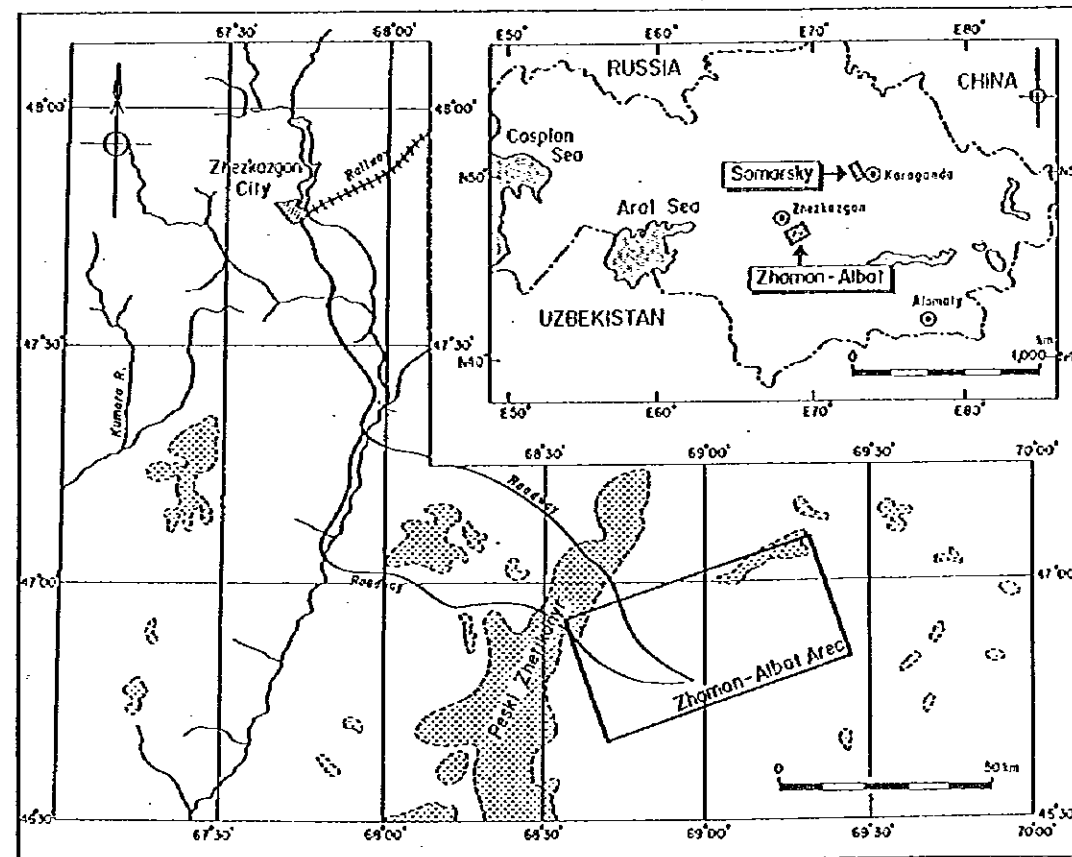


Report on the Mineral Exploration
in
the Zhaman-Aibat and Samarsky Area, Republic of Kazakhstan
(Phase III)

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



Japan International Cooperation Agency
Metal Mining Agency of Japan

February 1997

Scale 1 : 200

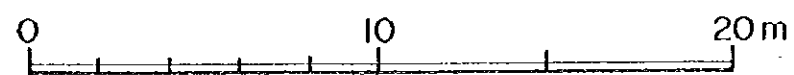


Plate 19 - 1 Geological Logging of the Drill Hole "MJK - 1" (1/10), Zhaman - Aibat Ore Deposit

MJK - 1		AREA: ZHAMAN-AIBAT			INCLINATION: -90°	ELEVATION: 357.04m		FINAL DEPTH: 650.50m		
SCALE(m)	DEPTH (m)	COLUMN	DESCRIPTION	REMARKS	MINERALIZATION	SULFIDE SILICA CLAY CARBONATE SULFATE	SAMPLE No.	ROCK PROPERTY		
								Angle of Fiss. (α°)	No. of Fiss. (/m)	Core Rec. %
10	1.20		Strongly weathered rock with fragments of red siltstone and fine-grained sandstone. Content of fragments is up to 50%. Reddish brown weathered siltstone with unclear expressed bedded structure, partially fractured. Leached caverns 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.	Zhidelsol Formation (Gypsum - rich Red Siltstone)				∠ 10-45°	10	100
	6.00				∠ 5°				∠ 40°	10
20	17.00		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 caverns are sizing up to 0.5x1.5 cm, filled in by calcite.	Zhidelsol Formation (Gypsum - rich Red Siltstone)				∠ 5°	1	94
	21.40		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°.		23.9-26.2m: weakly argillized			∠ 5°	4	94
30	39.05		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 caverns 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°).	Zhidelsol Formation (Gypsum - rich Red Siltstone)				∠ 5°	4	90
	47.90		39.05-44.8m, 46.1-47.9m: Light reddish brown fine-grained sandstone with carbonate-clayey cement. Including interlayers of kaolinized coarse-grained sandstone layers up to 6 cm, express lenicular 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°. 44.8-46.1m: Granite - pebble conglomerates, composed by quartz, limestone, flintstone with fragments of red aleurosandstone from 0.5 x 2 cm to 2 x 4 cm in amount up to 30%. The gravels and flat fragments are shaped as lamination oriented at 5°.					∠ 5-10°	4	93
40	66.50		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 a 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. rocks 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	Zhidelsol Formation (Gypsum - rich Red Siltstone)				∠ 5°	4	93
	66.50				∠ 5°			∠ 5°	4	95
50	66.50			Zhidelsol Formation (Gypsum - rich Red Siltstone)				∠ 5-10°	4	95
	66.50				∠ 5°	65.65-65.85m: Brecciated, chloritization weak	I	∠ 5-10°	4	95
60	66.50			Zhidelsol Formation (Gypsum - rich Red Siltstone)				∠ 5°	4	95
	66.50				∠ 5°	65.65-65.85m: Brecciated, chloritization weak	I	∠ 5-10°	4	95
70	66.50			Zhidelsol Formation (Gypsum - rich Red Siltstone)				∠ 5°	4	95
	66.50				∠ 5°	65.65-65.85m: Brecciated, chloritization weak	I	∠ 5-10°	4	95

Plate 19-2 Geological Logging of the Drill Hole "MJK - 1" (2/10),
Zhaman - Aibat Ore Deposit

MJK - 1		AREA: ZHAMAN-AIBAT		INCLINATION: -90°		ELEVATION: 357.04m		FINAL DEPTH: 650.50m	
DEPTH (m)	COLUMN	DESCRIPTION	REMARKS	MINERALIZATION	SAMPLE No.	ROCK PROPERTY	Angle of Fiss. (°)	No. of Fiss. (/m)	Core Rec. %
74.55		Red sandstone, including light-red limy sandstone layers (intervals: 10-30cm, thickness: 2-5mm). These rocks are medium-fractured; gypsum at fractures is oriented at 5°.					∠ 5°	2	95
77.90		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.					∠ 5°	2	95
86.50		77.9-79.1m: Red siltstone with spotted structure due to spots of light-red colored limy sandstone. Rare interlayers of fiber-like gypsum (selenite) with thickness up to 0.5 cm, oriented at 5°. Contact with underlying horizon is gradual. 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°. 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.					∠ 5°-10°	4	95
89.50		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 x 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
92.00		Red siltstone with unclear 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°.					∠ 5°	4	96
93.25		Reddish brown sandstone, fine-grained with carbonate-ferrous cement. Lenticular bedded structure at 10-15° due to interlying 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°.					∠ 5°	4	96
127.20		Reddish brown siltstone with spotted or rarely horizontally-bedded (at 5°) structure due to interlying 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.					∠ 5°	4	97
128.30		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°.					∠ 5°	4	97
130		Reddish brown, massive siltstone. The rock is medium fractured; gypsum veinlets at 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.					∠ 5°	4	97
140							∠ 5°	4	97

Zhideliso! Formotion (Gypsum - rich Red siltstone)

SULFIDE
SILICA
CLAY
CARBONATE
SULFATE

Plate 19-3 Geological Logging of the Drill Hole "MJK - 1" (3/10),
Zhaman - Aibat Ore Deposit

MJK - 1

AREA: ZHAMAN-AIBAT INCLINATION: -90° BEARING: -

ELEVATION: 357.04m FINAL DEPTH: 650.50m

SCALE (m)	DEPTH (m)	COLUMN	DESCRIPTION	REMARKS	MINERALIZATION	SULFIDE SILICA CLAY CARBONATE SULFATE	SAMPLE No.	ROCK PROPERTY		
								Angle of Fiss. (°)	No. of Fiss. (/m)	Core Rec. %
			Reddish brown colored siltstone with banded and spotted structure due to the interlayers of limy 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.					∠ 5-10°	4	97
	159.00		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.	Zhidelsoi Formation (Gypsum - rich Red Siltstone)	156.50-156.55m: weakly argillized			∠ 5-10°	3	97
	160.50		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						∠ 5-10°	3
	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°.					∠ 5-10°	3	97
	176.10		Brown massive siltstone. Unclearly 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.					∠ 5-10°	4	97
	200.80		200.06-208.65m: Brown colored massive siltstone. Unclearly 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 to 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°.					∠ 10°-30°	0	97
	209.15		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°	1	97
	210		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°	4	97

Plate 19-4 Geological Logging of the Drill Hole "MJK - 1" (4/10),
Zhaman - Aibat Ore Deposit

MJK - 1		AREA: ZHAMAN-AIBAT		INCLINATION: -90°		ELEVATION: 357.04 m		FINAL DEPTH: 650.50 m			
DEPTH (m)	COLUMN	DESCRIPTION	REMARKS	MINERALIZATION	SILICEOUS CLAY CARBONATE SULFATE	SAMPLE No.	ROCK PROPERTY	Angle of Fiss. (°)	No. of Fiss. (/m)	Core Rec. %	
212.80		210.00-211.15m: 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°.	Zhidelisoi Formation (Gypsum - rich Red Siltstone)					<5-10°	2	97	
219.05		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°.						"	2	97	
223.00		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.						"	1	97	
228.05		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°.						"	0	97	
		219.55-223.00m: Brown siltstone with unclear 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°.						"	1	97	
		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°.						"	0	97	
		226.20-227.10m: Brown siltstone with unclear expressed bedded structure. The rock is medium fractured. Contact with underlying horizon is clear, at the angle 0°.						"	1	97	
		227.10-228.05m: Red sandstone, fine-grained, with carbonate-ferrous cement. Bedding structure due to partings of dark aleurilites 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.						"	2	97	
242.30		Brown siltstone. Bedding structure (due to fine interlying 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.		Zhidelisoi Formation (Red Siltstone)					<5-10°	2	97
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°.							"	0	97
		242.75-252.40m: Brown siltstone. Unclear 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 (sienite), oriented at 5°, sometimes at 45°. Contact with underlying horizon is gradual.						"	3	97	
		252.40-253.15m: Light-red colored fine-grained sandstone, with carbonate-ferrous cement. Bedding structure (due to fine interlying with dark-red aleurilitite, 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.						"	0	97	
265.70		253.15-258.00m: Brown siltstone with interlayers of fine-grained sandstone.							<5°	1	98
		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.							<5-70°	3	98
270.10		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.							<75°	1	98
271.20		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 15°.							<20°	1	98
		Brown, massive siltstone with unclear 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°.							<10°	0	98

238.10-238.40m: weakly silicified zone with gypsum veinlets

Plate 19-5 Geological Logging of the Drill Hole "MJK - 1" (5/10),
Zhaman - Aibat Ore Deposit

MJK - 1

AREA: ZHAMAN-AIBAT INCLINATION: -90° 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 Fiss. (°)	No. of Fiss. (/ m) Core Rec. %
290		287.40	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	Zhidelsoi Formation (Red Siltstone)				∠ 20°	0 98
		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°.					∠ 10°-45°	0 98
300			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				∠ 10°	0 98	
310		316.60	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°.				∠ 20°	0 98	
		318.70	Light green colored siltstone				∠ 5°	0 98	
320		320.20	Red, massive siltstone with unclearly bedded structure. Including interlayers of fine-grained sandstone. Contact with underlying horizon is gradual.					0 98	
		323.90	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 98	
330		329.90	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 interlayering with siltstone) is horizontally-bedded at the angle 5°. Stretched-shaped fragments of red aleurite 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 98	
		332.40	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.					0 98	
340			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 97	
350		349.30						0 97	

Plate 19-6 Geological Logging of the Drill Hole "MJK - 1" (6/10), Zhaman - Aibat Ore Deposit

MJK - 1

AREA: ZHAMAN-AIBAT INCLINATION: -90°
BEARING: —

ELEVATION: 357.04 m FINAL DEPTH: 650.50 m

SCALE (m)	DEPTH (m)	COLUMN	DESCRIPTION	REMARKS	MINERALIZATION	SULFIDE SILICA CLAY CARBONATE SULFATE	SAMPLE NO.	ROCK PROPERTY
360	356.45		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.					Angle of Fiss. (°) $\angle 10^\circ$ No. of Fiss. (/m) 2 Core Rec. (%) 97
	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.	$\angle 5^\circ$ $\sim 20^\circ$ $\angle 5^\circ$				Angle of Fiss. (°) $\angle 20^\circ$ No. of Fiss. (/m) 1 Core Rec. (%) 97
	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.					Angle of Fiss. (°) $\angle 10^\circ$ No. of Fiss. (/m) 2 Core Rec. (%) 97
	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 mm. 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.	$\angle 0^\circ$				Angle of Fiss. (°) $\angle 20^\circ$ No. of Fiss. (/m) 0 Core Rec. (%) 97
	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°.	$\angle 5^\circ$				Angle of Fiss. (°) $\angle 10^\circ$ No. of Fiss. (/m) 0 Core Rec. (%) 97
			371.6-372.1m: Red, fine-grained sandstone with carbonate-ferrous cement including interlayers of siltstone. Cross-bedded structure at the angle 5-10°.	$\angle 5^\circ$ $\sim 15^\circ$				Angle of Fiss. (°) $\angle 10^\circ$ No. of Fiss. (/m) 0 Core Rec. (%) 97
			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 15-10°. The rock is slightly fractured, filled in by gypsum films. Contact with underlying horizon is wavy.	$\angle 10^\circ$				Angle of Fiss. (°) $\angle 10^\circ$ No. of Fiss. (/m) 0 Core Rec. (%) 97
			397.15-397.85m: Grayish-red, fine-grained laminated sandstone with siliceous-carbonate-ferrous cement.	$\angle 10^\circ$				Angle of Fiss. (°) $\angle 10^\circ$ No. of Fiss. (/m) 0 Core Rec. (%) 97
			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°.	$\angle 6^\circ$				Angle of Fiss. (°) $\angle 35^\circ$ No. of Fiss. (/m) 4 Core Rec. (%) 97
			397.15-397.95m: Weakly silicified					Angle of Fiss. (°) $\angle 10^\circ$ No. of Fiss. (/m) 1 Core Rec. (%) 97
			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 419m. Contact with underlying horizon is gradual.	$\angle 5^\circ$				Angle of Fiss. (°) $\angle 10^\circ$ No. of Fiss. (/m) 0 Core Rec. (%) 97
			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.	$\angle 6^\circ$				Angle of Fiss. (°) $\angle 10^\circ$ No. of Fiss. (/m) 0 Core Rec. (%) 97
	415.75		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°.	$\angle 5^\circ$				Angle of Fiss. (°) $\angle 10^\circ$ No. of Fiss. (/m) 0 Core Rec. (%) 97
	417.60							Angle of Fiss. (°) $\angle 10^\circ$ No. of Fiss. (/m) 0 Core Rec. (%) 97
								Angle of Fiss. (°) $\angle 10^\circ$ No. of Fiss. (/m) 3 Core Rec. (%) 97
								Angle of Fiss. (°) $\angle 10^\circ$ No. of Fiss. (/m) 0 Core Rec. (%) 97

Plate 19-7 Geological Logging of the Drill Hole "MJK - 1" (7/10),
Zhaman - Aibat Ore Deposit

MJK - 1		AREA: ZHAMAN-AIBAT		INCLINATION: -90°		ELEVATION: 357.04m		FINAL DEPTH: 650.50m		
SCALE (m)	COLUMN	DEPTH (m)	DESCRIPTION	REMARKS	MINERALIZATION	SULFIDE SILICA CLAY CARBONATE SULFATE	SAMPLE No.	Angle of Fiss. (°)	No. of Fiss. (7m)	Core Rec. %
		426.65	Reddish brown, sandy siltstone, massive with lamination due to interlayering 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°.		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
		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°.						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°.						0	97
		438.80	Reddish brown, sandy siltstone, including "sandstone balls (2-4cm)" and thin layers of sandstone. Interlayer of grayish-red fine-grained sandstone with thickness 16 cm occurs at the depth 437.55 m. Contact with underlying layer shows load casting structure(wavy).		438.80-440.70m: Weakly disseminated by pyrite.				0	97
		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.		440.7-442.0m, 442.4-443.2m: Disseminated by pyrite				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 occurring at the rock mass.		445.50-451.90m: Disseminated by pyrite				0	98
		445.50	Reddish brown, sandy siltstone.		446.5-447.7m: weak				0	98
		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.		447.7-448.2m: strong				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.		448.2-451.9m: weak				0	98
		464.80	Gray, medium grained sandstone with siliceous-carbonate cement, with partings 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.		451.90-454.60m: Weakly disseminated by pyrite.				0	97
		466.80	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.		454.60-464.80m: Weakly disseminated by pyrite				0	97
		474.80	459.10-460.45m: Light-gray, fine-grained sandstone with siliceous-carbonate cement.		459.0-459.6m: Medium-strongly disseminated by pyrite				0	97
		483.80	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				0	97
		484.00	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.		473.7-475.0m: Strongly disseminated by pyrite.				0	97
		484.00-491.0m	Brown, Alternation beds of Bituminous sandstone(with siliceous-carbonate cement) and siltstone. Interlayer of greenish-gray colored fine-grained sandstone occurs in the interval 484.15-484.3m. A lot of oil saturation zones are described in the interval 484.0-491.0m.		474.8-480m: Weak Chloritizain				0	99
		487.40-489.0m			480-483.7m: Disseminated by pyrite				0	99
		488.00			484.0-491.0m: Appear Bituminous sandstone				0	97
		489.00			487.4-489.0m: weakly disseminated by pyrite				0	97

Zhetkazgan Formation (Gray Sandstone)

Plate 19-8 Geological Logging of the Drill Hole "MJK - 1" (8/10),
Zhaman - Aibat Ore Deposit

MJK - 1		AREA: ZHAMAN-AIBAT		INCLINATION: -90°		ELEVATION: 357.04m		FINAL DEPTH: 650.50m				
DEPTH (m)	SCALE (m)	DESCRIPTION	REMARKS	MINERALIZATION	SULFIDE SILICA CLAY CARBONATE SULFATE	SAMPLE No.	ROCK PROPERTY	Angle of Fiss. (°)	No. of Fiss. (/m)	Core Rec. (%)		
491.90		Gray, fine-grained sandstone with siliceous-carbonate cement. Accumulation of pyrite crystals observed at the interval 490.35-490.4m. Oil saturation in the interval 490.2-490.9m. The rock is slightly fractured; calcite films at fractures. Contact with underlying layer is at the angle 5°.	Zhezkazgan Formation (Gray Sandstone)	490.2-490.9m: Appear Bituminous sandstone	-----	55	0	76	0	97		
493.20						56					0	97
495.10						57					0	97
499.45		Dark-gray, siltstone, with thinly bedded sandstone, at the angle 5°, including spots of light-gray limy sandstone. Joints contain calcite films. Contact with underlying layer is gradual.		495.10-495.45m: Weak Chloritization Very weak pyrite dissemination	-----	58	0	97	97			
502.90		Gray fine-grained sandstone with siliceous-carbonate cement, with thinly and horizontally bedded siltstone. Interlayer of intraterritorial conglomerate is observed within the interval 500.8-500.86. Calcite films coating joints and veinlets of calcite 4 cm thick is observed at the bottom of the layer.		499.45-502.90m: Weakly disseminated by pyrite Veinlets of calcite	-----	59	0	97	97			
509.40		Greenish-gray-Dark-gray, fine-grained sandstone with siliceous-carbonate cement with horizontally and thinly bedded alaurosandstone. The rock is slightly fractured with calcite films coating joints. Contact with underlying layer is 0°.		502.9-505.0m: Weakly disseminated by pyrite 502.9-506.1m: Weak Chloritization 505.0-505.3m: Cu, mineralization, Cu 12% Ag 72.9 g/t	-----	60	0	97	97			
521.70		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.		515.6-516.2m, 519.3-525.0m: Weakly disseminated by pyrite	-----	61	0	97	97			
524.60		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 films coating joints.		521.70-524.60m: Disseminated by pyrite	-----	62	0	97	97			
535.45		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°.		527.4-534.8m: concretions of calcite	-----	63	0	97	97			
540.75		Dark gray-greenish gray, alternation beds of fine-grained sandstone and siltstone bedded at the angle 5° with calcite films and pyrite concretions at joints. Contact with underlying layer is at the angle 0°.		537.0-539.0m: Weakly disseminated by pyrite	-----	64	0	97	97			
552.15		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	-----	65	0	97	97			
559.00		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.	-----	66	0	97	97			
560.50		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	-----	67	0	97	97			
560.50					-----	68	0	97	97			

Plate 19-9 Geological Logging of the Drill Hole "MJK - 1" (9/10), Zhaman - Aibat Ore Deposit

MJK - 1

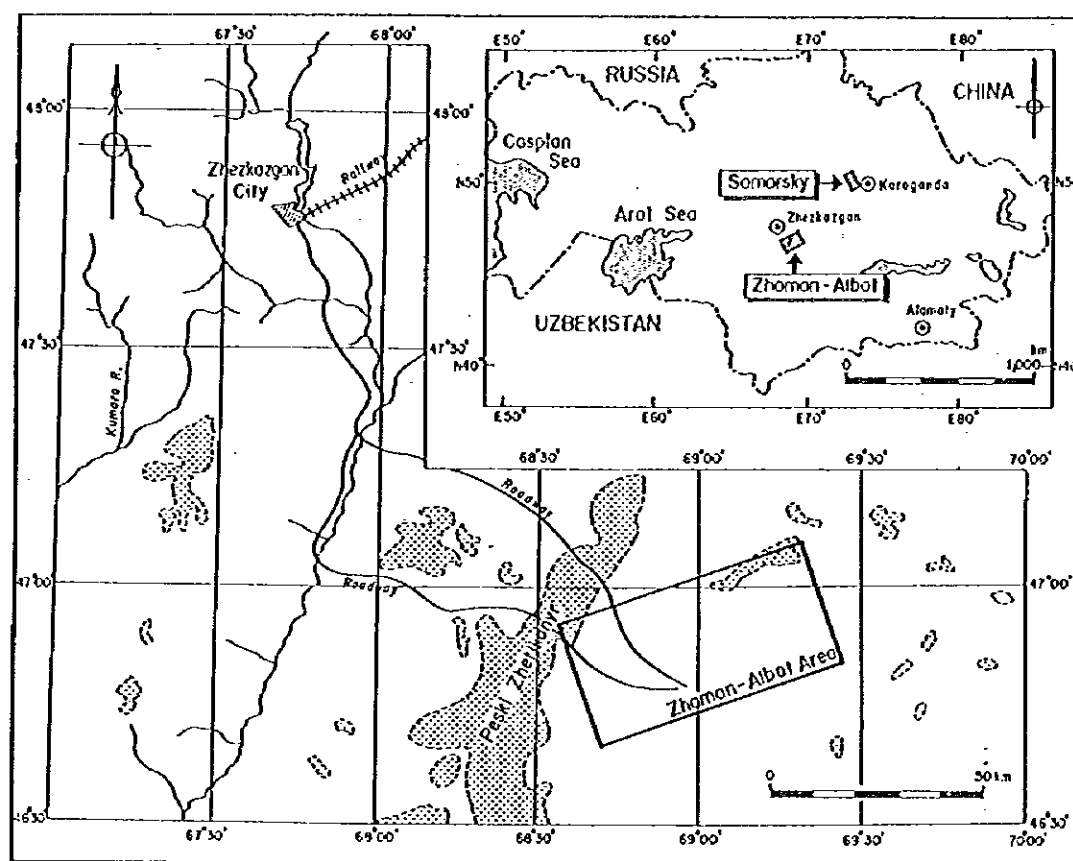
AREA: ZHAMAN-AIBAT INCLINATION: -90°
BEARING: —

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 Fiss. (°)	No. of Fiss. (/m)
-570	[Pattern]	561.70	Gray, coarse-fine grained sandstone, with siliceous cement. Graded bedding structure is developed at the angle 5°. Calcite films and fine abundant pyrite impregnation filling joint are observed through the layer.	Zhetkozgon Formation (Grey Sandstone)	560.00-561.70m: pyrite dissemination (medium) and calcite films (weak)	[Pattern]	69 560.0m ~560.3m	0	97
		568.00	Gray-pale greenish gray, fine alternation beds of sandy siltstone and fine grained sandstone, at the angle 5°-15°. Sometimes it contains sand-balls. Crystals and concretions of pyrite are observed at the interval from 564.6 to 565.0m. Contact with underlying layer is at the angle 0°.						
-580	[Pattern]	578.20	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 577.9m. 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.	Zhetkozgon Formation (Grey Sandstone)	564.6-565.0m: Strongly disseminated by pyrite 565.0-568.0m: Weakly disseminated by pyrite	[Pattern]	70 565.0m ~565.3m	0	97
		585.30	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.						
-590	[Pattern]	590.94	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°.	Zhetkozgon Formation (Grey Sandstone)	583.0-585.3m: Weak pyrite dissemination Sandstone layers: Weak oil odor	[Pattern]	74 585.0m ~585.3m	0	97
		597.60	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.						
-600	[Pattern]	600.12	Dark gray, alternating beds of fine grained sandstone(arenite) and siltstone, bedded at the angle 0°-5°. Chalcoite concentrated thin layers and weak pyrite dissemination (including a small amount of galena-chalcopyrite-bornite) are observed at the sandstone layers.	Zhezkuzgon Formation (Grey Sandstone)	585.30-590.94m: Thin layers with pyrite concentration	[Pattern]	75 591.0m ~610.0m	0	97
		608.27	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 chalcoite (>galena, bornite, chalcopyrite>pyrite) are observed within the interval 599.0-605.78m.						
-610	[Pattern]	609.30	Brownish light gray-greenish light gray, intraformational conglomerate (RAIMUNDO 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.	Cu - Mineralized	600.12-605.78m: strong 605.78-607.99m: very weak	[Pattern]	30 35	0	97
		610.75	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.						
-620	[Pattern]	614.35	Reddish brown, siltstone with indistinct bedded structure. Calcite concretions with size 0.3 x 0.6cm and no mineralization observed.	Weakly Mineralized	609.30-610.75m: Very weak pyrite dissemination	[Pattern]	40 43	0	97
		621.40	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.						
630	[Pattern]		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.	Taszkuduk Formation	614.35-621.40m: Very weak pyrite dissemination	[Pattern]	75 621.0m ~621.3m	0	97

Report on the Mineral Exploration
in
the Zhaman-Aibat and Samarsky Area, Republic of Kazakhstan
(Phase III)

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



Japan International Cooperation Agency
Metal Mining Agency of Japan

February 1997

Scale 1 : 200

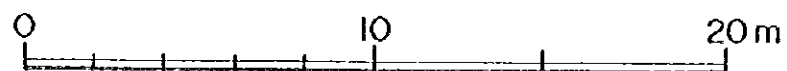


Plate 20 - 4 Geological Logging of the Drill Hole "MJK - 2" (4/10), Zhaman - Aibat Ore Deposit

MJK - 2

INCLINATION: - 90°

AREA: ZHAMAN-AIBAT BEARING:

ELEVATION:

FINAL DEPTH: 700.00 m

SCALE (m)	DEPTH (m)	COLUMN	DESCRIPTION	REMARKS	MINERALIZATION	SULFIDE QUARTZ CLAY CARBONATE SULFATE	SAMPLE NO.	ROCK PROPERTY		
								Angle of Fract. (°)	No. of Fract. (m)	Core Rec. (%)
210	211.50		Dark brown sandstone.					0	0	100
	214.30		Dark brown siltstone interbedded with fine grained sandstone. • 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.	45°				0	0	100
	235.70		Brown fine grained sandstone	45°				0	0	100
	236.40		Dark brown siltstone interbedded with light brown fine grained sandstone. • Gypsum (selenite) from 2cm to 15cm in all horizon. • Dark greenish grey siltstone partings (2-3cm thickness) in: 251.10-251.40m.	45°				0	0	100
	251.50		Brown siltstone, parallel lamination at the lower part by the interlayers of light brown fine grained sandstone. • 260.50-260.75m: Breccia of anhydrite • 263.90-264.65: White crystalline anhydrite.	40°				0	0	100
	264.65		Massive-weakly parallel laminated dark brown siltstone • 265.00-267.50m: Greyish white anhydrite up to 8cm.					0	0	100
	279.00		Brown sandstone.					0	0	100

Plate 20-8 Geological Logging of the Drill Hole "MJK-2" (8/10),
Zhaman - Aibat Ore Deposit

INCLINATION: -90°

AREA: ZHAMAN-AIBAT BEARING:

ELEVATION:

FINAL DEPTH: 700.00 m

SCALE (m)	DEPTH (m)	DESCRIPTION	REMARKS	MINERALIZATION				SAMPLE NO.	ROCK PROPERTY				
				SULFIDE	QUARTZ	CLAY	CARBONATE		SULFATE	Angle of Fiss. (°)	No. of Fiss. (m)	Cave Rec. (%)	
490		Greenish grey siltstone with grey fine grained sandstone.									0	100	
	493.40	• 493.40-494.00: Black line grained oil-carrying sandstone with pyrite									∠30°	0	100
	494.00	• 494.00-494.90: Massive grey siltstone with pyrite stains in fissures.									∠10°	2	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.									∠40°	0	100
	499.10	• 497.00-499.60: Dark greyish green siltstone with greyish brown line grained sandstone in lower 50cm.									∠0°	1	100
	499.60										∠70°	2	100
500	500.60	Brown siltstone with greyish brown fine grained sandstone.									∠5°	0	100
	501.80	Greenish grey siltstone.									∠80°	3	100
	503.20	• Grey fine grained sandstone. 505.20-505.30m and 505.90-506.00m.									∠70°	0	100
	506.50										∠5°	0	100
	509.10	Grey fine to medium grained sandstone with the interlayers of grey to black sandstone.									∠65°-70°	3	100
	509.80										∠10°	1	100
510	510.80	Dark-grey siltstone with grey fine grained sandstone. Films of calcite and disseminated pyrite are common in fissures.									∠5°-45°	2	100
	511.50	• 509.80-510.80: Dark brown massive siltstone.									∠5°	1	100
	512.30	• 511.50-512.30: Brown siltstone.									∠50°	1	100
	514.55	Brown siltstone with brown fine grained sandstone.									∠30°	1	100
	520	• 520.30-520.60m: Tectonic fissures consisting of clay. • 521.90-522.00m: Grey siltstone • 523.30-524.10m: Dark grey sandstone with dark grey siltstone. • 528.10-528.50m: Black fine grained sandstone with the smell of oil.									∠5°	0	100
	523.30										∠10°-60°	2	100
	524.10										∠85°-90°	2	100
	528.10										∠5°-40°	2	100
	528.50										∠20°	1	100
530	533.50	Dark grey siltstone with the interlayers of red siltstone in: 534.90-535.20m.									∠5°	2	100
	535.50	• 534.20-534.40m: Black fine grained sandstone with small of oil.									∠15°	0	100
	539.40	Brown siltstone with a few interlayers of brown fine grained sandstone.									∠90°	2	100
	539.70	• 539.20-539.60m: Grey fine grained sandstone.									∠30°	0	100
	543.20										∠0°	0	100
	546.40	Dark grey siltstone with the interlayers of dark-grey to black fine grained sandstone with smell of oil.									∠15°	0	100
	547.50	Brown massive siltstone with minor fine grained sandstone.									∠5°	2	100
	548.00	547.50-548.00: Grey siltstone									∠20°	0	100
	549.20	Dark grey siltstone with grey fine grained sandstone. Films of pyrite and marcasite at 550.90m.									∠0°	0	100
	551.70										∠5°	1	100
	552.35	Dark grey fine grained sandstone with smell of oil.									∠20°	3	100
	553.35	• 552.35-553.35: Dark grey to black massive siltstone									∠10°-20°	1	100
	554.35	• 554.35-554.80: Grey siltstone									∠10°	0	100
	554.80										∠5°	0	100
	555.30	Dark grey siltstone with grey fine grained sandstone.									∠5°-0°	2	100
560	559.80										∠10°	1	100
											∠35°	0	100
											∠0°	0	100

Plate 20-9 Geological Logging of the Drill Hole "MJK -2" (9/10),
Zhaman - Aibat Ore Deposit

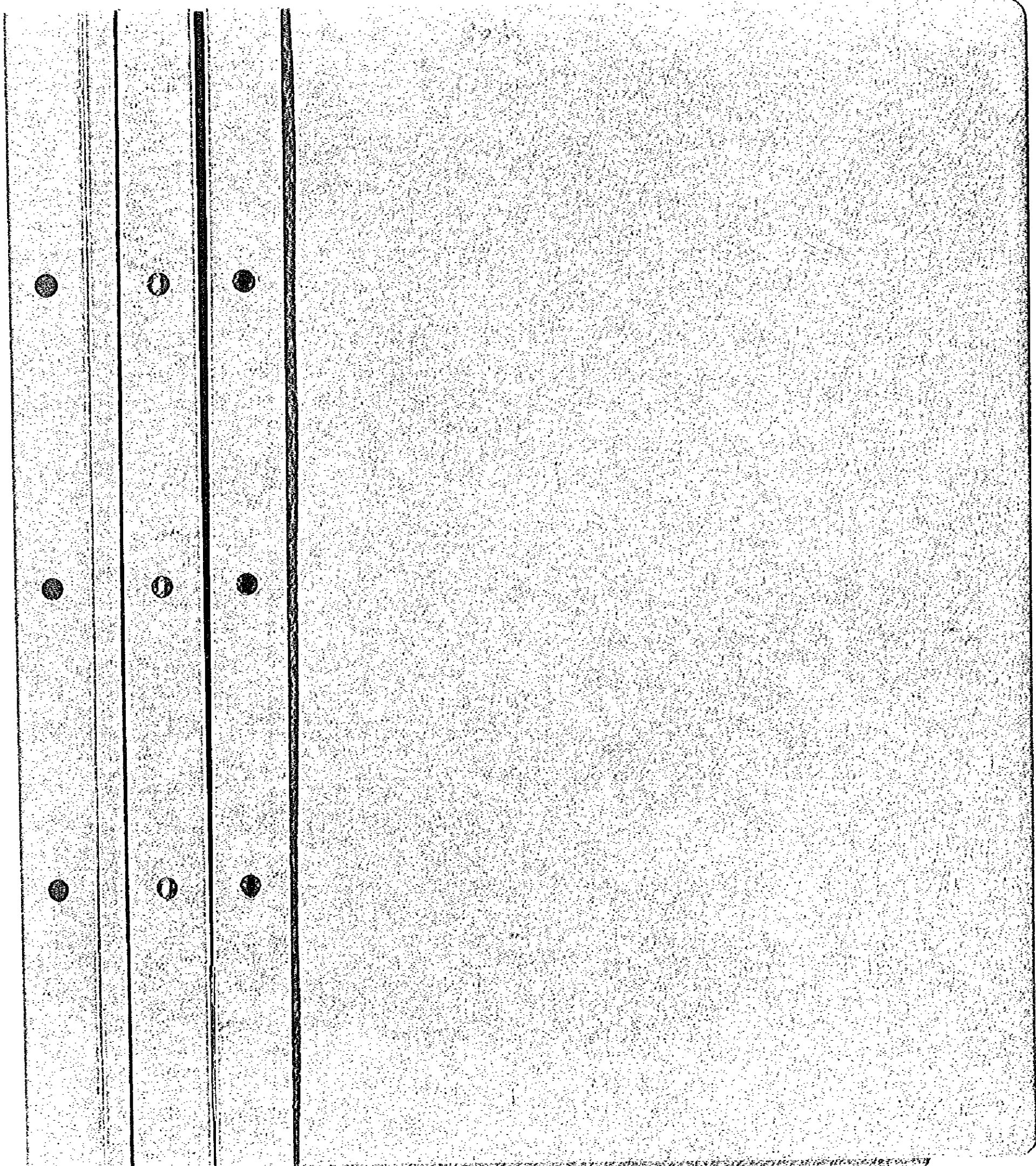
MJK - 2

INCLINATION: -90°

AREA: ZHAMAN-AIBAT BEARING:

ELEVATION: 336.5 m FINAL DEPTH: 700.00 m

DEPTH (m)	SCALING	DEPTH (m)	DESCRIPTION	REMARKS	MINERALIZATION	SULFIDE	QUARTZ	CLAY	CARBONATE	SULFATE	SAMPLE NO.	ROCK PROPERTY		
												Angle of Fish. (°)	No. of Fish. (m)	Cave Rec. (%)
560		561.20	Grey fine grained sandstone with intercalations of black sandstone and dark grey siltstone.		560.80-568.60m: 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°	1	100
		564.20										∠15°	1	100
		565.90										∠10°-20°	0	100
		566.40										∠5°	0	100
		567.10										∠60°	3	100
		568.00										∠15°	2	100
		568.60										∠5°	0	100
570			Grey (weekly greenish) siltstone with partings of grey fine grained sandstone.		568.60-593.60m: Rare pyrite spots.	+						∠5°	1	100
		574.90										∠5°	1	100
		576.40	Grey fine grained sandstone with smell of oil.		574.90m: Thick nesty pyrite.	+						∠5°	1	100
		578.50	Greyish-green siltstone with grey fine grained sandstone.									∠10°	1	100
		582.00	Grey fine grained sandstone with dark grey fine grained sandstone.									∠5°	0	100
			Thin bedded alternation of dark grey siltstone silty-sandstone and grey fine grained sandstone.									∠5°	0	100
590												∠50°	0	100
		593.60	Grey fine grained sandstone with minor dark grey to greenish grey fine grained sandstone.		593.60-599.60m: Common pyrite films.	+						∠20°	2	100
		599.60										∠5°	0	100
		603.00	Thinly bedded alternation of grey fine grained sandstone (40%) and laminated dark grey siltstone (60%).		599.60-603.00m: Rare pyrite spots.	+						∠45°	4	100
		605.40	Greenish grey siltstone with thin sandstone layers.		603.00-605.40m: Rare pyrite in fissures.							∠10°	1	100
		606.15	Medium bedded alternation of grey sandstone, grey conglomerate and grey siltstone.		606.75-607.80m: Chalcoite in fissures.							∠0°	1	100
		606.75			606.75-607.80m: Chalcoite in fissures.							∠35°	3	100
		607.80			608.40-609.00m: Weak galena/bornite diss.							∠10°	0	100
		609.00			609.00-610.40m: Abundant galena/chalcoite diss.							∠5°	1	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		610.40-611.40m: Massively chalcoite/bornite diss.	+						∠15°	1	100
		618.40			611.40-615.60m: Frequent diss. of chalcoite/bornite.							∠5°	0	100
		619.90	Greenish grey fine grained sandstone with intraformational conglomerate in 623.30-623.70m.		615.60-618.40m: Chalcoite diss.	+						∠20°	4	100
		624.30			618.40-619.90m: Spots/diss. of chalcoite.							∠5°	1	100
		625.90	Brown massive siltstone.									∠5°	0	100
		626.80	Brown to greenish grey fine grained massive sandstone.									∠45°	2	100
		628.40										∠5°	1	100
		629.00	Brown massive siltstone.		629.00-630.00m: Weak chalcoite diss.							∠5°	0	100
630												∠5°	0	100



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