

Chapter 2 Recommendation for the Phase II Survey

(1) Diamond drilling should be carried out to No.1 ore body of Sautbay deposits in the level of -300m bellow the surface, as this section of the ore body can be the immediate target of the future mining.

Data compilation and calculation of ore reserve are to be conducted for Saghinkan deposits(W) which is located in the northwest of Sautbay deposits and exploration has already been done.

In Phase III survey, calculation of ore reserve estimate and prefeasibility study are to be conducted in order to study the possibility of developing Sautbay deposits including Burgut and Saghinkan deposits.

(2) Diamond drilling should be carried out to the downward extension from -70m level of Bulutkan showing(Au), in which existence of high grade gold ore is already known.

In Bulutkan showing, four zones of brecciated, ferruginous, silicified metasomatite extending up to 4.5km are expected to occur under the surface gravel bed. Geophysical survey and trenching should be conducted to find out the horizontal and vertical extension of mineralization.

(3) An analysis of the satellite image has revealed the location of 17 alteration zones in which 4 are in Sautbay-Bulutkan area, and 5 are in Okjetpes area. It is that these alteration zones are the indication of high sulphide type gold mineralization. In order to investigate this possibility the field check surveys are to be conducted.

COLLECTED DATA

Collected Data

1. Ahmedov H.A.(1994): Project(draft) on search for gold and other useful minerals in the Bulutkan Area in 1994-1998
2. Allakhverdov O.L.(1994): Thematical (topical) Party for working out conditions and evaluation of mineral resources. Report on pre-feasibility study on industrial significance and expediency of preliminary exploration of Turbay gold deposit. Tashkent, pp.111.
3. Avezmetov H.R., Druchinina.(1979): Geological report on results of prospecting activities on the Turbay gold field for 1977 - 1979, Kyzylkum Geol.Prosp. Team, Muruntau settlement, pp: 107 (only graphical attachment).
4. Cheshuin A.P.(1994): Complex physical-geological modelling for the purpose of prospecting and local forecasting of Turbay ore knot mineralization, pp.165.
5. Horsov A.A.(1991): To develop and introduce rational methodology of processing prospecting geophysical methods complex for local forecasting of mineralisation in the Kokpatas ore field area in 1987 - 1991, pp.234.
6. Horsov A.A.(1992): Improvement of scientific methods and introduction of advanced technologies of geophysical research for purpose of prospecting and local forecasting of ore objects on the territory of Uzbekistan, pp.152.
7. Horsov A.A.(1993): List of applied software for geologic-geophysical data processing on PC, pp.10.
8. Horsov A.A. et al(1994): Evaluation of prospects and gold forecast resources in the Bukantau ore area on the basis of analysis of physical-geological models of ore objects, pp.104.
9. Jastrebov A.(1993): Reserves calculations in the contour of experiment-industrial pit on Sautbay tungsten deposit.
10. 国際鉱物資源開発協力協会(JMEC)(1994)：平成5年度資源開発協力基礎調査プロジェクト選定調査報告書 ウズベキスタン共和国。pp.177(in Japanese)
11. Kotunov A.Ja.(1977): Geological report on general gold and other mineral resources prospecting of Central Bukantau mountain range with identification of areas for detailed exploration on the basis of geological survey on the scale of 1:50,000 and complex of geological methods. Kyzilkum Prospecting Team, Muruntau Settlemt, pp.235.
12. Mechtiev E.A., Radajev A.A.(1983): Report on detailed prospecting activities for gold and other mineral resources in north-eastern part of Okjetpes ore field and prospecting-evaluating activities on the eastern continuation of mineralized zone

NI for 1980-1983, pp.119.

13. Miroshnikov L.V., Aristov A.S.(1982): Report on detailed exploration of Okjetpes silver deposit conducted for the period of 1979-1982, with reserves calculation from 01.09.1982, Kyzilkumgeologia. Kokpatas settlement, Kokpatas Geol. Prospecting Party, pp.409.
14. Radaeva T.P.(1994): Initial data for pre-feasibility study on Saghinkan deposit, Samarkandgeology, pp.70.
15. Shaakov B.B., Prokudin M.E.(1983): Report on detailed prospecting activities for gold in the limits of Central Turbay Gold-bearing Structure on mineralizations as following: Karatau, Oguztau, Kayansai, Daikovoye, Centralnoie and On Ore Point Groups: Taraubay, Sautbay, Oguztan, Ayolim. Kyzilkum prospecting Team, pp.258.
16. Shaakov B.B., Prokudin M.E.(1990): Prospecting activities for tungsten in north-western flank of the Sarytau deposit up to the the depth of 600m conducted for the period of 1988-1990: Kokpatas Geolprosp.Team, pp.381.
17. Tulegenov T.G.(1990): Petrophysical and geo-electronical research on Sautbay ore field, pp.55.
18. Zakinov P.E., Gershkovich E.M.(1975): Report on results of prospecting geologic-geophysical activities for gold and other mineral resources in the central part of Bukantau mountains, 1972-1974, Samarkandgeology, pp.148.
19. Zakirov A.T., Halmurzaev N.H.(1973): Gold, tungsten and other minerals prospecting in the South Turbay area and prospecting evaluating activities in the central part of the Sautbay tungsten deposit for period of 1985 -1993.

APPENDICES

Ap. 1 List of Rock Samples(1)

Sample No.	Field Name	Locality	Remarks	Rock		
				W.A	T	X
FR-2	Lamprophyre	Bulutkan	float(Mid Perm)	○	○	
FR-3	Quartz syenite	Bulutkan	float(Late Carb. - Early Perm.)	○	○	
FR-4	Granodiorite	Burgut	core(No.673,45m)	○		
FR-7	Granite	South Turbay	trench waste	○		
FR-8	Granodiorite	South Turbay	trench waste	○	○	
FR-9	Granodiorite	North Turbay	trench waste	○		
FR-12	Granosyenite	Okjetpes	trench waste	○		
FR-13	Granodiorite porphyry	Okjetpes 42° 03. 01' N 64° 05. 89' E	outcrop	○	○	
FR-14	Microdiorite	Okjetpes	shaft waste	○		
FR-16	Quartz diorite porphyry	Barhanny	trench waste(Pre. ore)	○	○	
FR-17	Granodiorite	Barhanny 42° 02' 24" N 64° 09' 56" E	trench waste	○		
FR-18	Two mica granite	Djylandy 42° 10. 45' N 63° 42. 82' E	outcrop(Oltyntau intrusive, Late Carb. - Perm.)	○		
FR-19	Aplite(pegmatitic)	Djylandy	core(No.2)	○		
FR-20	Quartz diorite	Djylandy	core(No.2)	○		
FR-22	Microgranite	Sarytau	shaft waste	○		
FR-23	Granodiorite	Sarytau 42° 09' 16" N 64° 18' 14" E	shaft waste	○	○	
FR-25	Microgranite	Sarytau	outcrop(dyke) EW75-80N, W=3m	○		
FR-27	Lamprophyre	Okjetpes	core(CKB-57,150m)	○	○	
FR-29	Lamprophyre	Okjetpes	core(CKB-60,39.0m)	○	○	
FR-30	Diorite	Okjetpes	core(CKB-94,45.0m)	○		
FR-31	Granite	Sautbay	core(CKB-26,145m)	○		
FR-32	Granite porphyry	Sautbay	core(CKB-26,215m)	○		
FR-33	Aplite	Sautbay	core(CKB-26,362m)	○		
FR-34	Granite porphyry	Saghinkan	core(CKB-258,72m)	○		
FR-35	Aplite	Saghinkan	core(CKB-258,84m)	○	○	
FR-36	Granite	Saghinkan	core(CKB-259,405m)	○		
FR-37	Granite	Sautbay	core(CKB-73,85m)	○		

W.A: Whole rock analysis

T: Thin section

X: X-ray analysis

Ap. 1 List of Rock Samples(2)

Sample No.	Field Name	Locality	Remarks	Rock		
				W.A	T	X
FR-38	Granite	Sautbay	core(CKB-73,365m)	○	○	
FR-39	Granite	Sautbay	core(CKB-58,45m)	○		
FR-40	Granite	Sautbay	core(CKB-47,40m)	○		
MA-32	Porphyrite	North Bulutkan	outcrop(dyke)	○		
MA-33	Granodiorite	North Bulutkan	outcrop(dyke)	○		
MA-35	Granodiorite	North Bulutkan	outcrop	○	○	
MA-38	Granite porphyry	Sautbay	core(CKB-2818,52m)	○		
MA-44	Granite	Kokpatas	outcrop	○		
MA-1	Phillite	S.E.Kokpatas	weathered, partially Fe-stained			○
MA-2	Hornfels	Bulutkan	phillitic,Fe-stained			○
MA-4	Hornfels	Sautbay	quartz stock work, Fe-stained			○
MA-11	Limestone	Okjetpes	Fe-stained			○
MA-12	Siltstone	Barhanny	yellow loess			○
MA-13	Shale	S.Okjetpes	Fe-stained			○
MA-14	Shale	S.Okjetpes	Fe-stained			○
MA-17	Granite	Djylandy	weakly weathered			○
MA-20	Dolomite	Cholcharatau	weak skarinization			○
MA-21	Shale	Cholcharatau	weak skarinization			○
MA-28	Hornfels	Sarytau	blacky,biotite			○
MA-36	Granite	N.Bulutkan	weathered			○
MA-37	Shale>skarn,granite	Sautbay	float			○
MA-39	Siltstone	Kokpatas	Cretaceous sediment			○
MA-40	Granite	Kokpatas	altered plagiogranite			○
MA-41	Shale	Kokpatas	altered			○

W.A: Whole rock analysis

T: Thin section

X: X-ray analysis

Ap. 2 List of Ore Samples(1)

Sample No.	Locality	Remarks	Ore		
			A8	A5	P
FO-1	South Turbay	shaft waste, quartz with pyrite			○
FO-4	Okjetpes	shaft waste, oxidized ore (pyrite, arsenopyrite, gypsum, hydro-oxide copper)			○
FO-5	Okjetpes	shaft waste, grey quartz with sulphide veinlets			○
FO-7	Barhanny	shaft waste, quartz veins with hematite			○
FO-8	Sarytau 42° 09. 58' N 64° 18. 26' E	shaft waste, skarn			○
FO-13	Okjetpes	core(CKB-67,93m)			○
FO-15	Saghinkan	core(CKB-201,476.7 - 476.9m)			○
FO-16	Saghinkan	core(CKB-258,118m)			○
FO-22	Saghinkan	core(CKB-259,309.6m) granite			○
MA-27	Sarytau	granite with quartz, Mo			○
FO-3	North Turbay	outcrop, quartz veins in the silicified rock (EW,85N, W=2.15m)	○		
FO-6	Okjetpes	trench outcrop, quartz veins (N48W 75SW, W=3.9m)	○		
217125	Saghinkan	CKB217(345.5 - 349.3m) Hornfels	○		
217126	Saghinkan	CKB217(349.3 - 349.6m) Hornfels	○		
217127	Saghinkan	CKB217(349.6 - 352.2m) Hornfels	○		
217128	Saghinkan	CKB217(352.2 - 355.0m) Hornfels	○		
217130	Saghinkan	CKB217(355.8 - 356.7m) Hornfels	○		
217131	Saghinkan	CKB217(356.7 - 358.3m) Hornfels	○		
217133	Saghinkan	CKB217(358.7 - 359.3m) Hornfels	○		
217138	Saghinkan	CKB217(361.5 - 362.0m) Hornfels	○		
217139	Saghinkan	CKB217(362.0 - 362.8m) Hornfels	○		
217144	Saghinkan	CKB217(369.1 - 369.7m) Hornfels	○		
3361-1	Bulutkan	C-3361(0 - 2m) Siltstone		○	
3361-2	Bulutkan	C-3361(2 - 4m) Siltstone	○		
3361-3	Bulutkan	C-3361(4 - 6m) Siltstone		○	
3361-4	Bulutkan	C-3361(6 - 8m) Siltstone		○	
3361-5	Bulutkan	C-3361(8 - 10m) Siltstone	○		
3361-6	Bulutkan	C-3361(10 - 12m) Hornfels		○	
3361-7	Bulutkan	C-3361(12 - 14m) Hornfels		○	
3361-8	Bulutkan	C-3361(14 - 16m) Hornfels	○		
3361-9	Bulutkan	C-3361(16 - 18m) Hornfels		○	
3361-10	Bulutkan	C-3361(18 - 20m) Hornfels		○	
3361-11	Bulutkan	C-3361(20 - 22m) Hornfels		○	

A8: Chemical analysis(8 elements)

A5: Chemical analysis(5 elements)

P: Polish

Ap. 2 List of Ore Samples(2)

Sample No.	Locality	Remarks	Ore		
			A8	A5	P
324040	Turbay	3240(78.0 - 80.0m) Quartzite	○		
324041	Turbay	3240(80.0 - 82.0m) Quartzite		○	
324042	Turbay	3240(82.0 - 84.0m) Quartzite		○	
324043	Turbay	3240(84.0 - 86.0m) Quartzite		○	
324044	Turbay	3240(86.0 - 88.0m) Quartz		○	
324045	Turbay	3240(88.0 - 90.0m) Quartz	○		
324046	Turbay	3240(90.0 - 92.0m) Quartz		○	
324047	Turbay	3240(92.0 - 94.0m) Quartz		○	
324048	Turbay	3240(94.0 - 96.0m) Quartz		○	
121034	Sautbay	CKB-121(234.7 - 235.8m) Skarn	○		
121035	Sautbay	CKB-121(235.8 - 239.0m) Granitoid	○		
175036	Sautbay	CKB-175(85.0 - 86.5m) Limestone	○		
175037	Sautbay	CKB-175(86.5 - 87.5m) Quartzite	○		
175038	Sautbay	CKB-175(87.5 - 88.5m) Quartzite	○		
175039	Sautbay	CKB-175(88.5 - 90.2m) Quartzite	○		
175040	Sautbay	CKB-175(90.2 - 92.0m) Quartzite	○		
175041	Sautbay	CKB-175(92.0 - 93.3m) Skarn	○		
175042	Sautbay	CKB-175(93.3 - 94.6m) Skarn	○		
175043	Sautbay	CKB-175(94.6 - 95.6m) Skarn	○		
175044	Sautbay	CKB-175(95.6 - 97.0m) Skarn	○		
175045	Sautbay	CKB-175(97.0 - 98.4m) Skarn	○		
175047	Sautbay	CKB-175(98.8 - 100.3m) Skarn	○		

A8: Chemical analysis(8 elements)

A5: Chemical analysis(5 elements)

P: Polish

Ap. 3 Assay Results of Ore Samples

Sample No,	Locality	Remarks	Au g/t	Ag g/t	Cu %	Pb %	Zn %	WO3 %	Mo %	Bi %
Sensibility			0.1	0.1	0.01	0.01	0.01	0.01	0.01	0.01
FO-3	North Turbay	outcrop, quartz veins in the silicified rock (EW,85N, W=2.15m)	1.0	0.6	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
FO-6	Okjetpos	trench outcrop, quartz veins (N48W 75SW, W=3.9m)	1.4	3.2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
217125	Saghinkan	CKB217(345.5 - 349.3m) Hornfels	0.2	3.2	0.01	<0.01	0.01	<0.01	<0.01	<0.01
217126	Saghinkan	CKB217(349.3 - 349.6m) Hornfels	<0.1	1.1	0.03	<0.01	0.01	<0.01	<0.01	<0.01
217127	Saghinkan	CKB217(349.6 - 352.2m) Hornfels	<0.1	9.8	0.03	<0.01	0.01	<0.01	<0.01	<0.01
217128	Saghinkan	CKB217(352.2 - 355.0m) Hornfels	0.1	<0.1	0.03	<0.01	<0.01	<0.01	<0.01	<0.01
217130	Saghinkan	CKB217(355.8 - 356.7m) Hornfels	<0.1	<0.1	0.01	<0.01	0.01	0.05	<0.01	<0.01
217131	Saghinkan	CKB217(356.7 - 358.3m) Hornfels	0.2	2.4	0.03	<0.01	0.02	0.38	<0.01	<0.01
217133	Saghinkan	CKB217(358.7 - 359.3m) Hornfels	<0.1	8.2	0.06	<0.01	0.01	<0.01	<0.01	<0.01
217138	Saghinkan	CKB217(361.5 - 362.0m) Hornfels	0.1	<0.1	0.04	<0.01	<0.01	1.40	<0.01	<0.01
217139	Saghinkan	CKB217(362.0 - 362.8m) Hornfels	0.1	4.0	<0.01	<0.01	<0.01	0.06	<0.01	<0.01
217144	Saghinkan	CKB217(369.1 - 369.7m) Hornfels	<0.1	20.8	0.02	0.02	<0.01	<0.01	<0.01	0.03
3361-1	Bulutkan	C-3361(0 - 2m) Siltstone	47.6	<0.1	0.10	<0.01	<0.01	-	-	-
3361-2	Bulutkan	C-3361(2 - 4m) Siltstone	88.3	6.4	0.12	<0.01	<0.01	<0.01	<0.01	0.07
3361-3	Bulutkan	C-3361(4 - 6m) Siltstone	14.9	10.8	0.07	<0.01	<0.01	-	-	-
3361-4	Bulutkan	C-3361(6 - 8m) Siltstone	91.5	35.3	<0.01	<0.01	<0.01	-	-	-
3361-5	Bulutkan	C-3361(8 - 10m) Siltstone	23.8	34.5	0.02	<0.01	<0.01	<0.01	<0.01	0.02
3361-6	Bulutkan	C-3361(10 - 12m) Hornfels	17.8	<0.1	0.31	<0.01	<0.01	-	-	-
3361-7	Bulutkan	C-3361(12 - 14m) Hornfels	11.4	9.5	0.28	<0.01	<0.01	-	-	-
3361-8	Bulutkan	C-3361(14 - 16m) Hornfels	3.5	17.4	0.47	<0.01	<0.01	<0.01	<0.01	<0.01
3361-9	Bulutkan	C-3361(16 - 18m) Hornfels	5.6	13.7	0.38	<0.01	<0.01	-	-	-
3361-10	Bulutkan	C-3361(18 - 20m) Hornfels	5.9	<0.1	0.35	<0.01	<0.01	-	-	-
3361-11	Bulutkan	C-3361(20 - 22m) Hornfels	10.5	1.4	0.47	<0.01	<0.01	-	-	-
324040	Turbay	3240(78.0 - 80.0m) Quartzite	1.1	16.6	0.02	<0.01	<0.01	<0.01	<0.01	<0.01
324041	Turbay	3240(80.0 - 82.0m) Quartzite	2.9	<0.1	0.02	<0.01	<0.01	-	-	-
324042	Turbay	3240(82.0 - 84.0m) Quartzite	3.3	8.5	0.03	<0.01	<0.01	-	-	-
324043	Turbay	3240(84.0 - 86.0m) Quartzite	6.0	25.0	0.03	0.01	<0.01	-	-	-
324044	Turbay	3240(86.0 - 88.0m) Quartz	1.8	<0.1	0.02	<0.01	0.01	-	-	-
324045	Turbay	3240(88.0 - 90.0m) Quartz	4.1	21.4	0.02	<0.01	<0.01	<0.01	<0.01	0.01
324046	Turbay	3240(90.0 - 92.0m) Quartz	1.5	<0.1	0.01	<0.01	<0.01	-	-	-
324047	Turbay	3240(92.0 - 94.0m) Quartz	0.4	<0.1	0.02	<0.01	<0.01	-	-	-
324048	Turbay	3240(94.0 - 96.0m) Quartz	0.2	<0.1	0.01	<0.01	<0.01	-	-	-
121034	Sautbay	CKB-121(234.7 - 235.8m) Skarn	<0.1	2.9	0.06	<0.01	<0.01	<0.01	<0.01	<0.01
121035	Sautbay	CKB-121(235.8 - 239.0m) Granitoid	0.1	6.4	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
175036	Sautbay	CKB-175(85.0 - 86.5m) Limestone	0.6	1.6	0.16	<0.01	<0.01	2.63	<0.01	0.01
175037	Sautbay	CKB-175(86.5 - 87.5m) Quartzite	0.6	0.3	0.11	<0.01	<0.01	0.95	<0.01	0.01
175038	Sautbay	CKB-175(87.5 - 88.5m) Quartzite	0.5	32.2	0.18	<0.01	<0.01	2.05	<0.01	<0.01
175039	Sautbay	CKB-175(88.5 - 90.2m) Quartzite	<0.1	<0.1	0.08	<0.01	<0.01	0.39	<0.01	<0.01
175040	Sautbay	CKB-175(90.2 - 92.0m) Quartzite	<0.1	<0.1	0.02	<0.01	0.01	<0.01	0.04	<0.01
175041	Sautbay	CKB-175(92.0 - 93.3m) Skarn	0.5	0.3	0.46	<0.01	<0.01	2.25	<0.01	<0.01
175042	Sautbay	CKB-175(93.3 - 94.6m) Skarn	1.3	<0.1	0.36	<0.01	<0.01	5.62	<0.01	0.03
175043	Sautbay	CKB-175(94.6 - 95.6m) Skarn	0.7	<0.1	0.28	<0.01	<0.01	7.04	<0.01	0.02
175044	Sautbay	CKB-175(95.6 - 97.0m) Skarn	1.2	<0.1	0.13	<0.01	<0.01	5.97	<0.01	0.04
175045	Sautbay	CKB-175(97.0 - 98.4m) Skarn	0.1	1.9	0.37	<0.01	<0.01	0.86	<0.01	<0.01
175047	Sautbay	CKB-175(98.8 - 100.3m) Skarn	0.5	0.6	0.38	<0.01	<0.01	2.88	<0.01	<0.01

Ap. 4 Analysis Results of Whole Rock Samples

Sample No.	Field Name	Locality	Remarks	SiO ₂ %	TiO ₂ %	Al ₂ O ₃ %	Fe ₂ O ₃ %	FeO %	CaO %	MnO %	MgO %	Na ₂ O %	K ₂ O %	P ₂ O ₅ %	LOI %
Sensibility				0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
FR-2	Lamprophyre	Bulutkan	float(Mid Perm)	59.19	0.66	15.65	1.19	3.95	4.71	0.10	4.08	4.22	4.12	0.28	2.50
FR-3	Quartz syenite	Bulutkan	float(Late Carb.- Early Perm.)	65.09	0.48	14.87	<0.01	2.36	3.78	0.11	1.44	3.56	5.15	0.21	4.34
FR-4	Granodiorite	Burgut	core(No.673,45m)	68.24	0.44	16.01	0.42	2.66	3.50	0.04	1.23	4.49	2.48	0.15	9.26
FR-7	Granite	South Turbay	trench waste	67.92	0.52	15.78	1.28	1.34	2.14	0.04	1.55	4.34	4.22	0.13	1.76
FR-8	Granodiorite	South Turbay	trench waste	69.44	0.49	15.80	0.61	1.42	3.17	0.03	0.97	4.01	3.78	0.13	1.14
FR-9	Granodiorite	North Turbay	trench waste	66.28	0.73	15.95	1.14	2.23	3.28	0.04	1.26	4.43	3.15	0.18	1.00
FR-12	Granosyenite	Okjetpes	trench waste	57.00	1.00	14.25	1.02	4.56	5.07	0.10	6.54	4.01	2.04	0.29	3.92
FR-13	Granodiorite porphyry	Okjetpes 42° 03. 01' N 64° 05. 89' E	outcrop	70.21	0.39	15.97	1.15	1.59	0.78	0.03	1.22	6.28	1.23	0.15	1.72
FR-14	Microdiorite	Okjetpes	shaft waste	53.97	1.04	14.32	1.77	4.59	5.89	0.10	6.56	3.52	2.24	0.31	5.16
FR-16	Quartz diorite porphyry	Barhanny	trench waste(Pre. ore)	62.19	0.98	17.30	1.72	2.56	1.26	0.03	2.97	5.16	1.18	0.38	4.05
FR-17	Granodiorite	Barhanny 42° 02' 24" N 64° 09' 56" E	trench waste	67.57	0.53	15.19	0.51	2.41	2.15	0.03	2.48	6.03	0.48	0.19	3.22
FR-18	Two mica granite	Djylandy 42° 10. 45' N 63° 42. 82' E	outcrop(Ollyntau intrusive, Late Carb. - Perm.)	74.03	0.11	14.65	<0.01	0.87	0.77	0.03	0.20	3.61	5.42	0.19	5.16
FR-19	Aplite(pegmatitic)	Djylandy	core(No.2)	75.20	0.03	14.20	0.47	0.66	0.54	0.40	0.07	4.47	3.78	0.09	4.56
FR-20	Quartz diorite	Djylandy	core(No.2)	72.31	0.25	15.30	0.02	1.84	1.77	0.07	0.50	4.86	2.87	0.05	0.51
FR-22	Microgranite	Sarytau	shaft waste	70.46	0.45	15.54	0.46	2.23	2.65	0.04	0.68	4.46	2.77	0.13	8.05
FR-23	Granodiorite	Sarytau 42° 09' 16" N 64° 18' 14" E	shaft waste	70.24	0.40	15.39	0.37	2.11	2.36	0.03	0.58	4.30	3.18	0.10	7.62
FR-25	Microgranite	Sarytau	outcrop(dyke) EW75-80N, W=3m	68.58	0.60	15.98	1.28	2.02	2.71	0.05	0.92	4.50	3.09	0.14	8.48
FR-27	Lamprophyre	Okjetpes	core(CKB-57,150m)	49.97	1.48	14.21	1.23	6.18	5.93	0.12	7.85	3.52	1.65	0.36	6.34
FR-29	Lamprophyre	Okjetpes	core(CKB-60,39.0m)	52.32	1.26	15.07	1.31	6.00	5.35	0.12	7.11	3.75	3.42	0.40	3.13
FR-30	Diorite	Okjetpes	core(CKB-94,45.0m)	46.22	1.03	12.41	1.28	7.02	7.22	0.14	9.69	2.48	1.20	0.21	9.24
FR-31	Granite	Sautbay	core(CKB-26,145m)	66.31	0.53	16.45	0.88	2.55	4.60	0.06	1.36	4.80	1.12	0.21	1.15
FR-32	Granite porphyry	Sautbay	core(CKB-26,215m)	65.92	0.48	16.16	1.12	2.52	2.78	0.05	1.49	4.88	2.66	0.16	1.54
FR-33	Aplite	Sautbay	core(CKB-26,362m)	75.54	0.03	13.24	0.37	0.45	0.63	0.02	0.05	5.02	3.67	<0.01	8.17
FR-34	Granite porphyry	Saghinkan	core(CKB-258,72m)	66.34	0.48	16.46	1.36	1.98	3.40	0.06	1.41	4.74	1.82	0.16	1.72
FR-35	Aplite	Saghinkan	core(CKB-258,84m)	77.26	0.04	12.50	0.41	0.23	1.48	0.02	0.12	5.16	2.21	0.05	1.40
FR-36	Granite	Saghinkan	core(CKB-259,405m)	72.66	0.24	14.54	0.59	1.08	1.70	0.02	0.59	4.33	4.04	0.07	7.94
FR-37	Granite	Sautbay	core(CKB-73,85m)	67.83	0.46	16.46	1.09	2.11	3.16	0.04	1.14	4.58	2.80	0.16	7.40
FR-38	Granite	Sautbay	core(CKB-73,365m)	72.42	0.26	14.72	0.51	1.45	1.88	0.03	0.69	4.21	3.55	0.09	6.94
FR-39	Granite	Sautbay	core(CKB-58,45m)	62.50	0.72	16.16	1.52	2.42	2.30	0.06	2.55	3.87	5.44	0.32	1.83
FR-40	Granite	Sautbay	core(CKB-47,40m)	62.04	0.77	15.68	1.49	2.78	2.40	0.08	3.02	3.78	5.51	0.33	2.01
MA-32	Porphyrite	North Bulutkan	outcrop(dyke)	70.93	0.38	15.56	0.74	1.82	2.52	0.05	0.77	4.63	2.38	0.11	0.57
MA-33	Granodiorite	North Bulutkan	outcrop(dyke)	70.88	0.37	15.29	0.51	1.74	2.37	0.05	0.69	4.84	2.85	0.13	6.74
MA-35	Granodiorite	North Bulutkan	outcrop	68.73	0.64	16.82	1.10	2.19	0.61	0.03	1.49	4.34	2.89	0.19	2.14
MA-38	Granite porphyry	Sautbay	core(CKB-2818,52m)	69.92	0.39	15.48	0.47	1.92	2.82	0.03	1.03	5.31	2.21	0.13	1.21
MA-44	Granite	Kokpatas	outcrop	61.83	0.75	15.95	0.99	3.77	4.69	0.08	3.69	4.46	2.99	0.25	5.63

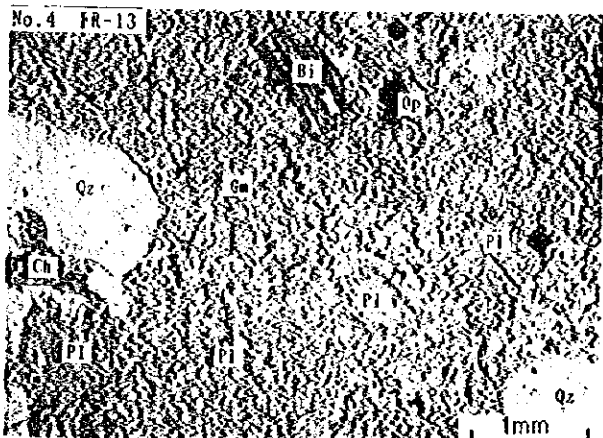
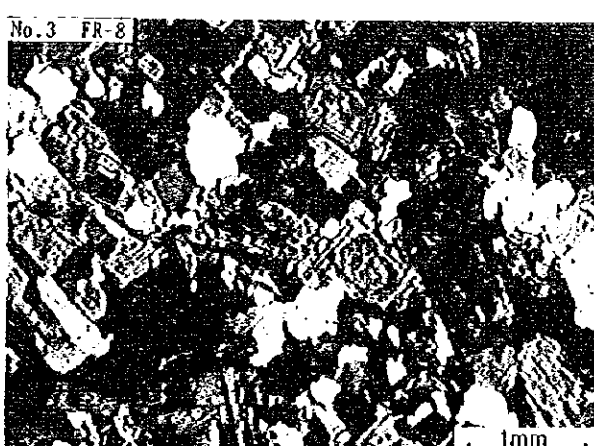
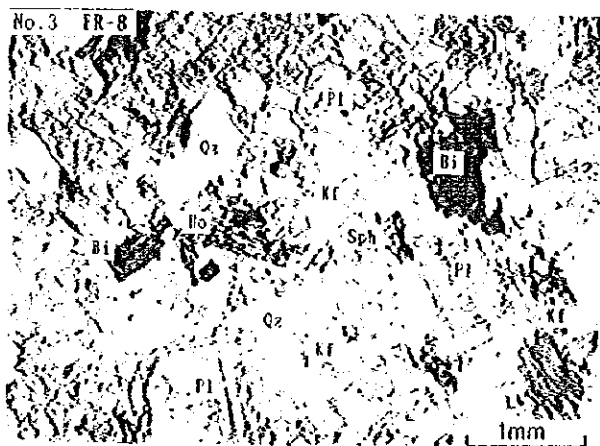
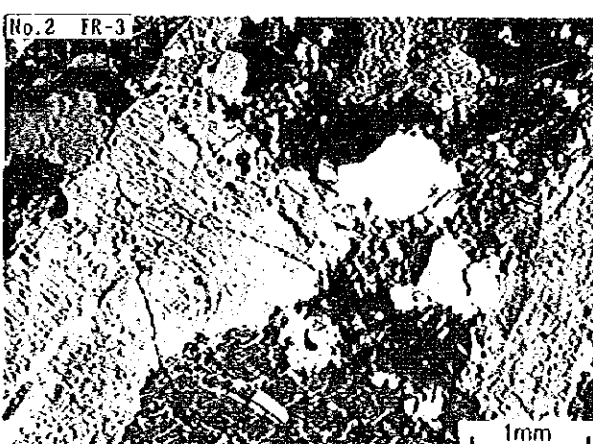
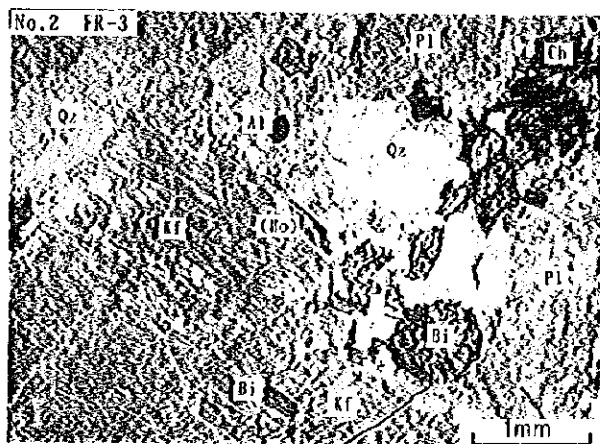
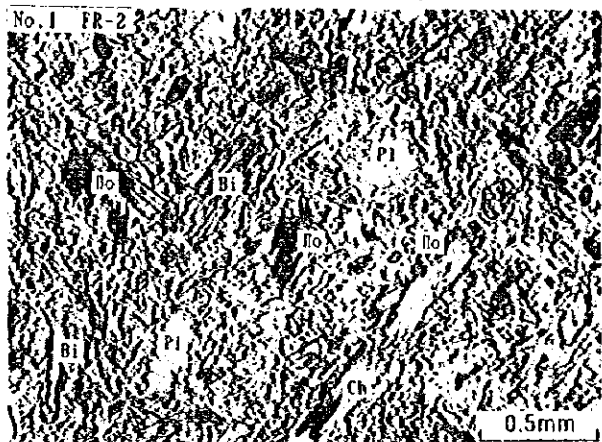
Ap. 5 Photomicrographs and Microscopic Observations of Thin Sections

Sample No.	Rock name	Locality	Primary mineral										Sec. miner.			Remarks					
			Qz	Kf	Pl	Ms	Ho	Op	Sp	Ap	Fl	Zr	Mz	Ch	Sec		Ep	Ac	Lc		
1	FR-2 Lamprophyre	Bultkan, float	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
2	FR-3 Quartz syenite	Bultkan, float	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	*
3	FR-8 Granodiorite	South Turbaym, trench waste	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	*
4	FR-13 Granodiorite porphyry	Okjetpes, outcrop	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	*
5	FR-16 Quartz diorite porphyry	Barkjannyl, trench waste	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	*
6	FR-23 Granodiorite	Sarytau, shaft waste	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	*
7	FR-27 Lamprophyre	Okjetpes, core (CKB-57, 150m)	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
8	FR-29 Lamprophyre	Okjetpes, core (CKB-60, 58m)	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
9	FR-35 Aplite	Saghiskan, core (CKB-258, 84m)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	*
10	FR-38 Granite	Sautbay, core (CKB-73, 365m)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	*
11	MA-35 Granodiorite	North Bultkan, outcrop	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	*

Qz: Quartz Kf: K-feldspar Pl: Plagioclase Bi: Biotite Ms: Muscovite Ho: Hornblende Op: Opaque mineral Sp: Sphene
 Ap: Apatite Fl: Fluorite Al: Allanite Zr: Zircon Mz: Monazite Se: Sericite C: Calcite Ep: Epidote Ac: Actinolite-tremolite
 Lc: Leucoxene
 ◎: Abundant ○: Common △: Poor *: Rare

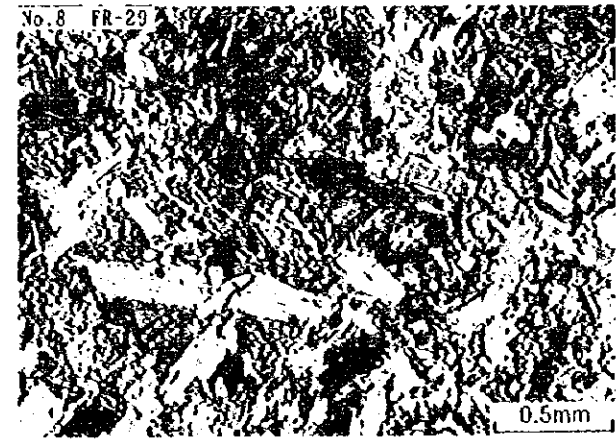
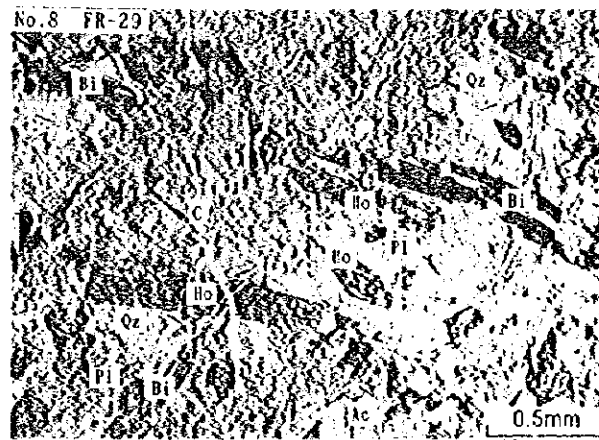
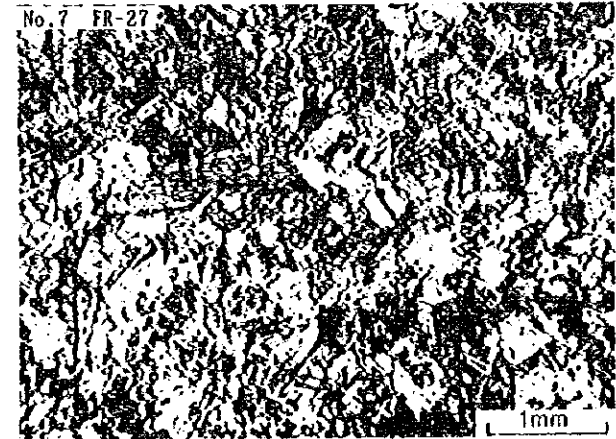
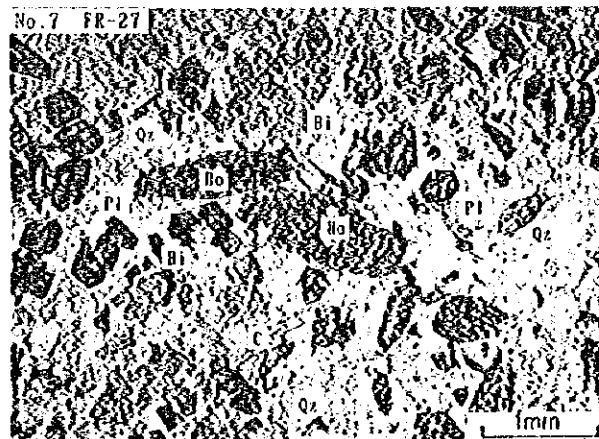
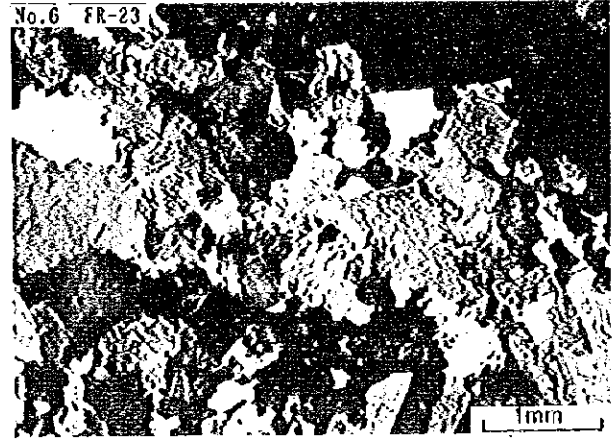
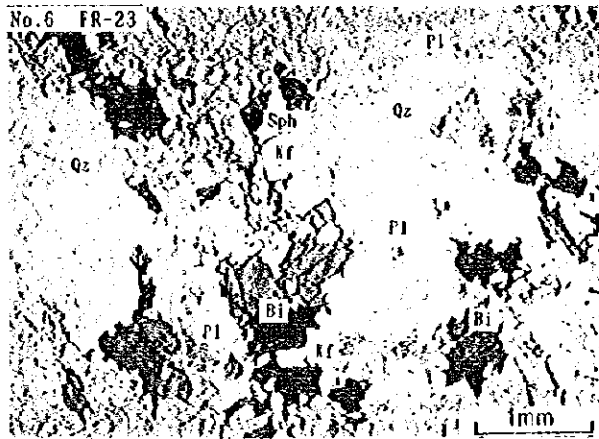
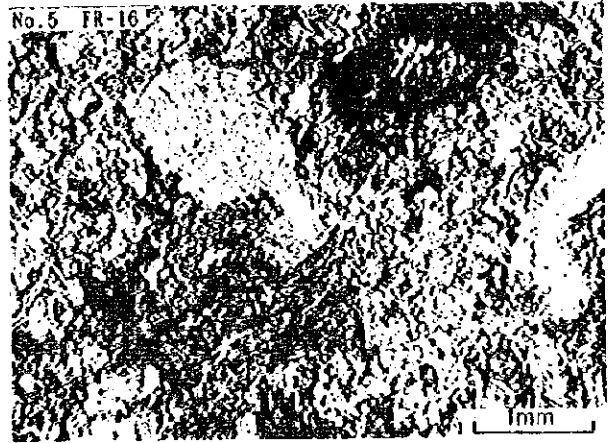
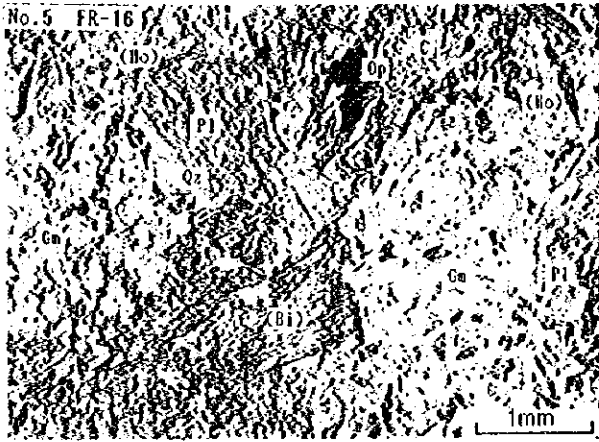
Plane polarized light

Crossed polarized light



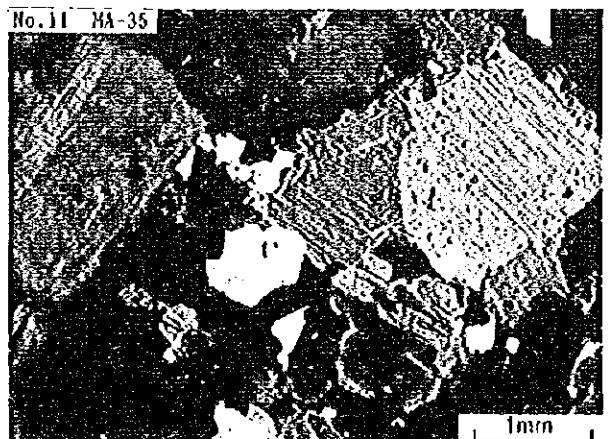
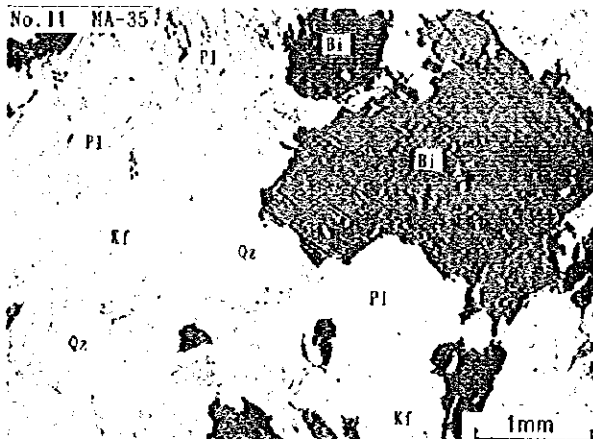
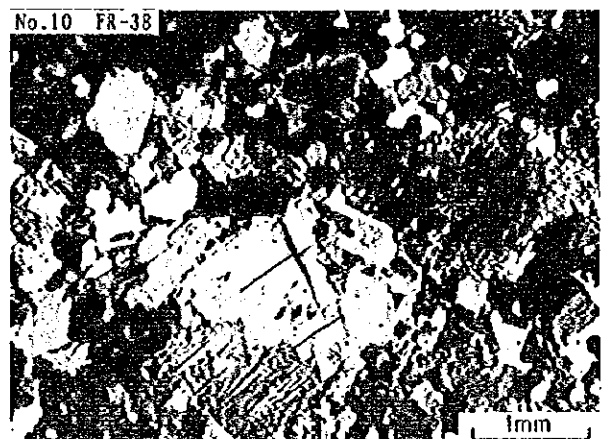
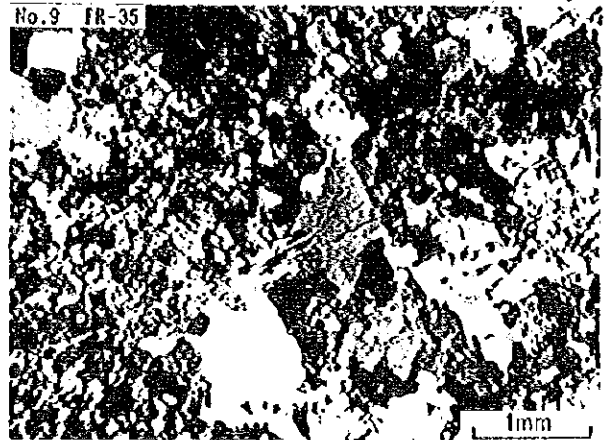
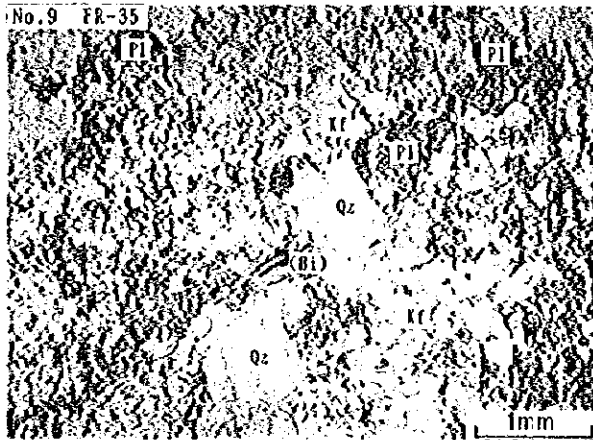
Plane polarized light

Crossed polarized light



Plane polarized light

Crossed polarized light



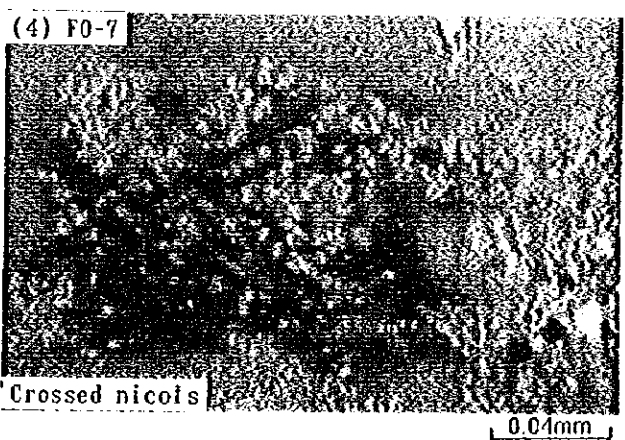
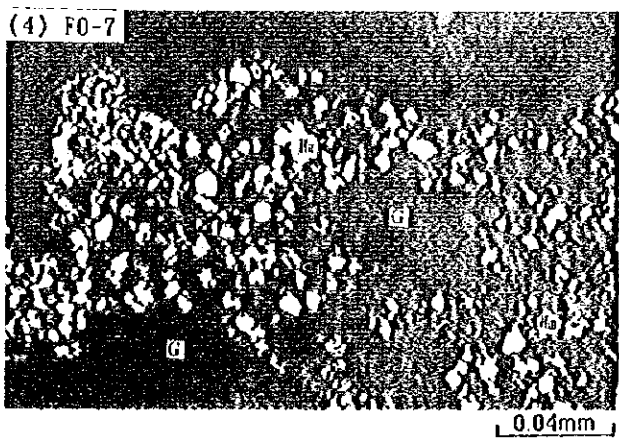
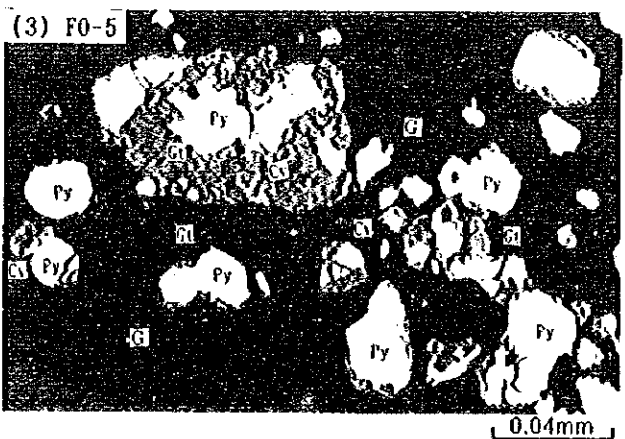
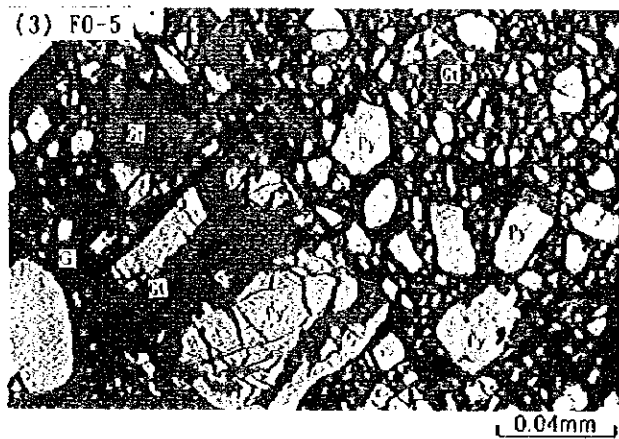
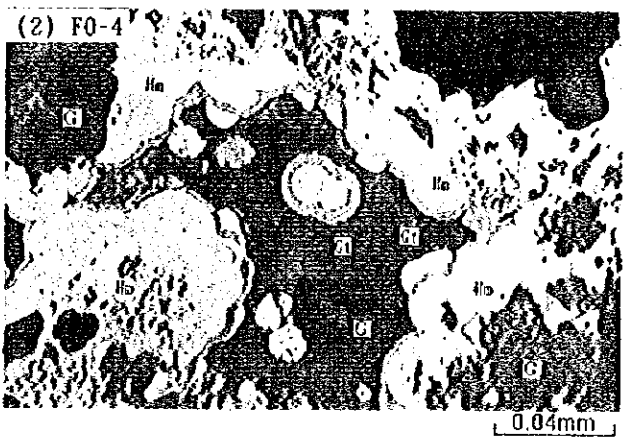
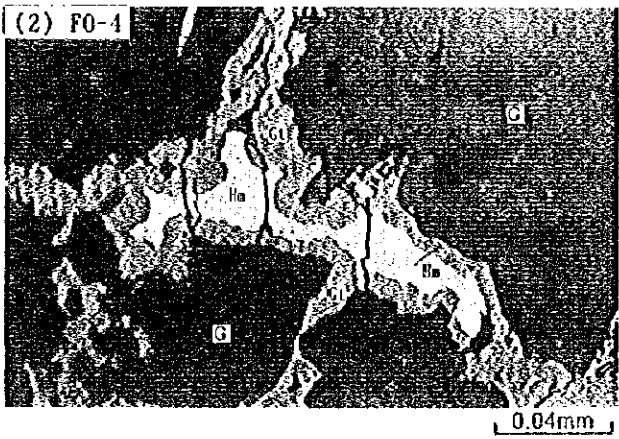
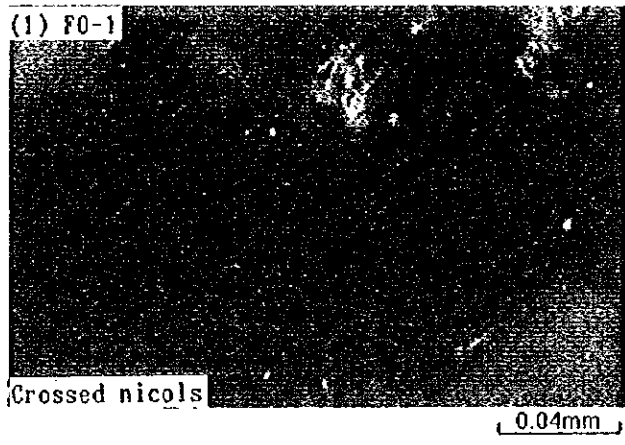
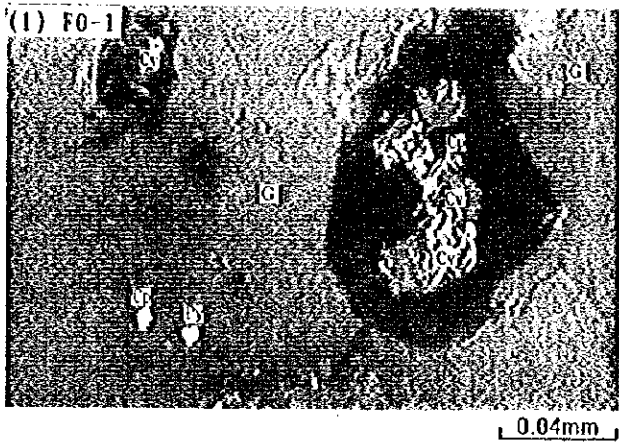
ABBREVIATION

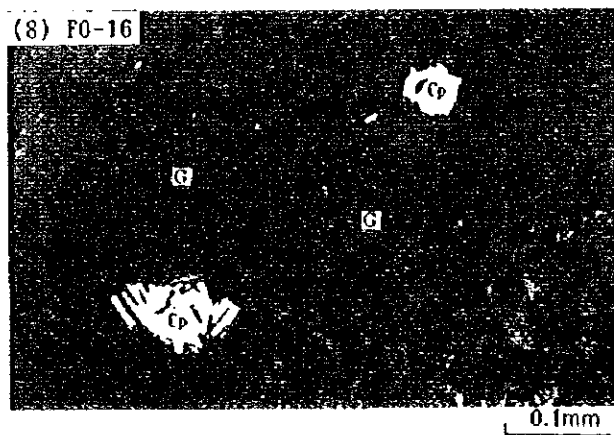
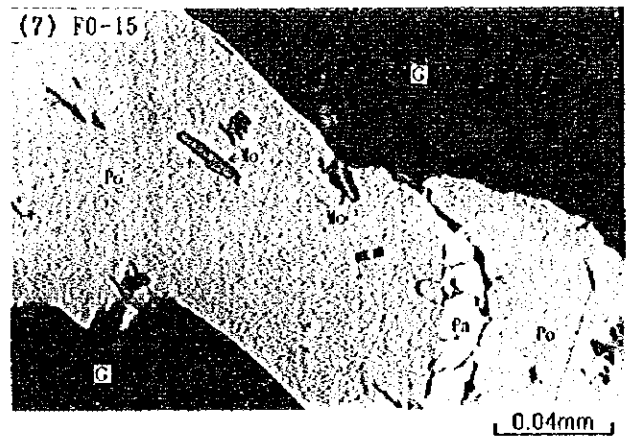
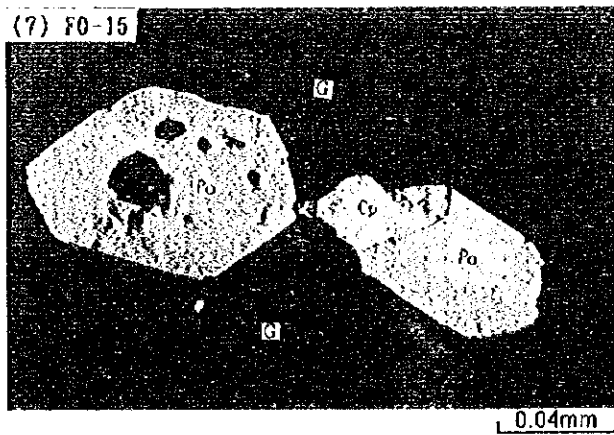
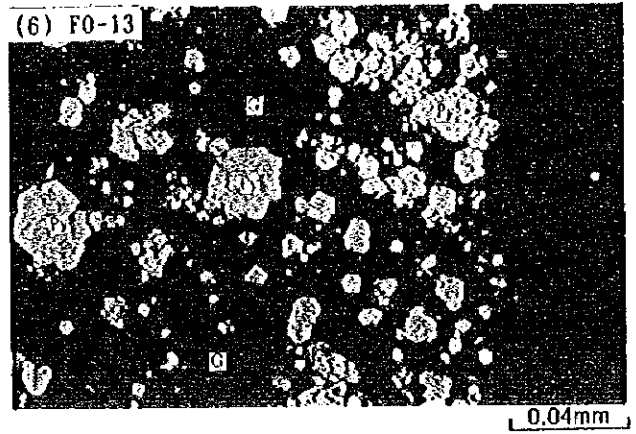
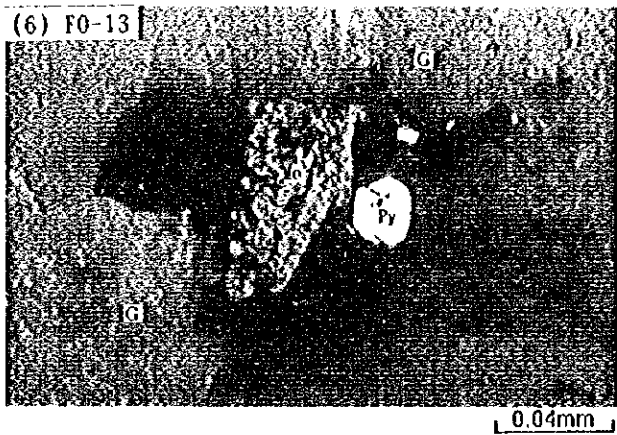
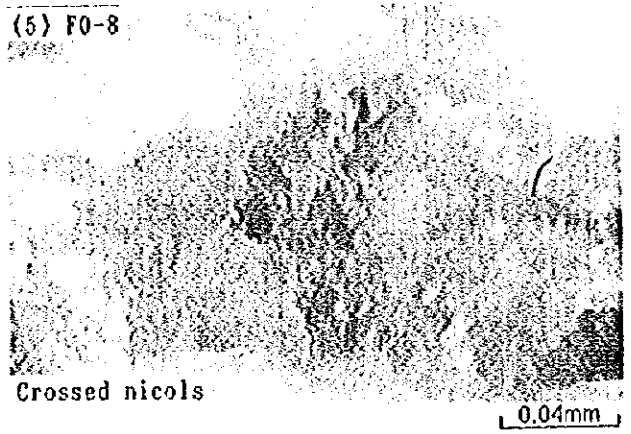
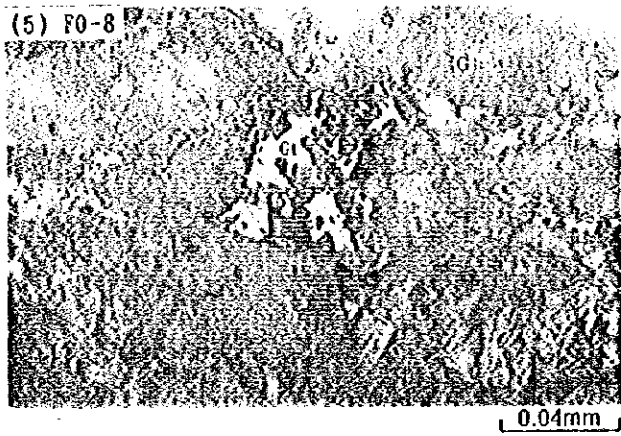
- | | |
|---------------------------------|------------------------------------|
| Al : Allanite | (Ho): Pseudomorph after hornblende |
| Bi : Biotite | Kf : K-feldspar |
| (Bi): Pseudomorph after biotite | Op : Opaque mineral |
| C : Calcite | Pl : Plagioclase |
| Ch : Chlorite | Qz : Quartz |
| Gn : Groundmass | Sph: Sphene |
| Ho : Hornblende | |

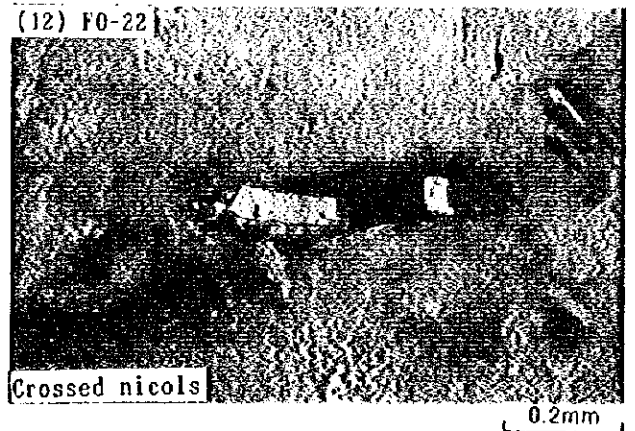
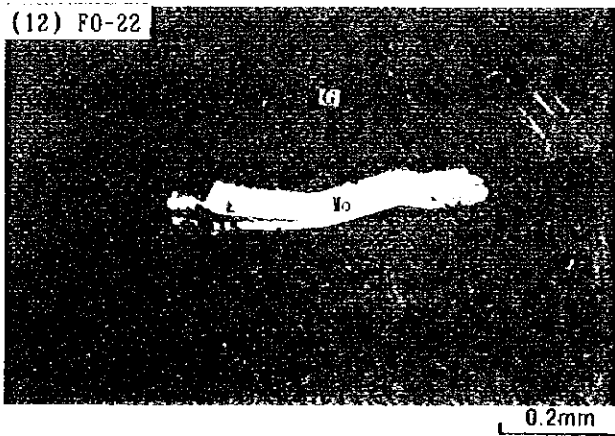
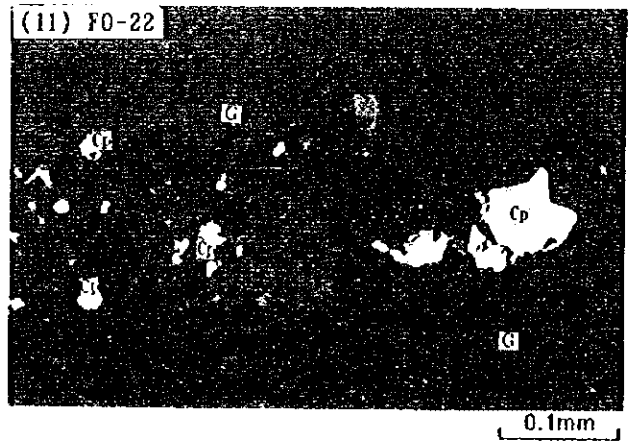
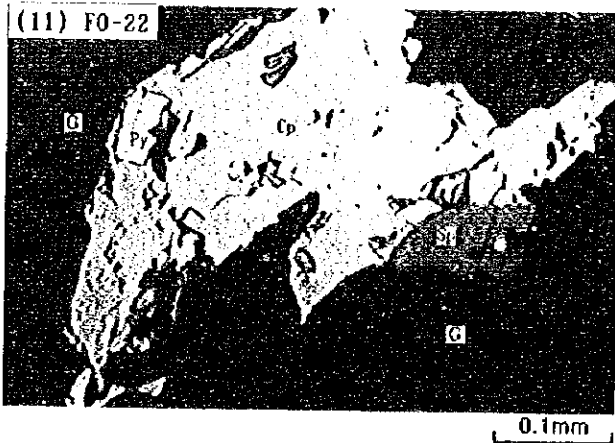
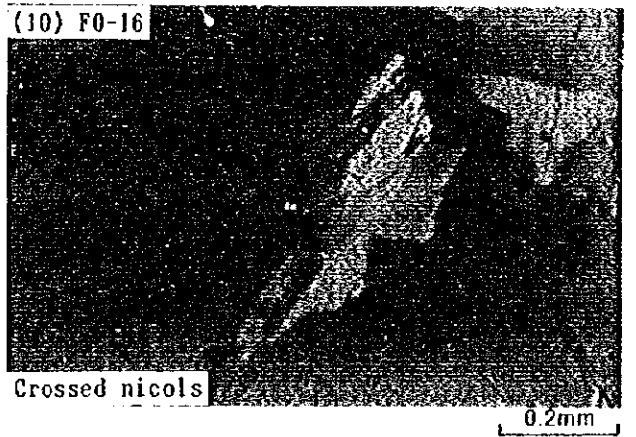
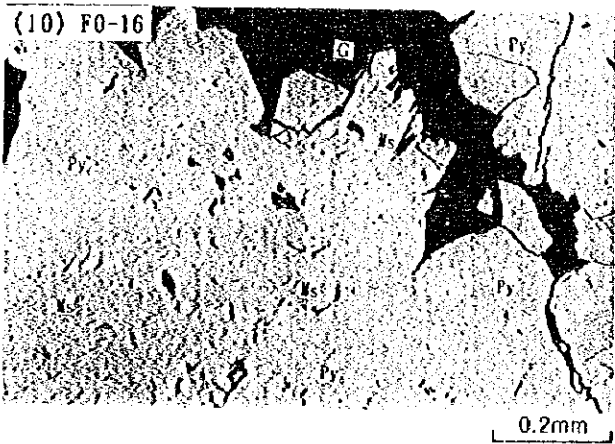
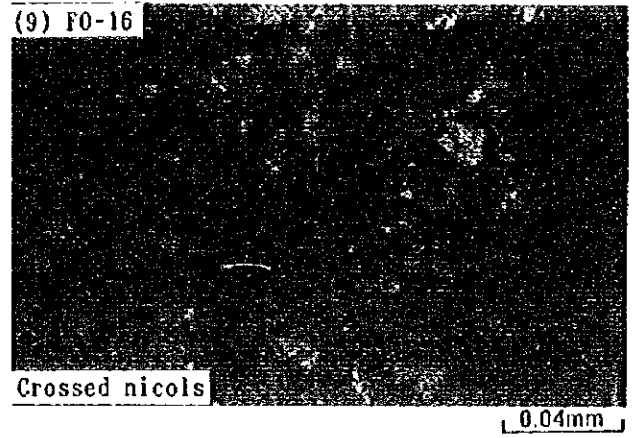
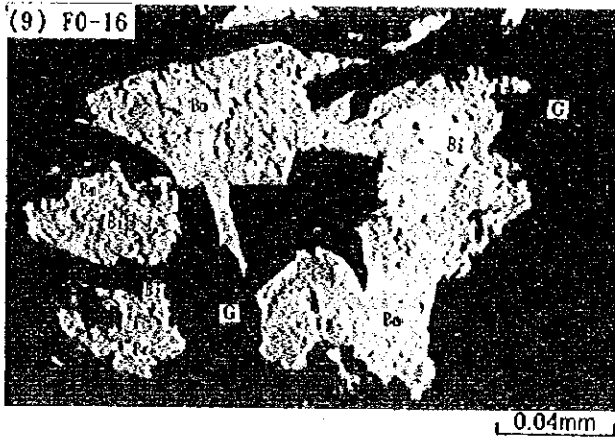
Ap. 6 Photomicrographs and Microscopic Observations of Polished Sections (1)

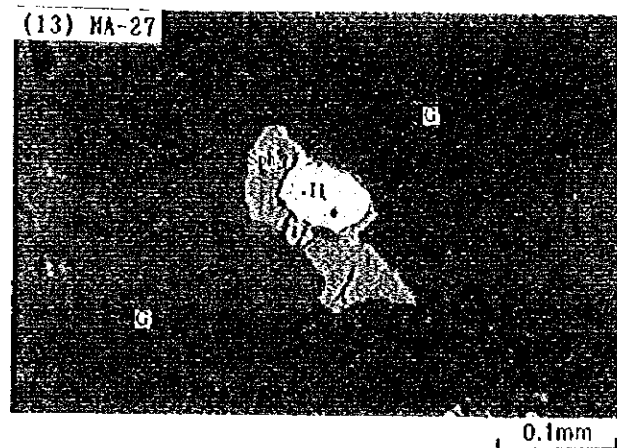
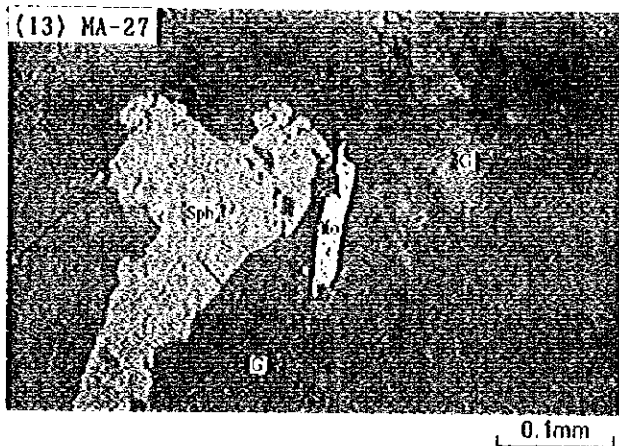
Sample Number	F0-1	F0-4	F0-5	F0-7	F0-8
Locality	South Turbay	Okjetpes	Okjetpes	Barkhannyl	Sarytau 42° 09' 58" N 64° 18' 26" E
Ore mineral	Abbr	Remarks	Am	Remarks	Am
Native bismuth	Bi				
Bismuthinite	Bi				
Molybdenite	Mo				
Pentlandite	Pn				
Chalcopyrite	Cp	10 μm, disse			
Covellite	Cv	Sp-repl, 2nd	※ coex-Gt		
Galena	Gn				
Sphalerite	Sp				
Arsenopyrite	Asp				
Pyrrhotite	Po				
Pyrite	Py	eu~an, por, vein	△an, disse	◎ eu~an, diss~vein	※an, disse
Marcasite	Ms				
Hematite	Hm		○ coexisting,		△eu~an, few~20 μm
Goethite	Gt		○ coriform str		※5~20 μm, 2nd
Ilmenite	Il				
Sphene	Sph				

Abbr: Abbreviations Am: Amount an: anhedral coex: coexisting with disse: disseminated eu: euhedral por: porphyritic
 repl: replacing 2nd: secondary str: structure
 ◎ abundant ○ common △ poor ※ rare









Abbreviations

Asp : Arsenopyrite	Il : Ilmenite
Bi : Native bismuth	No : Molybdenite
Bm : Bismuthinite	Ns : Marcasite
Cp : Chalcopyrite	Pn : Pentlandite
Cv : Covellite	Po : Pyrrhotite
G : Gangue minerals	Py : Pyrite
Gn : Galena	Sp : Sphalerite
Gt : Goethite	Sph : Sphene
Hm : Hematite	

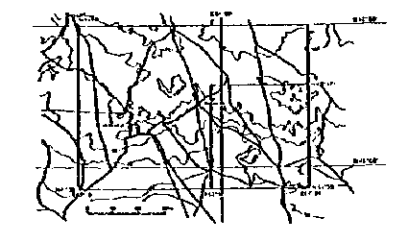
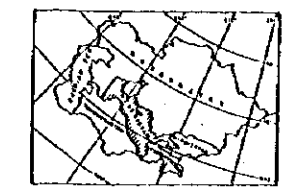
Ap. 7 Summary of X-ray Diffraction Analysis

No. Sample number	Locality	Silicate										Sulfate		Carbonate		Sulfi		Hydr		Hal- te	Remarks
		Qz	Sm	Ka	Se	Ch	Ph	Pl	Kf	Bi	Ho	Al	Gy	C	Do	Py	Gt	Hydr	Gt		
1	MA-1	⊙			○								○	※							
2	MA-2																		△		
3	MA-4	⊙			※						⊙								※		
4	MA-11																		△		
5	MA-12	⊙		△					※?												
6	MA-13	⊙		※	△				△	※					○						
7	MA-14	⊙		※											△						
8	MA-17	⊙																			
9	MA-20																				
10	MA-21				※	△				⊙											
11	MA-28	⊙																			Tremolite
12	MA-36	⊙																			Tremolite
13	MA-37	⊙																			
14	MA-39	⊙			△	△															
15	MA-40	⊙			※																
16	MA-41	⊙			△																

Al:Alunite Bi:Biotite C:Calcite Ch:Chlorite Do:Dolomite Gt:Goethite Gy:Gypsum Ho:Hornblende
 Hydr:Hydroxide Ka:Kaolinite Kf:K-feldspar Ph:Phlogopite Pl:Plagioclase Py:Pyrite Qz:Quartz
 Se:Sericitic Sulfi:Sulfide Sm:Smechtite
 ⊙ Abundant ○ Common △ Poor ※ Rare

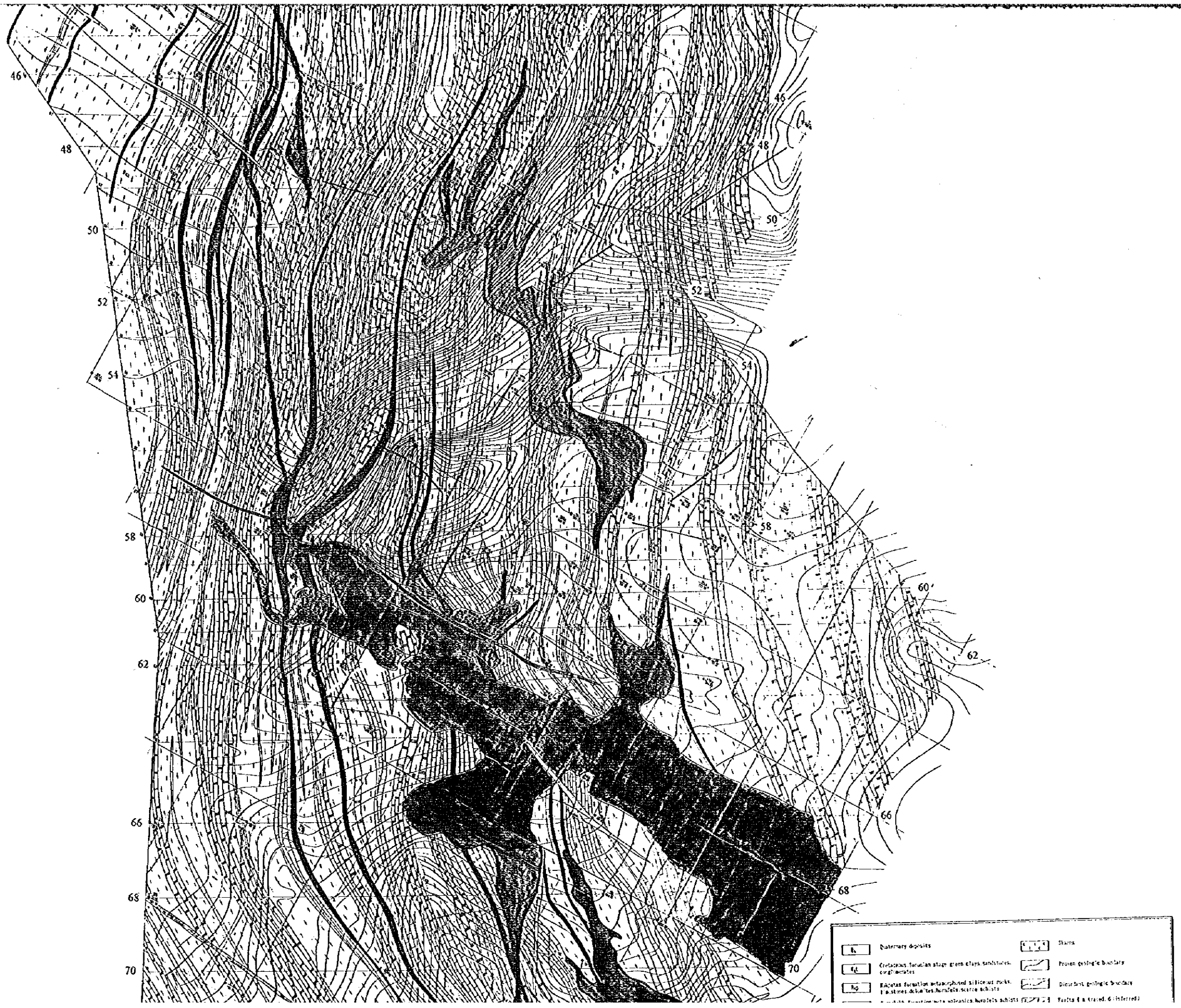
THE MINERAL EXPLORATION
IN
THE EASTERN BUKANTAU AREA
THE REPUBLIC OF UZBEKISTAN
(PHASE I)

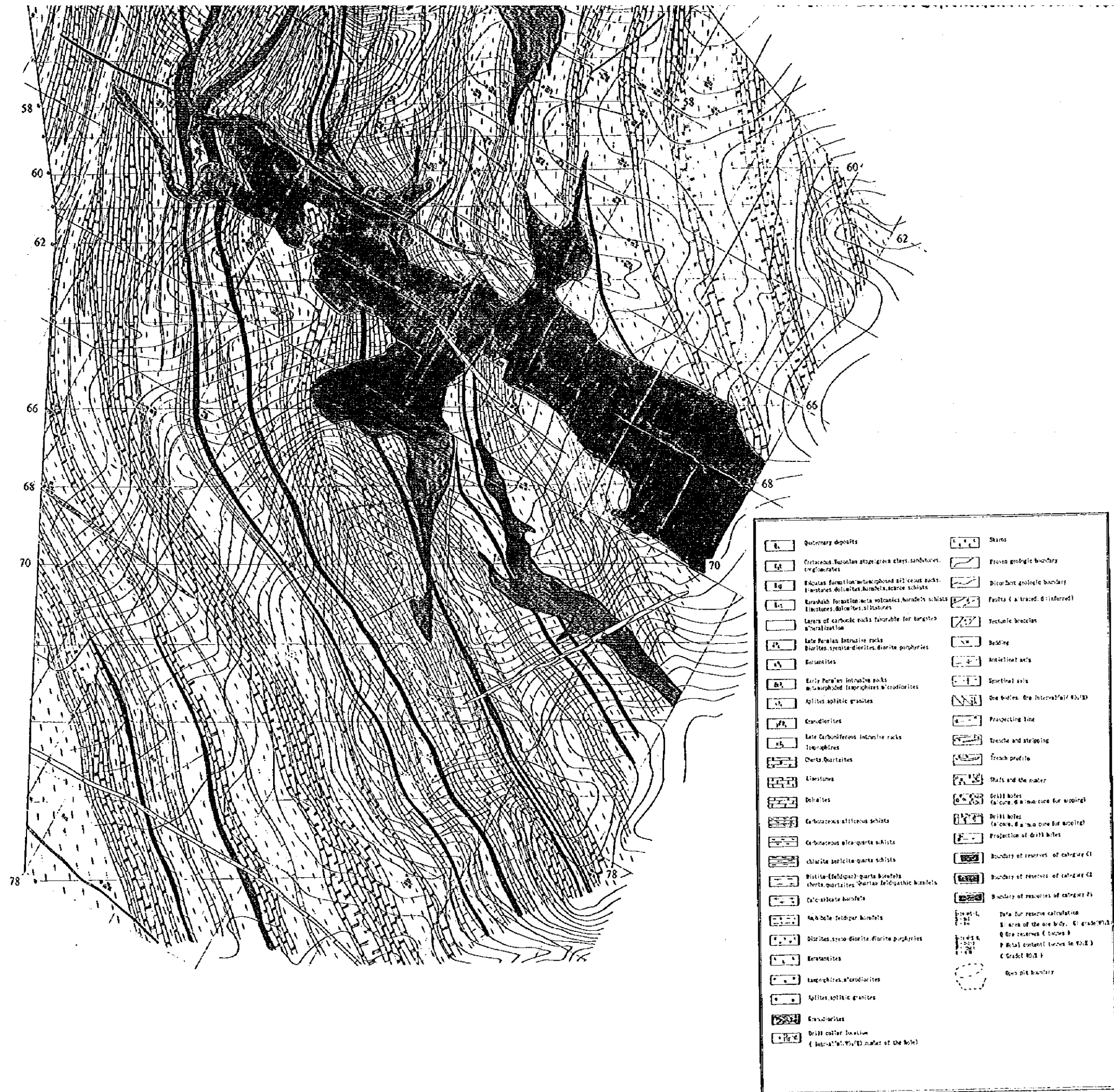
GEOLOGICAL MAP OF THE SAUTBAY ORE
DEPOSITS



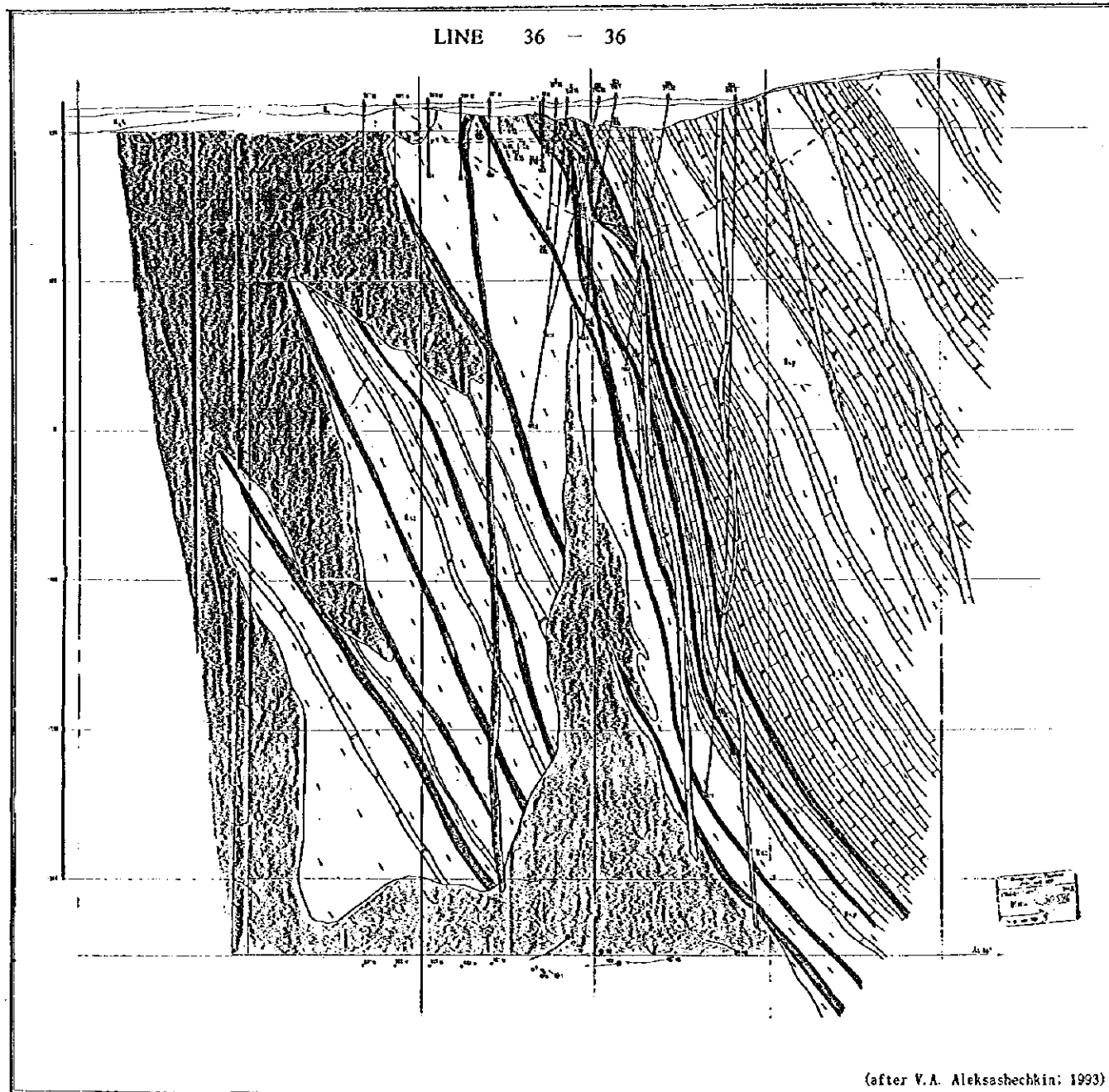
JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
FEBRUARY 1995
Prepared by MINDECO







(after V.A. Aleksashechkin: 1993)



Quaternary deposits	Stars
Cretaceous-Tertiary stage green clastic schists, conglomerates	Proven geologic boundary
Bakpuz formation metamorphosed siliceous rocks, limestones, dolomites, hornfels, marble schists	Discordant geologic boundary
Karakulsk formation meta volcanics, hornfels, schists, limestones, dolomites, siltstones	Faults (a traced, b inferred)
Layers of calcic rocks favorable for tungsten mineralization	Tectonic breccias
Late Permian intrusive rocks: Diorites, semi-diorites, diorite porphyries	Bidding
Kersantites	Auxiliary axis
Early Permian intrusive rocks: metabasites, diorites, gabbros, gneisses	Structural axis
Aplite-aplitic granites	Ore bodies: Ore intervals/ (M/S)
Granodiorites	Prospecting line
Late Carboniferous intrusive rocks: gabbros	Fence and striping
Cherts, quartzites	French profile
Limestones	Shale and the marker
Dolomites	Drill holes (a core, b non-core for sampling)
Carbonaceous siliceous schists	Drill holes (a core, b non-core for sampling)
Carbonaceous calc-quartz schists	Projection of drill holes
Chlorite-schist-quartz schists	Boundary of reserves of category C1
Biotite-feldspar-quartz hornfels, cherts, quartzites, Quartz-feldspathic hornfels	Boundary of reserves of category C2
Calc-silicate hornfels	Boundary of resources of category B1
Aphibole-feldspar hornfels	Data for reserve calculation
Diorites, semi-diorite, diorite porphyries	S: area of the ore body, G: grade (M/S)
Kersantites	Q: Ore reserves (t, tonnes)
Gabbros, gneisses, diorites	P: Metal content (tonnes in 1000 t)
Aplite-aplitic granites	C: Grade (M/S)
Granodiorites	Open pit boundary
Drill collar location (a: interval, M/S, number of the hole)	

PL-II-1-4(1)

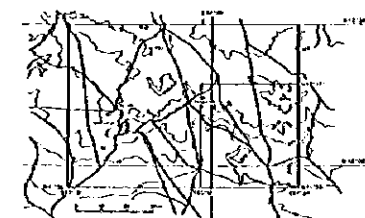
**THE MINERAL EXPLORATION
IN
THE EASTERN BUKANTAU AREA
THE REPUBLIC OF UZBEKISTAN
(PHASE I)**

**GEOLOGICAL CROSS SECTION (LINE 36-36)
OF THE SAUTBAY ORE DEPOSITS**

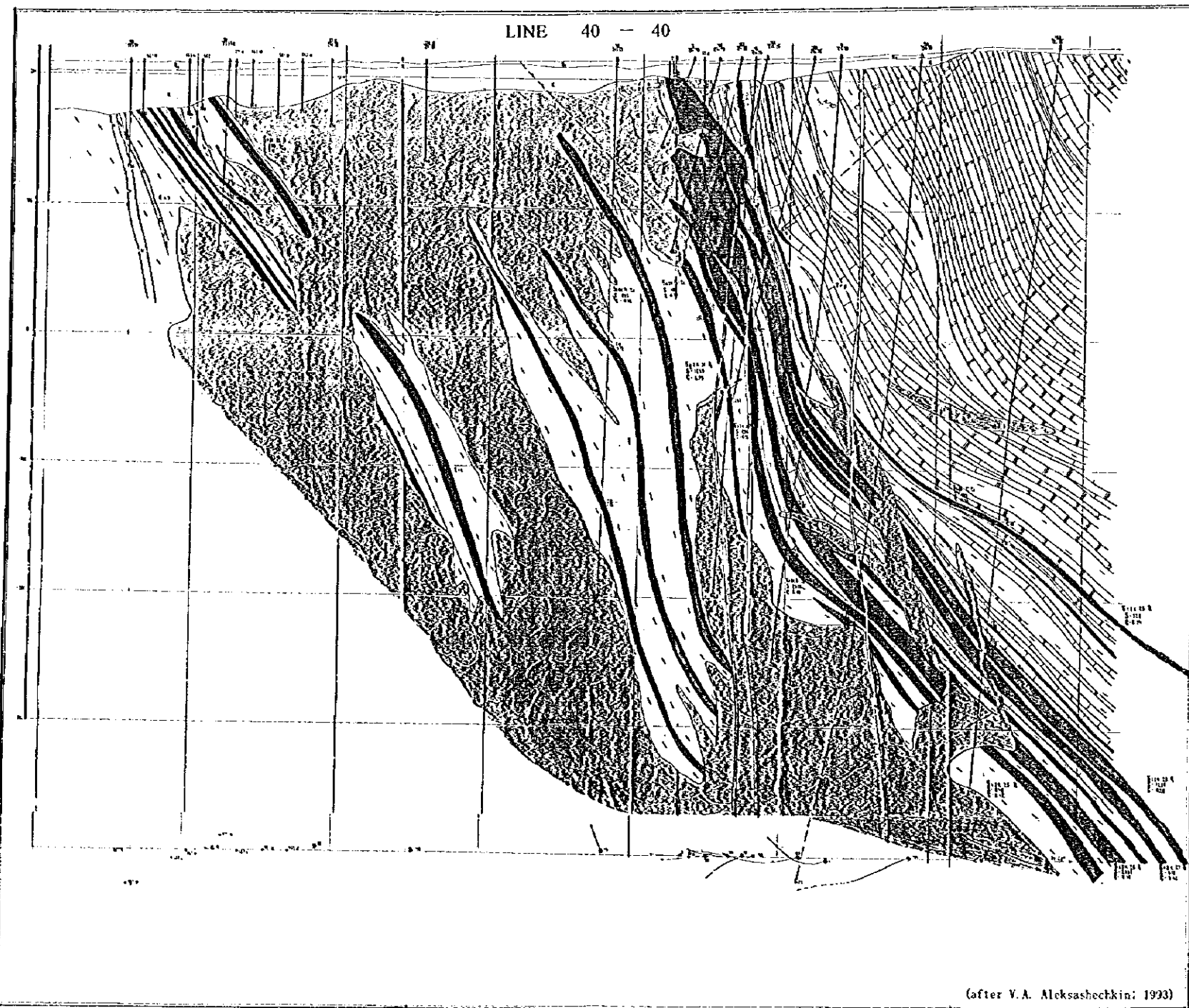
JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
FEBRUARY 1995
Prepared by MINDECO

THE MINERAL EXPLORATION
IN
THE EASTERN BUKANTAU AREA
THE REPUBLIC OF UZBEKISTAN
(PHASE I)

GEOLOGICAL CROSS SECTION (LINE 40-40)
OF THE SAUTBAY ORE DEPOSITS

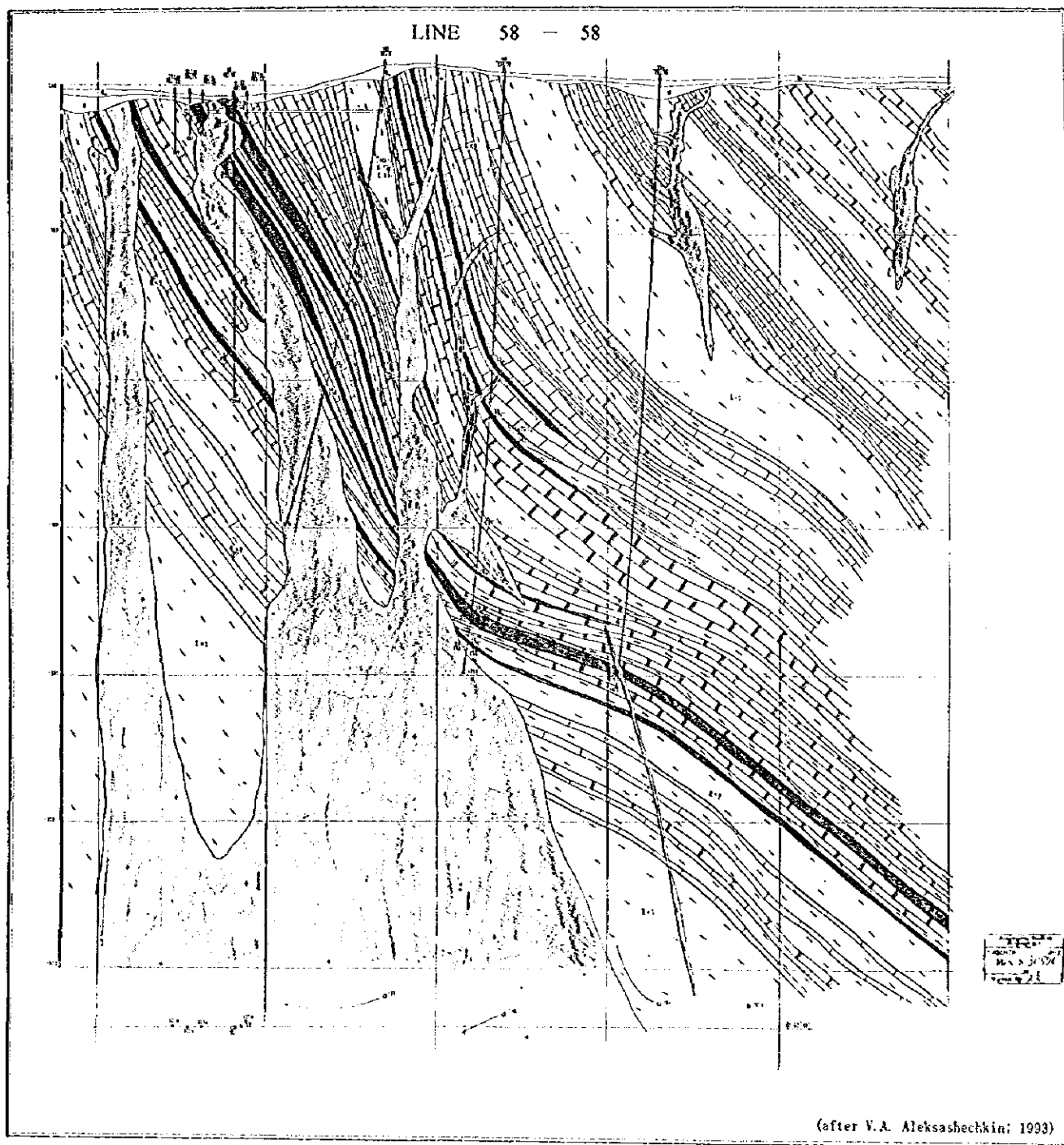


JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
FEBRUARY 1995
Prepared by MINDECO



(after V. A. Aleksashechkin: 1993)

	Quaternary deposits		Stars
	Quaternary deposits		Faults geological boundary
	Quaternary deposits		Discontinuity geological boundary
	Quaternary deposits		Faults (contracted, 6 inclined)
	Quaternary deposits		Tectonic breccias
	Quaternary deposits		Building
	Quaternary deposits		Artificial axis
	Quaternary deposits		Structural axis
	Quaternary deposits		Ore bodies (see International 70:2)
	Quaternary deposits		Prospecting line
	Quaternary deposits		Bench and striping
	Quaternary deposits		Bench profile
	Quaternary deposits		Shaft and the shafter
	Quaternary deposits		Drill holes (core, 6 a core core for mapping)
	Quaternary deposits		Drill holes (for ore, 6 a core core for mapping)
	Quaternary deposits		Projection of drill holes
	Quaternary deposits		Boundary of reserves of category C1
	Quaternary deposits		Boundary of reserves of category C2
	Quaternary deposits		Boundary of reserves of category C3
	Quaternary deposits		Data for reserve calculation
	Quaternary deposits		



	Quaternary deposits		Skins
	Cretaceous-Tertiary stage (green clays, sandstones, conglomerates)		Fresh geologic boundary
	Eopaleozoic formation (metals, gneiss, schists, limestone, dolomite, hornfels, quartz schists)		Evident geologic boundary
	Karakul formation (metals, calcinates, hornfels, schists, limestone, dolomite, siltstones)		Faults (a - traced, b - inferred)
	Layers of carbonic rocks favorable for tertiary mineralization		Tectonic breccias
	Late Permian intrusive rocks (Diorites, monzonite, diorites, diorite porphyries)		Bedding
	Bessanites		Anticlinal axis
	Early Permian intrusive rocks (metagabbro, feldspars, microdiorites)		Structural axis
	Aplites, apfite granites		Ore bodies. Ore Interval (a/b/c)
	Granodiorites		Prospecting line
	Late Carboniferous intrusive rocks (granophires)		Tremble and striping
	Cherts, quartzites		French profile
	Siltstones		Shaft and the shaft
	Dolomites		Drill holes (a) - core for mapping
	Carbonaceous siltstone schists		Drill holes (a) - core for mapping
	Carbonaceous mica quartz schists		Projection of drill holes
	Chlorite sericite quartz schists		Boundary of reserves of category C1
	Biotite (feldspar) quartz hornfels, cherts, quartzites, quartz feldspathic hornfels		Boundary of reserves of category C2
	Calc-silicate hornfels		Boundary of resources of category P1
	Amphibole feldspar hornfels		Data for reserve evaluation
	Diorites, monzonite, diorite porphyries		S1 area of the ore body. G - grade (0.1%)
	Bessanites		G1 ore reserves (1 tonne)
	Amphiboles, microdiorites		P1 (a) content (1 tonne (a/b/c))
	Aplites, apfite granites		G-grade (0.1%)
	Granodiorites		Open pit boundary
	Drill collar traces (Interval (a/b/c), number of the hole)		

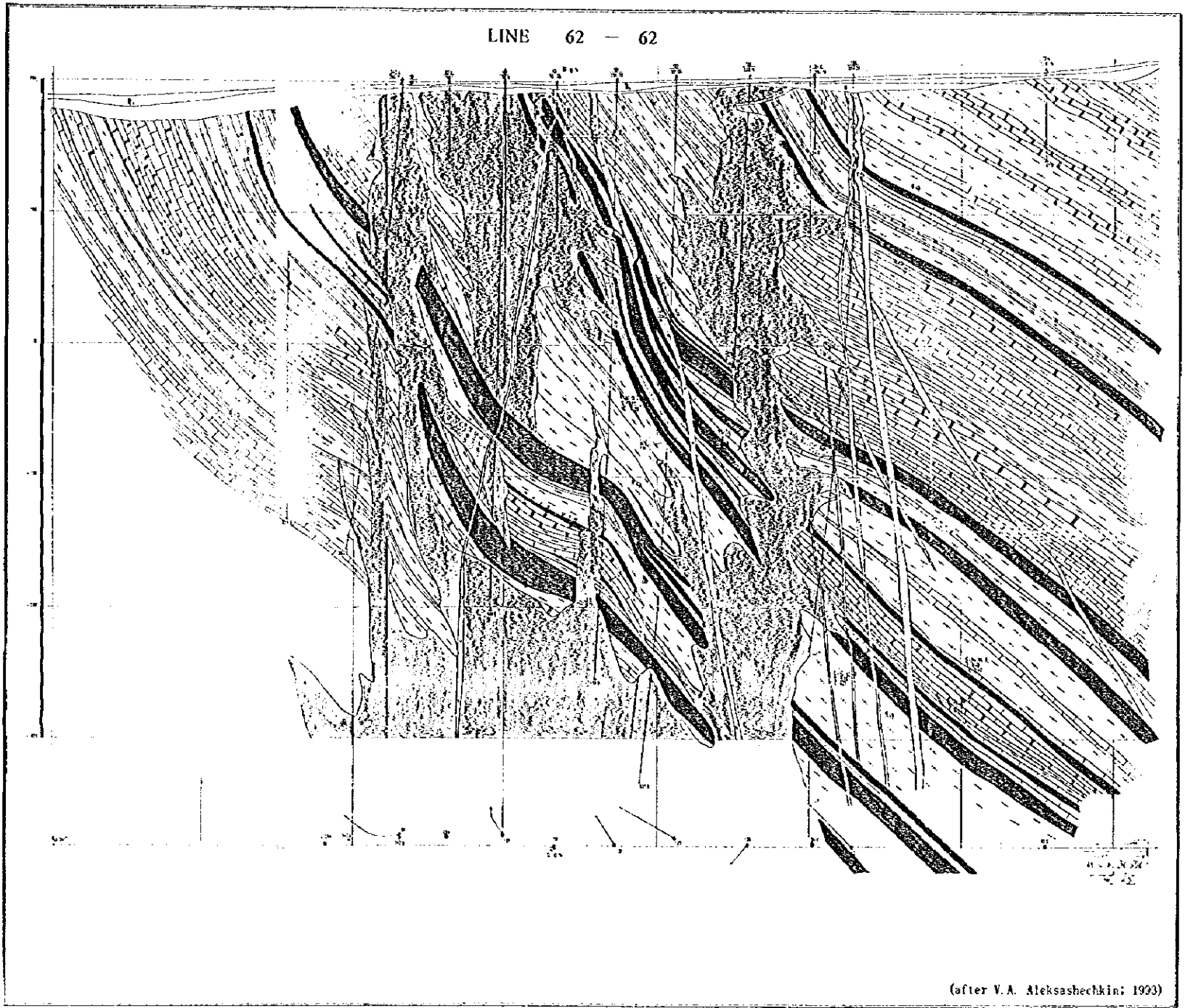
PL. II-1-4(3)

THE MINERAL EXPLORATION IN THE EASTERN BUKANTAU AREA THE REPUBLIC OF UZBEKISTAN (PHASE I)

GEOLOGICAL CROSS SECTION (LINE 58-58) OF THE SAUTBAY ORE DEPOSITS

JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
FEBRUARY 1995
Prepared by MINDECO

LINE 62 - 62

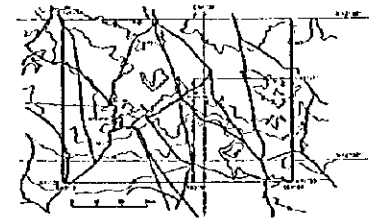
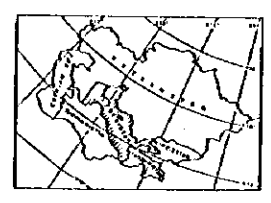


(after V.A. Aleksashechkin; 1993)

	Quaternary deposits		Skarns
	Cretaceous formation stage green clay sandstones, conglomerates		Proton geologic boundary
	Buzkays formation - metamorphosed siliceous sands, limestones, dolomites, marls, shales		Bioclastic geologic boundary
	Karakum formation - meta-volcanics, hornfels, schists, limestones, dolomites, siltstones		Faults (E - traced, O - inferred)
	Layers of carbonate rocks favorable for tungsten mineralization		Tectonic breccias
	Late Permian intrusive rocks Diorites, syeno-diorites, diorite porphyries		B. Mine
	Korantites		Anticlinal axis
	Early Permian intrusive rocks metagabbro, gabbro, lamprophyres, microdiorites		Spectral axis
	Apites apitic granites		One-billed, One-interval? (B, (A))
	Grandiorites		Prospecting line
	Late Carboniferous intrusive rocks lamprophytes		Trench and striping
	Cherts, quartzites		Trench profile
	Ektasites		Shaft and the number
	Dolomites		Drill holes (no core, 6 m interval for mapping)
	Carbonaceous siliceous schists		Drill holes (no core, 6 m interval for mapping)
	Carbonaceous mica quartz schists		Projection of drill holes
	chlorite-sericite-quartz schists		Boundary of reserves of category C1
	biotite (feldspar)-quartz hornfels cherts, quartzites, quartzite-feldspathic hornfels		Boundary of reserves of category C2
	Calc-silicate hornfels		Boundary of reserves of category P1
	Aquibole feldspar hornfels		Data for reserve calculation S: area of the ore body, G: grade, P1: P: Ore reserves (tonnes) Q: Ore reserves (tonnes) P: Metal content, tonnes in P1M C: Grade (Wt. %)
	Diorites, syeno-diorite, diorite porphyries		Open pit boundary
	Korantites		
	Lamprophytes, microdiorites		
	Apites, apitic granites		
	Grandiorites		
	Drill collar location (Interval: (W, (A)), number of the hole)		

THE MINERAL EXPLORATION
IN
THE EASTERN BUKANTAU AREA
THE REPUBLIC OF UZBEKISTAN
(PHASE I)

GEOLOGICAL CROSS SECTION (LINE 62-62)
OF THE SAUTBAY ORE DEPOSITS



JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
FEBRUARY 1995
Prepared by MINDECO