1	33	2	13	0.8	55
270	2.5	0.1	4	49	1	28	0.1	63
282	2.5	0.1	1	36	1	32	0.1	150
283	2.5	0.1	4	42	2	14	0.1	50
293	2.5	0.1	1	10	2	8	0.1	75
296	2.5	0.1	4	35	0.5	20	0.1	53
298	2.5	0.1	4	22	3	7	0.1	26
137697	2.5	0.1	4	27	1	21	0.6	67
137699	2.5	0.1	4	28	1	3	0.8	102
RO-0	10	0.4	1	19	1	310	1	180
RO-1	2.5	0.1	1	20	0.5	13	0.8	150
RO-3	2.5	7.3	4	1650	0.5	2900	28	195
RO-3-2	2.5	6.2	6	1800	0.5	3750	60	212
RO-4	15	11.8	2	4450	0.5	7800	1.8	168
RO-4-2	175	65	26	10000	0.5	10000	7.2	250
RO-5	2.5	0.2	4	183	0.5	280	8	240
RO-6	2.5	0.1	1	50	0.5	200	1.2	195
RO-7	2.5	0.2	1	87	0.5	300	3	170
RO-8	2.5	0.8	4	275	0.5	150	1.6	188
RO-9	10	1.1	1	730	0.5	850	4.6	174
RO-10	2.5	0.4	1	290	0.5	114	2	172
RO-11	2.5	0.2	2	22	0.5	130	1.2	172
RO-12	2.5	1.8	1	186	0.5	3150	6.2	290
RO-13	2.5	0.1	1	77	0.5	360	3	245
RO-14	2.5	1.8	2	1050	0.5	640	1.8	85
RO-15	2.5	0.1	1	33	0.5	45	1.2	122
RO-16	2.5	0.1	1	17	0.5	21	0.8	130
X-3	2.5	0.1	2	8	0.5	9	0.6	135
X-6	2.5	0.1	4	26	0.5	16	0.2	46
X-7	2.5	0.1	4	18	0.5	42	0.6	70
X-9	2.5	0.1	1	18	0.5	23	0.2	52
X-11	2.5	0.1	1	20	1	8	0.2	34
X-13	2.5	0.1	2	19	0.5	18	0.6	142
X-14	2.5	0.1	1	22	1	8	0.4	130
X-16	2.5	0.1	1	13	0.5	10	0.8	122
X-18	2.5	0.1	1	17	1	2	0.4	88
X-20	2.5	0.1	1	10	1	2	1	86
X-21	2.5	0.1	2	62	1	100	2.2	164
X-23	2.5	0.1	2	12	0.5	8	0.8	60
X-25	2.5	0.1	4	29	2	13	0.6	68
X-27	2.5	0.1	1	14	1	6	0.4	40
X-29	2.5	0.1	1	15	1	7	2.2	125
X-32	2.5	0.1	1	6	1	3	0.4	58
Y-3	2.5	0.1	2	33	2	11	0.6	77
Y-5	2.5	0.1	2	6	1	12	0.4	58
Y-6	2.5	0.1	1	7	2	3	0.6	132
Y-7	2.5	0.1	1	8	2	3	0.6	82
Y-9	2.5	0.1	1	31	1	10	0.6	44
Y-10	2.5	0.1	1	12	2	4	0.6	83
Y-12	2.5	0.1	1	13	1	3	0.8	75
Y-14	2.5	0.1	1	16	2	5	0.6	140
Y-16	2.5	0.1	2	30	1	5	0.8	75
Y-17	2.5	0.1	1	17	0.5	9	0.2	82

sample No	Au(ppb)	Ag(ppm)	As(ppm)	Cu(ppm)	Mo(ppm)	Pb(ppm)	Sb(ppm)	Zn(ppm)
Y-18	10	0.1	1	5	0.5	4	0.6	96
Y-19	2.5	0.1	4	9	1	8	0.4	74
Y-20	2.5	0.1	1	12	1	13	0.6	114
Y-21	2.5	0.1	2	31	1	4	1.2	124
Y-23	2.5	0.1	1	4	1	6	1	144
137810	15	0.1	10	24	1	4	0.8	50
137815	20	0.1	22	58	2	0.5	0.8	11
137846	2.5	0.1	6	51	3	55	0.6	186
137850	2.5	0.1	1	12	0.5	6	0.4	33
137853	2.5	0.1	1	47	0.5	0.5	0.2	35
137854	2.5	0.1	1	79	0.5	68	3.8	125
137855	2.5	0.1	1	33	0.5	11	0.4	37
137857	2.5	0.1	8	10	1	5	0.1	20
137861	2.5	0.1	4	28	1	6	0.1	17
137866	2.5	0.1	1	53	1	23	1	180
137870	2.5	0.1	1	74	2	65	0.8	120
137876	2.5	0.1	4	36	2	6	0.6	110
137882	2.5	0.1	1	15	2	5	0.1	36
137884	2.5	0.1	4	84	1	12	0.2	32
137885	2.5	0.1	6	92	2	24	0.2	58
137890	2.5	0.1	4	34	2	14	0.1	40
137896	2.5	0.1	4	40	2	13	0.2	17
137898	2.5	0.1	10	66	1	104	0.2	185
137602	2.5	0.1	1	145	2	0.5	0.1	42

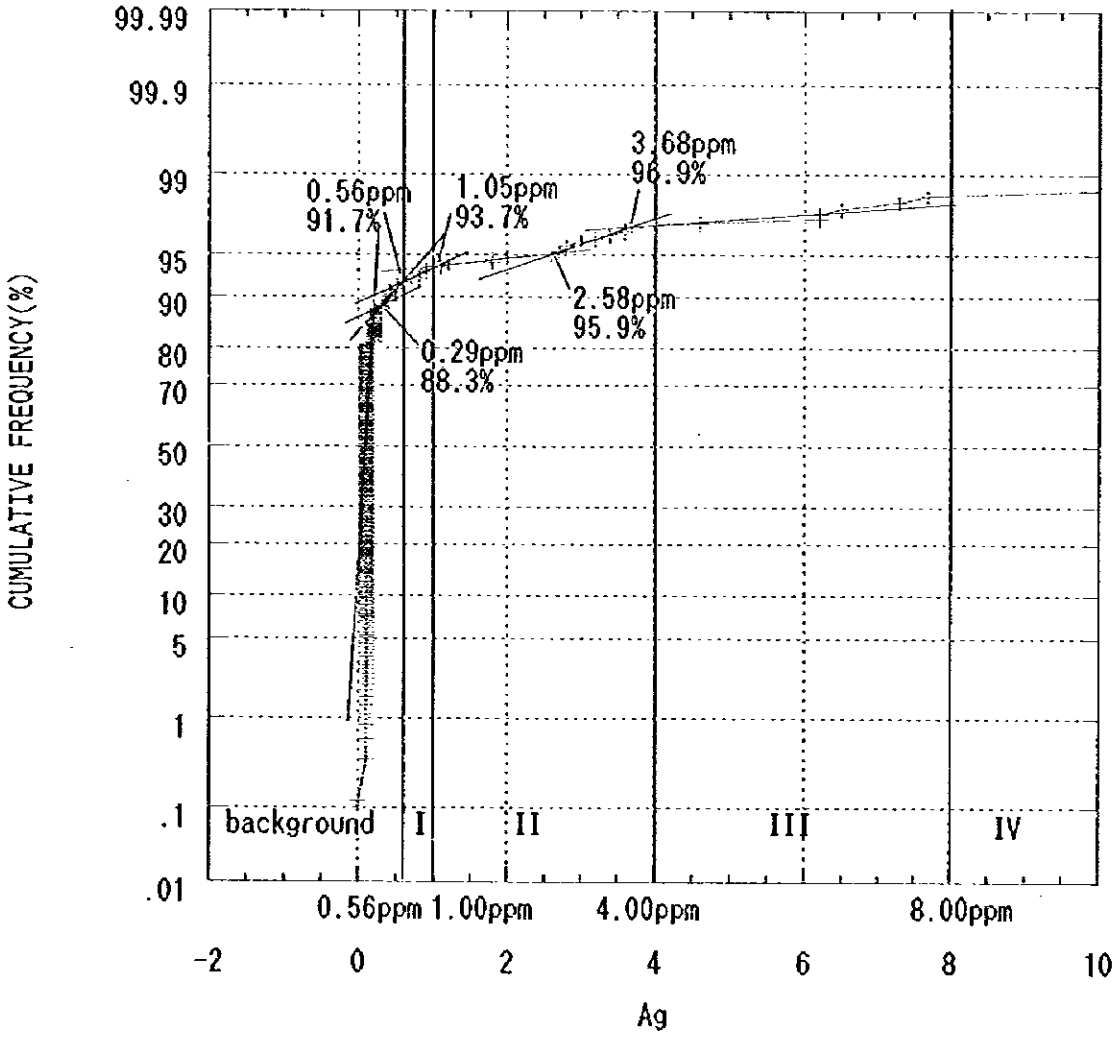
Appendix 5 (1) Cumulative frequency distribution (Au)



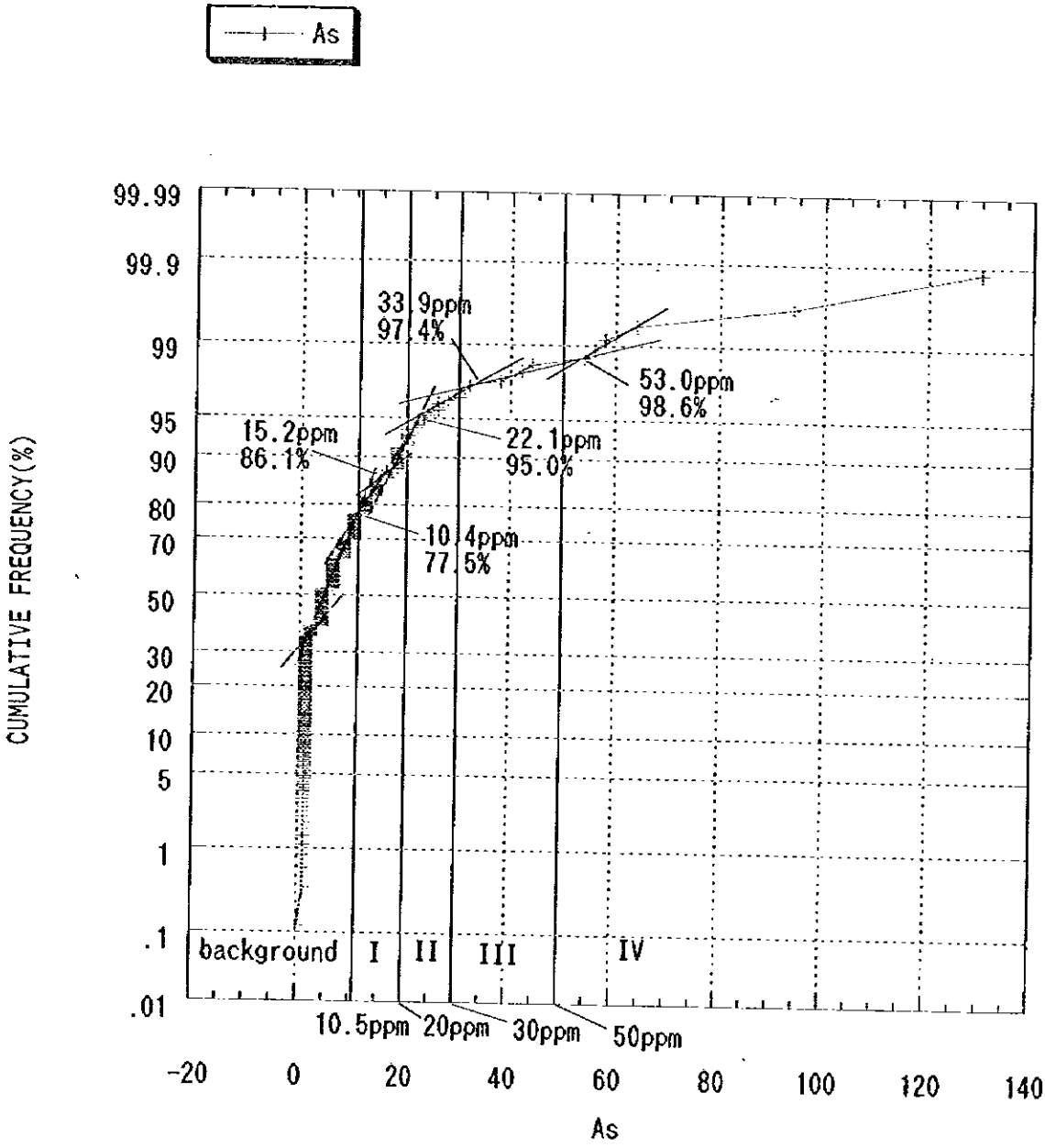
Appendix 5 (2) Cumulative frequency distribution (Ag)



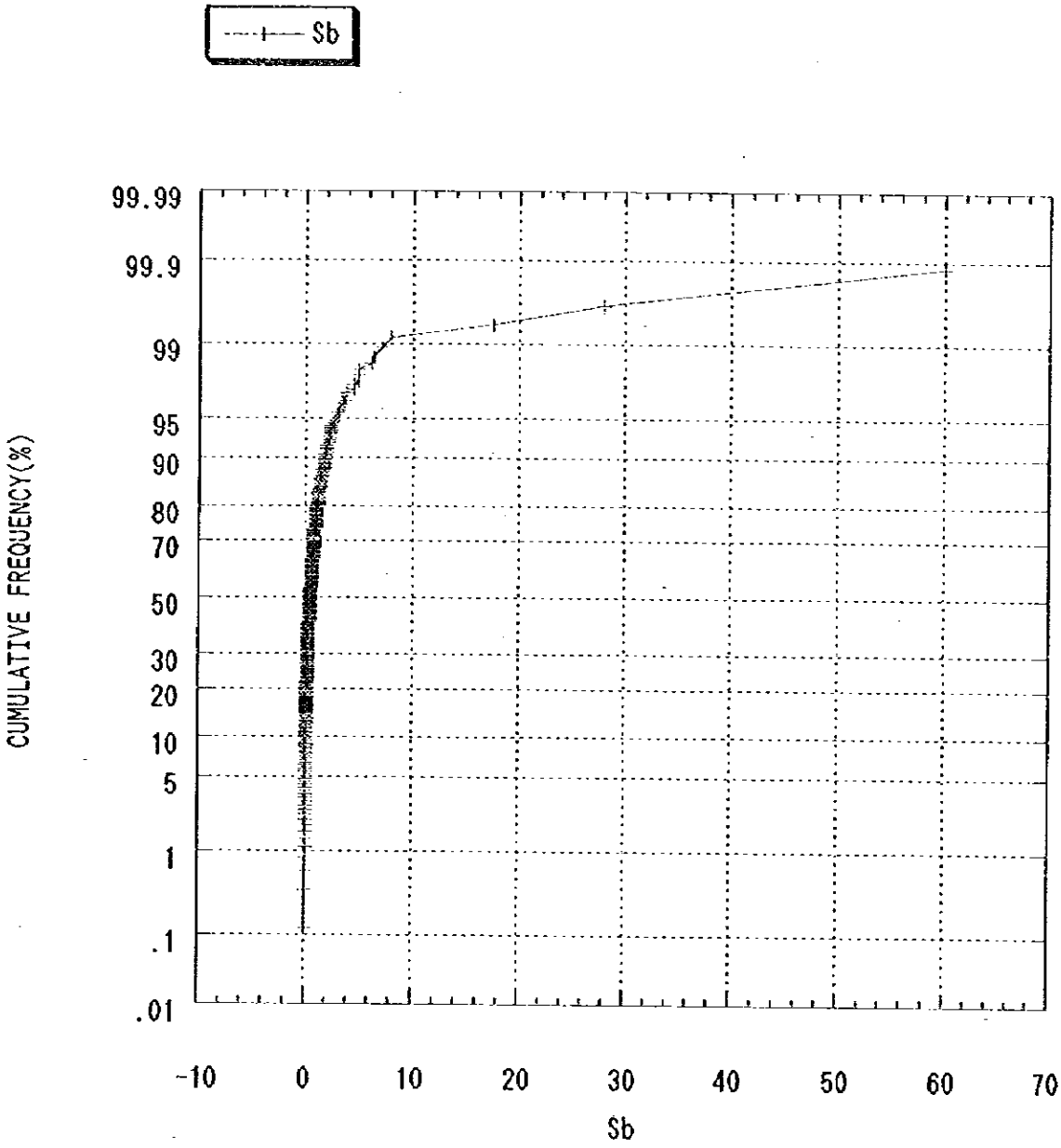
Appendix 5 (3)　Cumulative frequency distribution (Ag)



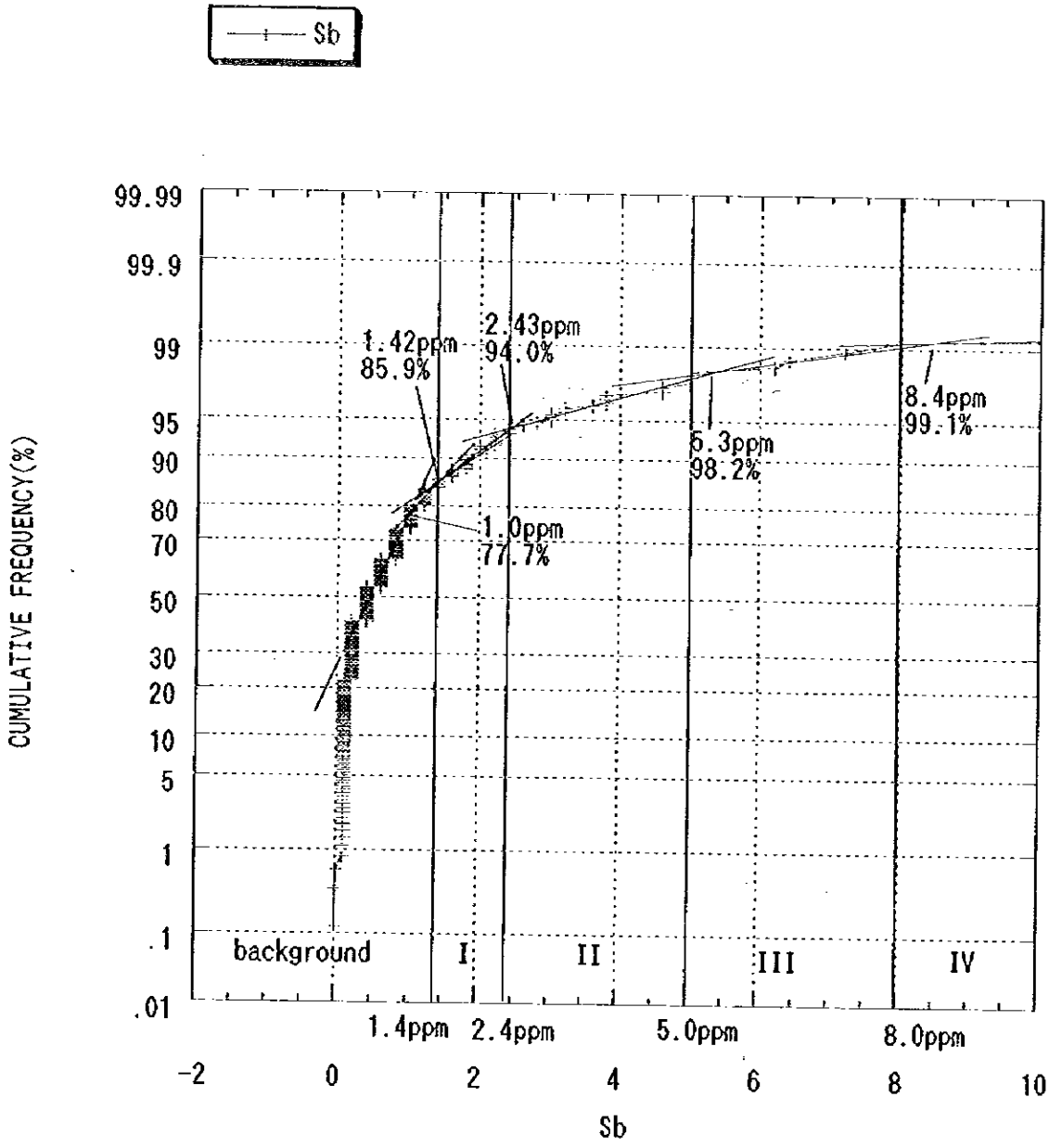
Appendix 5 (4) Cumulative frequency distribution (As)



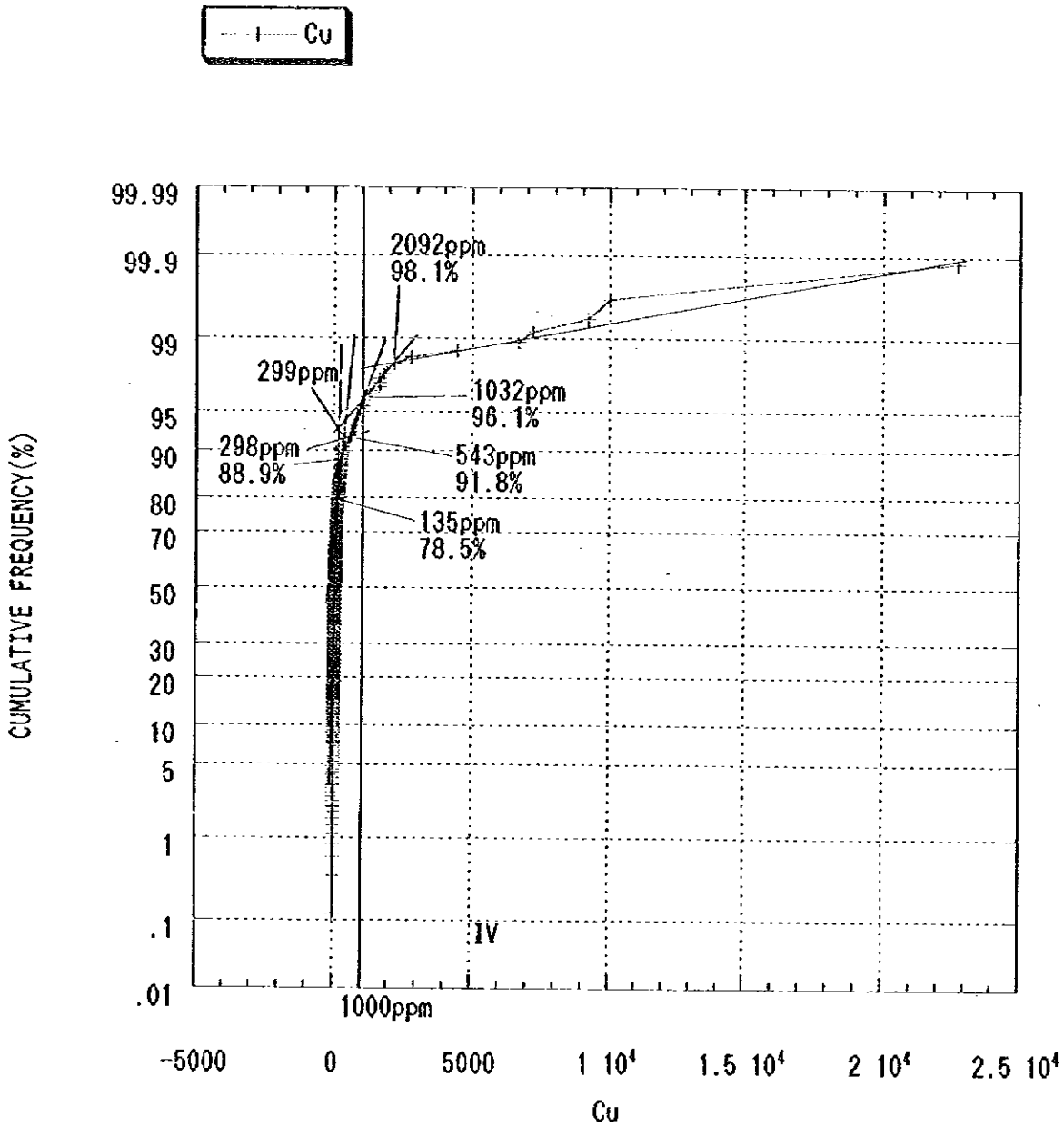
Appendix 5 (5)　Cumulative frequency distribution (Sb)



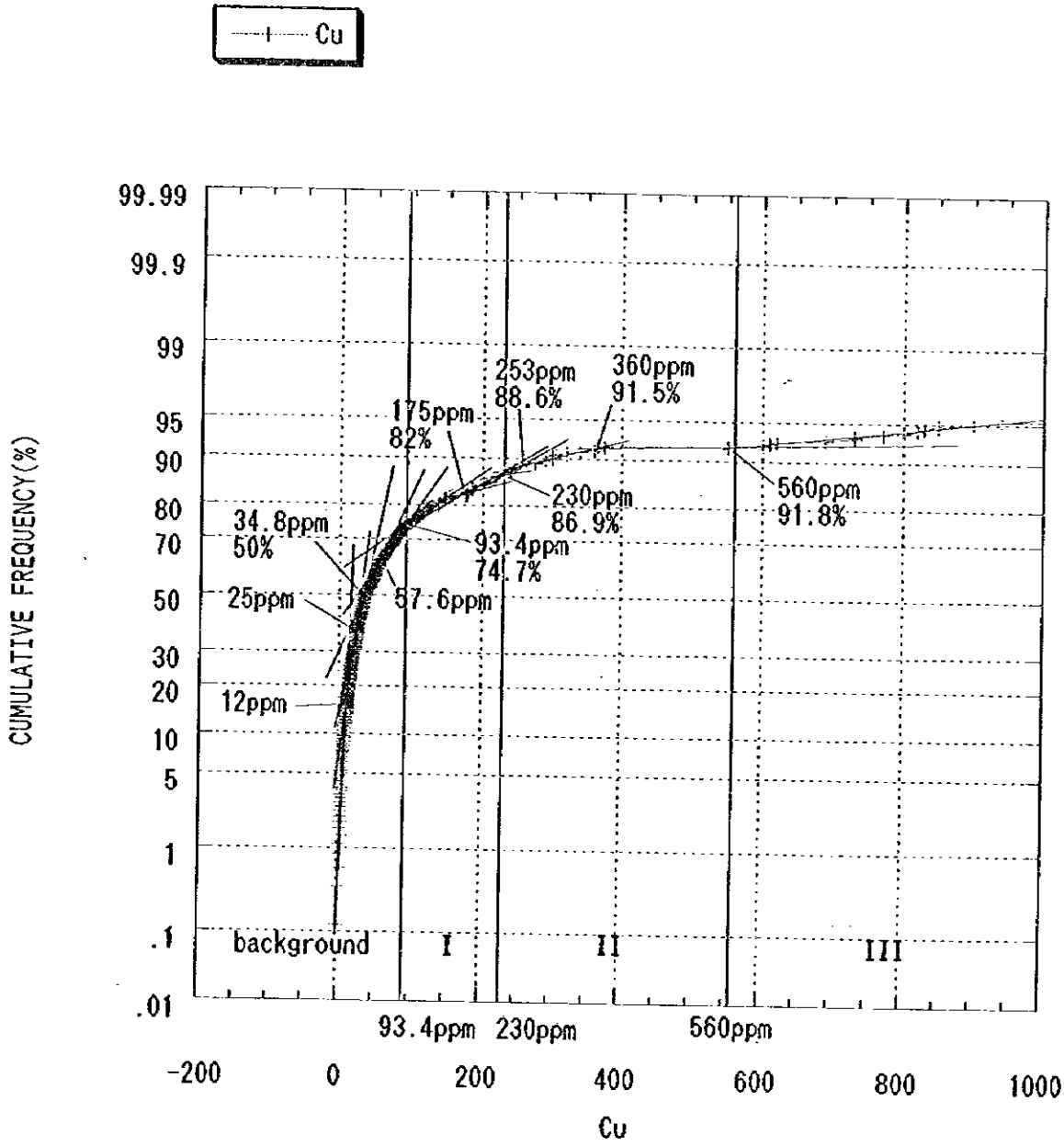
Appendix 5 (6)　Cumulative frequency distribution (Sb)



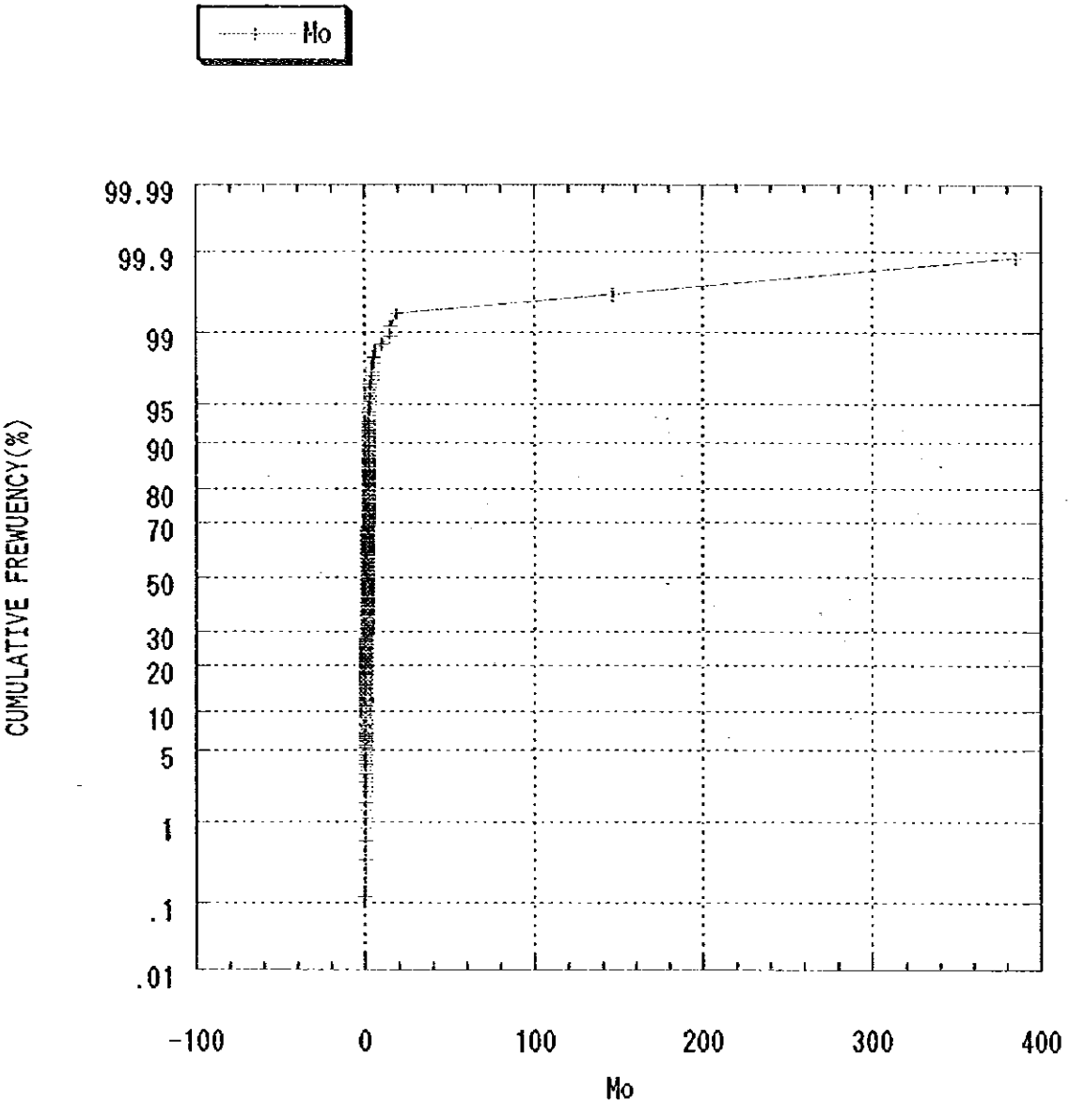
Appendix 5 (7)　Cumulative frequency distribution (Cu)



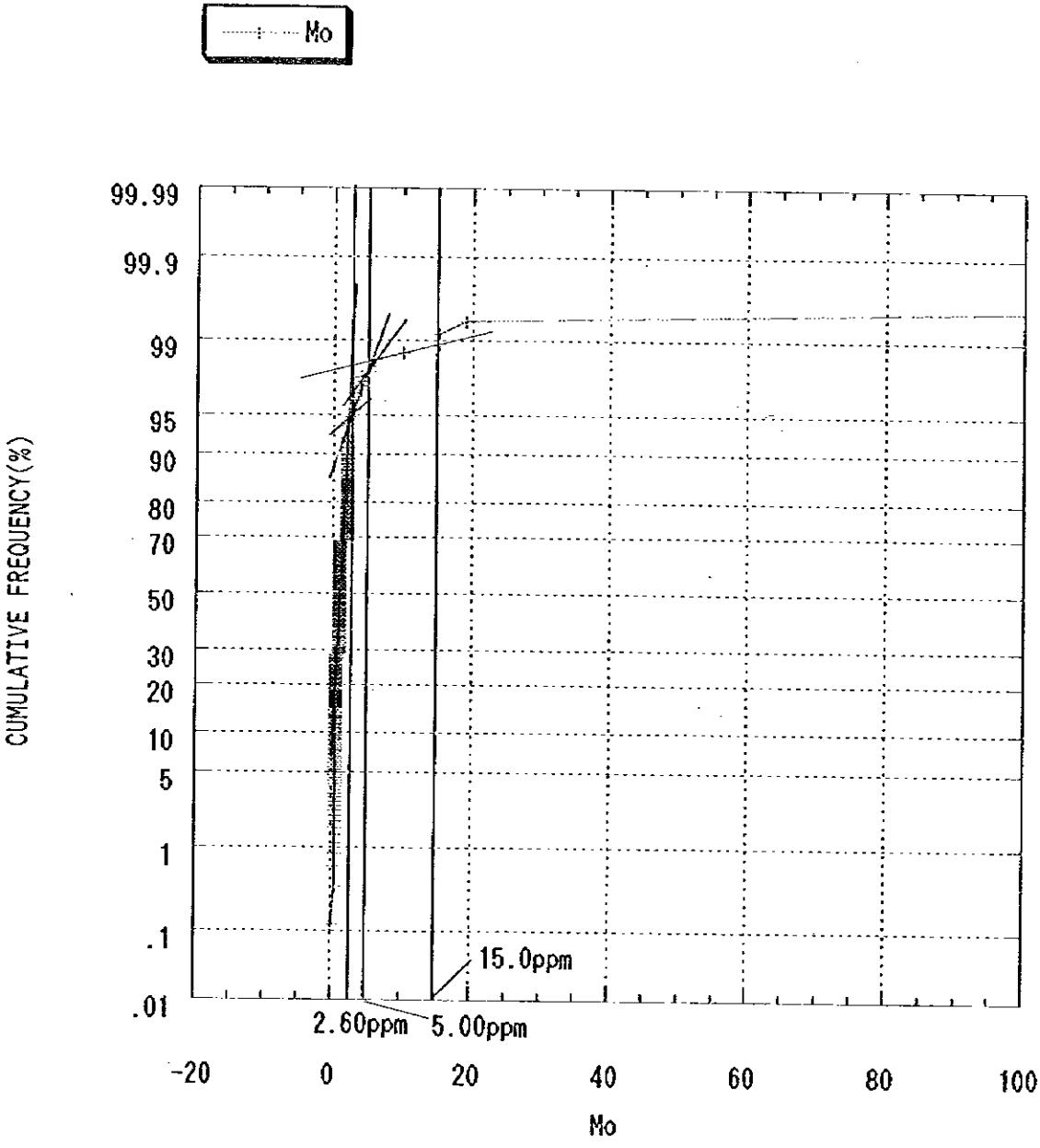
Appendix 5 (8) Cumulative frequency distribution (Cu,



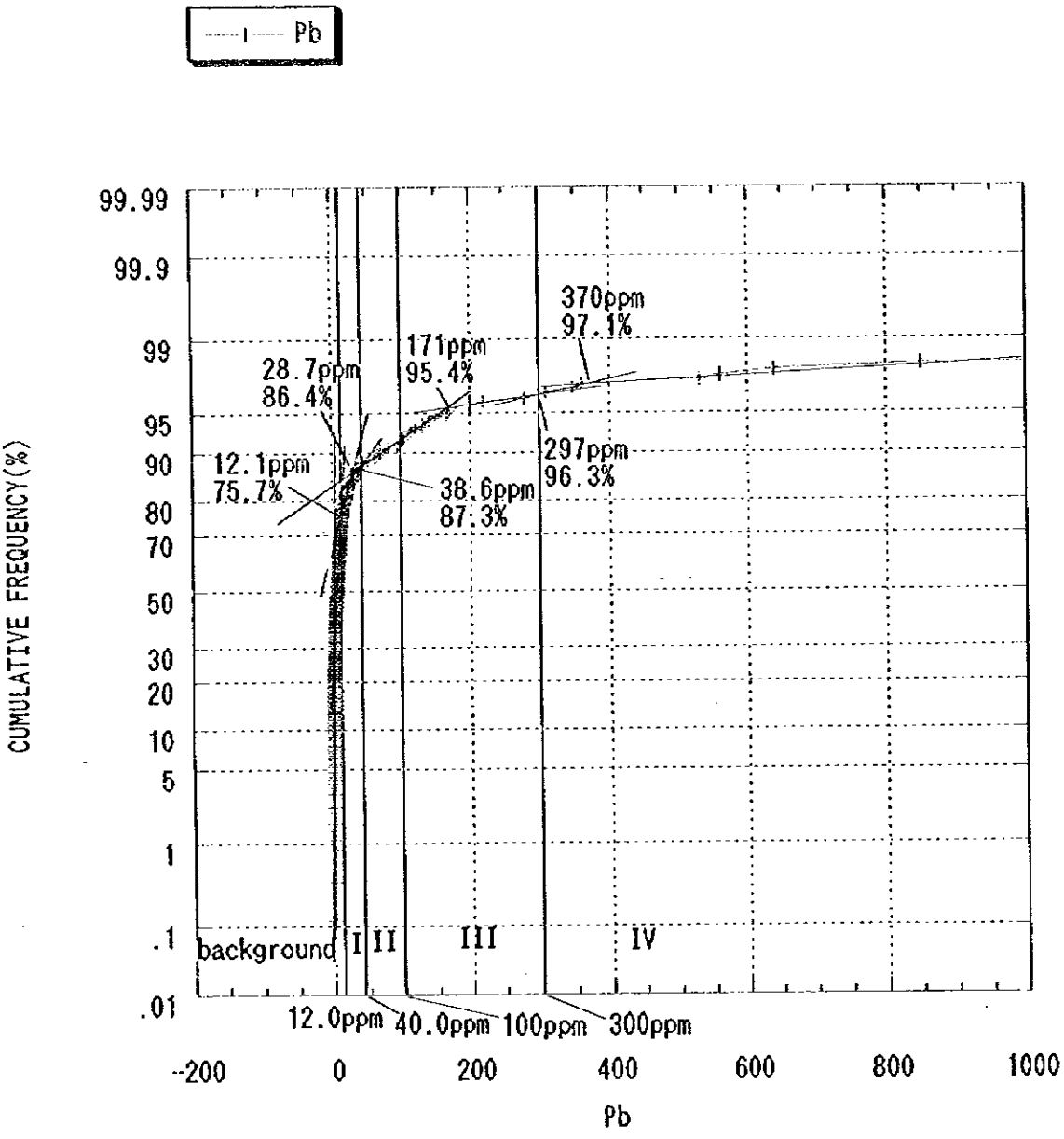
Appendix 5 (9)　Cumulative frequency distribution (Mo)



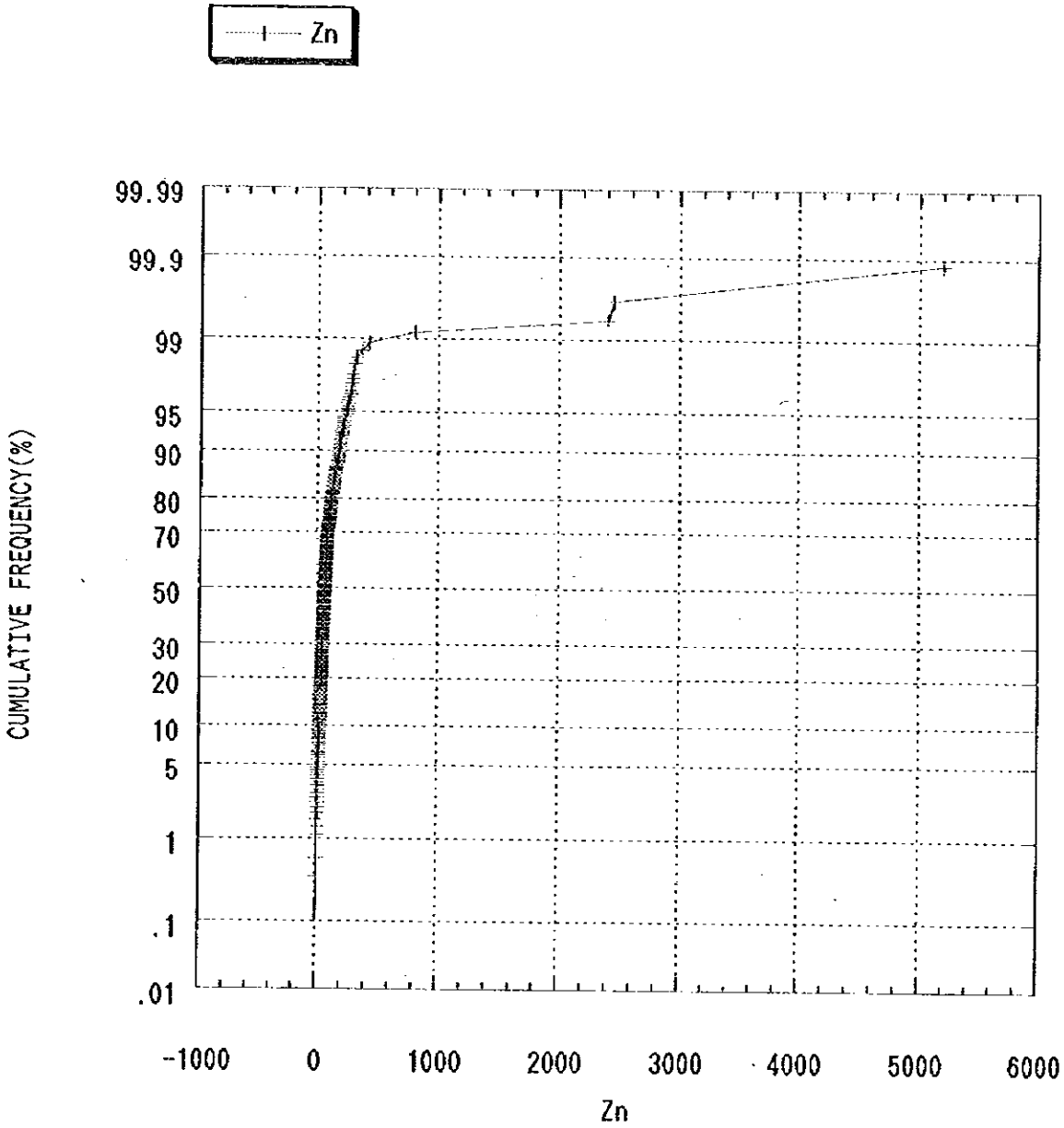
Appendix 5 (10) Cumulative frequency distribution (Mo)



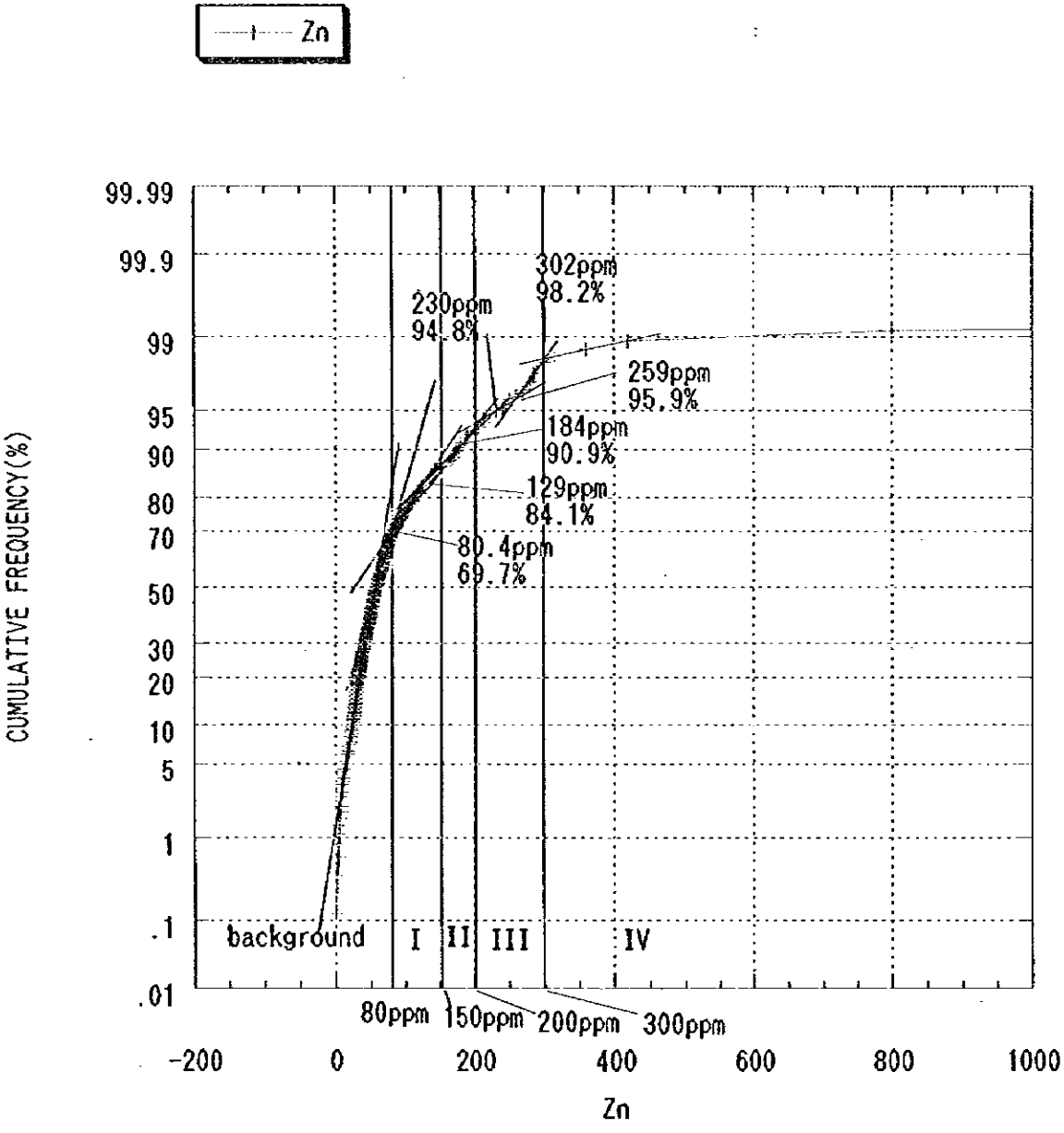
Appendix 5 (11) Cumulative frequency distribution (Pb)



Appendix 5 (12) Cumulative frequency distribution (Zn)



Appendix 5 (13) Cumulative frequency distribution (Zn)



Appendix 6 Criteria for the assignment of symbols to X-ray diffraction analysis

X-ray attatched sheet is made by following standerd of X-ray relative strength

mineral (d number)		peak height from background (dimension:chart divisions)			
		◎ : (much)	○ : (middle)	△ : (little)	・ : (trace)
Quartz	(3.34)	100<	99～50	49～10	<10
cristbalite	(4.05)				
trydimite	(4.27)				
feldsper	(3.17)	40<	39～20	19～10	<9
k-feldsper	(3.3)	20<	19～10	9～5	<5
albite	(3.2)				
sericite	(10.1)	20<	19～10	9～5	<5
chlorite	(7.1)				
smectite	(15.15)				
kaolinite	(7.18)				
pyrophyllite	(3.04)				
halloysite	(4.42)				
laumontite	(9.49)	45<	19～10	9～5	<5
clinoptilolite	(8.93)				
mordenite	(3.48)				
heulandite	(7.89)				
alunite	(2.99)	20<	44～20	19～10	<10
natro-alunite	(3.08)				
jarosite	(3.07)				
hornblende	(8.4)	20<	19～10	9～5	<5
augite	(3.31)				
pyrite	(2.71)	10<	9～5	4～3	<3
hematite	(2.7)				
goethite	(4.18)				
siderite	(3.52)				

Appendix 7 Results of X-ray powder diffraction analysis

	silicate minerals					clay minerals										zeolite			others		sulphate minerals		carbonate minerals		other minerals							
	quartz	cristobalite	tridymite	feldspar	k-feldspar	albite	sericite	chlorite	kaolinite	smectite	biotite	halloysite	S/S	C/S	clinoptilolite	mordenite	laumontite	stilbite	hornblend	crossular	epidote	alunite	gypsum	calcite	dolomite	pyrite	hematite	anatase	goethite	chalcanthite	cerussite	melanterite
961025011	◎			◎	○								・											・								
961025041	◎												△																			
961025071	◎			◎	◎								・																			
103003	◎				○		◎	◎		・									・							・						
103006	◎			◎	◎		・	◎																								
103007	◎						◎	・		△									△							△						
103018	◎			◎	○								△	○																		
103005	◎						◎	◎																・		△						
103036	○			・	○		◎	◎																								
103035	◎						◎																									
103001	◎						◎																			・						
137931	・			◎	◎			◎													△			・								
961025131	◎			○	○		・	・													△										
961025061	◎			◎	◎		△	△																								
961028011	◎			◎	◎		・	・											○													
137912	△			◎	◎		・	・	○																							
137945	○				△	◎			○												○											
961025091	◎			◎	◎		・	・																								
137917	◎			◎	◎				○										○													
961025081	◎				○	◎			○										○		○											
961025121	○			◎	◎			・	○	・											△			・								
137568	◎			◎	◎			・													○											
961025051	◎			◎	◎		・			・																						
103014	◎			◎	◎		△	○	○										△													
103015	○			・	○			△		◎									△					・								
103016	◎						◎																			・						
103024	◎						◎																			・						
137948	○			○	◎		・	○													△											
961025101	◎			◎	◎		・																	・								
103009	◎						◎																							◎		
103020	◎				◎	◎	・	・		△									○													

◎ : much ○ : middle △ : little ・ : trace

S/S: sericite-smectite interlayer clay mineral C/S: chlorite-smectite interlayer clay mineral

	silicate minerals																																								
	silicate			feldspar			clay minerals									zeolite				others			sulphate minerals			carbonate minerals			other minerals												
	quartz	cristobalite	tridymite	feldspar	k-feldspar	albite	sericite	chlorite	kaolinite	smectite	biotite	halloysite	S/S	C/S	clinoptilolit	mordenite	laumontite	stilbite	hornblend	grossular	epidote	alunite	gybsum		calcite	dolomite		pyrite	hematite	anatase	goethite	chalcanthite	cerussite	mimetite							
103021	○			◎	◎			○			○								◎																						
f-2	◎			◎	◎			·					·								△																			
f-4	◎							○													·												◎							
o-2	◎			△	◎			·		·											△																			
c-5	◎						○	◎													○																			
f-7	◎			△	◎																△				·								◎							
d-3	△			○	◎			◎										·			◎																			
e-3	◎						◎	△													△																			
e-8	◎			◎	◎			○													△																			
a-3	·			◎	◎			△		·								○			○																			
f-5	◎			◎	◎			△		·											·																			
103002	◎						◎																										?							
e-2	◎						◎														△				·															
a-5	◎			◎	◎			△		·											·																			
d-4	◎			◎	◎			△		·											·																			
103023				○	◎		◎							·																											
c-4	◎			·	○		○	◎													△																			
a-4				△	◎			◎		·								○			◎				·															
c-2	◎			◎	◎			◎		·											·																			
a-6	△			◎	◎					·						·		△			◎																			
d-2	△			◎	◎			◎		·											○																			
a-2				◎	◎			△		○											△																			
e-4	◎						◎	◎													○																			
g-7	◎			○	◎			△													○																			
c-3	◎			◎	◎			△													△																			
103013	◎			◎	○		·	◎		·																														
L-4	◎			◎	◎		·	△		·											△																			
f-1	◎			△	◎		·	△		△											○																			
e-6	◎			△	◎		◎	○													○																			

◎ : much ○ : middle △ : little · : trace

S/S : sericite-smectite interlayer clay mineral C/S : chlorite-smectite interlayer clay mineral

	silicate minerals																					sulphate minerals			carbonate minerals			other minerals								
	silicate			feldspar			clay minerals								zeolite				others																
	quartz	cristobalite	tridymite	feldspar	k-feldspar	albite	sericite	chlorite	kaolinite	smectite	biotite	halloysite	S/S	C/S	clinoptilolite	mordenite	laumontite	stilbite	hornblend	grossular	epidote	alunite	gybsum		calcite	dolomite		pyrite	hematite	anatase	goethite	chalcanthite	cerussite	mimetite		
n-4	◎			◎	◎			△		·											△															
0-5	◎				◎		·	△													△															
k-1	◎						△	·													○															
r-6	○						◎	◎													○															
g-5	◎						◎	◎													○															
k-3	◎			◎	◎		·														△															
k-4	◎						△	◎													◎															
0-4				◎	◎			◎		△											○				·											
e-5				△	◎		△	◎		○											○															
e-7	△			·	◎		◎	·		△											○				·											
e-1	△						·	◎													◎												○			
g-1	◎			◎	◎			·		·											○															
g-2	△						○	◎													○															
k-4	◎							◎													○															
h-2	◎			◎	◎			△													△															
g-4	◎						△	◎													○				·											
o-6	△				?			◎																								◎				
n-2	△				◎			·		·											○															
n-1	◎							△													○												·			
k-2	◎						◎			·											△															
h-2				◎	◎			·		○											◎															
h-5	◎				◎			○													○															
h-4	◎							◎													○															
I-1	◎				·		·	◎												○	○															
g-3	◎						◎	◎		·											○				·											
1-2	◎				·		△	○													◎												◎			
1-3	◎				◎		○	○													△												○			
0-1						◎		◎		◎											△												○			
X-14	◎			◎	◎		·	·													·															

◎ : much ○ : middle △ : little · : trace

S/S: sericite-smectite interlayer clay mineral C/S: chlorite-smectite interlayer clay mineral

	silicate minerals																					sulphate minerals			carbonate minerals			other minerals								
	silicate			feldspar			clay minerals								zeolite				others																	
	quartz	cristobalite	tridymite	feldspar	k-feldspar	albite	sericite	chlorite	kaolinite	smectite	biotite	halloysite	S/S	C/S	clinoptilolite	mordenite	laumontite	stilbite	hornblend	grossular	epidote	alunite	gybsum		calcite	dolomite		pyrite	hematite	anatase	goethite	chalcanthite	cerussite	mimetite		
X-18	◎			◎	◎		·	·													·				·											
X-20	◎			◎	◎			·													△		·													
X-21	◎			◎	◎		·	·		·											△															
X-23	◎			◎	◎			·		·											△															
X-3	◎			◎	◎					·											△															
X-6	◎			◎	◎		·	·													△															
X-9	◎			◎	◎		·	·													△															
Y-14	◎			◎	◎								·								△				·											
Y-16	◎			◎	◎								·								△															
Y-17	◎			◎	◎																△															
Y-18	◎			◎	◎		·			·											△															
Y−21	◎			◎	◎					·											△															
Y−3	◎			◎	◎					·											△															
Y−5	◎			◎	◎		·			·											△															
Y−6	◎			◎	◎		·			·											△															
Y−9	◎			◎	◎		·	·		·											△															
2−1	◎			◎	◎			·													△															
2−2	◎			◎	◎		·	·													△															
2−3	◎			◎	◎			△													△															

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