Appendices

Appendix 1 Summary of previous studies of ore-dressing tests of ores from Zhaman-Aibat and Taskura deposits (1)

##	Author of a Report	Name of Report, year of issue	Stage, sub-stage of a project, scale of survey (type of samples)	Description of survey, weight of samples, description of ore-dressing technological process	Results and effectiveness of ore-dressing technologies. Reason of low effectiveness of ore-dressing
1.	Parkhomenko L.P.	Report on assignments ## 495, 496: Studying of dressing of sulphide copper and copper-lead-zinc ores from Zhaman-Aibat deposit (samples 3, 4), Karaganda, LOPI TsLTsKNGO, 1986	Prospecting	1. Studying of ore material composition; 2. Grinding of ore before flotation; 3. Sorting of grind ore up to ± 0.074 mm; 4. Flotation of ore: - copper ore, 52 kg (sample 3), - copper-lead-zinc, 53 kg (sample 4), based on flow charts of ore-dressing facilities # 1 and # 3 of Zhezkazgantsvetmet Combine 5. Additional grinding of concentrate and intermediate products.	Copper concentrate (KM-2 brand) with copper grade 34.2% was obtained from copper ore (copper grade 2.12%) (recovery value equal to 90.1%). It was concluded, that improving quality of concentrate requires reducing consumption of foaming agents down to 60 g/t against 17-210 g/t as applied at ore-dressing facility. Three concentrates were obtained as result of dressing of copper-lead-zinc ore (grade of copper - 2.21%, lead - 1.44% and zinc - 1.83%): - copper (KM-7 brand) with copper grade 39.92% (recovery 79.1%); - lead (KS-7 brand) with lead grade 40.0% (recovery 71.0%); - zinc (KTs-6 brand) with zinc grade 48.5% (recovery 53.2%). Close intergrowth of copper, lead and zinc minerals was detected, it brings down selection in collective concentrate and results in big losses of metals in intermediate products.
2.	Malinova T.V.	Report on assignments ## 554, 556. Studying of ore-dressing of balance oxidized and sulphide copper ores from Taskura deposit (samples ## 10, 11), Karaganda, LOPI TsL TsKPGO, 1991	Prospecting-estimation	1. Studying of ore material composition; 2. Grinding of ore before flotation; 3. Screening and precipitation analysis of ore for sorting into particle size classes; 4. Flotation of ore, including oxidized ore (sample # 10) with sulphidization; 4.1. Preliminary testing of sulphurous sodium consumption and separate flotation of sand and sludge; 4.2. Testing within closed cycle as per flow chart of Zhezkazgan ore-dressing facility # 1 of Zhezkazgantsvetmet JSK	Dressing of oxidized ore (sample # 10 with weight 179.8 kg with copper grade 3.04%) resulted in obtaining copper concentrate (KM-7 brand) with copper grade 16.73% (recovery 77.70%). Sludge formation process, resulting in losses of copper in tailings of sand flotation and intermediate products. Dressing of sulphide ore (sample # 11 with weight 207.6 kg and copper grade 1.55%) resulted in obtaining copper concentrate (KM-2 brand) with copper grade 32.49% (recovery 91.88%)
3.	Malinova T.V.	Report on assignment # 590. Studying of dressing of sulphide zinc ore from Zhaman-Aibat deposit (sample # 60), Karaganda, LOPI TsL TsKPGO, 1991	Preliminary	1. Studying of ore material composition; 2. Grinding of ore before flotation; 3. Screening and precipitation analysis of ore for sorting into particle size classes; 4. Ore flotation; 4.1. Preliminary testing; 4.2. Testing within closed cycle as per flow chart and reagents regime of Zhezkazgan ore-dressing facility # 3 of Zhezkazgantsvetmet JSK	Dressing of zinc ore with sample weight 250 kg and zinc grade 1.16%, lead grade 0.33% and copper grade 0.29% resulted in obtaining 3 concentrates: - zinc concentrate (KTs-4 brand) with zinc grade 50.51% (recovery 76.36%); -lead concentrate (KS-6 brand) with lead grade 48.11% (recovery 69.01%); -copper concentrate (KM-4 brand) with copper grade 32.63% (recovery 45.52%).

Appendix 1 Summary of previous studies of ore-dressing tests of ores from Zhaman-Aibat and Taskura deposits (2)

##	Author of a Report	Name of Report, year of issue	Stage, sub-stage of a project, scale of survey (type of samples)	Description of survey, weight of samples, description of ore-dressing technological process	Results and effectiveness of ore-dressing technologies. Reason of low effectiveness of ore-dressing
4.	Raykh M.A.	Report of assignment # 593. Studying of dressing of suplhide lead ore from Zhaman-Aibat deposit (sample # 70). Karaganda, LOPI TsL TsKPGO, 1991	Preliminary exploration	1. Studying of ore material composition; 2. Grinding of ore before flotation; 3. Screening and precipitation analysis of ore for sorting into particle size classes; 4. Ore flotation; 4.1. Preliminary testing to determine consumption of xanthate; 4.2. Testing within closed cycle as per flow chart and reagents regime of Zhezkazgan ore-dressing facility # 3 of Zhezkazgantsvetmet JSK	Dressing of lead ore with sample weight 270 kg and lead grade 1.78%, copper grade 0.25% and zinc grade 0.17% resulted in obtaining lead concentrate (KS-6 brand) with lead grade 52.93% (recovery 85.84%). Tailings of lead flotation contain 18.5 g/t of silver, 18 g/t of rhenium, 0.18% of cadmium, 2.26 g/t of indium, 0.10 g/t of osmium, therefore they don't have to be wasted. They have to be directed into cycle of complex ores dressing of ore-dressing facility # 3.
5.	Ivanova N.P.	Report on assignment # 598. Studying of dressing of suplhide copper-silver ores from Zhaman-Aibat deposit (samples ## 91 and 100). Karaganda, LOPI TsL TsKPGO, 1991	Preliminary exploration	1. Studying of ore material composition; 2. Grinding of ore before flotation; 3. Screening and precipitation analysis of ore for sorting into particle size classes; 4. Pilot testing for selecting optimal degree of ore grinding, consumption f sulphurous sodium, butyne xanthate, foaming agent, re-concentration of concentrates.	Dressing of copper-silver ore - sample 91 with weight 349 kg, copper grade 1.05%, silver grade 42 g/t - resulted in obtaining copper concentrate (brand KM-1) with copper grade 48.66% (recovery 87.31%), with silver grade 2092 g/t (recovery 91.93%); - sample # 100 with weight 120 kg, copper grade 0.75% and silver grade 52 g/t - resulted in obtaining copper concentrate (brand KM-1) with copper grade 55.4% (recovery 90.74%), with silver grade 4004 g/t (recovery 90.15%).
6.	Malinova T.V.	Report on assignment # 550 Studying of dressing of 50 small-scale technological samples of copper ores from the deposit, for mapping aims (## 5-9, 13-15, 18, 19, 21-30, 32, 42-47, 50-53, 55-57, 61-64, 69, 77, 78, 80-88), Karaganda, LOPI TsL TsKPGO, 1991	Preliminary exploration	1. Studying of ore material composition; 2. Grinding of ore before flotation; 3. Screening analysis of ore of original particles size 1.0-0.0 mm; 4. Screening and precipitation analysis of ore for sorting into particle size classes; 5. Testing of flotation within closed cycle as per flow chart of Zhezkazgan ore-dressing facility # 1 Sample weight from 5 to 28 kg.	The ores can be processed at ore-dressing facility # 1. Dressing of those ores requires finer degree of grinding; chalcopyrite ores with increased content of pyrite require different reagent regime (providing depressing pyrite). There is an opportunity to dress off-balance copper sulphide ores, obtaining concentrates KM-6 and KM-3. Highest content of silver (1094.5 g/t - average for 5 samples) is contained in KM-3 concentrate from off-balance copper ore from the Northern deposit, which is typical only for rich copper ores of the same deposit.
7.	Shamaeva T.S.	Report on assignment # 550[a]. Studying of ore-dressing of 30 small-scale technological samples of zinc, lead-zinc, copper-lead, copper-lead-zinc and copper-zinc ores from Zhaman-Aibat deposit, Karaganda, LOPI TsL TsKPGO, 1991	Preliminary exploration	1. Studying of ore material composition; 2. Grinding of ore before flotation; 3. Screening and precipitation analysis of ore for sorting into particle size classes; 4. Ore flotation; 4.1. Carrying out of preliminary testing; 4.2. Carrying out of flotation testing as per established flow chart and reagent regime; 5. Chemical assaying of original ore,	All ores can be dressed at ore-dressing facility # 3, except zinc ores, that require separate technology and reagent regime. Ores of the Central and Northern deposit are favorable for dressing. Deep grinding of ore or intermediate product is required; pyrite has to be extracted into pyrite concentrate.

Appendix 1 Summary of previous studies of ore-dressing tests of ores from Zhaman-Aibat and Taskura deposits (3)

##	Author of a Report	Name of Report, year of issue	Stage, sub-stage of a project, scale of survey (type of samples)	Description of survey, weight of samples, description of ore-dressing technological process	Results and effectiveness of ore-dressing technologies. Reason of low effectiveness of ore-dressing
				intermediate products due to small weight of samples (5-16 kg) 6. Description of metrological (instrumentation) support for research	
8.	Ivanova N.P.	Report on assignment # 603. Studying of dressing of lead ore from Zhaman-Aibat deposit (sample # 105). Karaganda, LOPI TsL TsKPGO, 1991	Preliminary exploration	1. Studying of ore material composition; 2. Grinding of ore before flotation; 3. Ore flotation tests with screening and precipitation analysis of ore with particles size as required for flotation; 4. Ore flotation tests within closed cycle 5. Description of required instrumentation	Dressing of lead ore (sample # 105, weight 126 kg with lead grade 1.13%) as per established flow chart resulted in producing standard lead concentrate (KS-3a brand, as per OST 48-92-75 or KS-2 as per OST 48-92-75), option #1-5 with lead grade 62.37% (recovery 90.08%). Galena is highly active for flotation. Ore is classified as easily dressible.
9.	Shamaeva T.S.	Addition to the Report on assignment # 550[a]. Results of testing dressing of sulphide lead ore in small-scale technological sample # 121. LOPI TsL TsKPGO, 1992	Preliminary exploration	1. Studying of ore material composition; 2. Grinding of ore before flotation; 3. Screening and precipitation analysis of ore with particles size as required for flotation; 4. Ore flotation as per flow chart and reagents consumption regime established at Zhezkazgan ore-dressing facility # 3; 5. Phase semi-quantitative spectral analysis of original ore from the deposits: Central one - 12 samples (## 59, 65-68, 73, 74, 89, 90, 94, 99, 103); Northern one - 10 samples (16, 17, 33-36, 49, 54, 75, 76); Eastern one - 7 samples (12, 20, 39-41, 58, 72)	Dressing of lead ore in sample 121 with weight 8 kg and lead grade 1.18% and copper grade 0.28% resulted in producing two concentrates: - lead concentrate - (KS-4 brand) with lead grade 70.79% (recovery 85.44%) and copper grade 3.57; - copper concentrate - (KM-7 brand) with copper grade 16.76% (recovery 54.51%) and lead grade 4.86%. The ore can be dressed at Zhezkazgan ore-dressing facility # 3.
10.	Malinova T.V.	Addition to the Report on assignment # 550. Studying dressing of 12 small-scale technological samples of copper ores from Zhaman-Aibat deposit for mapping purposes (samples ## 92, 93, 95-98, 101, 102, 104, 106, 111, 112). LOPI TsL TsKPGO, 1992	Preliminary exploration	1. Studying of ore material composition; 2. Grinding of ore before flotation; 3. Screening analysis of ore with initial particles size 1.0-0.0 mm 4. Screening and precipitation analysis of ore with particles size as required for flotation; 5. Flotation tests within closed cycle as per flow chart, established at Zhezkazgan ore-dressing facility # 1. Samples weight from 5 to 22 kg. 6. Technological parameters related to distribution of accessory valuable and hollow components (silicates) in ore-	Ores can be dressed at Zhezkazgan ore-dressing facility # 1. Finer degree of grinding is required for ore-dressing. There is an opportunity to dress off-balance copper sulphide ores obtaining concentrates of KM-5 and KM-2 brand. Concentrate produced of 2 off-balance samples of ore from the Northern deposit contain the highest content of silver 1101 and 1816 g/t (silver grade in original ore is equal to, accordingly, to 19.8 and 25.3 g/t, which is typical only for rich ores.

Appendix 1 Summary of previous studies of ore-dressing tests of ores from Zhaman-Aibat and Taskura deposits (4)

##	Author of a Report	Name of Report, year of issue	Stage, sub-stage of a project, scale of survey (type of samples)	Description of survey, weight of samples, description of ore-dressing technological process	Results and effectiveness of ore-dressing technologies. Reason of low effectiveness of ore-dressing
				dressing products of both those 12 samples and additionally 50 more previously studied samples.	
11.	Malinova T.V.	Report on assignment # 610. Studying of dressing of balance sulphide copper ore of Taskuduk Formation from Zhaman-Aibat deposit (sample # 119), LOPI TsL TsKPGO, 1992	Preliminary exploration	1. Studying of ore material composition; 2. Grinding of ore before flotation; 3. Screening analysis of initial ore with particles size 1.0-0.0 mm; 4. Screening and precipitation analysis of ore with particles size as required for flotation; 5. Preliminary testing of 5 weighted portions within closed cycle as per flow chart and reagents regime of Zhezkazgan ore-dressing facility # 1; 6. Testing within closed cycle of 10 weighted portions as per established flow charts and regime 7. Description of metrological (instrumentation) support	Dressing copper ore in sample 119 with weight 145 kg and copper grade 1.90%, lead grade 0.12% from lower ore horizons, resulted in obtaining copper concentrate (KM-2 brand) with copper grade 32.07% (recovery 91.28%) and lead grade 1.68%. Ore is suitable for dressing at Zhezkazgan ore-dressing facility # 1.
12.	Malinova T.V.	Report on assignment # 550[b]. Studying of dressing of small-scale samples of sulphide ore with native copper from Zhaman-Aibat deposit (samples ## 113, 114, 115, 116-mixed). LOPI TsL TsKPGO, 1992	Preliminary exploration	1. Studying of ore material composition; 2. Grinding of ore before flotation; 3. Screening analysis of initial ore with particles size 1.0-0.0 mm; 4. Screening and precipitation analysis of ore with particles size as required for flotation; 5. Preliminary tests; 5.1. Ore dressing within open cycle as per flotation-gravity and gravity-flotation pattern; 5.2. Tests within closed cycle as per flotation flow-chart; 5.3. Tests as per gravity technology of dressing native copper by hydrocyclon.	Ores are suitable for dressing at Zhezkazgan ore-dressing facility # not only by gravity method, but also by flotation method. Flotation resulted in obtaining copper concentrates: - in sample # 113 with weight 22.3 kg with copper grade 1.33% - KM-2 brand concentrate with copper grade 31.67% (recovery 91.90%); - in sample # 114 with weight 15.4 kg and copper grade 1.96% - KM-0 concentrate wit copper grade 44.04% (recovery 93.93%); - in sample # 115 with weight 17.6 kg and copper grade 3.61% - KM-0 brand concentrate with copper grade 50.83% (recovery 94.07%); - in sample 116-mixed - KM-0 copper concentrate with copper grade 44.46% (recovery 93.82). Gravity method for sample 116-mixed resulted in obtaining KM-0 copper concentrate with copper grade 81.47% (recovery 61.11%). Gravity products are suggested to be additionally extracted by flotation method.
13.	Pack V.P., Chalova R.T., Krukova E.I., et. al.	Report on testing in large-scale laboratory conditions of dressing two ore samples from Zhaman-Aibat	Preliminary exploration	1. Studying of ore material composition in small-scale laboratory sample # 5[a] with weight 268 kg and # 6[a] with weight 184 kg;	Applying flotation for ore dressing shows acceptable technological parameters: obtaining copper concentrate from copper ore, with copper grade 32-35% (recovery 91-92%); from complex (copper-lead) ore - copper concentrate with copper grade

Appendix 1 Summary of previous studies of ore-dressing tests of ores from Zhaman-Aibat and Taskura deposits (5)

##	Author of a Report	Name of Report, year of issue	Stage, sub-stage of a project, scale of survey (type of samples)	Description of survey, weight of samples, description of ore-dressing technological process	Results and effectiveness of ore-dressing technologies. Reason of low effectiveness of ore-dressing
		deposit as per flow charts of Zhezkazgan Mining and Smelting Combine providing complex utilization of raw materials. Almaty, KazNIIMS, 1991.		2. Laboratory testing of dressing of ore samples ## 5[a] and 6[a]; 3. Large-scale laboratory testing of dressing ore in sample of copper ore # 311 with weight 4640 kg and copper-lead ore # 71 with weight 6192 kg; 4. Designing of recycled water supply system for dressing ore from Zhaman-Aibat deposit; 5. Estimation of dressing properties in big chunks of copper ore by technique of r X-ray separation; 6. Assessment of waste-less technology of ore-dressing providing utilization of tailings of ore-dressing for production of construction materials	39-41% (recovery from ore 82-83%) and lead concentrate with lead grade 42-43% (recovery from ore 72-73%). Recycled and underground water from Zhezkazgan can be used as sources of water supply for flotation. It is expedient to include a step of preliminary ore concentration (by medium-heavy and X-ray separation) into ore-dressing flow-chart, having made prior assessment in the course of further exploration. Tailings, remaining from ore-dressing can be utilized for production of porous concrete (50 and 75 brand) (50% of tailings with addition of lime (15%) and powdered aluminum (0.03%) and water.
14.	Ospanova G.	Report on laboratory studies of geo-technological technologies of extraction of copper an accessory components from ores of Zhaman-Aibat deposit; flow charts for processing of productive solutions; feasibility estimation and selecting of the appropriate option for leaching out of copper, copper-lead, copper-silver ores in three samples with weight 50 kg each. Almaty, MTsNK-Interntional Laboratory, Kazakhstan branch, 1992.	Preliminary exploration	1. Analyzing the status of a problem and possibilities of leaching-out of copper from poor ores; 2. Studying material composition of ores in three samples (107, 108, 109); 3. Studying of leaching-out of copper and accessory components: - in agitation regime, - in percolation regime; 4. Working out of technologies for processing of productive solutions based on copper: - by cementation method, - by extraction method, - by sorption method; 5. Description of metrological (instrumentation) support.	In agitation regime the biggest influence onto extraction of copper, lead, zinc and silver into productive solution is produced by hypochlorite-ions (recovery of copper 90.0-95.1%, lead 85.7-97.3% and silver 81.4-95.3%). Regime of percolation in HCl media with hypochlorite-ion additives leads to full transformation of ore with recovery of copper, lead and silver 98-100% into productive solution. Highest extraction of copper from productive solution was reached using cementation sedimentation - 97%, extraction and sorption methods are similar - complete copper extraction 83.0-83.4%.
	Pack V.P., Chalova R.T.	Reference report on laboratory testing of ore-dressing of strontium-containing rocks from Zhaman-Aibat field. Almaty, KazNIIMS, 1992	Preliminary exploration	1. Studying of material composition of the sample 110 with the weight 240 kg; 2. Grinding of the sample; 3. Screening analysis of the sample 4. Studying of ore dressing as per flow chart for dressing celestine ore of Aurtash, Aryk deposits by gravity method.	Applying gravity technology for dressing sample of strontium-containing rocks with strontium grade 0.26% resulted in obtaining concentrate with strontium grade 2.14% (recovery from ore 25.15%). Mineralogical analysis detected no celestine. Strontium was presumably correlated to rock-forming minerals - quartz, feldspar, calcite. Further studying of technology of strontium extraction are inexpedient due to its low grade in original ore.

Appendix 1 Summary of previous studies of ore-dressing tests of ores from Zhaman-Aibat and Taskura deposits (6)

##	Author of a Report	Name of Report, year of issue	Stage, sub-stage of a project, scale of survey (type of samples)	Description of survey, weight of samples, description of ore-dressing technological process	Results and effectiveness of ore-dressing technologies. Reason of low effectiveness of ore-dressing
	Ginatullin A.M.	Report on geological and technological modeling based on data from Zhaman-Aibat deposit. Almaty, KOME, 1992	Preliminary exploration	1. Collecting and summarizing, statistical and correlation analysis of initial data (geological, chemical assay, mineralogical, ore-dressing), assessment of their variation; 2. Setting criteria (mathematical models) for estimating values of ore-dressing parameters, contents of minerals-concentrators, as based on ore composition; 3. Modeling of expected values of copper recovery into copper concentrate and bornite content in copper ore; 4. Compiling balance for breakdown of main and accessory components per minerals and ore-dressing products in 22 small-scale and laboratory samples (## 5, 6a, 19, 27-29, 31, 44, 57, 60, 63, 66, 69-71, 77, 82, 83, 85, 87, 99, 100)	1. Intervals of values of expected copper recovery into concentrate and content of bornite in ore were determined from chemical assay data based on worked out logic systems; correlation with experimental data was high. 2. Behavior of main and accessory components in the process of processing raw materials from ore to concentrate (including losses in wasted tailings separately for each type of ore) was analyzed based on compiled balances of breakdown of 22 samples. 3. The conclusion was made on expediency of further ore-dressing test and related testing. 4. It is recommended to continue geological and technological modeling at PC, including compiling maps of contours of expected ore-dressing parameters and preparation of balances of elements breakdown into ore minerals and ore-dressing products.
	Baybatchayev A.B.	Concluding Report on mining-geological conditions and mining-technological properties of development of Zhaman-Aibat deposit. Karaganda, KarPTI, 1990	Preliminary exploration	1. Field engineering-geological description of core in 25 exploration wells, including two benchmark-parametric wells (## 441 and 457) throughout total depth of drilling. 2. Analyzing and summarizing data of laboratory and geophysical studies of physical and mechanical rock properties. 3. Metrological (instrumentation) description. 4. The following issues have been defined and studied: 4.1. lithological types of rocks (at thin sections - 121 pieces); 4.2. Hydrophysical properties of rocks (at 146 samples); 4.3. strength properties of rocks (528 samples); 4.4. elastic-deformation properties of rocks (at 306 samples); 4.5. technical properties of rocks (284 samples);	Engineenng-geological zonation of Zhaman-Aibat deposit (at the stage of preliminary exploration) was worked out based on complexity of mining-geological conditions and shock hazard for stripping and development. As per classification of engineering-geological conditions (VSEGINGEO), the deposit falls within V type. Based on difficulty of studying, the deposit is referred to deposits of medium difficulty. Based on complexity of engineering-geological conditions for stripping and development the deposit is characterized as having medium complexity (type 3b). Simple and medium complex areas with ore reserves (over 90%) are located at depths with potential shock hazard of rocks and ores. The deposit can be developed by underground mining applying breast-pillar system.

Appendix 1 Summary of previous studies of ore-dressing tests of ores from Zhaman-Aibat and Taskura deposits (7)

##	Author of a Report	Name of Report, year of issue	Stage, sub-stage of a project, scale of survey (type of samples)	Description of survey, weight of samples, description of ore-dressing technological process	Results and effectiveness of ore-dressing technologies. Reason of low effectiveness of ore-dressing
				4.6. drillability of rocks (102 samples from 12 wells); 4.7. physical and mechanical properties as determined by acoustic logging in 27 wells; 4.8. shock hazard of rocks (at 12 samples from 4 wells); 4.9. classifying areas as per stripping conditions and conditions for the deposit development.	

Appendix 2 Assay Results of Samples from the Zhaman-Albat Ore Deposit.

Serial No.	Sample No.	Au (g/t)	Ag (g/t)	Cu (%)	Pd (%)	Zn (%)
1	2		6	2.09	0.01	0.01
2	3		13	4.82	<0.01	<0.01
3	4		8	3.2	0.01	<0.01
4	5		7	2.62	<0.01	<0.01
5	6	<0.1	19	5.16	0.01	<0.01
6	10		5	1.56	<0.01	0.01
7	13		22	4.28	0.02	0.01
8	14		60	8.99	0.03	<0.01
9	17		24	6.24	<0.01	<0.01
10	19		11	2.43	0.05	<0.01
11	21	<0.1	26	5.49	0.1	<0.01
12	22		25	5.28	<0.01	<0.01
13	23		15	3.72	0.16	<0.01
14	24		8	1.62	1.4	<0.01
15	28		14	7.04	0.01	<0.01
16	30		4	1.56	<0.01	<0.01
17	33		47	0.96	<0.01	<0.01
18	34		44	0.92	<0.01	0.01
19	35		8	4.42	<0.01	<0.01
20	36	<0.1	<1	0.78	<0.01	<0.01
21	41	<0.1	<1	2.88	0.01	<0.01
22	42		3	1.43	<0.01	<0.01
23	43		10	2.49	0.26	<0.01
24	44		10	2.24	0.81	<0.01
25	45		67	12.1	0.03	<0.01
26	46	<0.1	26	6.24	<0.01	<0.01
27	47		24	6.32	<0.01	0.01
28	48		5	1.43	0.13	<0.01
29	49		13	3.81	0.04	<0.01
30	50		17	4.02	<0.01	0.01

Appendix 2 Assay Results of Samples from the Zhaman-Aibat Ore Deposit, (continued)

Serial No.	Sample No.	Au (g/t)	Ag (g/t)	Cu (%)	Pd (%)	Zn (%)
1	1	<0.1	2	0.25	0.38	0.01
2	7		<1	0.23	<0.01	0.01
3	8		2	0.5	<0.01	0.01
4	9		2	0.63	0.06	0.02
5	11	<0.1	1	<0.01	<0.01	0.01
6	12		4	0.56	<0.01	0.01
7	15		1	0.35	<0.01	<0.01
8	16	<0.1	2	0.37	0.5	0.07
9	18		2	0.43	<0.01	<0.01
10	20		<1	0.39	0.09	0.01
11	25		<1	0.19	0.02	<0.01
12	26	<0.1	<1	0.34	0.8	<0.01
13	27		<1	0.24	0.04	<0.01
14	29		<1	0.46	<0.01	<0.01
15	31	<0.1	2	0.59	<0.01	<0.01
16	32		298	0.09	<0.01	<0.01
17	37			0.07	0.01	0.16
18	38			0.64	0.01	0.3
19	39			0.07	0.06	0.39
20	40			0.15	0.17	0.07

Appendix 3 Whole Rock Analysis of Samples from the Zhaman-Aibat Ore Deposit

Sample No.	DDM No.	Depth m	Formation	SiO_2 (%)	Al_2O_3 (%)	TiO_2 (%)	Fe_2O_3 (%)	FeO (%)	CaO (%)	MnO (%)	Na_2O (%)	MgO (%)	K_2O (%)	P_2O_5 (%)	LOI (%)	Total (%)
WRA- 1	664	74.5	P_1kn	21.2	4.01	0.2	0.76	1.53	32.5	0.11	1.45	6.98	0.97	0.1	29.7	99.51
WRA- 2	577	130	$P_{1-2}d$	66.1	12	0.6	4.07	0.61	3.92	0.09	4.79	1.23	2.1	0.14	3.92	99.57
WRA- 3	577	378	C_3dz	68.8	12.7	0.57	2.68	1.1	2.8	0.08	4.83	1.07	1.33	0.12	3.46	99.54
WRA- 4	584	404.6	C_3dz	66.5	12.1	0.42	0.71	1.52	4.96	0.12	4.53	1.08	1.72	0.11	5.01	98.78
WRA- 5	389	601.8	C_3dz	65.4	12.6	0.55	0.95	2.88	4.27	0.12	4	1.78	1.61	0.15	4.72	99.03
WRA- 6	593	601.9	C_3dz	60.2	16.7	0.64	1.88	4.43	1.63	0.13	1.63	2.65	3.95	0.16	4.79	98.79
WRA- 7	577	972	C_2ts	49.2	11.4	0.39	2.14	0.87	12	0.08	5.05	1.73	0.5	0.11	3.58	87.05
WRA- 8	753	830	C_2ts	62.8	16.2	0.73	4.75	0.85	1.41	0.03	3.94	2.14	3.28	0.15	3.06	99.34
WRA- 9	584	827.8	C_2ts	63.8	15.5	0.61	1.33	3.48	1.15	0.09	3.97	3.37	2.29	0.15	3.13	98.87
WRA-10	373	1045	C_{1v3-5}	27.9	5.39	0.22	0.65	1.47	34	0.16	0.76	1.07	1	0.16	26.9	99.68

Appendix 4 Microscopic Observation of Polished Sections from the Zhaman-Aibat Ore Deposit (1)

Sample No.	DDH No.	Depth from (m)	Depth to (m)	Orebody /Horizon	Ore Type	Observation	Mineral composition (%) nCu	nAg	Cp	Bn	Cc	Dg	Cv	Py	Cl	Sp	Gn	Gr	UNK
P-1	179	643.5	644.05	Central/4-I	Cu ore	Main constituent minerals are bornite, chalcopyrite, sphalerite and galena, and small amounts of digenite, covellite and native silver are also identified under the microscope. These minerals, as an aggregate, fill parts of interstices of clastic particles.	<1			60	30	<1	<1			5	5		
P-2	719	629.45	630	Central/4-I	Cu ore	Chalcopyrite, pyrite and a small amount of goethite occur as interstices-filling minerals among clastic grains. Anhedral grains of pyrite are included in intersitial chalropyrite.			95					5	<1				
P-3	500	635.3	635.8	Eastern/3-V	Cu ore	Native copper and a small amount of digenite fill the interstices of clastic particles.	95					5							
P-4	296	575.5	576	Eastern/4-I	Cu ore	Aggregates of chalcocite and digenite fill the interstices of clastic particles. Digenite occasionally occurs as lamella in chalcocite.					60	40							
P-5	500	635.8	636.6	Eastern/3-V	Cu ore	Round aggregates of chalcocite and a small amount of digenite occur interstitially. Digenite is sometimes observed as lamella digenite in chalcoite aggregates.					95	5							
P-6	500	624.9	625.7	Eastern/3-VI	Cu ore	Pyrite and small amounts of chalropyrite, covellite and goethite fill the interspaces of clastic particles. Chalcopyrite and covellite occur toghter as veinlets within interstitial pyrite.			10				<1	80	5				
P-7	593(II)	587.7	588.2	Eastern/4-I	Cu ore	Chalropyrite and small amounts of bornite and covellite fill parts of the intersaces of clastic particles. Bornite is often included in intperstitial chalcopyrite, and covellite occurs along fissures of some of rims of chalcopyrite.			95	5			<1						
P-8	380(II)	620.9	621.4	Central/4-I	Cu-Ag ore	Chalcocite, bornite, digenite and small amounts of native silver, covellite and an unkwoun mineral are constituent minerals. Chalcocite and bornite occur together, and are often found as graphic texture up to 12mm in max. size. Small grains of native silver (10-40 μm in size) are contained in digenite. An unknown mineral occurs as lamella in chalcocite. It's optical properties are: slightly darker than chalcocite, distinctly birefectant (creamy olive to bluish grey), and weakly anisotropic.		<1		40	50	10	<1						1
P-9	373	681.5	682.5	Central/4-I	Cu-Ag ore	Bornite, chalcopyrite, chalcocite, pyrite, native silver, digenite and covellite fill the interspaces of clastic particles. Small grains of native silver (40-50 μm in size) are found in the assemblage of bornite, chalcocite and digenite.		5	25	40									
P-10	179(XXXVI)	636.5	637.4	Central/4-I	Cu-Pb ore	Galera and small amounts of pyrite, bornite, chalcocite, digenite, germanite series mineral (probably colusite?) occur interstitially among clastic particles. Small grains of native silver (20-40xm in size) are contained in galena grains. Germanite series minerals is brownish grey in color, slightly lighter than bornite, and isotropic. It is associated with bornite and galena.		<1		10	5	5		15			60	5	

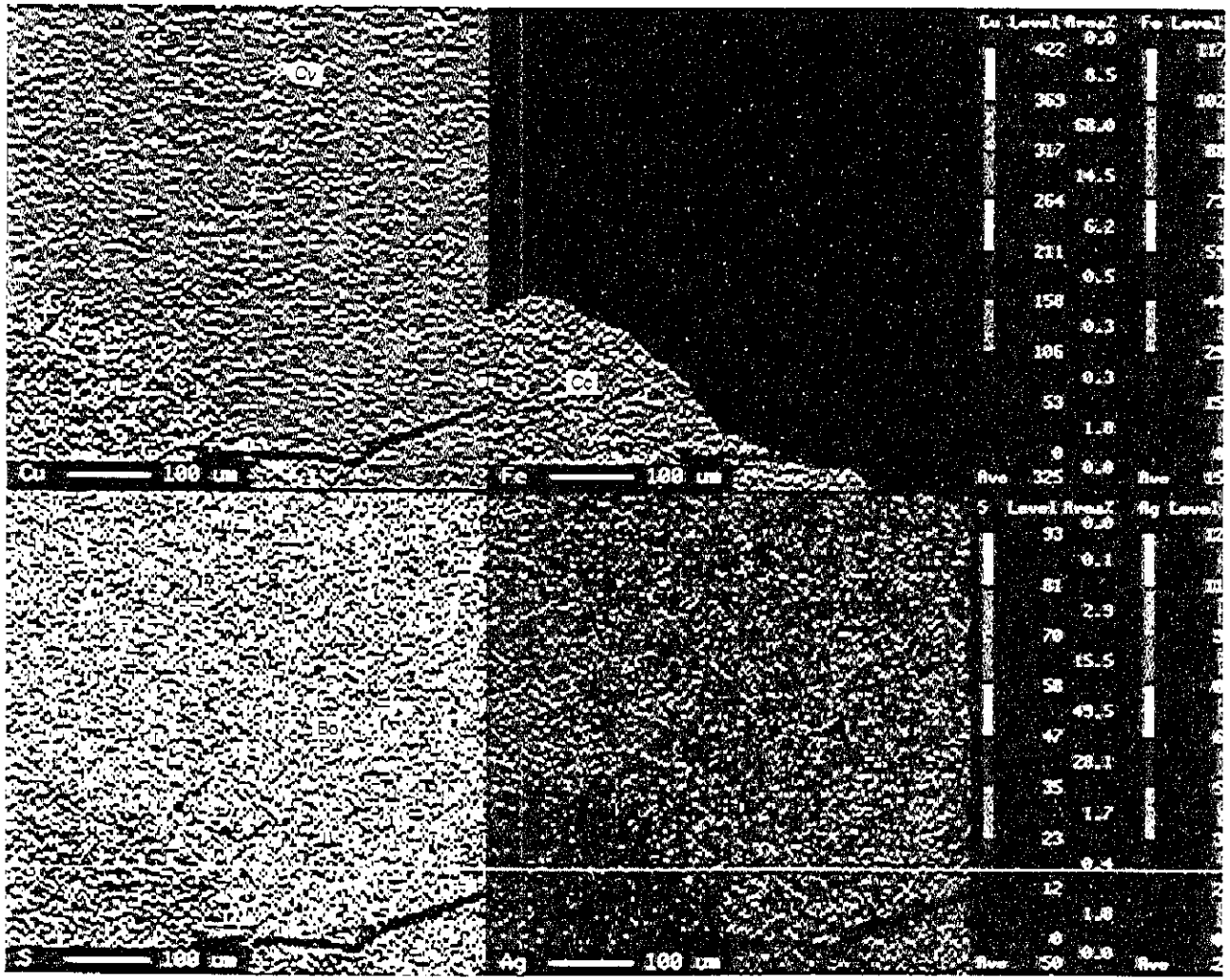
Appendix 4 Microscopic Observation of Polished Sections from the Zhaman-Aibat Ore Deposit (2)

Sample No.	DDH No.	Depth from (m)	Depth to (m)	Orebody /Horizon	Ore Type	Observation	Mineral composition (%) nCu	nAg	Cp	Bn	Cc	Dg	Cv	Py	Gt	Sp	Gn	Gr	NK
P-11	500	628.2	628.7	Eastern/3-VI	Cu-Pb ore	Constituent minerals are bornite, chalcocite and small amounts of digenite and galena. Bornite and chalcocite occasionally occur as graphic texture.				50	30	10					10		
P-12	552(IV)	662.5	663.4	Northern/4-I	Cu-Pb ore	Galena, pyrite and a small amount of goethite fill the interspaces of clastic particles. Large grains or aggregates of galena(about 8mm × 5mm in size) include prismatic crystals (0.2-1.2mm in length) of gangue minerals.								40	<1		60		
P-13	T-5	17.5	18.5	Taskura	Cu ore	Chalcocite, digenite and small amounts of chalcopyrite, covellite, pyrite, sphalerite and bornite are constituent minerals. Chalcopyrite and bornite occur as relicts in the assemblage of chalcocite, digenite and covelbite.			10	5	35	20	10	10		10			

nCu native copper
nAg native silver
Cp chalcopyrite
Bn bornite
Cc chalcocite
Dg digenite
Cv covellite
Gr(?) germanite series mineral(?)(probably colusite)
Py pyrite
Gt goethite
Sp sphalerite
Gn galena
UNK unknown mineral

Appendix 5 Microscopic Observation of Thin Sections from the Zhaman-Aibat Ore Deposit

Sample No.	DDH No.	Depth(m)	Formation	Rock Name	Macroscopic Feature	Microscopic Feature	Identified Minerals
TS-1	838	314.0	C₃dz	Very fine-grained sandstone (Red sandstone)	Poor sorting. Average diameter:0.08mmφ	Matrix:carbonitization	Quartz:angular, 40%, Feldspar:plagioclase, K-felkspar, 40%, Muscovite, Opeque minerals, Goethite(?)
TS-2	710	673.2	C₃dz	Carbonatized conglomerate ("Raimundo" conglomerate)	Pebble size congls. :Max. dia., 95mmφ, volcanic rocks, Limestone (micrites), Chert	Matrix:carbonatization	
TS-3	584	381.2	C₃dz	Laminated very fine-grained sandstone (Grey sandstone)	Average diameter:0.06mmx	Matrix:carbonitization	Quartz:angular, 20%, Feldspar:plagioclase, Opeque minerals, Calcite (20%)
TS-4	776	528.8	C₃dz	Very fine-grained sandstone (Grey sandstone)	Average diameter:0.1mmφ	Matrix:carbonitization	Quartz:angular, 40%, Feldspar:plagioclase, K-feldspar, 40%, Others:chlorite, Goethite(?)
TS-5	508	732.0	C₂ts	Carbonatized conglomerate ("Interformational conglomerate")	Pebble size congls. :Max. dia. 10mm×6mm Limestone (micritic), Chert, Sandstone	Matrix:carbonitiaztion, quatz, plagioclase, K-feldspar, chlorite, etc.	
TS-6	577	912.0	C₂ts	Fine grained sandstone (Red sandstone)	Average diameter:0.18mmφ	Matrix:carbonitization	Quartz:angular, 30%, Feldspar:plagioclase, K-feldspar, 40%, Chlorite, Goethire, Biotie
TS-7	584	740.5	C₂ts	Coarse-grained siltstone (Green aleurolite)	Average diameter:0.05mmφ	Matrix:carbonitization	Quartz:angular, 20%, Feldspar:plagioclase, K-feldspar, 20%, Muscovite, Chlorite, Opeque minerals
TS-8	584	811.8	C₁s	Fossiliferous limestone (Biomicrite)	Fossils:brachiopods, molluscs, etc.	Micritic	Calcite, Opeque minerals, etc.
TS-9	664	74.5	P₁kn	Coarse-grained siltstone ("Marl")	Average diameter:0.05mmφ Rocks fragment:limestone, chert, volcanic rocks	Matrix:carbonitization	Quartz:angular, 20% Feldspar:plagioclase, K-feldspar, Perthire(?), 10%, Chlorite, Opeque minerals
TS-10	577	130.7	P₁zd	Coarse-grained sandstone (Red-sandstone)	Average diameter:0.5mmφ Rock fragment:limestone, chert, volcanic rocks	Matrix:carbonitizaton	Quartz:angular, 40%, Feldspar:plagioclase, K-feldspar, Perthire(?), 40%, Rock fragment:10%, Others:10%, (calcite: 10%)



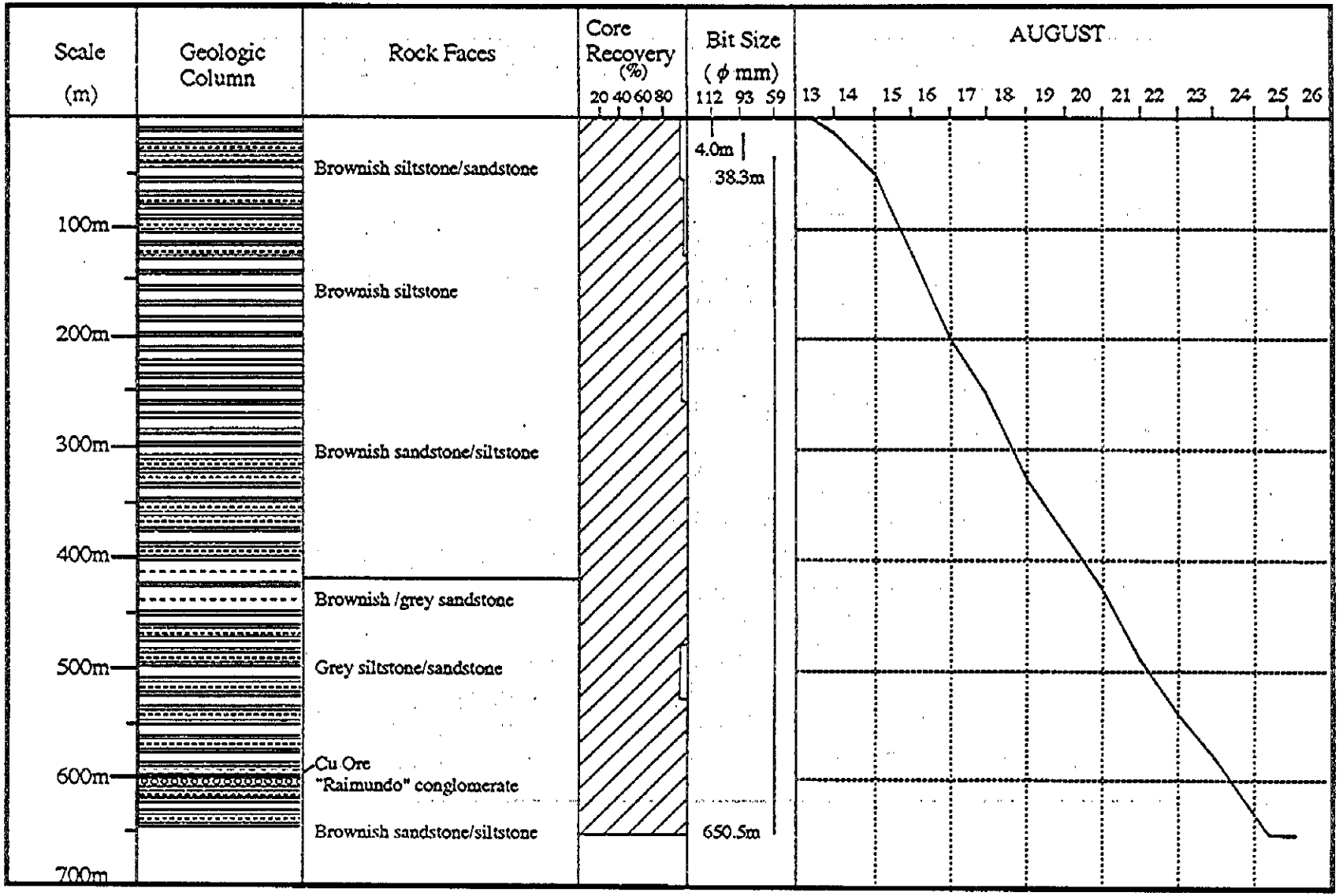
Sample No. : 95-EP-03
Location : Zhezkazgan South Mine
Ore type : Cu Ore
Minerals :
Cc : chalcocite
Bo : bornite
Cv : covellite

Appendix 6 Electron Microprobe X-ray Color Image of the High Grade Ore in the Zhezkazgan Mine

Appendix 7 Assay Results of Check Analysis of Ore Samples from the Zhaman-Aibat Ore Deposit

Sample Location				Dzezukazgan Labs				Chemex Labs				
Drill No.	Spl. No.	From (GL-m)	To (GL-m)	Cu %	Pb %	Zn %	Ag g/t	Cu %	Pb %	Zn %	Ag g/t	Au g/t
364	16624	621.20	621.70	1.65	<0.05	<0.05	4.2	1.65	<0.01	0.02	4.1	<0.005
364	16625	621.70	622.30	3.70	<0.05	<0.05	16.5	3.62	0.01	<0.01	10.5	<0.005
364	16626	622.30	622.80	11.06	<0.05	<0.05	50.0	10.20	0.02	<0.01	42.3	<0.005
364	16627	622.80	623.30	5.53	<0.05	<0.05	35.0	5.46	0.01	<0.01	22.8	<0.005
364	16628	623.30	624.00	11.55	<0.05	<0.05	67.0	11.80	0.01	0.01	49.2	<0.005
364	16629	624.00	625.00	4.44	<0.05	<0.05	18.5	4.59	0.01	0.01	20.4	<0.005
364	16632	626.00	626.50	0.47	<0.05	<0.05	3.4	0.52	<0.01	0.01	1.6	<0.005
266	30225	613.20	613.80	2.04	<0.05	<0.05	6.0	1.39	<0.01	0.01	5.6	<0.005
266	30229	615.30	615.90	1.87	<0.05	<0.05	5.0	1.88	0.01	0.01	4.7	<0.005
266	30230	615.90	616.60	4.56	<0.05	<0.05	18.0	4.55	0.01	0.01	15.9	<0.005
266	30231	616.60	617.10	0.50	<0.05	<0.05	4.0	0.49	<0.01	0.01	2.4	<0.005
266	30232	617.10	617.80	2.21	<0.05	<0.05	15.5	2.10	<0.01	0.01	23.1	<0.005
266	30233	617.80	618.80	5.28	<0.05	<0.05	23.5	5.13	<0.01	0.01	27.6	<0.005
279	30637	613.80	614.30	0.35	<0.05	<0.05	2.0	0.33	<0.01	0.01	0.7	<0.005
279	30640	615.80	616.30	3.72	<0.05	<0.05	19.5	3.35	<0.01	0.01	21.4	<0.005
279	30642	616.90	617.50	1.90	<0.05	<0.05	11.5	1.88	0.01	0.01	11.5	<0.005
252	13989	615.40	615.90	3.04	<0.05	<0.05	17.0	3.12	<0.01	0.01	15.9	<0.005
254	30010	597.05	597.70	2.62	0.15	<0.05	10.0	2.65	0.01	0.01	10.6	<0.005
254	30011	597.70	598.20	3.40	<0.05	<0.05	9.5	3.45	0.01	0.01	8.5	<0.005
254	30012	598.20	598.70	0.90	<0.05	<0.05	3.5	0.94	<0.01	0.02	1.6	<0.005
254	30013	598.70	599.20	0.23	<0.05	<0.05	0.5	0.23	0.01	0.02	<0.3	<0.005
254	30014	599.20	599.70	3.26	<0.05	<0.05	7.5	3.16	0.01	0.02	9.7	<0.005
254	30015	599.70	600.25	6.36	<0.05	<0.05	10.5	6.29	0.01	0.01	11.0	<0.005
245	15540	598.50	599.00	4.67	<0.05	<0.05	10.0	4.19	<0.01	0.02	14.7	<0.005
398	18005	528.90	529.90	2.88	<0.05	<0.05	4.5	2.93	<0.01	0.02	4.5	<0.005
398	18008	531.50	532.00	0.95	<0.05	<0.05	3.4	0.99	<0.01	0.01	3.4	<0.005
567	111883	523.45	524.10	1.50	<0.05	<0.05	4.4	1.34	0.01	<0.01	4.6	0.025
567	111887	526.25	526.80	0.43	<0.05	<0.05	3.0	0.45	<0.01	<0.01	2.6	0.025
726	120448	574.10	574.60	3.05	<0.05	<0.05	16.0	3.35	<0.01	0.01	12.0	<0.005
726	120449	574.60	575.10	6.25	<0.05	<0.05	21.7	5.98	<0.01	0.01	20.5	<0.005
726	120453	576.60	577.70	2.61	<0.05	<0.05	4.4	2.87	<0.01	<0.01	3.4	<0.005
255	30042	600.60	601.50	3.16	<0.05	<0.05	7.3	3.01	0.01	<0.01	7.5	<0.005
402	18072	550.10	550.60	1.23	<0.05	<0.05	2.6	1.17	0.02	0.01	1.9	<0.005
402	18073	550.60	551.10	1.84	0.22	<0.05	4.6	1.93	0.06	0.01	3.5	<0.005
402	18074	551.60	552.60	6.36	0.42	<0.05	15.0	6.26	0.11	0.02	10.9	<0.005
402	18075	552.60	553.60	4.36	0.27	<0.05	10.0	4.53	0.07	0.02	6.8	<0.005

Appendix 8 Drilling Progress of the Hole "MJK-1", the Zhaman-Aibat Ore Deposit



Appendix 9 Drilling Equipments of the Hole "MJK-1", the Zhaman-Albat Ore Deposit

Article	Model	Specification	Quantity
Drilling machine	ZIF-650M	Capacity : ϕ59mm 800m Inner diameter of spindle : 63.5mm Spindle speed : 81~800 rpm Weight : 2800kg	1 set
Power unit	A-2-42-4	Electric Motor Revolution : 1450rpm Related power : 30 KW 380V	1 set
Drilling pump	NB-320/100	Type : 3 cylinder single acting Volume (max) : 320 ℓ/min Pressure (max) : 63 kg/cm²	1 set
Power unit	4A200-M 6UZ-220/380v	Electric Moter Revolution : 100rpm Related power : 22KW 380V	1 set
Water supply pump	6-12-33A	Type : turbine Volume (max) : 50 ℓ/min Pressure (max) : 50kg/cm²	1 set
Power unit	AO2-Y 1-6	Electric motor Revolution : 960rpm Related power : 3 KW	1 set
Wire line hoist	K-6 3×25+1×16		1 set
Derrick	mRU6U-18/20	Pipe structual derrick	1 set
Generator	6ms-13-41 12Om-4	Diesel engine Revolution : 500rpm Related power : 320KVA Weight : 4080kg	1 set
Drill rod	CCK-59		650m
Water tank		9m³	1 set

Appendix 10 Consumed Materials of the Drill Hole "MJK-1", the Zhaman-Albat Ore Deposit

Article	Unit	Quantity
Diamond Bit 59mm	Pcs	10
Cemented carbide bit 112mm	Pcs	1
do. 93mm	Pcs	3
Diamond reaming shell 59mm	Pcs	2
Core lifter	Pcs	13
Core lifter case	Pcs	6
Core box	Pcs	130
Lost circulation mtarial	Kg	100
Diesel	1	8000
Gasoline	1	2800
Engine oil	1	400

Appendix 11 Operational Results of the Drill Hole "MJK-1", the Zhaman-Aibat Ore Deposit

Item	Drilling hole No.			MJK - 1
Drilling Data	Drilling length		(m)	650.5
	Core length		(m)	640.55
	Core recovery		(%)	98.5
	Depth by	112mm size	(m)	4.0
	do.	93mm size	(m)	34.3
	do.	59mm size	(m)	612.2
	Cashing pipe	108mm	(m)	4.0
	do.	89mm	(m)	38.3
	Drilling mashine			ZIF - 650
Working Period	Working Period			8.13~8.26
	Actual Working Days		(d)	14
	No Working Days		(d)	0
	Total		(d)	14
	Actual Working Days	Mounting	(d)	0.5
		Drilling	(d)	12.5
		Dismounting	(d)	0.5
		Others	(d)	0.0
		Total	(d)	13.5
	Drilling length / Working Period		(m/d)	16.5
	Drilling length / Drilling days		(m/d)	52.0
	Drilling length / Drilling shifts		(m/s)	26.0
Working Time	Drilling		(h)	167°05'
	Hoisting & Lowering rod etc.		(h)	132°55'
	Repairing		(h)	0°00'
	Sub total		(h)	300°00'
	Mounting		(h)	12°00'
	Dismounting		(h)	12°00'
	Others		(h)	0°00'
	Total		(h)	324°00'
	Drilling length / Drilling hour		(m/h)	3.9
Workers	Total drilling workers			295
	Total drilling workers / Drilling length		(w/.m)	0.45

Appendix 12-1 Geological Logging of the Drill Hole "MJK-1" (1/10), Zhaman-Aibat Ore Deposit

MJK – 1 INCLINATION: –90°

AREA: ZHAMAN-AIBAT BEARING: — ELEVATION: 357.04 m FINAL DEPTH: 650.50 m

SCALE (m)	COLUMN	DEPTH (m)	DESCRIPTION	REMARKS	MINERALIZATION	SULFIDE	SILICA	CLAY	CARBONATE	SULFATE	SAMPLE No	ROCK PROPERTY: Angle of Fiss. (°)	No. of Fiss. (/m)	Core Rec. %
		1.20	Strongly weathered rock with fragments of red siltstone and fine-grained sandstone. Content of fragments is up to 50%.											100
			Reddish brown weathered siltstone with unclearly expressed bedded structure, partially fractured. Leached cavems are partly filled in by calcite. Interlayer: Grayish-red weathered, fine-grained, sandstone at the depth of 1.40 m with thickness, equal to 30 cm.	∠5°									10	100
		6.00											10	93
													10	93
													10	91
														91
														92
														96
														94
10			Reddish brown, siltstone with fine grained, partially porous sandstone. Lamination angle is equal to 5°. These rocks are strongly fractured. Fractures surface is coated by gypsum, traces of iron oxide and dendrite of manganese. Leached cavems are sizing up to 0.5x1.5 cm, filled in by calcite.	∠5°								∠ 40°	1	94
												∠ 85°	1	94
														94
														94
		17.00										∠ 5°	1	94
													4	94
													4	94
													4	94
													4	93
20			Light reddish brown fine grained sandstone. Interlayers of red coarse-grained sandstone (5-20 cm thick) with clayey-carbonate-ferrous cement is strongly weathered. This sandstone is sometimes porous, unclearly expresses bedded structure. Gravels included in sandstone orient at 5°.	∠5°								∠ 80°	4	95
												∠ 35°	4	95
		28.40											4	94
													4	94
													4	93
					23.9-25.2m, weakly argillized								3	93
													2	94
			Reddish brown, sandy siltstone, unclearly expressed bedded structure, strongly fractured. Traces of ferruginization, manganese dendrite and thin films of gypsum and chlorite at walls of fractures. Lamination angle is equal to 5°. Leached cavems filled in by calcite are described all through the horizon sizing up to 2.0 x 2.0 cm. Numerous layers of gypsum (selenite) are observed below 28.6 m with thickness 0.1-1.0 cm, oriented at 5-10° (partly 35-60°).									∠ 5°	4	94
													4	91
													4	91
													4	91
30													4	90
													4	90
													4	90
													4	90
													4	91
													4	91
													4	91
													4	91
													4	92
		39.05											4	92
40			39.05-44.8m, 45.1-47.9m, Light reddish brown fine-grained sandstone with carbonate-clayey cement, including interlayers of kaolinized coarse-grained sandstone layers up to 6 cm, express lenticular and horizontally-bedded structure due to red fine-grained sandstone interlayers(0.2cm). There are numerous interlayers of fiber like gypsum with thickness from 2 to 4, oriented at 5-0°. 44.8-45.1m, Granule - pebble conglomerates, composed by quartz, limestone, limestone with fragments of red aleurosandstone from 0.5 x 2 cm to 2 x 4 cm in size-put up to 30%. The gravels and flat fragments are shaped as lamination oriented at 5°.	∠5°									4	92
													4	92
													4	92
													4	92
													4	92
													4	92
													4	92
													4	92
													4	92
		47.90											4	92
50			Reddish brown siltstone (or fine-grained muddy sandstone) with carbonate-ferrous cement. Partially brecciated, sliding surfaces and chlorite films are observed along the fractures. Muddy sandstone has an horizontally bedded structure at 5° due to interlayers of limy sandstone. The thickness of the limy sandstone layers is from 10 to 30 cm and maximum thickness is 1.0 m. rock's fractures are filled in by fiber like gypsum with thickness from 1 to 3 cm, oriented mostly at 5°. 65.65-65.85m Brecciated, chloritization weak	∠5°									4	92
													4	92
													4	93
												∠ 5-10°	4	93
													4	93
													4	93
													4	94
													4	94
													4	94
													4	94
													4	94
													4	94
60				∠5°									4	94
				∠5°									4	94
													4	93
				∠70°	65.65-65.85m, Brecciated, chloritization weak								4	93
		66.50										∠ 80-90°	4	93
												∠ 80-90°	4	93
												∠ 60-80°	3	93
												∠ 10°	2	93
												∠ 0-10°	2	93
70													2	93

Appendix 12-2 Geological Logging of the Drill Hole "MJK-1" (2/10), Zhaman-Aibat Ore Deposit

MJK – 1 INCLINATION: -90°

AREA: ZHAMAN-AIBAT BEARING: – ELEVATION: 357.04m FINAL DEPTH: 650.50m

SCALE (m)	COLUMN	DEPTH (m)	DESCRIPTION	REMARKS	MINERALIZATION	SULPHIDE	SILICA	CLAY	CARBONATE	SULPHATE	SAMPLE No.	ROCK PROPERTY: Angle of Fiss	No. of Fiss (/m)	Core Rec %
80			Red sandstone, including light red tiny sandstone layers (intervals 10-30cm, thickness 2-5mm). These rocks are medium-fractured, gypsum at fractures is oriented at 5°.	∠ 5°								∠ 5°	2	95
		74.55	Red sandstone, fine grained with carbonate-ferrous cement, horizontally bedded structure due to fine lamination with siltstone. The rock is medium fractured. Rare veinlets of gypsum (5°) with thickness up to 2 cm. Contact with underlying horizon is clear, at 5°. Including rare fragments of brown colored siltstone										〃	2	98
		77.90										〃	2	95
												〃	2	93
												〃	2	95
												〃	2	95
												〃	2	95
												∠ 8-10°	4	95
			77.9-79.1m: Red siltstone with spotted structure due to spots of light-red colored tiny sandstone. Rare interlayers of fiber-like gypsum (selenite) with thickness up to 0.5 cm, oriented at 5°. Contact with underlying horizon is gradual.									〃	4	93
			79.1-79.8m: Red sandstone, fine-grained, bedded due to interlayers of aleurosandstone 5° with gypsum veinlets 0.2-0.4 cm thick, oriented at 10-20°.									〃	4	95
			79.8-86.5m: Red siltstone with interlayers of fine grained (83.9-84.15 m) gypsum and single gypsum veinlets 0.3-0.4 cm thick.									〃	4	96
		86.50										〃	4	96
												〃	4	96
			Light red, sandstone, fine grained with carbonate-ferrous cement, horizontally-bedded structure at 5°. Graded bedding and lamina structures are developed. The rock is medium fractured, veinlets of gypsum with thickness up to 1.5 cm. Carbonate gypsum inclusions sizing up to 1.0 × 1.5 cm within the interval from 87.2 to 87.8 m. Contact with underlying horizon is clear, at 10°.	∠ 5° ~10°								〃	4	96
		89.50										〃	4	96
90												〃	4	96
		92.00										〃	4	96
		93.25	Red siltstone with unclearly expressed bedded structure. Including rare siliceous-carbonate accumulations, veinlets of gypsum with thickness 5 mm, interlayer of fine-grained grayish-red colored sandstone with thickness 20 cm. Contact with underlying horizon is at 0°.	∠ 0°								〃	4	96
												〃	4	96
												〃	4	96
			Reddish brown, sandstone, fine-grained with carbonate-ferrous cement. Lenticular bedded structure at 10-15° due to interlaying with fine-grained siltstone. The rock is medium fractured with gypsum (up to 1.5 cm thick) filling in fractures. Contact with underlying horizon is at 0°.									〃	4	96
												〃	4	96
100												〃	4	96
												〃	4	96
												〃	4	95
												〃	4	96
												〃	4	96
												〃	2	96
												∠ 5°	4	96
												〃	4	97
												〃	4	97
												〃	4	97
110			Reddish brown, siltstone with spotted or rarely horizontally-bedded (at 5°) structure due to interlaying with fine-grained sandstone interlayers of fine-grained sandstone with thickness up to 25 cm, maximum, 140cm. There is an interlayer of green colored siltstone at the depth: 94.8m, 106.25m and 110.6m with thickness 10 - 30 cm. These rocks are medium fractured, fractures are filled in by gypsum with thickness from 1mm to 5 cm. Contact with underlying horizon is unclear and gradual	∠ 0°								〃	4	97
												〃	4	97
												〃	4	97
												〃	4	97
												〃	4	97
												〃	4	97
												〃	4	97
												∠ 10°	2	97
												〃	2	97
												〃	2	97
				∠ 0°								〃	2	97
120												〃	2	97
			Red colored laminated sandstone, fine grained, with carbonate-ferrous cement. Banded structure at 5-15. The rock is medium fractured, gypsum (1mm to 4 cm thick) filling in fractures. Contact with underlying horizon is at 5°.									〃	4	97
												〃	4	97
												〃	4	97
												〃	4	97
												〃	4	97
												〃	4	97
		127.20										〃	4	97
		128.30										〃	4	97
130			Reddish brown, massive siltstone. The rock is medium fractured, gypsum veinlets of rare fractures (thickness up to 5 mm). There are numerous interlayers of fine-grained sandstone with thickness 7-10 cm. The layer is continued below.									〃	4	97
												〃	4	97
												〃	4	97
												∠ 10-15°	4	97
												∠ 5°	4	97
												〃	4	97
												〃	4	97
												〃	4	97
												〃	4	97
140												〃	4	97

Zhalpaktal Formation (Gypsum-rich Red siltstone)

Appendix 12-3 Geological Logging of the Drill Hole "MJK-1"(3/10), Zhaman-Aibat Ore Deposit

MJK - 1 INCLINATION: -90°
AREA: ZHAMAN-AIBAT BEARING: — ELEVATION: 357.04 m FINAL DEPTH: 650.50 m

SCALE (m)	COLUMN	DEPTH (m)	DESCRIPTION	REMARKS	MINERALIZATION	SULFIDE	SILICA	CLAY	CARBONATE	SULFATE	SAMPLE No	ROCK PROPERTY: Angle of Fract. (°)	No of Fract. (/m)	Core Rec. %
150			Reddish brown colored siltstone with banded and spotted structure due to the interlayers of tiny sandstone Partings with thickness from 1 to 3 cm and interlayers of fine-grained sandstone are described at intervals 145.40-145.70 m, 147.3-147.6, 148.2-148.6, 156.9-157.20 m Graded bedding structure (inclination, 10-15°) is observed in the above intervals The rock is medium fractured, fractures are filled in by gypsum and are oriented at 5°, 45° and 15°, thickness of gypsum layers varying from 1 mm to 2 cm. Contact with underlying horizon is gradual	∠ 10° ~ 15°							∠ 5-10°	4	97
												∠ 20°	4	97
												∠ 5-10°	4	97
												"	4	97
												"	4	97
												"	4	97
												"	4	97
												∠ 10-20°	3	97
												∠ 5-10°	3	97
												"	3	97
												"	3	93
												"	3	93
												"	3	93
			Brown sandstone, fine grained, with carbonate-ferrous cement. Structure is horizontally bedded at 5° due to interlaying with red colored siltstone The rock is medium fractured, fractures are filled in by gypsum. Contact with underlying horizon is gradual	∠ 5°	156.50-156.55m, weakly argillized							"	3	97
		159.00										"	3	97
160		160.50										"	3	97
												"	3	97
												∠ 5-20°	2	97
												"	2	97
												"	2	97
												"	2	97
												"	2	97
												"	2	97
			Reddish brown, siltstone Structure is basically horizontally-bedded at 5° due to partings of fine grained sandstone with thickness up to 1 mm Interlayers of red fine-grained sandstone with thickness 10-15 cm occur all through the layer Interlayer of medium-grained sandstone with thickness 30 cm is described at the depth 165.0m and 169.9m	∠ 5°								"	2	97
												"	2	97
												"	2	97
												"	2	97
												"	2	97
170												"	2	97
												"	2	97
												"	2	97
		174.20	Red sandstone, fine grained, with carbonate-ferrous cement. Structure is horizontally bedded at 5° due to the graded bedding structure Interlayer of siltstone with thickness 33 cm. The rock is medium fractured, fractures are filled in by gypsum with thickness up to 2 cm. Contact with underlying horizon is at 0°.	∠ 5°								"	2	97
		176.10		∠ 0°								"	2	97
												∠ 5-10°	3	97
												"	4	97
												"	4	97
												"	2	97
												"	1	97
180			Brown massive siltstone Undearly expressed bedded structure Rare partings of fine-grained sandstone with thickness up to 5 cm and interlayers up to 25 cm The rock is medium fractured, fractures are filled in by gypsum with thickness up to 3 cm, oriented at 10° and 30°. The layer is continued below									"	2	97
												"	3	97
												"	4	97
												"	6	97
												"	2	97
												"	4	97
												"	3	97
												"	1	97
												"	0	97
190				∠ 10° ~ 30°								"	1	97
												"	0	97
												"	2	97
												"	4	97
												"	3	97
			200.08-208.65m, Brown colored massive siltstone Undearly expressed bedded structure The rock is medium fractured Frequent veinlets of gypsum with thickness up to 1 cm Fractures are oriented at 45°, 15° and 5°. Gypsum veinlets at the interval from 207.5 to 208.65 m are oriented by two groups (at 15° and 5° and along core axis) Contact with underlying horizon is at 5°.	∠ 5°								"	4	97
												"	7	97
												"	7	97
												"	4	97
												"	2	97
200		200.80										"	2	97
			208.70-209.15m, Grayish-green siltstone Horizontally-bedded structure resulted from partings of red siltstone with thickness up to 1 cm. The rock is medium fractured, fractures are filled in by gypsum with thickness up to 2 cm. Contact with underlying horizon is at 10°.	∠ 10°								"	2	97
												"	1	97
												"	1	97
												"	4	97
												"	4	97
												"	4	97
												"	4	97
												"	3	97
		208.70	209.15-210.0m, Brown sandstone, fine-grained, with carbonate ferrous cement. Structure is sometimes bedded at 10°, 5° due to fine lamination with siltstone The rock is medium fractured, fractures are filled in by gypsum and are oriented at 30°, 10°, their thickness varies from 1 mm to 2 cm. Contact with underlying horizon is clear, at the angle 0°.	∠ 0°								"	2	97
210		209.15										"	2	97

Zhideliisai Formation (Gypsum - rich Red Siltstone)

Appendix 12-4 Geological Logging of the Drill Hole "MJK-1" (4/10), Zhaman-Aibat Ore Deposit

MJK-1

INCLINATION: -90°

AREA: ZHAMAN-AIBAT BEARING: —

ELEVATION: 357.04m FINAL DEPTH: 650.50m

SCALE (m)	COLUMN	DEPTH (m)	DESCRIPTION	REMARKS	MINERALIZATION	SULFIDE	SILICA	CLAY	CARBONATE	SULFATE	SAMPLE No	ROCK PROPERTY: Angle of Fliss	No of Fliss (1/m)	Core Rec. %
220		212.80	210.30-211.15m. Brown sandstone, fine-grained, with carbonate-ferrous cement. Bedding Structure at the angle 10°, 5° due to fine lamination, alternation with siltstone. The rock is medium fractured, fractures are filled in by gypsum and are oriented at 30°, 20°, their thickness varies from 1 mm to 2 cm. Contact with underlying horizon is clear, at the angle 0°. 211.15-212.80m. Red sandstone, fine-grained, with carbonate-ferrous cement. Bedding Structure [resulted from partings of dark-red fine-grained sandstone, thickness of partings is up to 1 cm] at the angle 15-10°. The rock is medium fractured, fractures are filled in by gypsum, oriented at 0°, 15°. Contact with underlying horizon is clear, wavy, at the angle 0°.	Zhideliisai Formation (Gypsum-rich Red Siltstone)									
		219.05	Brown siltstone, bedding structure [due to partings of greenish-gray siltstone with thickness up to 1 mm] at the angle 5°. The rock is medium fractured. Contact with underlying horizon is gradual										
		223.00	219.05-219.55m. Brown colored fine-grained (muddy) sandstone with carbonate-ferrous cement, with graded bedding structure at the angle 5°. Contact with underlying horizon is sharp at the angle 5°. 219.55-223.00m. Brown siltstone with unclearly expressed bedded structure. Interlayers of dark-greenish-gray siltstone with thickness 13 cm and interlayers of red colored fine-grained sandstone with thickness 25 cm. The rock is medium fractured, fractures are filled in by gypsum, oriented at 5°. Contact with underlying horizon is clear, at the angle 10°.										
		228.05												
230			223.00-226.20m. Red sandstone, fine-grained, with carbonate-ferrous cement, with the bedding structure [due to partings of red fine-grained sandstone] at the angle 15°, 5°. Interlayers of siltstone with thickness from 6 to 25 cm are observed. The rock is medium fractured, fractures are filled in by gypsum, fractures oriented at 10°, thickness of gypsum veinlets is up to 5 cm. Contact with underlying horizon is at <10°. 226.20-227.10m. Brown siltstone with unclearly expressed bedded structure. The rock is medium fractured. Contact with underlying horizon is clear, at the angle 0°. 227.10-228.05m. Red sandstone, fine-grained, with carbonate-ferrous cement. Bedding structure due to partings of dark aleurolites is horizontal at the angle 5°. Interlayers of dark-red siltstone with thickness 10-15 cm are described there. Contact with underlying horizon is unclear and gradual.										
240		242.30			238.10-238.40m weakly silicified zone with gypsum veinlets									
			Brown siltstone. Bedding structure [due to fine interlaying with fine-grained sandstone] is horizontal at the angle 5°. The rock is medium fractured, fractures are filled in by gypsum and oriented at 30°, 10°. Interlayer with calcite-gypsum-anhydrite aggregate with thickness 30 cm occurs at the depth 233.0 m. Interlayer of fine grained sandstone with thickness 35 cm described at 239.7 m. Contact with underlying horizon is gradual.										
250		252.40	242.30-242.75m. Light-brown colored, fine-grained sandstone with carbonate-ferrous cement. Bedding structure [due to partings of dark-brown siltstone with thickness 1mm] shows the angle 5-15°. Partings of dark brown colored siltstone with thickness up to 2 cm are observed as well. Contact with underlying horizon is clear, at 0°. 242.75-252.40m. Brown siltstone. Unclearly expressed bedded structure. Interlayers of fine-grained sandstone with thickness 5-7 and 10-25 cm. The rock is medium fractured, fractures are filled in by gypsum (selenite), oriented at 5°, sometimes at 45°. Contact with underlying horizon is gradual.	Zhideliisai Formation (Red Siltstone)									
			252.40-253.15m. Light-red colored fine grained sandstone, with carbonate-ferrous cement. Bedding structure [due to fine interlaying with dark-red aleurolite, thickness of partings is up to 1 cm] is horizontal at the angle 5°. The rock is slightly fractured. Contact with underlying horizon is gradual. 253.15-258.00m. Brown siltstone with interlayers of fine grained sandstone. 258.00-265.70m. Light-red colored, fine-grained sandstone with frequent interlayers of fine-grained sandstone (thickness is up to 20 cm). Bedding structure [due to partings of dark-red fine-grained sandstone] is horizontal at the angle 85°, lamination at the bottom of each layer at the angle 5-15°. Interlayer of brown siltstone(30 cm thick) is also observed. The rock is fractured, fractures are filled in by gypsum veinlets and films with thickness 5 mm. Contact with underlying horizon is gradual.									
260		265.70												
270		270.10												
		274.20	Light-red colored siltstone. Partings of fine grained sandstone with thickness 3-5 cm are described through all the layer. The rock is slightly fractured, fractures contain films of gypsum.										
			Light-red colored fine-grained sandstone with bedding structure [due to changing granulometric composition] at the angle 15°. The rock is slightly fractured, fractures contain films of gypsum oriented at the angle 5°. Contact with underlying horizon is at 5°.										
280			Brown, massive siltstone with unclearly bedded structure. Films of gypsum at fractures with thickness 1 mm, oriented at 55°, 45°. At the bottom of layer, the rock is strongly fractured (283.0-287.25 m). Contact is at 15°.										

Appendix 12-5 Geological Logging of the Drill Hole "MJK-1" (5/10), Zhaman-Aibat Ore Deposit

MJK - I

AREA: ZHAMAN-AIBAT INCLINATION: -90° BEARING: — ELEVATION: 357.04m FINAL DEPTH: 650.50m

DEPTH (m)	DESCRIPTION	Angles	REMARKS
	Brown, massive siltstone with unclearly bedded structure. Films of gypsum at fractures with thickness 1 mm, oriented at 55°, 45°. At the bottom of layer, the rock is strongly fractured (282.9-287.40 m). Contact is at 15°. Thin layers of green-dark green colored siltstone are observed within the interval from 286m to 287.20m		Zhidelisai Formation (Red Siltstone)
287.40 – 291.40	Light-red colored, fine-grained sandstone, with carbonate ferrous cement, cross-bedded at 5-15° due to partings of dark-red siltstone. Interlayers of dark-red siltstone with total thickness 0.6 m are observed as well. The rock is slightly fractured, fractures are filled in by gypsum. Contact with underlying horizon is at 0°.	∠15°, ∠5°, ~15°, ∠0°	
291.40 – 316.60	Brown siltstone with unclearly bedded structure. Including the interlayers of fine-grained sandstone with thickness up to 30 cm, maximum thickness reaching 0.8 m. These rocks are fractured, fractures are filled in by gypsum (up to 1 mm thick). Contact with underlying horizon is at 0°. Thin layers of green-dark green colored siltstone are observed within the interval from 312.90m to 313.10m	∠0°	
316.60 – 3·8.70	Red colored fine-grained sandstone with carbonate ferrous cement. Structure is horizontally-bedded at the angle 5° due to partings of dark-red siltstone, thickness of partings reaching 1 cm. Contact with underlying horizon is at 0°.	∠5°, ∠0°	
– 320.20	Light green colored siltstone		
320.20 – 323.90	Red, massive siltstone with unclearly bedded structure. Including interlayers of fine-grained sandstone. Contact with underlying horizon is gradual		
323.90 – 329.90	Alternation of dark-red siltstone and fine-grained sandstone. Siltstone layers are dominant. Fine-grained sandstone layers occur at the intervals 324.0-324.4, 325.3-325.55, 328.1-328.4, 329.3-329.6 m. Structure is horizontally bedded at the angle 5°. Fractures are filled in by gypsum films.	∠0°	
329.90 – 332.40	Alternation of dark-red siltstone and fine-grained sandstone. Sandstone layers are dominant. Sandstone layers are light red colored, and matrix is composed of carbonate ferrous cement. Bedding structure (due to interlaying with siltstone) is horizontally-bedded at the angle 5°. Stretched shaped fragments of red aleurolite 0.3 x 1.0 cm in size occur at the bottom of the Sandstone layer. Contact with underlying horizon is clear at 15° as to core axis	∠0°, ∠15°, ∠10°, ~8°	
	Brown, sandy siltstone with frequent interlayers of fine grained sandstone with thickness 10-15 cm with lamination at 15-10°. The rock is medium fractured, fractures are filled in by gypsum, its thickness varying from fiber-like to 1 mm, they are oriented at 5-15°. Contact with underlying horizon is gradual		
– 349.50	Light red colored fine-grained sandstone with carbonate-ferrous cement. Sedimentary structure (due to partings of dark-red, fine-grained siltstone) is cross-bedded at 65°, 0°, 10°. The rock is slightly fractured. Interlayers of dark-red sandstone are also described there. Contact with underlying horizon is clear at 0°.	∠0°	

MINERALIZATION	SULFIDE	SILICA	CLAY	CARBONATE	SULFATE	SAMPLE No

ROCK PROPERTY

Angle of Fiss (°)	No of Fiss (/m)	Core Rec %
	0	98
	0	98
∠30°	3	98
∠30°	4	98
∠10°	10	98
•	10	98
∠<45°	10	98
	0	98
∠<45°	2	98
∠10°	2	98
	0	98
∠<45°	2	98
∠10°	1	98
	0	99
	0	98
	0	98
	0	99
	0	98
∠10°	1	98
	0	98
	0	98
	0	98
	0	98
	0	98
	0	98
	0	98
	0	98
	0	98
	0	98
	0	98
	0	98
	0	98
	0	98
	0	98
∠30°	1	98
	0	99
∠5°	2	98
	0	98
	0	98
	0	98
	0	98
	0	98
	0	98
	0	98
	0	98
	0	98
	0	98
	0	98
	0	98
∠0°	1	98
	0	98
	0	98
	0	98
	0	98
∠35°	1	98
	0	98
∠5°	1	98
	0	98
	0	98
	0	98
∠10°	1	98
	0	98
	0	98
∠80°	1	98
	0	97
	0	97
	0	97
∠0°	1	97
	0	97
	0	97
	0	97

Appendix 12-6 Geological Logging of the Drill Hole "MJK-1" (6/10), Zhaman-Aibat Ore Deposit

MJK-1

AREA: ZHAMAN-AIBAT INCLINATION: -90° BEARING: — ELEVATION: 357.04m FINAL DEPTH: 650.50m

DEPTH (m)	DESCRIPTION		REMARKS	MINERALIZATION
	Dark-reddish brown, sandy siltstone with potted / bedded structure due to interlaying with fine-grained sandstone. Interlayers of fine-grained sandstone show cross-bedded structure (thickness 15-25 cm). The rock is slightly fractured, fractures contain gypsum with thickness 5 mm.		Zhidelisai Formation (Red Siltstone)	
356.45 / 358.70	Reddish brown, sandstone, medium-grained, sometimes coarse-grained, with carbonate-ferrous cement. Graded bedding structure and cross-bedding structure are observed (at the angle 10-20°, 5°). Frequent accumulations of anhydrite / gypsum sizing up to 1.0 x 0.8 cm are described within the interval from 356.65 to 356.95 m. Fragments of red siltstone are described at the bottom of the layer with size up to 0.2 x 0.5 m. Contact with underlying horizon is clear at 5°. Gypsum interlayer (1 cm thick) is occurred at the contact.	∠5°–30°, ∠5°		
365.50	Dark-gray, sandy siltstone with potted and lenticular-bedded structure due to interlayers and spots of light fine-grained limy sandstone. Interlayers of fine-grained sandstone with thickness 18 cm are also observed. Contact with underlying horizon is gradual.			
369.95	Reddish brown, fine-grained sandstone with carbonate-ferrous cement. Structure is horizontally-bedded, sometimes cross-bedded at the angle 10-15° due to partings of fine-grained sandstone with darker shading with thickness of the partings equal to 0.1 cm. Partings of dark-red siltstone with thickness up to 3 cm. Accumulations of anhydrite (1.0 x 1.5 cm) are also observed there. The rock is slightly fractured, fractures are coated by gypsum film. Contact with underlying horizon is at 0°. Interlayer of intraformational conglomerate (8 cm thick) at the contact.	∠0°, ∠8°–10°		
379.70	Red, sandy siltstone, horizontal-bedding, including interlayers of limy fine-grained sandstone with thickness up to 10 cm. The rock is fractured. Contact with underlying horizon is at the angle 5°. 371.6-372.1m. Red, fine-grained sandstone with carbonate-ferrous cement including interlayers of siltstone. Cross-bedded structure at the angle 5-10°.	∠0°		
397.65	**Sandstone layers:** Reddish brown, fine-medium grained sandstone, with carbonate-ferrous cement, fine interlaying with fine-grained sandstone (0.2cm thick), cross-bedded at the angle 35-10°. The rock is slightly fractured, filled in by gypsum films. Contact with underlying horizon is wavy. 397.15-397.85m: Grayish-red, fine-grained laminated sandstone with siliceous-carbonate-ferrous cement. **Siltstone layers:** Reddish brown, sandy siltstone or aleurosandstone, including interlayers of light limy fine grained sandstone with thickness 3-5 cm, horizontally bedded. Contact with underlying horizon is sharp at the angle 0°.	∠10°–0°, ∠0°	Zhezkazgan Formation (Grey Sandstone)	397.15-397.85m. Weakly silicified
	Reddish brown, sandy siltstone including spots of light-red limy sandstone and rare spots of green aleurolite. Interlayer of greenish-gray fine-grained sandstone with thickness 25 cm occur at the depth 403.2 m. Thin interlayers of gray colored fine-grained sandstone with thickness 20 cm are observed at the interval from 413 to 415m. Contact with underlying horizon is gradual.			403.20m. Appearance of gray sandstone
	Reddish-gray, fine-grained sandstone with siliceous-carbonate-ferrous cement, horizontally-bedded at 5°. Sometimes transforming into medium-coarse-grained sandstone. Partings of greenish-gray aleurolite with thickness 3-5 cm, interlayer of red aleurolite with thickness 20 cm are observed as well. Fragments of dark red aleurolites. Contact is with underlying horizon is gradual.			
415.75 / 417.60	Reddish brown, sandy siltstone, spotted-bedded structure due to interlaying with fine-grained sandstone. Contact with underlying horizon is unclearly expressed, oriented at the angle 0°.	∠5°, ∠0°		415.75-417.60m. Weakly disseminated by pyrite. Weakly silicified. 419.85m-420.80m. Weakly disseminated by pyrite. Pyrite grains are very fine

Scale (m): 360, 370, 380, 390, 400, 410, 420

Mineralization columns: SULFIDE, SILICA, CLAY, CARBONATE, SULFATE; SAMPLE No

ROCK PROPERTY

Angle of Fiss (°)	No of Fiss (/m)	Core Rec %
∠10°	2	97
	0	97
	0	97
	0	97
	0	97
	0	97
∠30°	1	97
∠10°	2	97
•	1	97
	0	97
	0	97
	0	97
	0	97
	0	97
	0	97
	0	97
∠30°	1	97
	0	97
	0	97
	0	97
	0	97
	0	97
	0	97
	0	97
	0	97
	0	97
	0	97
	0	97
	0	97
	0	97
	0	97
	0	97
	0	97
∠10°	1	97
	0	97
	0	97
	0	97
	0	97
	0	97
	0	97
	0	97
∠10°	1	97
	0	97
	0	97
	0	97
	0	97
	0	97
	0	97
∠15°	4	97
•	1	97
	0	97
	0	97
	0	97
	0	97
	0	97
	0	97
	0	97
	0	97
	0	97
	0	97
	0	97
	0	97
	0	97
	0	97
	0	97
	0	97
	0	97
	0	97
∠10°	3	97
	0	97

Appendix 12-7 Geological Logging of the Drill Hole "MJK-1"(7/10), Zhaman-Aibat Ore Deposit

MJK - 1 INCLINATION: -90°

AREA: ZHAMAN-AIBAT BEARING: -- ELEVATION: 357.04 m FINAL DEPTH: 650.50 m

SCALE (m)	COLUMN	DEPTH (m)	DESCRIPTION	REMARKS	MINERALIZATION	SULFIDE	SILICA	CLAY	CARBONATE	SULFATE	SAMPLE No.	ROCK PROPERTY: Angle of Core	No. of Frac. (/m)	Core Rec. %
430		426.65	Reddish brown, sandy siltstone, massive with lamination due to interlaying with gray fine-grained sandstone. Interlayer of reddish gray fine-grained sandstone occurs at the interval 421.3-421.75. Contact with underlying horizon is clear at the angle 5°.										0	97
		428.40	Gray medium-fine-grained sandstone with siliceous carbonate ferrous cement. Interlayer of gray aleurolite with thickness 10 cm, fragments of dark-gray aleurolite 0.5 x 1.0 cm are observed as well. Contact with underlying horizon is clear at the angle 0°.		426.65-428.40m. Pyrite accumulations with size up to 0.4-0.8 cm, and weakly disseminated by pyrite through the layer. Weak silicification.								0	97
		430.00	Reddish brown siltstone with gray spots with interlayers of fine grained sandstone with thickness 20 cm. Bedding structure is horizontal. Contact with underlying layer is gradual.		430.00-432.25m. Calcite films.								0	97
		432.25	Gray sandstone with red spots, fine-grained, with siliceous-carbonate cement. Bedding structure is horizontal, cross bedded at the angle 5-10°. The rock is slightly fractured, with films of calcite at fractures. Contact with underlying layer is unclear at the angle 0°.								435.0m ~ 438.8m 441		0	97
		438.80	Reddish brown, sandy siltstone, including sandstone balls (2-4cm) and thin layers of sandstone. Interlayer of gray-ish-red fine-grained sandstone with thickness 16 cm occurs at the depth 437.55 m. Contact with underlying layer shows load casting structure(wavy).										0	97
440		440.70	Dark greenish gray, sandy siltstone, horizontally-bedded at the angle 5°. With lamination structure due to interlayers of sandstone. Contact with underlying layer is gradual.		438.80-440.70m. Weakly disseminated by pyrite.						440.8m ~ 443.8m 451		0	97
		444.40	Light-gray, coarse- fine grained sandstone with siliceous-carbonate cement, with calcite films coating fractures. Graded bedding structure is developed at the angles 5°, 10°. Contact with underlying layer is gradual. Frequent very fine grained pyrite crystals occuring at the rock mass.		440.7-442.0m, 442.8-443.2m. Disseminated by pyrite. Weak silicification.								0	97
		445.50	Reddish brown, sandy siltstone.								445.0m ~ 448.0m 46		0	98
450		451.90	445.50-449.00m. Dark-gray, laminated medium-grained sandstone with siliceous-carbonate cement, with siltstone thin layers. There are a lot of fragments of greenish-gray aleurolite with size up to 3 x 5 cm. Frequent small pyrite crystals occur in the rock mass.	Zhetkazgan Formation (Gray Sandstone)	445.50-451.90m. Disseminated by pyrite. 446.5-447.7m, weak. 447.7-448.2m, strong. 448.2-451.9m, weak.								0	98
		454.60	449.00-451.90m. Black-dark gray siltstone with the bedding structure due to the fine lamination of fine-grained sandstone layers. Joints are oriented at the angle 15-20, 80°. Contact with underlying layer is at the angle 0°. Frequent small pyrite crystals described in the rock mass.		451.90-454.60m. Weakly disseminated by pyrite.						448.0m ~ 450.8m 47		0	98
			Gray, medium grained sandstone with siliceous-carbonate cement, with parlings of dark-gray aleurolite with thickness 1-3 cm, and with fragments of dark-gray aleurolite sizing from 0.5 x 1.5 cm to 3 x 4 cm.										0	97
460		464.80	Dark gray-black, sandy siltstone, with the bedding structure at the angle 5° due to partings of fine-grained sandstone. Joints are coated with calcite films, joints are oriented at the angle 5°, sometimes at the angle 45°. Contact with underlying layer is gradual. 459.10-460.45m: Light-gray, fine-grained sandstone with siliceous-carbonate cement.		454.60-464.80m. Weakly disseminated by pyrite. 459.0-459.6m. Medium-strongly						455.0m ~ 458.8m 48		0	97
			Gray-Light gray, coarse-medium grained laminated sandstone, with siliceous carbonate cement, horizontally bedded, including a lot of thin interlayers of black siltstone with thickness up to 1 mm. The rock is slightly fractured with calcite films coating joints. Interlayer of greenish-gray aleurolite occurs in the interval 470.7-470.85. The rock is slightly fractured. Contact with underlying layer is at the angle 10°.		464.80-474.80m. Weakly disseminated by pyrite. 473.7-475.0m. Strongly disseminated by pyrite.						463.0m ~ 466.0m 49		0	97
470		474.80									470.0m ~ 473.5m 51		0	97
			Greenish gray-dark gray, siltstone, including lenses of gray fine-grained sandstone. Joints oriented at the angle 60-55°, calcite films coating joints. Contact with underlying layer is gradual.		474.8-480m. Weak Chloritization. 480-483.7m. Disseminated by pyrite.						473.0m ~ 476.0m 52		0	97
480		483.80									480.0m ~ 482.8m 53		0	97
			Brown, Alternation beds of Bituminous sandstone(with siliceous-carbonate cement) and siltstone. Interlayer of greenish-gray colored fine grained sandstone occurs in the interval 484.85-484.3m. A lot of oil saturation zones are described in the interval 484.0-491.0m.		484.0-491.0m. Appear Bituminous sandstone. 487.4-489.0m. weakly disseminated by pyrite.						485.0m ~ 488.8m 54		0	97
490														

Appendix 12-8 Geological Logging of the Drill Hole "MJK-1" (8/10), Zhaman-Aibat Ore Deposit

MJK - 1 INCLINATION: -90°

AREA: ZHAMAN-AIBAT BEARING: --

ELEVATION: 357.04m FINAL DEPTH: 650.50m

SCALE (m)	COLUMN	DEPTH (m)	DESCRIPTION	REMARKS	MINERALIZATION	SULFIDE	SILICA	CLAY	CARBONATE	SULFATE	SAMPLE No.	ROCK PROPERTY: Angle of Fissure	No. of Fissure (/m)	Core Rec. %
		491.90	Gray fine-grained sandstone with siliceous-carbonate cement. Accumulation of pyrite crystals observed at the interval 430.35-490.4m. Oil saturation in the interval 430.2-430.9m. The rock is slightly fractured, calcite fills at fractures. Contact with underlying layer is at the angle 5°.		430.2-430.9m. Appear Bituminous sandstone 493.20-495.10m. Disseminated by pyrite						55		0	97
		493.20											0	97
		495.10	Dark gray, siltstone with laminated and thinly bedded sandstone										0	97
			Gray, fine-grained sandstone with siliceous-carbonate cement, cross-bedded at the angles 15. Spots with increased pyrite content are also described through the layer, with calcite fills coating joints joints		495.10-499.45m. Weak Chloritization Very weak pyrite dissemination						56		1	97
		499.45											0	97
500			Dark gray, siltstone, with thinly bedded sandstone, at the angle 5°, including spots of light-gray fine sandstone. Joints contain calcite fills. Contact with underlying layer is gradual		499.45-502.90m. Weakly disseminated by pyrite Veinlets of calcite						57		0	97
		502.90											0	97
			Gray fine-grained sandstone with siliceous-carbonate cement, with thinly and horizontally bedded siltstone. Interlayer of intraformational conglomerate is observed within the interval 500.8-500.86. Calcite fills coating joints and Veinlets of calcite 4 cm thick is observed at the bottom of the layer.		502.9-505.0m. Weakly disseminated by pyrite 502.9-506.1m. Weak Chloritization 505.0-505.3m. Cu, mineralization, Cu +2%, Ag 72.9 g/t						58		0	97
		509.40	Greenish-gray-Dark gray, fine-grained sandstone with siliceous-carbonate cement with horizontally and thinly bedded alaurce sandstone. The rock is slighly fractured with calcite fills coating joints. Contact with underlying layer is 0°.								59		0	97
510			Greenish-gray - dark gray, sandy siltstone. Structure is bedded at the angle 0-5° due to fine lamination with dark-gray sandstone. Contact with underlying layer is gradual. Rare concretions of pyrite with size 1 x 1-1.5-2.0 cm are described through the layer.	Zhezkazgan Formation (Gray Sandstone)	515.6-516.2m, 519.3-525.0m, Weakly disseminated by pyrite						60		0	97
			Gray-greenish gray, fine-medium grained sandstone with thinly and horizontally bedded red-green colored shade with siliceous-carbonate cement. Concretions of pyrite are observed within the layer. The rock is medium fractured with calcite fills coating joints.								61		0	97
520		521.70			521.70-524.60m. Disseminated by pyrite								0	97
		524.60									62		0	97
			Gray, sandy siltstone. Interlayer of horizontal micro-crystalline limestone is observed within the interval 535.5-535.9 m and 528.2-528.4m. Frequent concretions of calcite sizing from 0.1 x 0.2 cm to 0.5 x 1.0 cm are described within the interval 527.4-527.8m and 531.7-534.8 m. Contact with underlying layer is at the angle 0°.		527.4-534.6m. concretions of calcite						63		0	97
530		535.45									64		0	97
			Dark gray-greenish gray, alternation beds of fine-grained sandstone and siltstone bedded at the angle 5° with calcite fills and pyrite concretions at joints. Contact with underlying layer is at the angle 0°.		537.0-539.0m. Weakly disseminated by pyrite						65		0	97
540		540.75											0	97
			Pale gray-greenish gray, alternation beds of fine-grained sandstone (with siliceous cement and) siltstone bedded at the angle 0°. Lamination and graded bedding structure are developed. Weak pyrite dissemination is observed at the sandstone layers. Oil saturation in the interval 544.45-545.80m and 549.50-550.35m.		540.75-552.15m. Weak pyrite dissemination in the sandstone layers. 544.45-545.80m and 549.50-550.35m. Oil saturation						66		1	97
550		552.15									67		0	97
			Greenish-gray - dark gray, sandy siltstone. Structure is bedded at the angle 0-5° due to fine lamination with dark-gray sandstone. Contact with underlying layer is gradual. 556.8-557.15m gray, medium grained sandstone with weak pyrite dissemination and with Oil saturation.		556.8-557.15m, weak pyrite dissemination and Oil saturation.						68		2	97
		559.00	Pale gray, Coarse fine grained sandstone, with graded bedding and lamination structure, bedding structure at the angle 10°.		559.00-560.00m. Weak pyrite dissemination								0	97
560													0	97

Appendix 12-9 Geological Logging of the Drill Hole "MJK-1" (9/10), Zhaman-Aibat Ore Deposit

MJK-1 INCLINATION: -90°
AREA: ZHAMAN-AIBAT BEARING: — ELEVATION: 357.04m FINAL DEPTH: 650.50m

SCALE (m)	COLUMN	DEPTH (m)	DESCRIPTION	REMARKS	MINERALIZATION	SULFIDE	SILICA	CLAY	CARBONATE	SULFATE	SAMPLE No	ROCK PROPERTY: Angle of Flas (°)	No of Flas (/m)	Core Rec %
570		561.70	Gray, coarse fine grained sandstone, with siliceous cement. Graded bedding structure is developed at the angle 5°. Calcite fins and fine abundant pyrite impregnation filling joint are observed through the layer.	∠5°	560.00-561.70m pyrite dissemination (medium) and calcite fins (weak)						69		0	97
			Gray-pale greenish gray, fine alternation beds of sandy siltstone and fine grained sandstone, at the angle 5°-15°. Sometimes it contains sand-balls. Cristals and concretions of pyrite are observed at the interval from 564.6 to 565.0m. Contact with underlying layer is at the angle 0°.	∠5°-15°	564.6-565.0m. Strongly disseminated by pyrite 565.0-568.0m. Weakly disseminated by pyrite						70		0	97
		568.00		∠0°									0	97
			Pale gray, coarse-fine grained sandstone with siliceous-carbonaceous cement, graded bedding structure is developed. Weak pyrite dissemination is observed all through the layer. Partially including brecciated siltstone fragments at the interval from 573.4 to 574.1m and from 576.0 to 577.5m. Bedding structure is horizontal, sometimes cross-bedded at the angle 5°-15°. Joints are oriented at the angle 5°-35°. Contact with underlying layer is wavy and gradual.	∠0°-15°	568.00-578.20m. Weak pyrite dissemination						71		0	97
580		578.20	Alternation beds of Sandstone and siltstone, horizontally bedded 583.0-585.3m: Weak pyrite dissemination Sandstone layers: Coarse-medium-fine grained sandstone layers showing graded bedding structure with Weak oil odor, thickness 0.9m-1.2m. Abundant fragments of greenish gray siltstone are observed in the layer. Contact with underlying layer is wavy (load cast ?). Siltstone layers: Greenish gray, Rare carbonaceous concretions with size up to 1.0 x 1.5cm and Black mud ball are observed in the layer.	∠0°							72		0	97
			Gray, fine grained laminated sandstone, horizontally bedded. Dark gray colored interlayers with abundant pyrite are observed through the sandstone layer. Contact with underlying layer is at the angle 10°.		583.0-585.3m Weak pyrite dissemination Sandstone layers: Weak oil odor						73		0	97
		585.30											0	97
			Gray-dark gray, laminated and thinly bedded sandstone including a small quantity of siltstone thin layers. Distinct graded bedding structure (bedding inclination, 0°-10°) is observed. Pyrite dissemination is observed all through the layers, strongly disseminated zones are distributed in the coarse grained sandstone layers.	∠0°	585.30-590.94m. Thin layers with pyrite concentration						74		0	97
590		590.94		∠10°									0	97
			Dark gray, alternating beds of fine grained sandstone(arenite) and siltstone, bedded at the angle 0°-5°. Chalcocite concentrated thin layers and weak pyrite dissemination (including a small amount of galena-chalcopyrite-bornite) are observed at the sandstone layers.	∠0°-10°	590.94-597.60m Pyrite dissemination 590.94-592.72m strong 592.72-593.95m weak 594.36-594.64m strong 594.64-595.80m weak 595.80-597.60m strong						Sample No 1~43		0	97
		597.60	Light gray brown, medium grained massive sandstone, containing a small amount of conglomerate and siltstone thin layers, bedded at the angle 3°-7°. Dissemination by chalcocite (>>galena, bornite, chalcopyrite>pyrite) are observed within the interval 599.0-605.78m.	∠0°-5°	599.00-600.12m: Chalcocite concentration layers and weak pyrite dissemination								0	97
600		600.12											0	97
			Brownish light gray-greenish light gray, intraformational conglomerate (RAHUNDO Conglomerate), consisting of angular fragments of white or pink colored limestone and siltstone (sizing from 5 x 5mm to 15 x 30mm) and cement of green colored (caused by weak chloritization) muddy sandstone. At the bottom of the layer, cement is represented by red sandstone. No mineralization observed.	∠5°-7°	600.12-605.78m Dissemination by chalcocite(>>galena, bornite, chalcopyrite >pyrite) 600.12-605.78m strong 605.78-607.58m very weak								0	97
		608.27											0	97
		609.30	Gray (partially brown), fine-medium grained sandstone(arenite) with siliceous-carbonaceous cement with horizontal graded bedding structure. Contact with underlying layer is wavy. Very weak pyrite dissemination is observed.	∠0°	609.30-610.75m Very weak pyrite dissemination								0	97
610		610.75											0	97
			Reddish brown, siltstone with indistinct bedded structure. Calcite concretions with size 0.3 x 0.6cm and no mineralization observed.										0	97
		614.35											0	97
			Reddish light brown, laminated fine-medium grained sandstone, bedded at the angle 5°-10°. Reddish brown colored shale layer is observed within the interval 617.20-618.30m. Contact with underlying layer is wavy.	∠5°-10°	614.35-621.40m Very weak pyrite dissemination								0	97
620		621.40									75		0	97
			Reddish brown, horizontally bedded siltstone, containing calcite concretions sizing from 0.3 x 0.5cm to 0.5 x 2.0cm. Brown colored laminated sandstone layer is observed within the interval 624.65-625.80m and 628.00-630.00m.	∠0°									0	97
630													0	97

Appendix 12-10 Geological Logging of the Drill Hole "MJK-1" (10/10), Zhaman-Aibat Ore Deposit

MJK-1 INCLINATION: -90°
AREA: ZHAMAN-AIBAT BEARING: --
ELEVATION: 357.04m FINAL DEPTH: 650.50m

SCALE (m)	COLUMN	DEPTH (m)	DESCRIPTION	REMARKS	MINERALIZATION	SULFIDE	SILICA	CLAY	CARBONATE	SULFATE	SAMPLE No.	ROCK PROPERTY: Angle of Fract. (°)	No. of Fract. (/m)	Core Rec. %
			Reddish brown, siltstone with indistinct horizontal bedded structure, containing calcite concretions sizing from 0.5 x 1cm to 2 x 3cm. Interlayers of medium grained sandstone and intraformational conglomerate are observed at the middle of the layer. ∠ 0°	Taskuduk Formation									0	97
												∠ 10°	2	97
													0	97
													0	97
													0	97
													0	97
													0	97
													0	97
		639.80											0	97
640			Brownish gray, laminated medium grained sandstone, strongly fractured at the top of the layer. Contact with underlying layer is wavy.								642.0m ~ 642.3m 75		0	97
			Intraformational pebble conglomerate, consisting of red colored siltstone fragments and medium grained sandstone matrix. Contact with underlying layer is wavy. ∠ 0°										0	97
													0	97
													0	97
													0	97
		646.90											0	97
		647.80	Red colored siltstone with indistinct bedded structure. Calcite concretions 0.5 x 1cm in size occur at the top of the layer. Interlayer of fine grained sandstone is observed within the interval 648.80-649.20m.										0	97
													0	97
650		650.50	(Final Depth)										0	97

Appendix 13-1 Assay Results of Core Samples from the Drill Hole "MJK-1"

Sample No.	From m	To m	Length m	Au ppb	Ag g/t	Cu %	Pb %	Zn %	Fe tot %	Re ppm	S sulfide %	S sulfate %	S tot %	S elem %	FeO %
No.01	591.00	591.50	0.50	< 5	0.3	0.01	0.05	0.02	2.36	3	0.87	0.02	0.89	< 0.01	1.50
No.02	591.50	592.00	0.50	< 5	1.0	0.01	0.01	0.01	1.81	< 1	0.77	0.01	0.78	-	-
No.03	592.00	592.50	0.50	< 5	0.3	0.02	0.04	0.01	1.98	3	1.04	0.01	1.05	-	-
No.04	592.50	593.00	0.50	< 5	0.7	0.06	0.07	0.02	2.16	< 1	0.73	0.01	0.74	-	-
No.05	593.00	593.50	0.50	< 5	0.3	0.03	0.03	0.03	2.16	< 1	0.72	0.02	0.74	-	-
No.06	593.50	594.00	0.50	< 5	0.3	0.07	0.10	0.02	1.48	6	0.47	0.01	0.48	-	-
No.07	594.00	594.50	0.50	< 5	0.7	0.09	0.01	0.02	1.54	4	0.45	0.01	0.46	-	-
No.08	594.50	595.00	0.50	< 5	0.3	0.09	0.01	0.04	2.38	< 1	0.58	0.01	0.59	-	-
No.09	595.00	595.50	0.50	< 5	0.7	0.16	0.02	0.09	1.79	< 1	0.48	0.01	0.49	-	-
No.10	595.50	596.00	0.50	< 5	1.0	0.11	0.04	0.05	1.35	< 1	0.67	0.01	0.68	-	-
No.11	596.00	596.50	0.50	< 5	0.3	0.06	0.03	0.03	2.24	< 1	0.64	0.00	0.64	-	-
No.12	596.50	597.00	0.50	< 5	0.7	0.16	0.01	0.03	2.30	< 1	0.84	0.01	0.85	-	-
No.13	597.00	597.50	0.50	< 5	0.3	0.04	0.02	0.02	2.92	< 1	0.53	0.01	0.54	-	-
No.14	597.50	598.00	0.50	< 5	0.3	0.04	0.07	0.05	3.00	3	1.40	0.01	1.41	-	-
No.15	598.00	598.48	0.48	< 5	1.4	0.53	0.11	0.22	3.61	4	1.70	0.01	1.71	0.05	3.13
No.16	598.48	599.03	0.55	< 5	1.0	0.32	0.02	0.22	2.34	6	0.85	0.01	0.86	-	-
No.17	599.03	599.21	0.18	< 5	6.9	2.02	0.03	0.02	2.97	1	1.34	0.02	1.36	-	-
No.18	599.21	599.82	0.61	< 5	6.9	1.18	0.08	0.02	3.25	1	1.34	0.01	1.35	-	-
No.19	599.82	600.02	0.20	< 5	37.4	14.50	1.82	0.02	3.30	9	4.76	0.02	4.78	-	-
No.20	600.02	600.40	0.38	< 5	3.4	0.51	3.27	0.01	2.68	11	0.63	0.06	0.69	-	-
No.21	600.40	600.77	0.37	< 5	7.9	1.54	1.04	0.01	1.34	11	0.58	0.04	0.62	-	-
No.22	600.77	601.75	0.98	< 5	10.6	1.34	6.54	< 0.01	1.34	34	1.33	0.05	1.38	-	-
No.23	601.75	602.17	0.42	< 5	85.7	12.00	0.08	0.01	1.00	40	3.03	0.01	3.04	-	-
No.24	602.17	602.68	0.51	< 5	26.4	4.99	0.26	< 0.01	1.55	14	1.32	0.02	1.34	-	-
No.25	602.68	603.10	0.42	< 5	118.6	15.30	0.21	< 0.01	0.99	20	4.04	0.03	4.07	0.02	14.80
No.26	603.10	603.66	0.56	< 5	11.3	1.96	< 0.01	< 0.01	1.28	4	0.51	0.11	0.62	-	-
No.27	603.66	604.05	0.39	< 5	10.3	2.22	0.74	< 0.01	1.30	5	0.71	0.07	0.78	-	-
No.28	604.05	604.15	0.10	40	6.9	1.34	< 0.01	0.01	2.46	2	0.39	0.01	0.40	-	-
No.29	604.15	604.65	0.50	< 5	14.4	2.35	< 0.01	< 0.01	1.35	< 1	0.61	0.07	0.68	-	-
No.30	604.65	605.00	0.35	< 5	27.8	4.59	< 0.01	0.01	0.80	< 1	1.18	0.31	1.49	-	-
No.31	605.00	605.20	0.20	< 5	23.7	3.50	< 0.01	< 0.01	1.43	< 1	0.91	0.11	1.02	-	-
No.32	605.20	605.34	0.14	< 5	38.7	10.30	< 0.01	< 0.01	2.35	4	2.55	0.06	2.61	-	-
No.33	605.34	605.47	0.13	< 5	16.1	2.62	0.03	< 0.01	2.35	< 1	0.73	0.03	0.76	-	-
No.34	605.47	605.61	0.14	< 5	12.0	1.88	< 0.01	0.01	1.81	2	0.53	0.04	0.57	-	-
No.35	605.61	605.78	0.17	< 5	39.8	7.51	< 0.01	< 0.01	1.48	< 1	1.92	0.04	1.96	0.04	6.99
No.36	605.78	606.50	0.72	< 5	0.3	0.03	< 0.01	0.01	1.67	< 1	0.01	0.12	0.13	-	-
No.37	606.50	607.00	0.50	< 5	0.3	0.02	< 0.01	0.01	2.01	< 1	0.01	0.08	0.09	-	-
No.38	607.00	607.50	0.50	< 5	0.3	0.02	< 0.01	0.01	2.77	3	0.18	0.01	0.19	-	-
No.39	607.50	608.00	0.50	< 5	0.0	0.01	< 0.01	0.01	2.44	< 1	0.12	0.01	0.13	-	-
No.40	608.00	608.50	0.50	< 5	0.0	0.02	< 0.01	0.01	2.93	< 1	0.02	0.02	0.04	-	-

Appendix 13-2 Assay Results of Core Samples from the Drill Hole "MJK-1"

Sample No.	From m	To m	Length m	Au ppb	Ag g/t	Cu %	Pb %	Zn %	Fe tot %	Re ppm	S sulfide %	S sulfate %	S tot %	S elem %	FeO %
No.41	608.50	609.00	0.50	< 5	0.0	0.03	0.01	0.02	2.73	< 1	< 0.01	0.02	0.02	----------	----------
No.42	609.00	609.50	0.50	< 5	0.3	0.12	0.02	0.01	3.34	2	0.06	0.01	0.07	----------	----------
No.43	609.50	610.00	0.50	< 5	0.3	0.04	0.03	0.01	2.57	< 1	0.03	0.01	0.04	----------	----------
No.44	435.00	435.30	0.30	< 5	0.0	< 0.01	0.01	< 0.01	4.05	5	0.01	0.02	0.03	----------	----------
No.45	440.00	440.30	0.30	< 5	0.0	0.01	0.01	0.01	3.83	< 1	1.73	0.01	1.74	0.03	2.12
No.46	445.00	445.30	0.30	< 5	0.0	0.01	< 0.01	0.01	3.84	< 1	< 0.01	0.20	0.20	----------	----------
No.47	450.00	450.30	0.30	< 5	0.0	0.01	< 0.01	< 0.01	1.02	3	0.17	0.04	0.21	----------	----------
No.48	455.00	455.30	0.30	< 5	0.0	0.01	0.05	0.01	3.00	< 1	0.03	0.01	0.04	----------	----------
No.49	460.00	460.30	0.30	< 5	0.0	< 0.01	< 0.01	0.01	3.18	3	1.10	0.01	1.11	----------	----------
No.50	465.00	465.30	0.30	< 5	0.0	< 0.01	< 0.01	0.01	3.13	< 1	0.81	0.01	0.82	----------	----------
No.51	470.00	470.30	0.30	< 5	0.0	< 0.01	0.01	0.01	2.38	< 1	0.07	0.03	0.10	----------	----------
No.52	475.00	475.30	0.30	< 5	0.0	< 0.01	< 0.01	< 0.01	2.70	< 1	0.38	0.01	0.39	----------	----------
No.53	480.00	480.30	0.30	< 5	0.0	0.02	< 0.01	0.01	3.92	2	0.01	0.02	0.03	----------	----------
No.54	485.00	485.30	0.30	< 5	0.0	< 0.01	0.01	< 0.01	1.80	< 1	0.03	0.01	0.04	----------	----------
No.55	490.00	490.30	0.30	< 5	0.0	0.01	0.01	< 0.01	1.47	< 1	0.71	0.02	0.73	0.02	0.72
No.56	495.00	495.30	0.30	< 5	0.0	0.01	0.01	< 0.01	3.50	< 1	1.58	0.01	1.59	----------	----------
No.57	500.00	500.30	0.30	< 5	0.0	0.01	< 0.01	< 0.01	2.40	2	1.13	0.02	1.15	----------	----------
No.58	505.00	505.30	0.30	< 5	0.0	0.01	< 0.01	0.01	4.09	< 1	0.01	0.02	0.03	----------	----------
No.59	510.00	510.30	0.30	< 5	0.0	0.01	< 0.01	< 0.01	4.04	< 1	0.01	0.01	0.02	----------	----------
No.60	515.00	515.30	0.30	< 5	0.0	0.01	< 0.01	0.01	3.34	1	0.72	0.02	0.74	----------	----------
No.61	520.00	520.30	0.30	< 5	0.0	0.01	< 0.01	0.01	4.22	< 1	2.54	0.02	2.56	----------	----------
No.62	525.00	525.30	0.30	< 5	0.3	0.07	0.01	0.01	3.09	< 1	1.07	0.02	1.09	----------	----------
No.63	530.00	530.30	0.30	< 5	0.0	0.01	< 0.01	0.01	3.42	< 1	0.02	0.30	0.32	----------	----------
No.64	535.00	535.30	0.30	< 5	0.3	0.01	< 0.01	0.01	3.94	< 1	0.02	0.18	0.20	----------	----------
No.65	540.00	540.30	0.30	< 5	0.0	0.01	< 0.01	0.01	3.93	< 1	0.06	0.09	0.15	0.01	3.61
No.66	545.00	545.30	0.30	< 5	0.0	0.01	< 0.01	0.01	4.14	4	< 0.01	0.02	0.02	----------	----------
No.67	550.00	550.30	0.30	< 5	0.3	0.01	< 0.01	0.01	2.25	2	0.30	0.01	0.31	----------	----------
No.68	555.00	555.30	0.30	< 5	0.0	< 0.01	< 0.01	0.02	4.82	2	0.03	0.00	0.03	----------	----------
No.69	560.00	560.30	0.30	< 5	0.0	0.02	0.03	0.01	2.14	< 1	0.07	0.01	0.08	----------	----------
No.70	565.00	565.30	0.30	< 5	0.0	0.01	0.01	0.01	3.23	6	0.37	0.01	0.38	----------	----------
No.71	570.00	570.30	0.30	< 5	0.0	< 0.01	< 0.01	< 0.01	2.64	2	0.05	0.00	0.05	----------	----------
No.72	575.00	575.30	0.30	< 5	0.0	< 0.01	< 0.01	0.01	2.55	< 1	0.09	0.01	0.10	----------	----------
No.73	580.00	580.30	0.30	< 5	0.0	0.03	0.01	0.01	2.69	2	0.04	0.01	0.05	----------	----------
No.74	585.00	585.30	0.30	< 5	0.3	0.02	< 0.01	0.01	2.65	< 1	0.07	0.01	0.08	----------	----------
No.75	621.00	621.30	0.30	< 5	0.0	0.01	0.01	< 0.01	1.60	3	< 0.01	0.02	0.02	0.02	0.71
No.76	642.00	642.30	0.30	< 5	0.0	0.01	< 0.01	0.01	4.05	< 1	< 0.01	0.03	0.03	----------	----------
No.77	Zhezkazgan South Mine			65	798.8	31.90	0.08	< 0.01	3.97	29	10.42	0.00	10.42	----------	----------
No.78	Zhezkazgan South Mine			5	459.4	27.70	0.02	< 0.01	4.59	40	10.41	0.00	10.41	----------	----------
No.79	Zhezkazgan South Mine			< 5	778.3	29.90	0.01	< 0.01	3.80	48	9.94	0.00	9.94	----------	----------
No.80	Zhezkazgan South Mine			< 5	1028.6	30.90	0.01	< 0.01	1.85	17	8.73	0.00	8.73	----------	----------

Appendix 14 Whole Rock Analysis of Core Samples from the Drill Hole "MJK-1", Zhaman-Aibat Ore Deposits

Sample No.		95-N45J3	95-N55J3	95-N65J3	95-N22J3	95-N26J3
Depth from	m	440.00	490.00	540.00	600.77	603.10
Depth to	m	440.30	490.30	540.30	601.75	603.66
SiO2	(%)	60.75	59.01	56.11	65.10	70.03
Al2O3	(%)	14.04	9.78	14.54	9.86	10.00
TiO2	(%)	0.58	0.47	0.62	0.32	0.37
Fe2O3	(%)	3.30	1.41	1.61	0.14	0.04
FeO	(%)	2.26	0.78	3.87	2.04	1.86
CaO	(%)	3.53	11.85	5.13	5.14	5.50
MnO	(%)	0.11	0.27	0.16	0.11	0.09
Na2O	(%)	3.74	4.57	2.52	3.05	3.73
MgO	(%)	2.26	0.39	2.55	0.57	0.53
K2O	(%)	2.31	0.66	3.21	1.94	1.56
P2O5	(%)	0.14	0.10	0.16	0.08	0.09
LOI	(%)	5.73	9.61	7.69	3.84	5.27
Total	(%)	98.75	98.90	98.17	92.19	99.07

Appendix 15-1 Microscopic Observation of Polished Sections from the Drill Hole "MJK-1", Zhaman-Aibat Ore Deposit

Sample No.	Drill No.	From (m)	To (m)	Location	Observation	Cc	Bn	Cv	El	Dz	Gr	Go
95-PS-01	MJK-1	599.82	600.02	Eastern Orebody	Chalcocite-like minerals mainly chalcocite and small amounts of digenite and djurleite(60%), bornite (38%), electrum (1%), goethite(1%), and gangue minerals are constituent minerals. Chalcocite-like minerals and bornite occur as interstice-filling product among sedimentary particles and as veinlets in clay-rich parts of the rocks. Ag-rich electrum (max 0.1mm in size) occurs in veinlets of less than 2mm in width, which consist of chalcocite-like minerals (mainly chalcocite) and less bornite, in dark bluish green clay.	◎	○		+			+
95-PS-02	MJK-1	600.40	600.77	Eastern Orebody	Chalcocite-like minerals mainly chalcocite (95%), goethite (4%), covellite (1%) and gangue minerals are constituent minerals. Chalcocite-like minerals are interstitial among sedimentary particles. Aggregates of goethite grains as secondary products probably after pyrite within some of sedimentary particles are also observed.	◎		+				△
95-PS-03	MJK-1	600.77	601.75	Eastern Orebody	Chalcocite-like minerals (mainly chalcocite, less digenite and rare djurleite)(98%), goethite (2%) and gangue minerals are constituent minerals. Chalcocite-like minerals occur interstice-filling products among sedimentary particles, and also within some of the particles. Goethite occurs as secondary products after pyrite.	◎						△
95-PS-04	MJK-1	601.75	602.17	Eastern Orebody	This constitutes chalcocite-like minerals (chalcocite >> digenite > djurleite) (80%), bornite (19%), gersdorffite-cobaltite series mineral (1%) and gangue minerals. Chalcocite-like minerals occur as aggregates of small grains and dots and occasionally as patches up to 3mm x 5mm in size. Bornite occurs as small inclusions in chacocite-like minerals and as anhedral grains with chalcocite-like minerals up to 40 micro-m in size. In such a case, these minerals tend to arrange linearly in the rock . Gersdorffite-cobaltite series mineral occurs as small euhedral crystals in chalcocite-like minerals generally with bornite inclusion, and might be misunderstood as skutterudite by Russian researcher.	◎	○				+	
95-PS-05	MJK-1	602.17	602.68	Eastern Orebody	Chalcocite-like minerals (mainly chalcocite and less digenite) (97%), bornite (1%), covellite (1%) and gangue minerals are constituent minerals. Chalcocite-like minerals occur interstitially among sedimentary particles. Bornite rarely occurs as small inclusions in chalcocite-like minerals. In such a case, bornite is surrounded by secondary djurleite which is an alteration product after chalcocite. Covellite and goethite are also secondary products after chalcocite-like minerals and probably pyrite, respectively.	◎	+	+				+
95-PS-06	MJK-1	602.68	603.10	Eastern Orebody	This polished section consist of chalcocite-like minerals (mainly chalcocite) (98%), bornite (1%), goethite (1%), and gangue minerals. Interstitial chalcocite-like minerals among sedimentary particles are predominant. Bornite occurs as small inclusion in chalcocite-like minerals. Goethite occurs as secondary products after pyrite in some of sedimentary particles.	◎	+					+
95-PS-07	MJK-1	605.00	605.20	Eastern Orebody	This is also composed of chalcocite-like minerals (mainly chalcocite) (99%), goethite (1%) and gangue minerals. Chalcocite-like minerals occur as interstice-filling products among sedimentary particles. Goethite occurs in some of sedimentary particles as secondary products after pyrite.	◎						+
95-PS-08	MJK-1	605.20	605.34	Eastern Orebody	This polished section consists of chalcocite-like minerals (mainly chalcocite and less digenite) (99%), goethite (1%) and gangue minerals. Chalcocite-like minerals occur as interstice-filling products among sedimentary particles. The sulphide minerals are generally more concentrated in sandy parts than silty parts.	◎						+

Cc: Chalcocite like minerals, Bn: Bornite, Cv: Covellite, El: Electrum, Dz: Zhezkazganite, Gr: Gersdorffite-cobaltite series minerals, Go: Goethite

◎: more tan 50%, ○: 30% - 50%, △: 10% - 30%, +: less than 10%

Appendix 1 5 - 2 Microscopic Observation of Polished Sections from the Drill Hole "MJK-1", Zhaman-Aibat Ore Deposit (continued)

Sample No.	Drill No.	From (m)	To (m)	Location	Observation	Cc	Bn	Cv	El	Dz	Gr	Go
95-PS-09	MJK-1	605.47	605.61	Eastern Orebody	Chalcocite-like minerals (mainly chalcocite) (97%), electrum (2%), goethite (1%) and gangue minerals are constituent minerals. Chalcocite-like minerals interstitially occur among sedimentary particles. Ag-rich electrum occurs as small inclusions up to 50 micro-m in size in open spaces in chalcocite-like minerals and in direct contact with chalcocite-like minerals. Goethite occurs as secondary products after pyrite.	◎			△			+
95-PS-10	MJK-1	The South Mine of the Zhezkazgan Mine			Sulphide minerals is predominant. It is composed of chalcocite-like minerals (mainly chalcocite) (60%), bornite (39%), electrum (1%) and gangue minerals. All of these ore minerals occur as interstice-filling products among sedimentary particles with quartz and other gangue minerals which occur as euhedral crystals. Chalcocite-like minerals and bornite coexist with each other. Ag-rich electrum is included within both chalcocite-like minerals and bornite, and the former case is rather common. Rarely "dzhezkazganite"-like minerals (?) occurs in chalcocite-like minerals, but it is difficult to identify this phase because of its tiny size.	◎	○		+	+?		

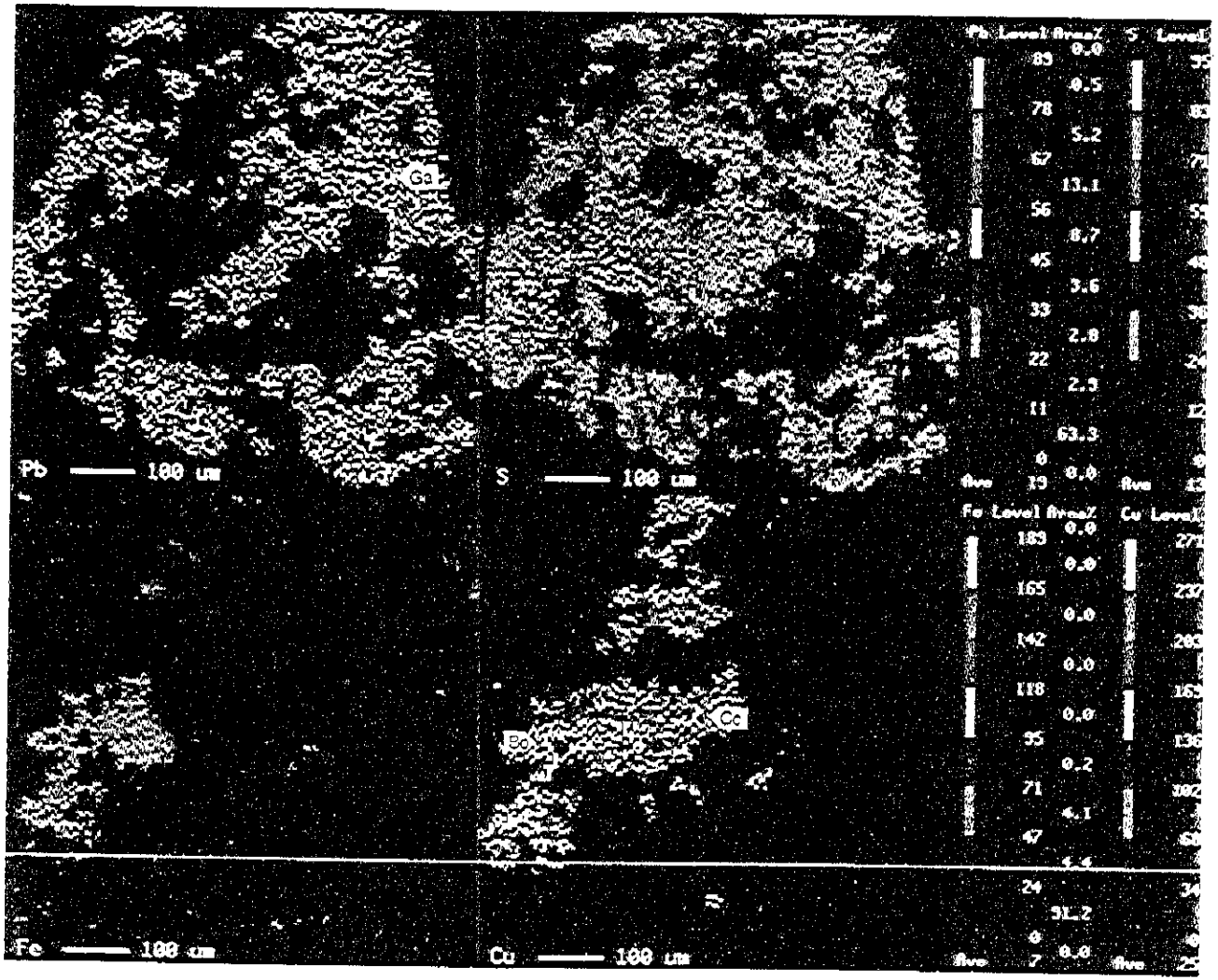
Cc: Chalcocite like minerals, Bn: Bornite, Cv: Covellite, El: Electrum, Dz: Zhezkazganite, Gr: Gersdorffite-cobaltite series minerals, Go: Goethite
◎: more tan 50%, ○: 30% - 50%, △: 10% - 30%, +: less than 10%

Appendix 16 Microscopic Observation of Thin Sections from the Drill Hole "MJK-1", Zhaman-Aibat Ore Deposit

Sample No.	DDH No.	Depth (m)	Formaton	Rock Name	Description	Identified Minerals
95-TS-01	MJK-1	203.5	Zhiderisai Formation	Laminated siltstone (red aleurolite)	average diameter : 0.02 - 0.05mm matrix : carbonitization (weak)	quartz, plagioclase, K-feldspar, sericite, chlorite, smectite, goethite(?)
95-TS-02	MJK-1	329.4	Zhiderisai Formation	Calcareous sandstone (red sandstone)	average diameter : 0.15mm matrix : carbonitization	quartz, carbonate minerals (mostly calcite), plogioclase, K-feldspar, opeque minerals, chlorite
95-TS-03	MJK-1	458.9	Zhezkazgan Formation	Thin laminated siltstone	average diameter : 0.02 - 0.0mm matrix : carbonitization	quartz, plagioclase, K-feldspar, opeque-minerals, carbonate minerals (mostly calcite), smectite
95-TS-04	MJK-1	539.9	Zhezkazgan Formation	Thin laminated siltstone	average diameter : 0.15 - 0.05mm matrix : carbonitization	quartz, plagioclase, K-feldspar, opeque minerals, carbonate minerals (mainly calcite), chlorite
95-TS-05	MJK-1	586.2	Zhezkazgan Formation	Calcareous fine-grained laminated sandstone	average diameter : 0.15mm matrix : carbonitization	quartz, plagioclase, K-feldspar, opeque minerals, carbonate minerals (mainly calcite),
95-TS-06	MJK-1	601.5	Zhezkazgan Formation	Thin bedded (or laminated) sandstone	average diameter : 0.4mm matrix : carbonitization, copper minerals	quartz, plagioclase, K-feldspar, opeque minerals, carbonate minerals (mainly calcite), tourmaline
95-TS-07	MJK-1	644.2	Taskuduk Formation	Calcareous sandstone	average diameter : 0.2mm matrix : carbonitization	quartz, plagioclase, K-feldspar, opeque minerals, carbonate minerals (mainly calcite), sericite, chlorite, smectite

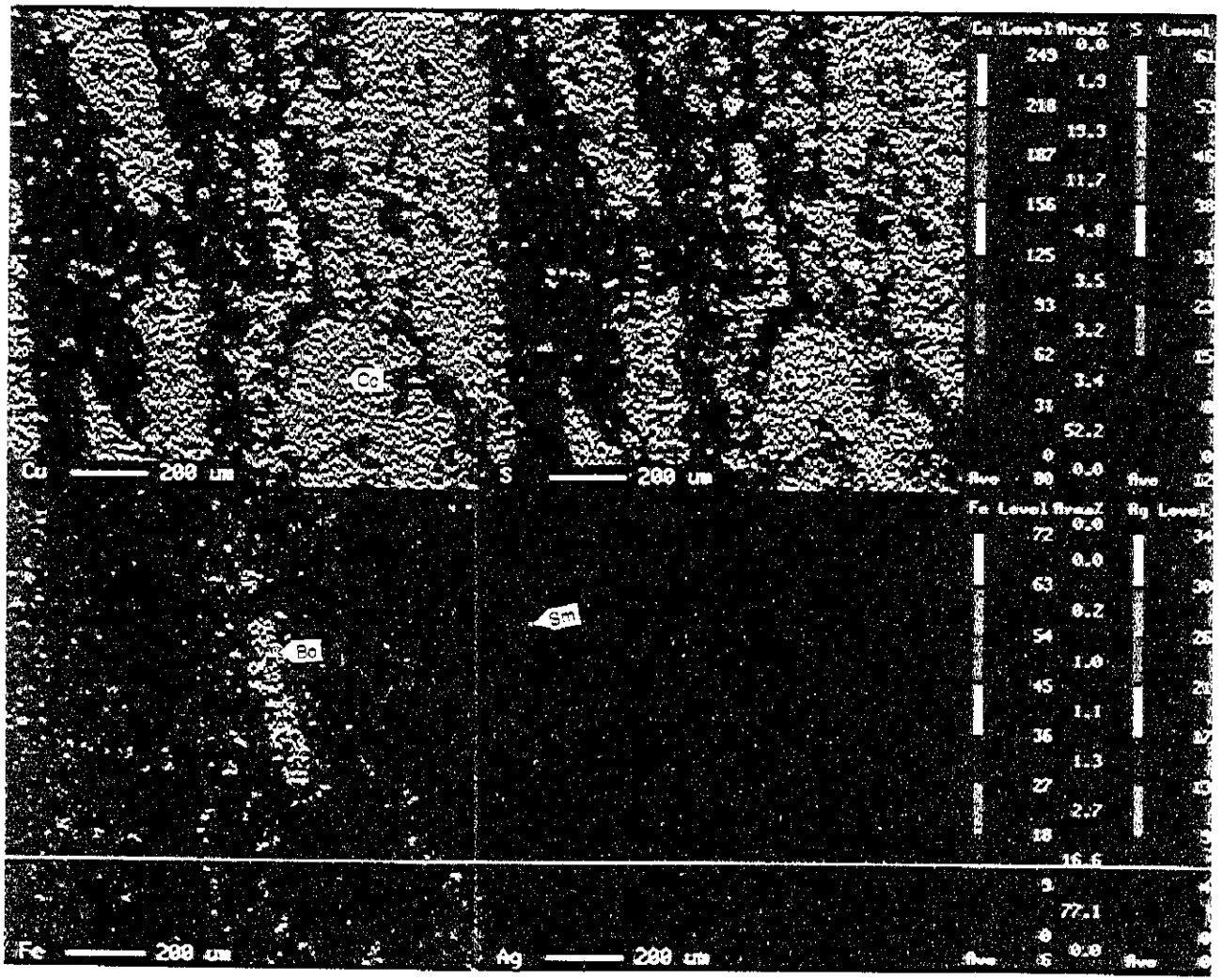
Appendix 17 EPMA Quantitative Analysis of Ore Samples from the Drill Hole "MJK-1" and Zhezkazgan Ore Deposit

No.	Fe (wt %)	Cu (wt %)	Ag (wt %)	Pb (wt %)	S (wt %)	Total (wt %)	Minerals
95-EP-01	10.63	66.656	0	0	23.801	101.087	bornite
(field code : No.23)	11.451	65.623	0.009	0	23.854	100.937	bornite
	11.28	64.029	0.032	0	23.692	99.033	bornite
	0.055	82.068	0	0	19.361	101.484	chalcocite
	0.076	82.192	0.04	0	18.951	101.259	chalcocite
	0.158	47.695	23.994	0	15.925	87.772	stromeyerite
	0.322	78.741	1.608	0	20.199	100.87	chalcocite
95-EP-02	0	0.185	0	86.638	13.505	100.328	galena
(field code : No.19)	0	0.037	0	86.392	13.211	99.64	galena
	10.69	64.588	0.014	0	23.929	99.221	bornite
	10.866	64.723	0	0	23.85	99.439	bornite
	0.041	82.831	0.026	0	19.497	102.395	chalcocite
	0.029	82.263	0	0	19.495	101.787	chalcocite
95-EP-03	11.292	64.929	0.297	0	24.042	100.56	bornite
(field code : No.80)	11.286	64.956	0.212	0	23.835	100.289	bornite
	0.022	82.186	0.395	0	19.038	101.641	chalcocite
	0.023	83.572	0.353	0	19.054	103.002	chalcocite



Sample No. :95-EP-01
Location : Eastern Orebody
DDH : MJK-1
Depth : 600.0m
Field code : No.19
Ore type : Cu ore
Minerals :
Cc : chalcocite
Bo : bornite
Ga : galena

Appendix 18 (1) EPMA Color Image of Complex Ore
from the Central Orebody of the Zhaman-Aibat Ore Deposit



Sample No. : 95-EP-02
Location : Eastern Orebody
DDH : MJK-1
Depth : 602.00m
Field code : No.23
Ore type : Cu ore
Minerals :
Cc : chalcocite
Bo : bornite
Sm : stromeyerite

Appendix 18 (2) EPMA Color Image of Complex Ore
from the Central Orebody of the Zhaman-Aibat Ore Deposit

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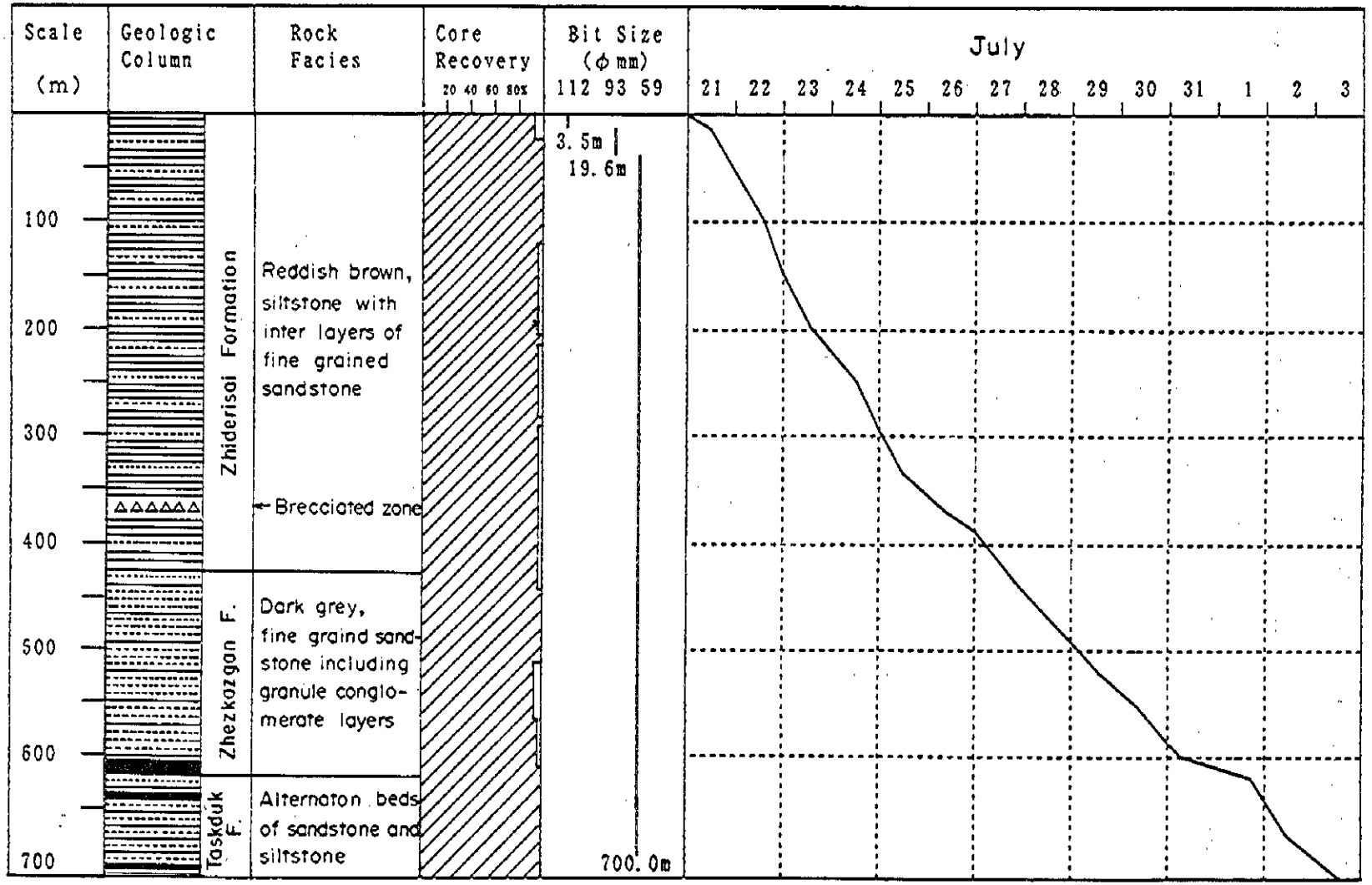
Appendix 19 Drilling Progress of the Hole "MJK-2", Zhaman-Aibat Ore Deposit



Appendix 20 Drilling Equipments of the Hole "MJK-2", Zhaman-Aibat Ore Deposit

Article	Model	Specification	Quantity
Drilling machine	ZIF—650M	Capacity: ϕ59mm 800m Inner diameter of spindle: 63.5mm Spindle speed: 81~800 rpm Weight: 2800 kg	1 set
Power unit	4A180M	Electric Motor Revolution: 1500 rpm Related power: 30KW 380 V	1 set
Drilling pump	HB3-120/40	Type:3cylinder single acting Volume (max) : 120 l/min Pressure (max) : 40 Kg/cm²	1 set
Power unit	4A132S4 6UZ—220/380v	Electric Motor Revolution: 1000 rpm Related power: 22KW 380 V	1 set
Water supply pump	6—12—33A	Type: turbine Volume (max) : 32 l/min Pressure (max) : 50 Kg/cm²	1 set
Power unit	AO2—Y1—6	Electric Motor Revolution: 1000 rpm Related power: 3 KW	1 set
Wire line hoist	K6—3×25+1×16		1 set
Derrick	mRU6U—18/20	Pipe structual derrick	1 set
Generator	6ms—13—41 120m—4	Diesel engine Revolution: 500 rpm Related power: 320 KVA Weight: 4080 kg	1 set
Drill rod	CCK—59		700m
Water tank		18m³	1 set

Appendix 21 Consumed Materials of the Drill Hole "MJK-2", Zhaman-Aibat Ore Deposit

Article	Unit	Quantity
Diamond Bit 59mm	Pcs	13
Cemented carbide bit 112mm	Pcs	1
do. 93mm	Pcs	2
Diamond reaming shell 59mm	Pcs	6
Core lifter	Pcs	20
Core lifter case	Pcs	11
Core box	Pcs	130
Lost circulation material	Kg	125
Diesel	l	8700
Gasoline	l	3100
Engine oil	l	560

Appendix 22 Operational Results of the Drill Hole "MJK-2",Zhaman-Aibat Ore Deposit

Item	Drilling hole No.			MJK-1
Drilling Data	Drilling length		(m)	700.0
	Core length		(m)	683.7
	Core recovery		(%)	97.6
	Depth by	112mm size	(m)	3.5
	do	93mm size	(m)	16.1
	do	59mm size	(m)	680.4
	Cashing pipe	108mm	(m)	3.5
	do	89mm	(m)	19.6
	Drilling mashine			ZIF-650
Working Period	Working Period			7.19~8.60
	Actual Working Days		(d)	19
	No Working Days		(d)	0
	Total		(d)	19
	Actual Working Days	Mounting	(d)	2
		Drilling	(d)	14
		Dismounting	(d)	3
		Others	(d)	0.0
		Total	(d)	19
	Drilling length / Working Period		(m/d)	36.8
	Drilling length / Drilling days		(m/d)	50.0
	Dilling length / Drilling shifts		(m/d)	21.2
Working Time	Drilling		(h)	203° 25'
	Hoisting & Lowering rod etc.		(h)	78° 50'
	Repairing		(h)	37° 45'
	Sub total		(h)	320° 00'
	Mounting		(h)	28° 00'
	Dismounting		(h)	25° 00'
	Others		(h)	0° 00'
	Total		(h)	373° 00'
	Drilling length / Drilling hour		(m/h)	3.44
Workers	Total drilling workers			428
	Total drilling workers / Drilling length		(w/.m)	0.61

Appendix 23-1 Geological Logging of the Drill Hole "MJK-2"(1/10), Zhaman-Aibat Ore Deposit

MJK-2 INCLINATION: -90°

AREA: ZHAMAN-AIBAT BEARING: ELEVATION: FINAL DEPTH: 700.00m

SCALE(m)	COLUMN	DEPTH (m)	DESCRIPTION	REMARKS	MINERALIZATION	SULFIDE	QUARTZ	CLAY	CARBONATE	SULFATE	SAMPLE NO	ROCK PROPERTY: Angle of Fract. (°)	No. of Fract. (/m)	Core Rec. (%)
			Reddish brown weathered sand and clay • 0.00-1.00m Average 20% sand with clay matrix • 1.00-2.85m Average 80% sand with clay matrix										0	100
		2.85											0	100
													0	100
													0	81
			Purplish brown siltstone with figth brown sandstone patches and partings. Selenite up to 25mm width, in lower horizon. • 12.00-12.40m Pink fine grained sandstone • 17.30-17.45m Brown silty sandstone	∠8°									0	81
													0	81
10				∠45°									0	81
													0	81
		12.00											0	81
		12.40											0	81
													0	81
													0	81
													0	81
		17.30											0	81
		17.45											0	81
													0	81
20		19.60											0	100
		21.40	Light brown fine grained sandstone with brown silty sandstone and grey to white gypsum	∠40° ∠5°									0	96
			Weakly laminated brown siltstone with light grey spots o grained limestone. • 23.10m Gypsum spot (1.5×2.5 cm) • 26.00m-27.20 Selenite fibrs up to 1.5cm width.										0	93
													0	93
													0	93
		27.20											0	93
													0	93
			Light brown fine grained sandstone with selenite veins(up to 1cm width) • 29.90-30.10m Intraformational pebble conglomerate	∠5°									0	100
30		30.20											0	100
													0	100
													0	100
			Light brown siltstone showing paralell lamination. • 27.00-32.00m Gypsum up to 1.5cm width(average 2 veins/m)and sporadic selenite • 36.10-51.40m Selenite veins(2.5cm) and chlorite in fractures										0	100
													0	100
													0	100
													1	100
													2	100
													1	100
													1	100
													1	100
													1	100
40				∠30°									1	100
				∠5°									1	100
													1	100
													1	100
													1	100
													1	100
													1	100
50													1	100
		51.40											1	100
		52.25	Light brown sandstone.	∠8°									1	100
			Brown siltstone with spots of limy fine grained calcareous sandstone. Gypsum veins up to 8cm width.	∠5°									1	100
		55.40											1	100
		57.00	Reddish brown fine grained sandstone	∠0°									1	100
													1	100
			Purplish brown siltstone showing parallel lamination. • 59.00m Gypsum of 20cm width • 63.00m Gypsum of 10cm width • 68.20m Greyish green siltstone parting of 2cm thickness										1	100
60													1	100
				∠0°									1	100
													1	100
													1	100
													1	100
													1	100
													1	100
													1	100
													1	100
													1	100

Appendix 23-2 Geological Logging of the Drill Hole "MJK-2"(2/10), Zhaman-Aibat Ore Deposit

MJK-2 INCLINATION: −90°

AREA: ZHAMAN-AIBAT BEARING: ELEVATION: FINAL DEPTH: 700.00m

SCALE(m)	COLUMN	DEPTH (m)	DESCRIPTION	REMARKS	MINERALIZATION	SULFIDE	QUARTZ	CLAY	Carbonate	SULFATE	SAMPLE NO	ROCK PROPERTY: Angle of Fes (°)	No. of Fes. (m)	Core Rec. (%)
70			Purplish brown siltstone showing parallel lamination.										0	100
			• 78.00m Gypsum of 6cm width.										0	100
			• 78.00-86.00m Numerous gypsum veins										0	100
													0	100
												∠5°	1	100
												∠10°	1	100
				∠0°								∠30°	1	100
													0	100
													0	100
80													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
90													0	100
													0	100
													0	100
													0	100
													0	100
		94.80										∠5°	1	100
			Brown fine to medium grained sandstone	∠0°								∠10°	1	100
		97.40										∠25°	1	100
			Purplish brown siltstone interbedded with thin sandstone layers	∠0°									0	100
				∠0°									0	100
			• 100.00-104.00m Numerous gypsum veins up to 12mm width.										0	100
100													0	100
													0	100
		102.40										∠10°	0	100
			Reddish brown fine to medium grained sandstone	∠0°								∠25°	0	100
		104.55											0	100
			Dark brown siltstone with intercalations of greenish blue siltstone in 115.80-117.00m, 121.20-121.26m, 122.60-122.80m and 123.40-123.60m										0	100
													0	100
													0	100
													0	100
													0	100
110													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
				∠0°									0	100
120													0	100
													0	100
													0	100
													0	100
													0	100
		125.80											0	100
		126.60	Brown fine grained sandstone with intercalation of dark brown siltstone in 126.60-127.40m.	∠0°									0	100
		127.40		∠0°									0	100
		128.30		∠0°									0	100
			Thinly bedded alternation of purplish brown siltstone and reddish brown fine grained sandstone										0	100
130													0	100
				∠0°									0	100
													0	100
													0	100
		135.70											0	100
			Purplish brown siltstone with fine grained sandstone.										0	100
													0	100
													0	100
													0	100
140													0	100

Appendix 23-3 Geological Logging of the Drill Hole "MJK-2"(3/10), Zhaman-Aibat Ore Deposit

MJK-2 INCLINATION: -90° AREA: ZHAMAN-AIBAT BEARING: ELEVATION: FINAL DEPTH: 700.00 m

SCALE(m)	COLUMN	DEPTH (m)	DESCRIPTION	REMARKS	MINERALIZATION	SULFIDE	QUARTZ	CLAY	CARBONATE	SULFATE	SAMPLE NO.	ROCK PROPERTY: Angle of Fra. (°)	No of Fra. (/m)	Core Rec. (%)
140			Purplish brown siltstone with fine grained sandstone. • 143.90-143.90m Conglomeratic anhydrite(0.5×1.0cm).										0	100
													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
150													0	100
													0	100
													0	100
		153.0											0	100
		154.0	Brown fine grained sandstone										0	100
													0	100
													0	100
													0	100
			Purplish brown siltstone • 154.00-155.40m Massive facies is dominated. • 155.40-188.60m Facies showing lamination is dominated. • Many interlayers of gypsum(selenite) up to 6cm in width. • Thin fine grained sandstone layers are interbedded in 166.50m-166.70m, 170.50m-170.65m, 170.70m-170.80m, 175.00m-175.10m, 179.90m-179.00m. • 184.70-185.20m Carbonate concretion (0.5×1.0cm).										0	100
160													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
170													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
180													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
		188.6											0	100
190			Brown siltstone interbedded with fine grained sandstones and breccia										0	100
		191.7											0	100
			Brown fine grained sandstone										0	100
		193.6											0	100
			Reddish brown fine grained sandstone with rare breccia parting • 200.50. Gypsum fibers up to 6cm.										0	100
													0	100
													0	100
													0	100
200													0	100
		201.6											2	100
		202.7	Reddish brown tectonic breccia consisting of fragments of light brown siltstone and gypsum cemented by fine grained sandstone										3	100
			Dark brown siltstone • Gypsum 203.10-203.60m, 204.90-206.30m, 206.70-207.60m and 208.40-208.80m. A few selenite interlayers up to 2cm width.										2	100
													0	100
													0	100
													0	100
													0	100
													0	100
210													0	100

Appendix 23-4 Geological Logging of the Drill Hole "MJK-2"(4/10), Zhaman-Aibat Ore Deposit

MJK-2 INCLINATION: −90°

AREA: ZHAMAN-AIBAT BEARING: ELEVATION: FINAL DEPTH: 700.00 m

SCALE(m)	COLUMN	DEPTH (m)	DESCRIPTION	REMARKS	MINERALIZATION	SULFIDE	QUARTZ	CLAY	CARBONATE	SULFATE	SAMPLE NO	ROCK PROPERTY: Angle of Fax (°)	No of Fax (/m)	Core Rec (%)
210		211.50											0	100
			Dark brown sandstone										0	100
				∠5°									0	100
		214.30											0	100
			Dark brown siltstone interbeded with fine grained sandstone										0	100
			• Gypsum (up to 15cm width) 217.20-217.40m,218.20-218.50m,219.90-220.20m,221.20-221.70m,225.40-225.90m,229.50-238.80m.										0	100
220				∠5°									0	100
				∠10°									0	100
													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
230													0	100
													0	100
													0	100
													0	100
													0	100
		235.70											0	100
		236.40	Brown fine grained sandstone										0	100
			Dark brown siltstone interbeded with light brown fine grained sandstone.										0	100
			• Gypsum(selonite) from 2cm to 15cm in all horizon.										0	100
			• Dark greenish grey siltstone partings (2-3cm thickness) in 251.10-251.40m.										0	100
240													0	100
				∠5°									0	100
				∠5°									0	100
													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
250													0	100
		251.50											0	100
			Brown siltstone parallel lamination at the lower part by the interlayers of light brown fine grained sandstone.										0	100
			• 260.50-260.75m,Breccia of anhydrite										0	100
			• 263.90-264.65: White crystalline anhydrite.										0	100
				∠5°									0	100
													0	100
													0	100
260													0	100
													0	100
													0	100
													0	100
													0	100
		264.65											0	100
			Massive-weakly parallel laminated dark brown siltstone									0°	1	100
			• 265.00-267.50m Greyish white anhydrite up to 8cm.									∠5°	1	100
													0	100
													0	100
													0	100
270													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
		279.00											0	100
280			Brown sandstone										0	100

Appendix 23-5 Geological Logging of the Drill Hole "MJK-2" (6/10), Zhaman-Aibat Ore Deposit

MJK-2 INCLINATION: -90°

AREA: ZHAMAN-AIBAT BEARING: ELEVATION: FINAL DEPTH: 700.00 m

SCALE(m)	COLUMN	DEPTH (m)	DESCRIPTION	REMARKS	MINERALIZATION	SULFIDE	QUARTZ	CLAY	CARBONATE	SULFATE	SAMPLE NO	ROCK PROPERTY: Angle of Fall (°)	No of Fas (m)	Core Rec (%)
280		280.20	Brown siltstone interbedded with brown fine grained sandstone. • Parting of anhydrite: 289.90-290.00 m and 290.60-291.30m. • Tectonic breccia 298.80-299.00m,299.70-299.80m,300.15-300.45m and 300.60-300.90m. • 297.70-297.85m Carbonate concretion(1.5×1.0cm) with the traces of chlorite	∠5° ∠0°								0	100
													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
290													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
300		300.90											3	100
			Brown siltstone,distinct parallel bedding by interlayers of fine grained sandstone. • Partings of anhydrite (up to 20cm thickness)in 311.30-311.95m,315.10-315.80m. • 317.80-318.00m Grey'sh brown sandstone layers	∠0°									4	100
													5	100
													2	100
													0	100
													0	100
													0	100
310													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
320													0	100
													0	100
		321.60											0	100
		322.10	Light brown fine grained sandstone	∠0°								∠8°	2	100
			Brown siltstone • 322.10-333.10m Gypsum up to 0.4cm. • 330.20-331.60m Brown siltstone with green spots • Breccias 327.00-327.20m,328.00-328.40m and 332.90-333.00m.										0	100
													0	100
													0	100
													0	100
													0	100
													0	100
330													0	100
													0	100
													0	100
		333.10											0	100
		334.70	Light brown fine grained sandstone										0	100
			Brown siltstone-silty sandstone with a few carbonate concretions up to 0.5×1.0cm. • Interlayers of fine grained sandstone in 338.20-338.40m and 350.10-350.35m. • 346.40m. Concretion of chorite carbonate. • Tectonic breccia consisting of sharp fractures of siltstone cemented by some fine crushed material in 336.10-336.20m,338.60-338.65m,341.20-341.60m,345.00-345.10m and 353.10-353.16m.									∠30°	3	100
													0	100
												∠45°	2	100
340												∠10°	3	100
												∠45°	3	100
													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
350													0	100

Appendix 23-6 Geological Logging of the Drill Hole "MJK-2"(6/10), Zhaman-Aibat Ore Deposit

MJK-2 INCLINATION: −90°

AREA: ZHAMAN-AIBAT BEARING: ELEVATION: FINAL DEPTH: 700.00m

SCALE(m)	COLUMN	DEPTH (m)	DESCRIPTION	REMARKS	MINERALIZATION	SULFIDE	QUARTZ	CLAY	CARBONATE	SULFATE	SAMPLE NO	ROCK PROPERTY: Angle of Fra. (°)	No. of Fra. (/m)	Core Rec. (%)
350													0	100
													0	100
		353.2											0	100
			Light brown siltstone interbedded with fine grained sandstone.										0	100
			• 353.20-353.60m Tectonic breccia consisting of small sharp fractured siltstone cemented by clay	∠5°									0	100
		353.0											0	100
			Light brown fine grained sandstone	∠60°									0	95
360		361.10		∠65°								∠45°	0	95
			Light brown siltstone with interlayers of fine grained sandstone										0	95
			• Sandstone 368.90-367.00m,368.40-368.70m and 375.30-375.50m.										2	100
			• Fissures or minor fault 368.80-370.00m,372.70-372.90m,373.60-373.80m and 375.50-375.70m.										2	100
			• 369.50-369.90m ,Tectonic breccia										2	75
													2	100
													2	100
													2	100
													2	100
													3	100
													3	100
													0	100
370													0	100
													0	100
													0	100
													0	100
			Tectonic breccia consisting of strongly crushed and mashed siltstone. Fractures are cemented by clay and carbonate materials.										0	100
		375.70											0	100
		376.70											2	75
			Light brown fine grained sandstone									∠60°	3	80
		377.90										∠75°	5	84
			Brown siltstone										4	98
380													4	100
													4	100
													4	100
													4	100
													4	100
		384.40											4	90
			Light brown fine to medium grained sandstone. Fining upwards sequence	∠5°									4	100
		387.20											5	100
			Reddish brown siltstone with the interlayers of reddish grey fine grained sandstone.										4	97
													4	100
390		390.60											4	100
			Brown fine to medium grained sandstone interbedded with siltstone.	∠5°									4	100
				∠8°								∠5°	2	100
		394.10										∠5°-10°	0	100
				∠0°									0	95
			Light brown to purplish brown siltstone interbedded with thin sandstones										0	95
			• 397.60-424.20: 3-10 veins of gypsum/meter,each vein is 1-2mm width.	∠0°									0	93
			• 395.00-398.20 Chlorite films on fracture plains										0	85
400			• 402.50-403.20 Grayish brown very fine grained sandstone										0	100
			• 404.40-405.20 Grayish brown to reddish brown fine grained sandstone with minor siltstone partings										0	100
			• 408.80-409.30 Sandstone fragments patch within siltstone matrix										0	100
			• 413.50-414.45 Banddied and irregular chlorite alteration.										0	100
													0	100
													0	100
													0	100
													0	100
410													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
													0	100
		417.30											0	100
		418.30	Massive fine to medium grained sandstone										0	100
420			Dark brown siltstone										0	100

Appendix 23-7 Geological Logging of the Drill Hole "MJK-2"(7/10), Zhaman-Aibat Ore Deposit

MJK-2 INCLINATION: −90°

AREA: ZHAMAN-AIBAT BEARING: ELEVATION: FINAL DEPTH: 700.00m

SCALE(m)	COLUMN	DEPTH (m)	DESCRIPTION	REMARKS	MINERALIZATION	SULFIDE	QUARTZ	CLAY	CARBONATE	SULFATE	SAMPLE NO	ROCK PROPERTY: Angle of Fiss (°)	No. of Fiss (/m)	Core Rec (%)
420				∠5°									0	98
												∠5°	0	98
												∠20°	0	99
		424.5											0	98
		425.9	Purplish grey fine grained sandstone	∠5°									0	100
													0	99
			Reddish brown siltstone with the interlayers of grey fine grained sandstone										0	99
			• Sandstone in 426.60-427.00m,428.60-428.80m, 433.40-433.70m and 435.00-435.30m.										0	99
430			• Breccia (mudball) in 428.00-428.10m,433.90-433.95m, 434.70-434.80m and 435.40-435.50m.										0	99
			Films of calcite and chorite in the fissures of all horizon.										0	99
													0	99
													0	99
													0	99
													0	99
													0	99
													0	99
		439.3											0	99
		439.0	Greyish brown medium grained sandstone.	∠5°									0	86
440			Reddish brown siltstone with rare spots of limy siltstone										0	100
		441.7	Chlorite in the fissures										0	100
			Greenish grey siltstone with reddish brown siltstone in 442.50-442.90m,448.70-448.80m.										0	100
		444.0	Chlorite and calcite films in the fissures										0	100
		446.2											0	100
		446.7											0	100
		448.3	Reddish brown siltstone with rare spots of green materials										0	88
		449.8											0	80
450		450.0	Medium-thick bedded alternation of reddish brown siltstone and greenish grey siltstone.										0	83
		451.2	• 448.70-448.90: Reddish brown siltstone with spots of grey materials									∠5°	1	100
			• 448.90-448.80: Greenish grey siltstone.										0	100
			• 448.80-450.00: Reddish brown siltstone										0	100
		456.3	• 450.00-451.20: Grey siltstone with calcite veins (up to 0.3cm width)										0	100
		457.1											0	100
		457.6											0	100
			• 451.20-456.30: Reddish brown siltstone with the interlayers of greenish dark grey tuff? in 453.70-454.00m.	∠5°								∠5°	2	100
460		460.3										∠15°	4	100
		461.3										∠5°	1	100
			Grey siltstone with the interlayers of grey to black fine grained sandstone.		451.30-454.40m: Weak pyrite diss								0	100
		463.8		∠5°								∠5°	2	100
		464.4	• 457.10-457.60: Brown siltstone.	∠5°	454.30-454.70m: Pyrite in fissures							∠15°	0	100
			• 460.30-464.90: Massive light brown siltstone	∠5°								∠15°	2	100
			• 463.80-464.40: Grey fine grained sandstone	∠5°								∠50°	2	100
		466.8											2	100
		467.7	• 464.50-464.70m: Strongly silicified zone with films of calcite and pyrite	∠5°	467.70-468.50m: Pyrite diss.							∠5°,45°	2	100
				∠5°								∠50°	4	100
		469.5	• 468.80-467.70: Massive brown siltstone									∠52.5°	2	100
470		470.0	• 467.70-469.50: Grey siltstone with grey fine grained sandstone partings. Pyrite films and pyrite spots at ca.469.10m.	∠5°	468.10m: Pyrite films & spots.							∠50°	2	100
					468.50-470.30m: Pyrite in fissures.									
		471.8		∠5°								∠50°	5	100
		472.6	• 469.50-470.00: Dark grey to black fine grained sandstone with the smell of oil	∠5°	471.80-472.80m: Tectonic breccia with pyrite							∠10°	6	100
		473.5		∠5°								∠10°	2	100
		474.1	Fissures filled with calcite and pyrite									∠52.5°	3	100
		475.1										∠15°	1	100
		476.1	• 471.80-472.80: Tectonic breccia with calcite and pyrite	∠5°								∠50°	2	100
				∠5°								∠10°	1	100
		478.0	Purplish brown siltstone with grey siltstone at lower part	∠5°	478.00-483.40m: Pyrite diss & films.							∠85°	2	100
		478.9										∠85°		
480		479.8	Light brown siltstone with red fine grained sandstone		482.50m: Spots of marcasite/pyrite							∠50°	1	100
			• 477.30-477.50m: Tectonic breccia									∠10°	3	100
		481.4										∠82.5°		
		482.8	Brown siltstone with brown fine grained sandstone	∠15°								∠5°-30°	5	100
		483.3										∠5°-5°	2	100
			Greyish brown to blackish grey fine grained sandstone with common pyrite dissimination and films										0	100
													0	100
				∠5°									0	100
			Brown siltstone with minor partings of brown fine grained sandstone										0	100
		489.3											0	100
490													0	100

Appendix 23-8 Geological Logging of the Drill Hole "MJK-2"(8/10), Zhaman-Aibat Ore Deposit

INCLINATION: -90°

AREA: ZHAMAN-AIBAT BEARING: ELEVATION: FINAL DEPTH: 700.00m

SCALE(m)	COLUMN	DEPTH (m)	DESCRIPTION	REMARKS	MINERALIZATION	SULPIDE	QUARTZ	CLAY	CARBONATE	SULPATE	SAMPLE NO	ROCK PROPERTY: Angle of Fis (°)	No. of Fis (∞)	Core Rec (%)
490			Greenish grey siltstone with grey fine grained sandstone		490.55-494.00m Pyrite in matrix.								0	100
			• 493.40-494.00 Black fine grained oil-carrying sandstone with Pyrite										0	100
		493.40										∠30°	2	100
		494.00										∠10°	2	100
		494.90	• 494.00-494.90 Massive gray siltstone with pyrite stains in fissures		494.00-494.90m Pyrite in fissures								0	100
					494.90-497.00m Spots of pyrite							∠40°	1	100
		497.00	• 494.90-497.00 Dark grey to black fine grained sandstone with weak smell of oil. Films of calcite and spots of pyrite are common.									∠ 0°	2	100
												∠10°	0	100
												∠80°	3	100
		499.10										∠70°	3	100
		499.60	• 497.00-499.60 Dark grayish green siltstone with grayish brown fine grained sandstone in lower 50cm.									∠ 5°	0	100
500		500.60											0	100
												∠ 5°	3	100
		501.60	Brown siltstone with greyish brown fine grained sandstone									∠85°	3	100
		503.20										∠10°	1	100
			Greenish grey siltstone		503.20-508.80m Pyrite in matrix.							∠5°,45°	2	100
			• Grey fine grained sandstone 505.20-505.30m and 505.90-506.00m.									∠ 5°	1	100
												∠80°	1	100
		506.50										∠30°	1	100
			Grey fine to medium grained sandstone with the interlayers of grey to black sandstone.									∠10°	1	100
					508.10-514.50m Pyrite dissem. in fissures.								0	100
		509.10											0	100
		509.80										∠87.5°	3	100
510		510.80	Dark-grey siltstone with grey fine grained sandstone									∠15°	1	100
		511.50	Films of calcite and dissiminated pyrite are common in fissures									∠ 5°	1	100
		512.30	• 509.80-510.80 Dark brown massive siltstone									∠5°,30°	2	100
			• 511.50-512.30 Brown siltstone									∠10°,85°	2	100
		514.55										∠85°,80°	2	100
			Brown siltstone with brown fine grained sandstone									∠5°,45°	2	100
												∠80°	1	100
			• 520.30-520.80m Tectonic fissures consisting of clay									∠30°	1	100
			• 521.90-522.00m Grey siltstone									∠ 5°	1	100
520			• 523.30-524.10m Dark grey sandstone with dark gray siltstone										0	100
			• 528.10-528.50m Black fine grained sandstone with the smell of oil.										0	100
													0	100
		523.30			523.30-524.10m: Pyrite in matrix.								0	100
		524.10										∠ 5°	2	100
												∠15°	0	100
												∠50°	2	100
												∠30°	0	100
													0	100
		528.10			528.10-528.50m: Pyrite in matrix.								0	100
		528.50											0	100
530													0	100
													0	100
													0	100
													0	100
		533.50											1	100
			Dark grey siltstone with the interlayers of red siltstone in. 534.90-535.20m.		533.50-535.50m: Pyrite in matrix.							∠15°	1	100
		535.50	• 534.20-534.40m: Black fine grained sandstone with smell of oil									∠25°	0	100
												∠0°,5°		100
													0	100
		539.40	Brown siltstone with a few interlayers of brown fine grained sandstone										0	100
540		539.70	• 539.20-539.80m Grey fine grained sandstone										0	100
													0	100
		543.20											0	100
			Dark grey siltstone with the interlayers of dark-grey to black fine grained sandstone with smell of oil		544.20m: Pyrite in matrix.								0	100
												∠ 5°	2	100
		546.40										∠20°	0	100
		547.50	Brown massive siltstone with minor fine grained sandstone									∠ 5°	1	100
		548.00	547.50-548.00: Grey siltstone		548.20-561.70m: Pyrite in matrix.							∠20°	3	100
		549.20										∠30°,20°	1	100
550			Dark grey siltstone with grey fine grained sandstone									∠10°	0	100
			Films of pyrite and marcasite at 550.90m.		550.90m-552.10m:								0	100
		551.70			Films of pyrite/marcasite.							∠40°	4	98
		552.35	Dark grey fine grained sandstone with smell of oil.		554.30-554.60m Pyrite films							∠0°,5°	1	89
		553.33	• 552.35-553.35 Dark grey to black massive siltstone		554.80-558.80m Pyrite in matrix.							∠10°	1	100
		554.35	• 554.35-554.80 Grey siltstone									∠ 5°	0	100
		554.80										∠5°,0°	2	100
		555.30	Dark grey siltstone with grey fine grained sandstone									∠10°	1	100
												∠35°	1	100
													0	100
560		559.80											0	100

Appendix 23-9 Geological Logging of the Drill Hole "MJK-2"(9/10), Zhaman-Aibat Ore Deposit

MJK-2 INCLINATION: -90°

AREA: ZHAMAN-AIBAT BEARING: ELEVATION: 336.5m FINAL DEPTH: 700.00m

SCALE(m)	DEPTH (m)	DESCRIPTION	REMARKS	MINERALIZATION	SAMPLE NO	ROCK PROPERTY: Angle of Fiss. (°)	No. of Fiss (ea)	Core Rec. (%)
560	561.20	Grey fine grained sandstone with intercalations of black sandstone and dark grey siltstone	∠5°	559.80-560.80m: Common pyrite diss		∠5°	2	100
	563.20	Pyrite is common in all horizon and its nests at 559.85m and 560.20m.		564.20-565.90m: Pyrite in fissures.		∠30°	1	100
	563.70		∠20°			∠5°	1	100
	564.20	• 564.20-565.90: Grey fine grained sandstone with fissures stained by pyrite	∠5°			∠15°	1	100
	565.90						0	100
	566.45						0	100
	567.10	• 565.90-568.40: Greyish green massive siltstone	∠25°			∠30-20	2	100
	568.00		∠25°				0	100
	568.60	• 567.10-568.00: Dark grey siltstone	∠5°			∠5°	1	100
570		Grey(weakly greenish) siltstone with partings of grey fine grained sandstone		569.80-569.80m: Rare pyrite spots		∠60°	3	100
						∠15°	2	100
			∠5°			∠5°	0	100
							0	100
							0	100
	574.90						0	100
		Grey fine grained sandstone with smell of oil.	∠10°	574.90m: Thick nesty pyrite.		∠5°	1	100
	576.40	• 574.90m: Thick nesty interlaying of pyrite.				∠5°	1	100
	578.50	Greyish green siltstone with grey fine grained sandstone	∠5°			∠10°	1	100
580							0	100
		Gray fine grained sandstone with dark grey fine grained sandstone.	∠5°			∠5°	2	100
	582.00					∠30°	0	100
		Thin bedded alternation of dark grey siltstone silty-sandstone and grey fine grained sandstone.					0	100
							0	100
			∠5°				0	100
590							0	100
							0	100
							0	100
	593.60						0	100
		Grey fine grained sandstone with minor dark grey to greenish grey fine grained sandstone.	∠5°	595.80-599.80m: Common pyrite films		∠10°	1	100
			∠10°			∠0°	1	100
			∠10°				0	100
			∠10°			∠5°	2	100
600	599.60					∠20°	0	100
		Thinly bedded alternation of grey fine grained sandstone(40%) and laminated dark grey siltstone (60%).	∠5°	599.80-603.20m: Rare pyrite spots.	Sample No. 1-133 (599.60 -700.00)	∠5°	2	100
	603.00					∠45°	0	100
		Greenish grey siltstone with thin sandstone layers.	∠5°	603.00-605.40m: Rare pyrite in fissures.	1	∠45°	4	100
	605.40					∠10°	1	100
	606.15	Medium bedded alternation of grey sandstone,grey conglomerate and grey siltstone.	∠30°	606.75-607.80m: Chalcocite in fissures.			0	100
	606.75					∠5°	1	100
	607.80				5	∠5°	1	100
	609.00		∠5°	608.40-608.60m: Weak galena/bornite diss			0	100
610		Grey fine to coarse grained sandstone interbedded with granule-pebble conglomerate in 614.6-615.6m,617.5-617.65m,618.4-619.5m and 619.45-619.85m.	∠5°	608.00-610.40m: Abundant galena/chalcocite diss			0	100
				610.40-611.40m: Massively chalcocite/bornite diss		∠5°	1	100
			∠5°	611.40-615.60m: Frequent diss. of chalcocite/bornite			0	100
							0	100
			∠5°	615.80-618.40m: Chalcocite diss	10		0	100
	618.40		∠10°				0	100
				618.45-618.80m: Spot/diss. of chalcocite	15	∠5°	1	100
620	619.90						0	100
		Greenish grey fine grained sandstone with intraformational conglomerate in 623.30-623.70m.	∠5°				0	100
					20	∠50°	4	100
	624.30					∠20°	1	100
	625.90	Brown massive siltstone.				∠5°	1	100
	626.80	Brown to greenish grey fine grained massive sandstone.			25	∠5°	2	100
						∠10°	0	100
	628.40		∠5°				0	100
630	629.00	Brown massive siltstone		629.00-630.00m: Weak chalcocite diss	30		0	100
							0	100
						∠5°	2	100
							0	100
					35		0	100
						∠45°	2	100
						∠5°	1	100
							0	100
					40	∠5°	1	100
						∠5°	1	100
							0	100

Appendix 23 - 10 Geological Logging of the Drill Hole "MJK - 2" (10/10), Zhaman - Aibat Ore Deposit

MJK - 2 INCLINATION: - 90°

AREA: ZHAMAN-AIBAT BEARING: ELEVATION: FINAL DEPTH: 700.00 m

SCALE(m)	DEPTH (m)	DESCRIPTION	REMARKS	MINERALIZATION	SAMPLE NO	ROCK PROPERTY: Ang'le of Fiss. (°)	ROCK PROPERTY: No. of Fiss. (/m)	ROCK PROPERTY: Core Rec. (%)
630		629.00-639.10 Greyish green medium to coarse grained sandstone with intraformational conglomerate in 633.20-633.50m, 638.20-638.30m, 638.60-638.70m and 639.00-639.10m.	∠5°	630.00-630.30m: Densely diss of chalcocite. 630.75-631.80m: Weak chalcocite diss	45		0	100
							0	100
							0	100
						∠5°	1	100
					50		0	100
							0	100
							0	100
							0	100
	639.10				55	∠5°	2	100
640	639.70	Greyish green massive siltstone with brown siltstone in upper 20cm.		638.70-644.15m: Weak chalcocite diss		∠5°	0	100
		Greenish grey fine grained sandstone with scattered pebbles (up to 40%) of grey siltstone	∠40°	642.80m: Bornite/chalcocite diss.	60	∠5° ∠10°	0 2	100 100
	644.00						0	100
		Greyish brown fine grained sandstone with brown siltstone in 644.00-644.15m and 644.90-645.00m and intraformational conglomerate (30cm. thick) at 645.00m.	∠30°				0	100
					65		0	100
	646.90					∠50° ∠15°	3	100
	647.60	Brown massive siltstone.	∠5°			∠20°	1	100
650		Grey fine grained sandstone with dark grey to greyish brown fine grained sandstone. Interlayers of greyish brown pebbles are common.			70	∠5°	0	100
							0	100
							0	100
	651.90						0	100
		Brown siltstone to fine grained sandstone with greenish brown fine grained sandstone(652.50-653.60m)	∠0°		75	∠5°	1	100
							0	100
	655.00						0	100
		Greenish grey fine grained sandstone with silt-fragment in all horizon.	∠5°		80		0	100
	657.40					∠5°	1	100
		Greyish brown fine to coarse grained sandstone with brown siltstone. Intraformational conglomerate is common and silt-fragment patches in places	∠5°				0	100
			∠5°				0	100
660			∠40°		85		0	100
						∠5°	1	100
			∠0°				0	100
	665.90						0	100
		Brown massive siltstone			90	∠5°	1	100
						∠45° ∠20°	2	100
						∠5°	1	100
							0	100
670					95		0	100
						∠67°	1	100
	672.00					∠5°	0	100
	673.20	Greyish brown fine grained sandstone	∠40°			∠15°	2	100
		Greenish grey fine grained sandstone Intraformational conglomerate at 676.10m and 678.45m.	∠5°	673.20-678.50m: Scatter diss of pyrite	100		0	100
							0	100
						∠5°	0	100
							0	100
	679.50				105	∠5°	3	100
680		Brown massive siltstone					0	100
						∠5°	2	100
	682.20		∠0°			∠5°	2	100
		Brown massive siltstone with greyish brown fine grained sandstone.	∠5°		110	∠5°	2	100
							0	100
	684.60					∠5°	3	100
	685.10	Greyish green siltstone	∠5°			∠5°	3	100
		Greenish grey fine grained sandstone with grey siltstone in 686.9-687.5m.		686.20-692.30m: Weak chalcocite/bornite diss.	115		0	100
							0	100
			∠5°				0	100
690						∠5°	1	100
					120	∠67°	1	100
							0	100
	692.30						0	100
		Brown siltstone with brown fine grained sandstone.	∠5°		125	∠5°	1	100
						∠10°		
	695.50	Greyish brown fine grained sandstone with brown fine grained sandstone				∠80°	2	100
							0	100
	697.00		∠5°			∠5°	1	100
		Brown massive siltstone			130	∠5°	2	100
	699.20					∠10°	0	100
700		Grey fine grained sandstone	∠5°			∠5° ∠15°	2	100

Appendix 24-1 Assay Results of Core Samples from the Drill Hole "MJK-2"

Sample No.	From m	To m	Length m	Au ppb	Ag g/t	Cu %	Pb %	Zn %	Fe tot %	Re ppm	S sulfide %	S sulfate %	FeO %
No. 1	599.60	600.60	1.00	<5	< 0.34	0.03	0.02	0.01	1.96	< 1	0.11	-	-
No. 2	600.60	601.60	1.00	<5	< 0.34	0.02	0.02	0.02	2.37	< 1	0.13	-	-
No. 3	601.60	602.30	0.70	<5	< 0.34	0.02	0.02	0.02	2.89	< 1	0.11	-	-
No. 4	602.30	603.00	0.70	<5	< 0.34	0.07	0.05	0.06	2.55	< 1	0.29	-	-
No. 5	603.00	604.00	1.00	<5	< 0.34	0.04	0.01	0.02	3.92	< 1	0.04	0.01	4.28
No. 6	604.00	604.70	0.70	<5	0.34	0.08	0.19	0.02	3.96	< 1	0.06	-	-
No. 7	604.70	605.40	0.70	<5	0.34	0.09	0.09	0.03	3.90	< 1	1.22	-	-
No. 8	605.40	606.15	0.75	<5	< 0.34	0.52	0.13	0.23	2.35	2	0.82	-	-
No. 9	606.15	606.75	0.60	<5	0.68	0.13	0.28	0.43	1.98	3	0.78	-	-
No. 10	606.75	607.80	1.05	<5	0.34	0.13	0.11	0.02	4.20	< 1	0.29	-	-
No. 11	607.80	608.40	0.60	<5	0.34	0.11	2.00	0.01	2.59	1	0.70	-	-
No. 12	608.40	609.00	0.60	<5	2.05	1.02	1.42	0.01	2.78	7	0.92	-	-
No. 13	609.00	609.95	0.95	<5	14.36	6.20	15.30	0.02	1.89	51	4.55	-	-
No. 14	609.95	610.40	0.45	<5	28.73	10.90	16.00	0.01	1.86	63	5.86	-	-
No. 15	610.40	611.40	1.00	<5	14.71	5.62	0.02	< 0.01	1.29	10	1.82	-	-
No. 16	611.40	612.00	0.60	<5	0.34	0.06	0.01	0.01	4.41	< 1	0.02	-	-
No. 17	612.00	612.60	0.60	<5	42.41	19.90	0.03	0.01	2.05	82	6.29	-	-
No. 18	612.60	613.40	0.80	<5	4.45	1.67	0.14	< 0.01	1.06	3	0.59	-	-
No. 19	613.40	613.75	0.35	<5	8.21	3.47	0.01	< 0.01	1.22	3	1.64	-	-
No. 20	613.75	614.60	0.85	<5	3.42	1.48	< 0.01	< 0.01	0.88	< 1	1.30	-	-
No. 21	614.60	615.35	0.75	<5	6.50	2.69	< 0.01	< 0.01	0.93	3	1.67	-	-
No. 22	615.35	615.60	0.25	<5	1.37	0.53	< 0.01	0.01	1.26	< 1	1.14	-	-
No. 23	615.60	616.20	0.60	<5	0.34	0.23	< 0.01	0.02	3.11	< 1	0.14	-	-
No. 24	616.20	616.90	0.70	<5	4.10	2.45	< 0.01	0.01	1.70	3	1.23	-	-
No. 25	616.90	617.50	0.60	<5	2.39	1.56	0.01	0.01	1.49	4	0.49	0.04	2.97
No. 26	617.50	617.70	0.20	<5	9.92	3.60	0.01	0.01	2.35	7	1.20	-	-
No. 27	617.70	618.40	0.70	<5	0.68	0.55	< 0.01	0.02	1.71	< 1	0.13	-	-
No. 28	618.40	618.60	0.20	<5	0.68	0.54	0.01	0.01	2.19	< 1	0.16	-	-
No. 29	618.60	619.05	0.45	<5	9.92	6.31	0.01	0.02	2.02	3	1.86	-	-
No. 30	619.05	619.65	0.60	<5	0.68	0.58	0.01	0.02	3.05	< 1	0.18	-	-
No. 31	619.65	619.90	0.25	<5	< 0.34	0.06	0.01	0.03	5.76	< 1	0.05	-	-
No. 32	619.90	621.00	1.10	<5	< 0.34	0.08	< 0.01	0.02	2.53	< 1	0.04	-	-
No. 33	621.00	622.10	1.10	<5	0.34	0.05	0.02	0.02	3.07	< 1	0.03	-	-
No. 34	622.10	623.20	1.10	<5	0.34	0.09	< 0.01	0.02	2.54	< 1	0.06	-	-
No. 35	623.20	624.30	1.10	<5	0.34	0.10	0.01	0.01	2.00	< 1	0.05	-	-
No. 36	624.30	625.10	0.80	<5	< 0.34	0.01	< 0.01	0.02	5.32	< 1	0.02	-	-
No. 37	625.10	625.90	0.80	<5	< 0.34	0.02	0.01	0.02	5.25	< 1	0.01	-	-
No. 38	625.90	626.90	1.00	<5	< 0.34	0.01	< 0.01	0.02	4.80	< 1	0.01	-	-
No. 39	626.90	627.60	0.70	<5	< 0.34	0.01	0.01	0.01	2.93	< 1	0.03	-	-
No. 40	627.60	628.40	0.80	<5	0.34	0.02	0.01	0.02	2.38	< 1	0.05	-	-

Appendix 24-2 Assay Results of Core Samples from the Drill Hole "MJK-2"

Sample No.	From m	To m	Length m	Au ppb	Ag g/t	Cu %	Pb %	Zn %	Fe tot %	Re ppm	S sulfide %	S sulfate %	FeO %
No. 41	628.40	629.00	0.60	<5	< 0.34	0.08	< 0.01	0.03	5.90	< 1	0.04	-	-
No. 42	629.00	630.00	1.00	<5	0.34	0.01	0.01	0.02	2.56	< 1	0.05	-	-
No. 43	630.00	630.40	0.40	<5	12.65	5.32	0.01	0.01	1.93	< 1	1.45	-	-
No. 44	630.40	630.80	0.40	<5	2.39	1.03	0.01	0.01	1.67	< 1	0.44	-	-
No. 45	630.80	631.40	0.60	<5	0.68	0.27	< 0.01	0.02	2.30	<1	0.12	0.04	2.77
No. 46	631.40	631.60	0.20	<5	7.52	2.17	0.01	0.01	2.73	< 1	0.60	-	-
No. 47	631.60	632.40	0.80	<5	< 0.34	0.03	0.02	0.03	3.39	< 1	0.02	-	-
No. 48	632.40	633.20	0.80	<5	< 0.34	0.01	0.01	0.01	2.26	< 1	0.02	-	-
No. 49	633.20	634.00	0.80	<5	< 0.34	0.14	0.01	0.01	2.32	< 1	0.09	-	-
No. 50	634.00	634.90	0.90	<5	< 0.34	0.01	0.02	0.02	3.67	< 1	0.02	-	-
No. 51	634.90	635.30	0.40	<5	2.74	0.46	0.01	< 0.01	1.93	< 1	0.30	-	-
No. 52	635.30	635.70	0.40	<5	4.10	0.80	0.01	0.01	1.75	< 1	0.30	-	-
No. 53	635.70	636.50	0.80	-	< 0.34	0.02	< 0.01	0.02	-	-	-	-	-
No. 54	636.50	637.30	0.80	-	< 0.34	0.02	< 0.01	0.01	-	-	-	-	-
No. 55	637.30	638.10	0.80	-	0.68	< 0.01	< 0.01	0.01	-	-	-	-	-
No. 56	638.10	639.10	1.00	-	< 0.34	0.01	< 0.01	0.01	-	-	-	-	-
No. 57	639.10	639.70	0.60	-	< 0.34	0.05	< 0.01	0.04	-	-	-	-	-
No. 58	639.70	640.50	0.80	-	0.34	0.17	< 0.01	0.03	-	-	-	-	-
No. 59	640.50	641.30	0.80	-	0.34	0.19	< 0.01	0.02	-	-	-	-	-
No. 60	641.30	641.70	0.40	-	< 0.34	0.16	0.01	0.02	-	-	-	-	-
No. 61	641.70	642.00	0.30	-	< 0.34	0.03	< 0.01	0.03	-	-	-	-	-
No. 62	642.00	643.00	1.00	-	0.68	0.27	< 0.01	0.02	-	-	-	-	-
No. 63	643.00	644.00	1.00	-	< 0.34	0.19	< 0.01	0.02	-	-	-	-	-
No. 64	644.00	645.00	1.00	-	0.34	0.01	< 0.01	0.03	-	-	-	-	-
No. 65	645.00	646.00	1.00	-	0.68	0.25	< 0.01	0.01	-	-	-	-	-
No. 66	646.00	646.90	0.90	-	< 0.34	0.01	< 0.01	0.02	-	-	-	-	-
No. 67	646.90	647.60	0.70	-	< 0.34	0.01	0.01	0.03	-	-	-	-	-
No. 68	647.60	648.40	0.80	-	< 0.34	0.01	< 0.01	0.01	-	-	-	-	-
No. 69	648.40	649.20	0.80	-	< 0.34	0.01	< 0.01	0.03	-	-	-	-	-
No. 70	649.20	650.00	0.80	-	< 0.34	0.01	0.01	0.02	-	-	-	-	-
No. 71	650.00	650.90	0.90	-	< 0.34	0.01	0.01	0.02	-	-	-	-	-
No. 72	650.90	651.90	1.00	-	< 0.34	0.10	< 0.01	0.01	-	-	-	-	-
No. 73	651.90	652.50	0.60	-	< 0.34	0.02	0.01	0.02	-	-	-	-	-
No. 74	652.50	653.00	0.50	-	< 0.34	0.02	< 0.01	0.02	-	-	-	-	-
No. 75	653.00	653.60	0.60	-	< 0.34	0.01	< 0.01	0.02	-	-	-	-	-
No. 76	653.60	654.30	0.70	-	< 0.34	0.06	0.17	0.02	-	-	-	-	-
No. 77	654.30	655.00	0.70	-	< 0.34	0.02	< 0.01	0.02	-	-	-	-	-
No. 78	655.00	655.80	0.80	-	< 0.34	0.01	< 0.01	0.01	-	-	-	-	-
No. 79	655.80	656.60	0.80	-	< 0.34	0.01	< 0.01	0.02	-	-	-	-	-
No. 80	656.60	657.40	0.80	-	0.68	0.04	0.01	0.02	-	-	-	-	-

Appendix 24-3 Assay Results of Core Samples from the Drill Hole "MJK-2"

Sample No.	From m	To m	Length m	Au ppb	Ag g/t	Cu %	Pb %	Zn %	Fe tot %	Re ppm	S sulfide %	S sulfate %	FeO %
No. 81	657.40	658.30	0.90	-	< 0.34	0.02	< 0.01	0.02	-	-	-	-	-
No. 82	658.30	659.00	0.70	-	< 0.34	0.01	< 0.01	0.02	-	-	-	-	-
No. 83	659.00	659.70	0.70	<5	0.34	0.01	0.01	0.01	4.51	< 1	0.02	-	-
No. 84	659.70	660.50	0.80	<5	< 0.34	0.01	0.01	0.02	3.83	< 1	<.01	-	-
No. 85	660.50	661.20	0.70	<5	< 0.34	0.01	< 0.01	0.02	2.85	< 1	0.03	0.01	2.47
No. 86	661.20	661.90	0.70	<5	< 0.34	0.01	0.01	0.02	2.66	< 1	0.05	-	-
No. 87	661.90	662.70	0.80	<5	< 0.34	0.01	0.01	0.02	3.20	< 1	0.04	-	-
No. 88	662.70	663.70	1.00	<5	< 0.34	0.01	0.01	0.01	2.22	< 1	0.13	-	-
No. 89	663.70	664.40	0.70	<5	< 0.34	0.01	0.01	0.01	2.26	< 1	0.19	-	-
No. 90	664.40	665.10	0.70	<5	< 0.34	0.03	0.01	0.02	3.30	< 1	0.02	-	-
No. 91	665.10	665.90	0.80	<5	1.03	0.20	0.02	0.01	1.75	< 1	0.09	-	-
No. 92	665.90	666.90	1.00	<5	< 0.34	0.01	0.01	0.01	4.41	< 1	0.01	-	-
No. 93	666.90	667.90	1.00	<5	0.34	0.05	0.02	0.01	4.08	< 1	0.04	-	-
No. 94	667.90	668.90	1.00	<5	< 0.34	< 0.01	0.03	0.01	4.95	< 1	0.01	-	-
No. 95	668.90	669.90	1.00	<5	< 0.34	0.01	0.01	0.01	4.65	< 1	0.02	-	-
No. 96	669.90	670.90	1.00	<5	< 0.34	0.01	0.02	0.01	4.70	< 1	0.03	-	-
No. 97	670.90	672.00	1.10	<5	14.36	5.66	0.06	< 0.01	1.14	14	1.89	-	-
No. 98	672.00	672.60	0.60	<5	0.34	0.03	0.02	0.01	3.90	< 1	0.03	-	-
No. 99	672.60	673.20	0.60	<5	< 0.34	0.01	0.01	0.02	4.84	< 1	0.04	-	-
No. 100	673.20	674.30	1.10	<5	1.03	0.38	0.02	< 0.01	1.62	< 1	0.86	-	-
No. 101	674.30	675.40	1.10	<5	< 0.34	0.03	0.02	0.01	1.78	< 1	0.09	-	-
No. 102	675.40	676.50	1.10	<5	< 0.34	0.03	0.03	0.02	2.04	< 1	0.25	-	-
No. 103	676.50	677.50	1.00	<5	0.34	0.03	0.04	0.02	3.00	< 1	0.11	-	-
No. 104	677.50	678.50	1.00	<5	0.34	0.01	0.02	0.01	2.40	< 1	0.03	-	-
No. 105	678.50	679.50	1.00	<5	< 0.34	0.01	< 0.01	0.02	5.00	< 1	0.02	0.01	3.20
No. 106	679.50	680.40	0.90	<5	< 0.34	0.01	0.02	0.01	4.49	< 1	<.01	-	-
No. 107	680.40	681.20	0.80	<5	< 0.34	0.01	0.01	0.01	4.22	< 1	0.02	-	-
No. 108	681.20	682.20	1.00	<5	< 0.34	0.01	0.01	0.01	3.40	< 1	0.02	-	-
No. 109	682.20	682.90	0.70	<5	< 0.34	0.02	0.01	0.02	4.40	< 1	0.01	-	-
No. 110	682.90	683.50	0.60	<5	< 0.34	0.01	0.01	0.01	3.19	< 1	0.03	-	-
No. 111	683.50	684.60	1.10	<5	< 0.34	0.01	< 0.01	0.01	4.93	< 1	0.02	-	-
No. 112	684.60	685.10	0.50	<5	0.34	0.08	0.02	0.02	3.95	4	0.07	-	-
No. 113	685.10	685.70	0.60	<5	< 0.34	0.01	0.06	< 0.01	1.74	< 1	0.15	-	-
No. 114	685.70	686.30	0.60	<5	< 0.34	0.01	0.54	0.01	2.13	4	0.22	-	-
No. 115	686.30	686.90	0.60	<5	0.34	0.02	0.88	0.01	2.00	8	0.27	-	-
No. 116	686.90	687.50	0.60	<5	0.34	0.05	0.19	0.02	2.93	2	0.11	-	-
No. 117	687.50	688.00	0.50	<5	< 0.34	0.02	0.06	0.01	2.28	2	0.06	-	-
No. 118	688.00	688.85	0.85	<5	< 0.34	0.01	0.20	0.01	2.05	5	0.19	-	-
No. 120	688.85	689.30	0.45	<5	2.05	0.48	0.18	0.01	2.30	11	0.31	-	-
No. 121	689.30	690.20	0.90	<5	< 0.34	0.02	0.09	0.01	2.00	2	0.13	-	-

Appendix 24-4 Assay Results of Core Samples from the Drill Hole "MJK-2"

Sample No.	From m	To m	Length m	Au ppb	Ag g/t	Cu %	Pb %	Zn %	Fe tot %	Re ppm	S sulfide %	S sulfate %	FeO %
No. 122	690.20	691.20	1.00	<5	1.03	0.07	0.28	0.01	2.00	4	0.19	-	-
No. 123	691.20	691.50	0.30	<5	< 0.34	0.03	0.20	0.01	2.80	3	0.18	-	-
No. 124	691.50	692.30	0.80	<5	3.08	0.69	< 0.01	0.01	1.84	5	0.33	-	-
No. 125	692.30	692.45	0.15	<5	5.47	1.48	0.01	0.03	4.28	5	0.60	<0.01	6.52
No. 126	692.45	693.50	1.05	<5	< 0.34	0.01	0.01	0.01	4.59	< 1	0.01	-	-
No. 127	693.50	694.50	1.00	<5	< 0.34	< 0.01	0.01	0.01	4.52	< 1	0.02	-	-
No. 128	694.50	695.50	1.00	<5	< 0.34	0.01	0.01	0.01	4.28	< 1	0.01	-	-
No. 129	695.50	696.20	0.70	<5	< 0.34	0.01	0.01	0.01	2.88	< 1	0.06	-	-
No. 130	696.20	697.00	0.80	<5	< 0.34	0.05	0.02	0.01	2.60	< 1	0.05	-	-
No. 131	697.00	698.10	1.10	<5	< 0.34	0.01	0.01	0.01	4.58	< 1	0.02	-	-
No. 132	698.10	699.20	1.10	<5	< 0.34	0.01	0.01	0.01	4.45	< 1	0.01	-	-
No. 133	699.20	699.80	0.60	<5	0.34	0.03	0.01	0.01	2.16	< 1	0.06	-	-
No. 134	699.80	700.00	0.20	<5	< 0.34	0.02	0.01	0.01	4.37	< 1	0.01	-	-

Appendix 25 Whole Rock Analysis of Core Samples from the Drill Hole "MJK-2", Zhaman-Aibat Ore Deposits

Sample No.		96-W1	96-W2	96-W3	96-W4	96-W5
Depth from	m	417.72	560.13	591.20	676.71	681.00
Depth to	m	414.87	560.23	591.28	676.81	681.23
SiO2	(%)	59.88	56.55	58.55	66.74	63.69
Al2O3	(%)	14.42	8.98	15.18	11.90	14.06
TiO2	(%)	0.59	0.30	0.66	0.47	0.70
Fe2O3	(%)	3.26	1.83	1.60	0.68	3.20
FeO	(%)	1.52	0.50	3.61	1.75	1.65
CaO	(%)	3.73	13.74	3.50	4.22	2.42
MnO	(%)	0.10	0.45	0.13	0.13	0.12
Na2O	(%)	2.67	4.09	2.02	3.94	3.13
MgO	(%)	2.37	0.25	2.31	1.09	1.47
K2O	(%)	3.15	0.62	3.97	1.56	2.86
P2O5	(%)	0.15	0.07	0.17	0.09	0.15
LOI	(%)	6.64	12.43	6.64	5.14	4.84
Total	(%)	98.48	99.81	98.34	97.71	98.29

Appendix 26-1 Microscopic Observation of Polished Sections from the Drill Hole "MJK-2", Zhaman-Aibat Ore Deposit

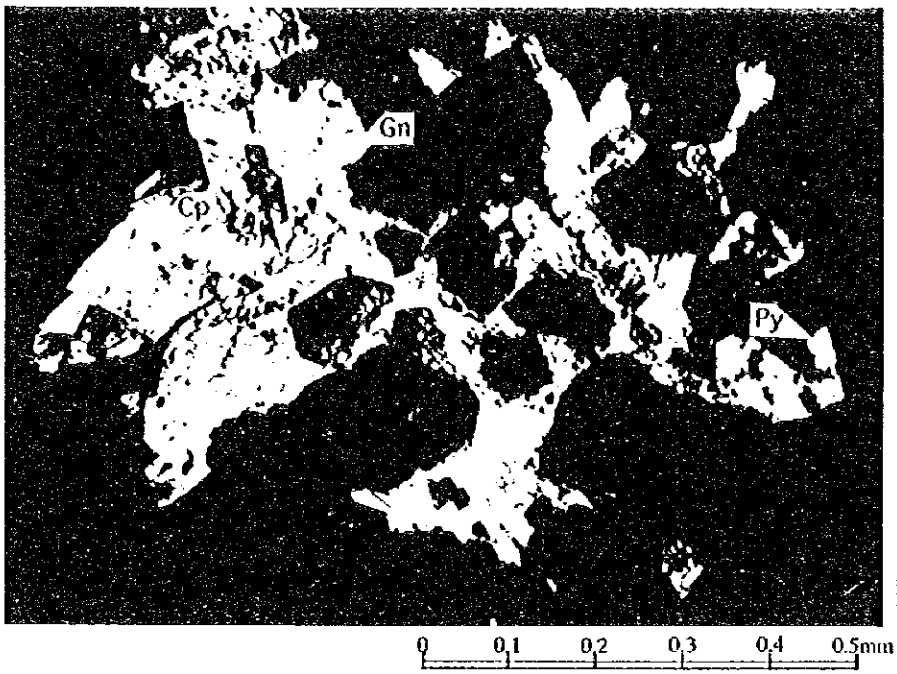
Sample No.	Drill No.	Depth (m)	Location	Observation	Cc	Bn	Cv	St	El	Py	Cp	Gn	Sp	Go
96-PS-01	MJK-2	608.10	Central Orebody	This polished section consist of galena (40%), pyrite (30%), chalcopyrite (20%), goethite (10%), and gangue minerals. Aggregates of anhedral grains of galena, anhedral grains of chalcopyrite, and euhedral to subhedral grains of pyrite (some of them are brecciated), up to 0.8mm in size, fill among sedimentary particles (sands). Goethite looks like a secondary product after pyrite or marcasite.						○	△	○		△
96-PS-02	MJK-2	608.35	Central Orebody	The constituent minerals are galena (40%), pyrite (30%), chalcopyrite (20%), bornite (5%), goethite (5%), and gangue minerals. Like 96-PS-01, these opaque minerals except goethite occure as aggregates up to 2mm in size, showing interstice-filling among sedimentary particles (sands)		+				○	△	○		+
96-PS-03	MJK-2	608.88	Central Orebody	The opaque constituents of this polished section are galena (50%), pyrite (30%), bornite (10%), goethite (10%) and gangue minerals. Chalcopyrite was not found. Aggregates of anhedral grains of galena, subhedral - euhedrl grains of pyrite, and anhedral bornite, up to 1.2mm in size, occur interstitially among sedimentary particles. This sandstone has layering almost horizontally, but there is no regularity on arrangement of the opaque minerals.		△				○		◎		
96-PS-04	MJK-2	609.32	Central Orebody	This polished section is composed of bornite (30%), chalcocite-like minerals (30%, in this case, chalcocite is predominant, but a small amount of digenite is also found), chalcopyrite (10%), covellite (5%), pyrite (5%), stromeyerite (5%), galena (5%), organic matters (5%) and gangue minerals. These opaque minerals except goethite and organic matters occure as aggregates of irregulaar shape, up to 2.5mm in size, interstitially among sedimentary particles (sands). Also, bornite and chalcocite-like minerals sometimes show micrographic texture.	○	○	+	+		+	△	+		
96-PS-05	MJK-2	609.60	Central Orebody	It consists of galena (50%), chalcocite-like minerals (20%, chalcocite is predominant), bornite (15%), covellite (5%), pyrite (5%), organic matters (5%) and gangue minerals. These opaque minerals except organic matters occure as aggregates, up to 2mm in size, interstitially among sedimentary particles (sands). Galena occures as relatively coarse grains as a member of the aggregates above mentioned, and and anhedral grains of galena with inclusions of fine grained gangue minerals. The latter aggregates do not include other sulfide minerals in general, or are contained in the former aggregates as breccias. It suggests that galena has at least two stages of formation.	△	△	+			+		◎		
96-PS-06	MJK-2	610.20	Central Orebody	This polished section is composed of chalcocite-like minerals (40%, chalcocite is more dominant than digenite), bornite (40%), galena (10%), organic matters (5%) and gangue minerals. Anhedral grains of chalcocite-like minerals, bornite and galena occure as aggregates of interstice-filling products, up to 3mm in size, among sedimentary particles (sands). One undetermined mineral is observed in such aggregates as subhedral columnar grains up to 0.15mm in size. It is gray in color, and clearly anisotropic.	○	○						△		
96-PS-07	MJK-2	610.70	Central Orebody	The opaque minerals od this polished section, which is predominant in sulfide minerals, are chalcocite-like minerals (50%, digenite and chalcocite are nearly same amount), bornite (45%), and Ag-rich electrum (5%). Chalcocite-like minerals and bornite occur as aggregates, up to 3mm in size, interstitially among particles (sands), and occasionally show micrographic texture. Anhedral grains of Ag-rich electrum, up to 02mm x 0.1mm in size, occers in some of the sedimentary particles with probably clay minerals, not quartz sands.	◎	○			+					+

Cc: Chalcocite like minerals, Bn: Bornite, Cv: Covellite, St: Stromeyerite, El: Electrum, Py: Pyrite, Cp: Chalcopyrite, Gn: Galena, Sp: Sphalerite, Go: Goethite
◎: more tan 50%, ○: 30% - 50%, △: 10% - 30%, +: less than 10%

Appendix 26-2 Microscopic Observation of Polished Sections from the Drill Hole "MJK-2", Zhaman-Aibat Ore Deposit (continued)

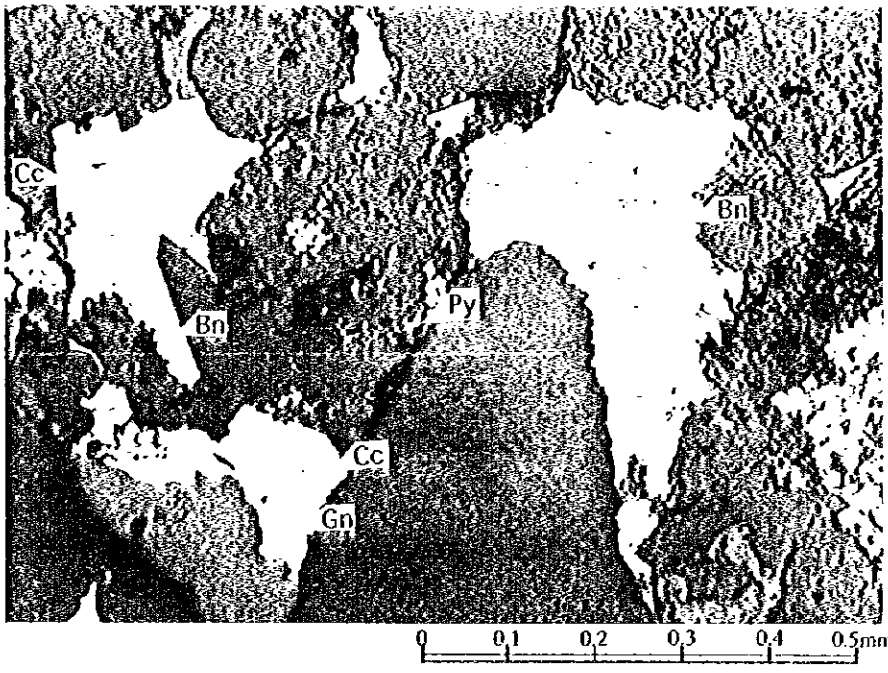
Sample No.	Drill No.	Depth (m)	Location	Observation	Cc	Bn	Cv	St	El	Py	Cp	Gn	Sp	Go
96-PS-08	MJK-2	611.80	Central Orebody	This polished section consists of chalcocite-like minerals (60%, chalcocite is more dominant than digenite), bornite (40%) and gangue minerals. These opaque minerals occur as aggregates, up to 1mm in size, interstitially among sedimentary particles (sands), and occasionally show micrographic texture.	◎	○								
96-PS-09	MJK-2	612.30	Central Orebody	This polished section is composed of chalcocite-like minerals (60%, chalcocite and digenite are nearly same amount), bornite (35%), organic matters (5%) and gangue minerals. These opaque minerals are sometimes concentrated in some layers or veinlets in the host sandstone, and occur as anhedral grains in interstitial aggregates among sedimentary particles (sands). At least two kinds of gamgue minerals are coexisted with these opaque minerals at the stage of ore-formation.	◎	○								
96-PS-10	MJK-2	613.50	Central Orebody	It consitsts of chalcocite-like minerals (50%, digenite looks more dominant than chalcocite), bornite (45%), goethite (5%) and gangue minerals. Anhedral grains of chalcocite-like minerals and bornite occur as aggregates, up to 1,5mm in size, interstitially among sedimentary particles, and sometimes show micrographic texture.	◎	○								
96-PS-11	MJK-2	615.50	Central Orebody	This polished section is composed of chalcocite-like minerals (60%, chalcocite and digenite are nearly same amount), bornite (40%),and gangue minerals. Chalcocite-like minerals and bornite occur as aggregates, up to 2mm in size, interstitially among sedimentary particles, and sometimes show micrographic texture.	◎	○								
96-PS-12	MJK-2	617.70	Central Orebody	This polished section consists of chalcocite-like minerals (60%, chalcocite and digenite are nearly same amount), bornite (40%), and gangue minerals. These opaque minerals are also interstice-filling products, up to 1mm in size, among sedimentary particles (sands),	◎	○								
96-PS-13	MJK-2	630.05	Central Orebody	This polished section is composed of chalcocite-like minerals (90%, chalcocite is more dominant than digenite), goethite (5%), organic matters (5%) and gangue minerals. Chalcocite-like minerals occur as irregular-shaped aggregates, up to 2mm in size, interstitially among sedimentary particles (sands). They occasionally arrange like veinlets.	◎									
96-PS-14	MJK-2	635.65	Central Orebody	This polished section is composed of chalcocite-like minerals (95%, chalcocite is more dominant than digenite), pyrite (5%), and gangue minerals. Anhedral grains of chalcocite-like minerals, up to 0.2mm in size, scarcely occur among sedimentary particles (sands). Pyrite is included in some of the sedimentary particles, and seems not to be related to ore-mineralization.	◎					+				
96-PS-15	MJK-2	688.10	Central Orebody	This polished section consists of pyrite (30%), chalcopyrite (30%), galena (30%),sphalerite (10%) and gangue minerals. The amount of sulfide minerals is not much. Aggregates of anhedral grains of chalcopyrite, galena and sphalerite occur as interstice-filling products, up to 1mm in size, among particles.						○	○	○	△	

Cc: Chalcocite like minerals, Bn: Bornite, Cv: Covellite, St: Stromeyerite, El: Electrum, Py: Pyrite, Cp: Chalcopyrite, Gn: Galena, Sp: Sphalerite, Go: Goethite
◎: more tan 50%, ○: 30% - 50%, △: 10% - 30%, +: less than 10%



Sample	: 96-PS-02
Drill Hole	: MJK-2
Depth	: 608.35m
Orebody	: Central
Horizon	: 4-I

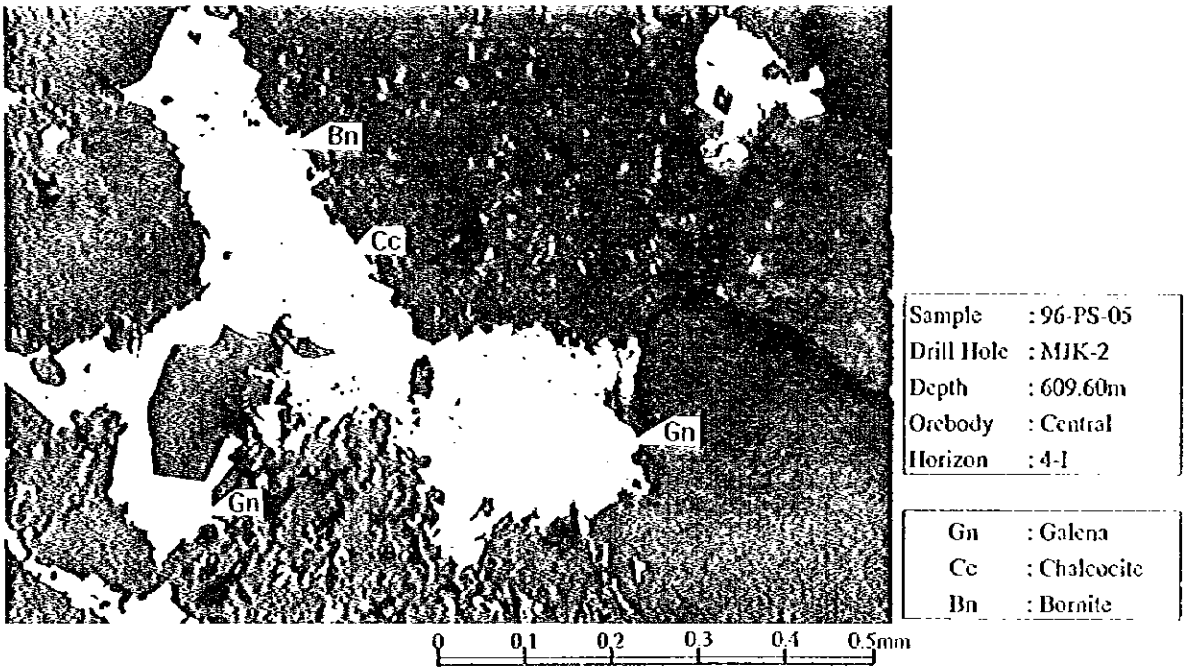
Gn	: Galena
Cp	: Chalcopyrite
Py	: Pyrite

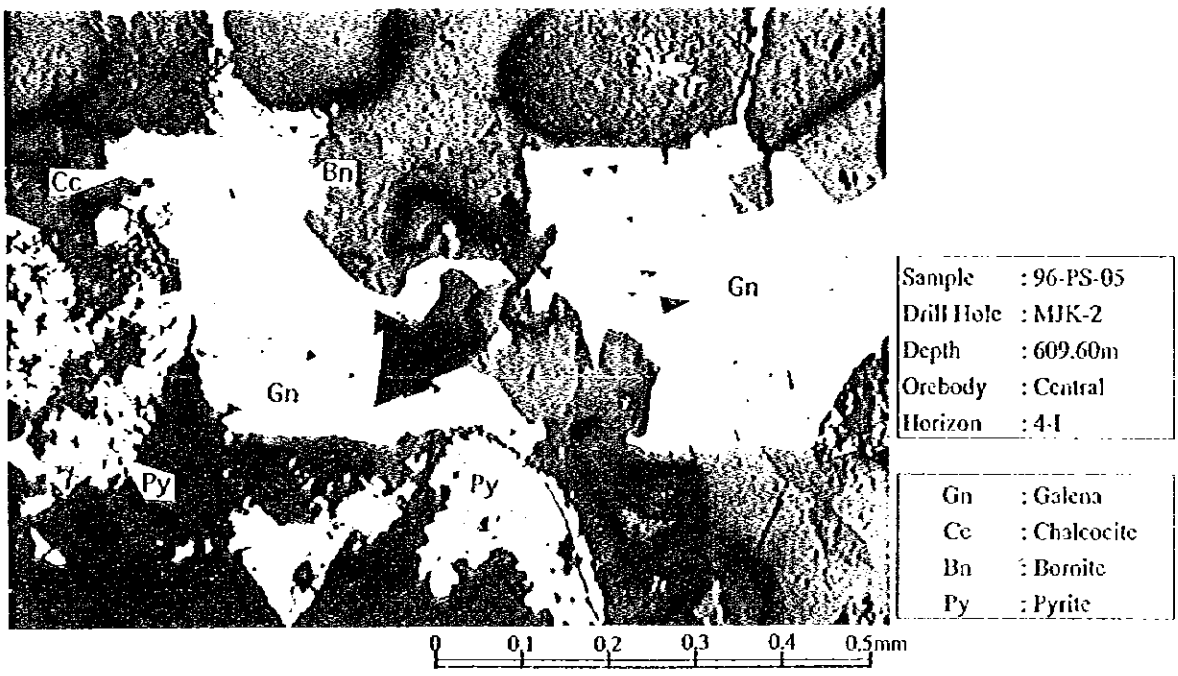


Sample	: 96-PS-01
Drill Hole	: MJK-2
Depth	: 609.32m
Orebody	: Central
Horizon	: 4-I

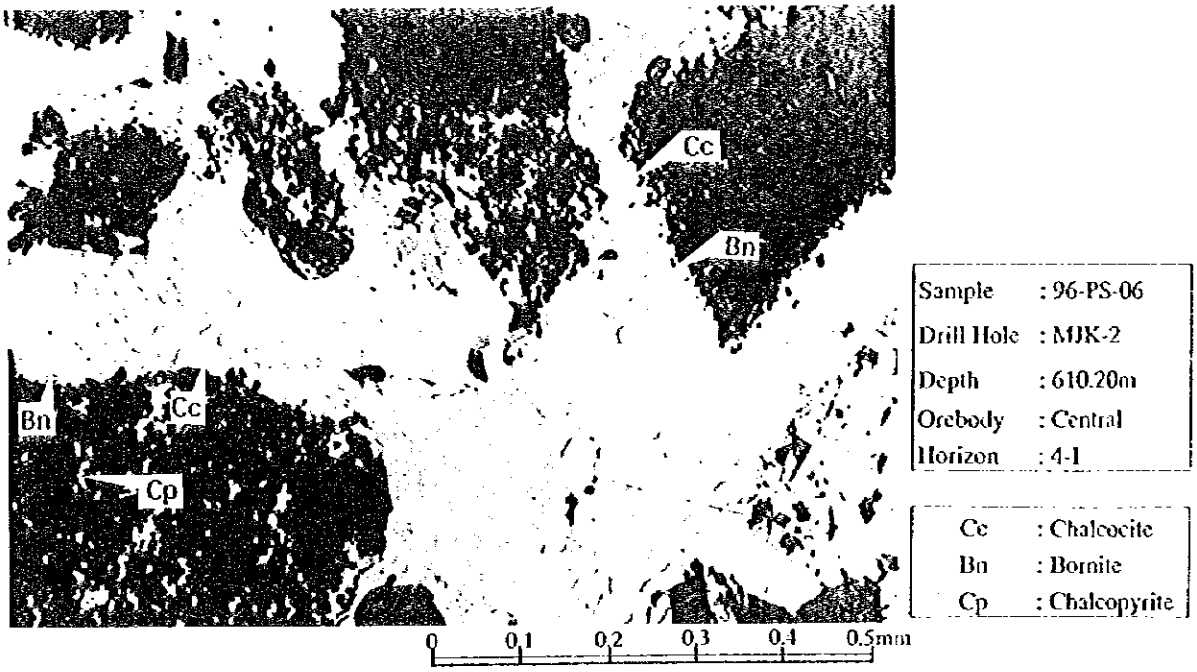
Gn	: Galena
Cc	: Chalcocite
Bn	: Bornite
Py	: Pyrite

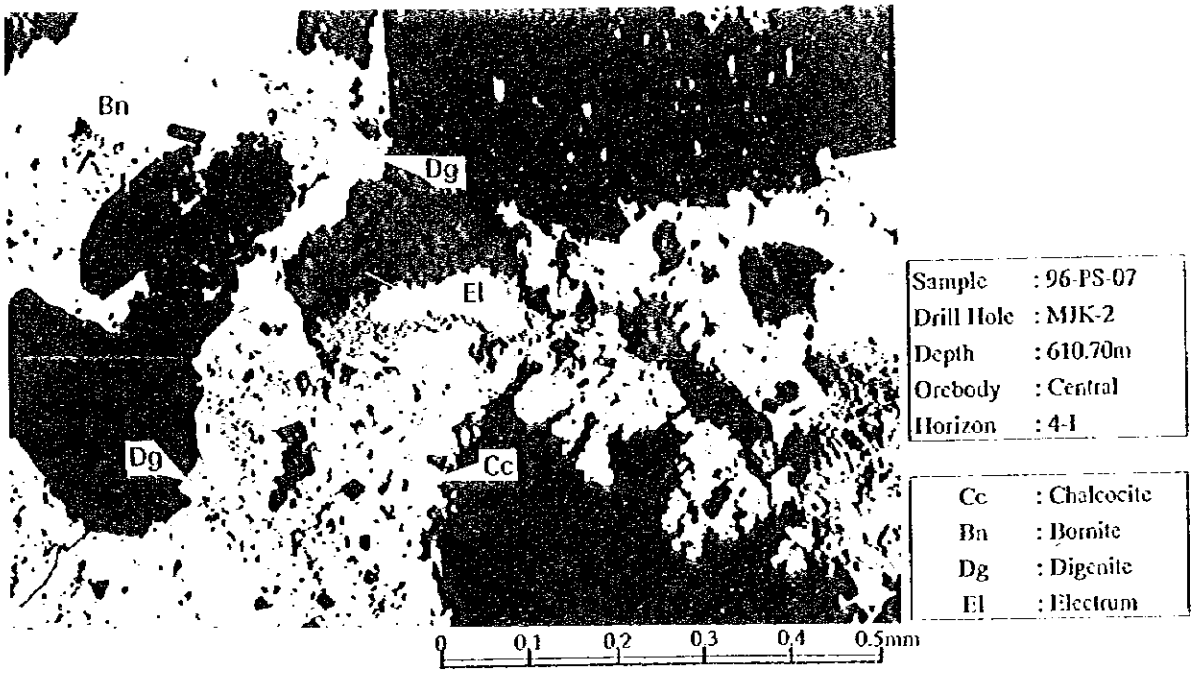
Appendix 27-1 Photomicrographs of Ore Minerals in Polished Sections from the Drill Hole "MJK-2", Zhaman-Aibat Ore Deposit



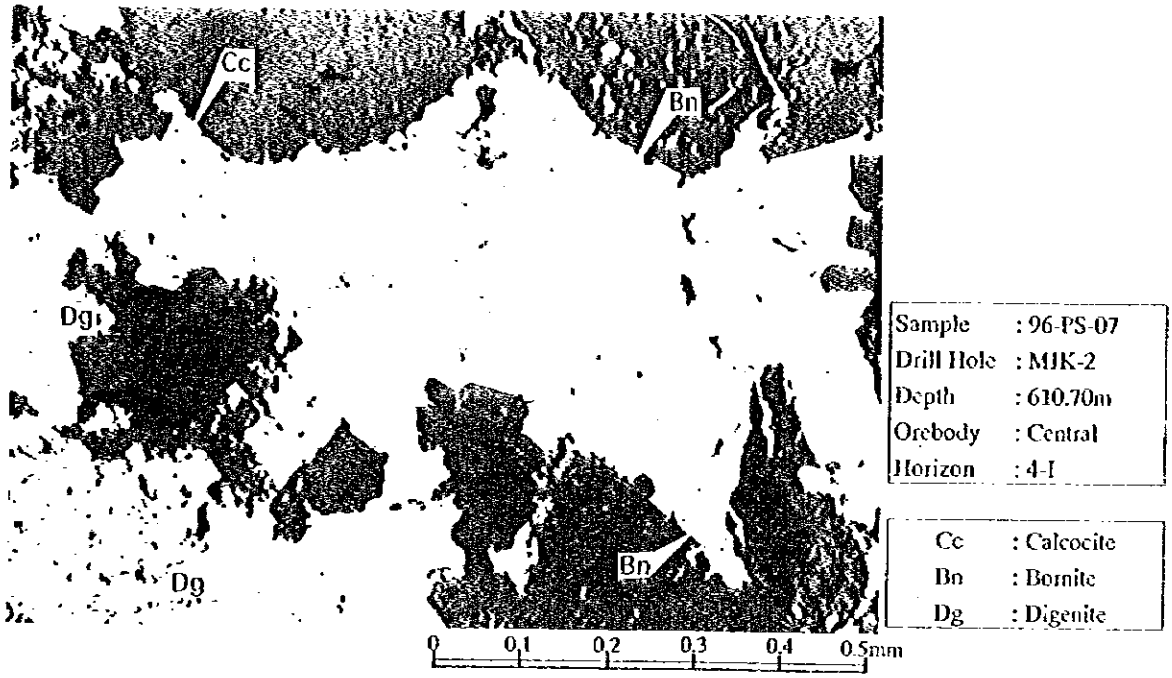


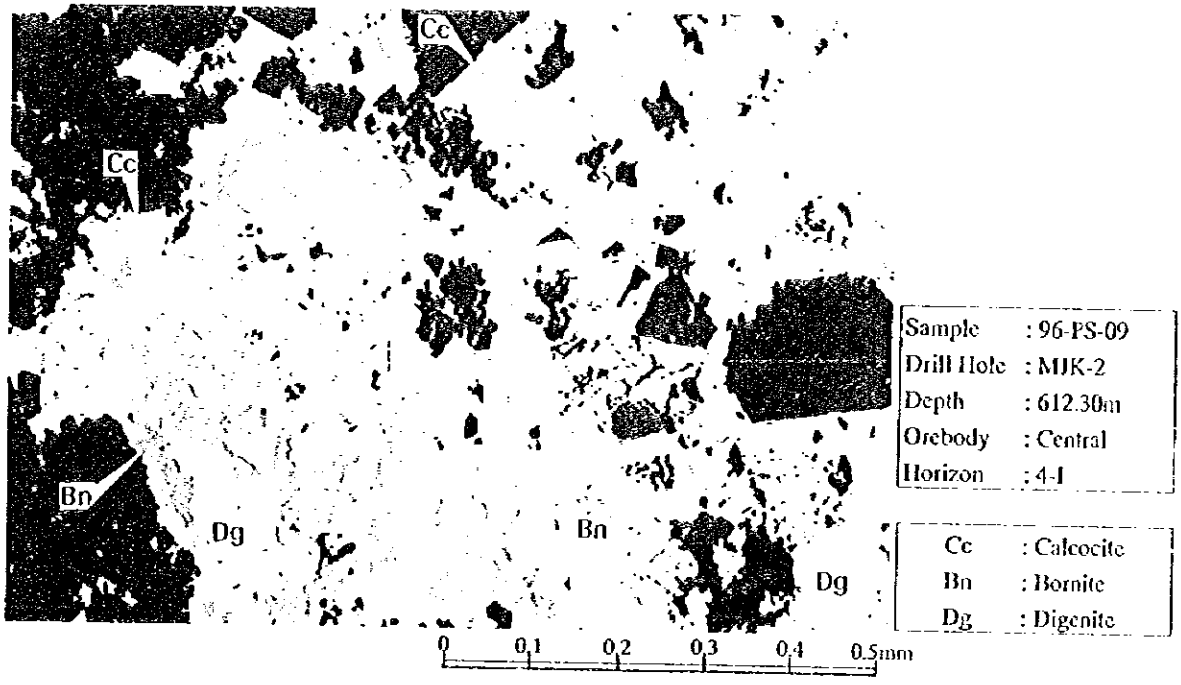
Appendix 27-2 Photomicrographs of Ore Minerals in Polished Sections from the Drill Hole "MJK-2", Zhaman-Aibat Ore Deposit (continued)





Appendix 27-3 Photomicrographs of Ore Minerals in Polished Sections from the Drill Hole "MJK-2", Zhaman-Aibat Ore Deposit (continued)





Appendix 27-4 Photomicrographs of Ore Minerals in Polished Sections from the Drill Hole "MJK-2", Zhaman-Aibat Ore Deposit (continued)

Appendix 28-1 Microscopic Observation of Thin Sections from the Drill Hole "MJK-2", Zhaman-Aibat Ore Deposit

Sample No.	DDH No.	Depth (m)	Formaton	Rock Name and Ore Grade	Description
96-TS-01	MJK-2	608.10	Zhezkazgan Formation Ore Horizon 4-I	Medium grained sandstone Cu:0.1%, Pb:2.0% Assay Interval: 607.80 - 608.40m	**Sand grains** grain size : ϕ 0.3mm±, angular quartz, plagioclase, chart fragments >>glauconite, biotite **Matrix** calcite, opaque minerals
96-TS-02	MJK-2	608.88	Zhezkazgan Formation Ore Horizon 4-I	Fine grained sandstone Cu:1.0%, Pb:1.4% Assay Interval: 608.40 - 609.00m	**Sand grains** grain size : ϕ 0.2mm±, max ϕ 0.5mm, angular quartz, plagioclase, chart fragments >>glauconite, biotite **Matrix** sericite, calcite, opaque minerals
96-TS-03	MJK-2	609.32	Zhezkazgan Formation Ore Horizon 4-I	Coarse grained sandstone Cu:6.2%, Pb:15.3% Assay Interval: 609.00 - 609.95m	**Sand grains** grain size : ϕ 0.2mm~2.0mm, sub-angular~rounded quartz, plagioclase, chart and welded tuff fragments **Matrix** sericite, calcite, opaque minerals>>chlorite, biotite
96-TS-04	MJK-2	609.60	Zhezkazgan Formation Ore Horizon 4-I	Medium grained sandstone Cu:6.2%, Pb:15.3% Assay Interval: 609.00 - 609.95m	**Sand grains** grain size : ϕ 0.2mm±, max ϕ 0.5mm, sub-angular quartz, plagioclase, chart fragments >>chlorite, biotite **Matrix** opaque minerals>>calcite
96-TS-05	MJK-2	610.20	Zhezkazgan Formation Ore Horizon 4-I	Medium grained sandstone Cu:10.9%, Pb:16.0% Assay Interval: 609.95 - 610.40m	**Sand grains** grain size : ϕ 0.3mm±, max ϕ 0.5mm, sub-angular quartz, plagioclase, volcanics fragments **Matrix** calcite, opaque minerals>>chlorite, biotite

Appendix 28-2 Microscopic Observation of Thin Sections from the Drill Hole "MJK-2", Zhaman-Aibat Ore Deposit (continued)

Sample No.	DDH No.	Depth (m)	Formaton	Rock Name	Description
96-TS-06	MJK-2	611.80	Zhezkazgan Formation Ore Horizon 4-I	Medium grained sandstone Cu:0.1%, Pb:0.0% Assay Interval: 611.40 - 612.00m	**Sand grains** grain size : ϕ 0.3mm±, max ϕ 0.5mm, sub-angular quartz, plagioclase, volcanics fragments **Matrix** calcite, opaque minerals>>chlorite, biotite
96-TS-07	MJK-2	612.30	Zhezkazgan Formation Ore Horizon 4-I	Very coarse grained sandstone Cu:19.9%, Pb:0.0% Assay Interval: 612.00 - 612.60m	**Sand grains** grain size : ϕ 0.3mm～1.0mm, sub-angular quartz, chart fragments **Matrix** calcite, opaque minerals
96-TS-08	MJK-2	613.50	Zhezkazgan Formation Ore Horizon 4-I	Very coarse grained sandstone Cu:3.5%, Pb:0.0% Assay Interval: 613.40 - 613.75m	**Sand grains** grain size : ϕ 0.5mm～1.0mm±, sub-angular quartz, plagioclase, welded tuff>>biotite **Matrix** calcite, opaque minerals
96-TS-09	MJK-2	630.05	Taskuduku Formation Ore Horizon 3-VI	Fine grained sandstone Cu:5.3%, Pb:0.0% Assay Interval: 630.00 - 630.40m	**Sand grains** grain size : ϕ 0.1～0.2mm±, angular quartz, plagioclase>>volcanics fragments **Matrix** calcite, opaque minerals>>sericite
96-TS-10	MJK-2	688.10	Taskuduku Formation Ore Horizon 3-II	Fine grained sandstone Cu:0.0%, Pb:0.2% Assay Interval: 688.00 - 688.85m	**Sand grains** grain size : ϕ 0.1～0.2mm±, angular quartz, plagioclase **Matrix** calcite>> opaque minerals