

Fig. 4.11.1

Geological Log of Borehole

Project Name		Takai Hydro-electric Power Development Project			Site Name		Upper Takai Dam Site					
Hole No	U-1 (1)	Elevation of Ground Level		159.46 m	Ground Water Level	-372 m	Bit Size	16 (HX) %				
Date	Beginning	August 30th, 1981		Operator				Casing	m to m			
	Ending	September 14th, 1981		Supervisor	Tokuji SUJIMOTO Shiro OGANO			Dry Drilling	m to m			
Scale	Elevation(m)	Depth(m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R. Q. D (%)	Logan Value. (Lp) Permeability. K (cm ² /m)	Result of Rock Tests	Rock Classification
	159.66	0.60		Khaki	Top Soil		Containing Organic Material	20 (100) %	20 (100) %	(Lp) 10 ⁻¹ 1 10 10 ² (K) 10 ⁻⁸ 10 ⁻⁵ 10 ⁻²		
	146.46	13.00		Brown	Sandy Sandstone	Completely Weathered	Clayey including Breccia					
	143.26	16.20		Brown to Khaki	Quartzose Sandstone	Completely Weathered	Sandy including Breccia					
	141.26	18.20		Brown to Gray	Quartzose Sandstone	Highly Weathered	Very Cracks Iron Oxide Stained Crack					
				Light Gray to Brown	Quartzose Sandstone	Moderately Weathered	Very Cracks Iron Oxide Stained Crack.					CL
R. Q. D : Rock Quality Designation Legend: Result of Rock Tests Depth D : Density, Specimen in Air. (g/cm ³) σ _c : Unconfined Compression Strength. (Kg/cm ²)											checked	

Fig. 4.11.2

Geological Log of Borehole

Project Name		Takai Hydro-electric Power Development Project			Site Name	Upper Takai Dam	Site No.					
Hole No	U-1 (2)	Elevation of Ground Level	159.46 m	Ground Water Level	-37.2 m	Bit Size	76 (NX) %					
Date	Beginning	August 30th, 1981	Operator		Logging	m to m						
	Ending	September 14th, 1981	Supervisor	Takaji SUGIMOTO Shige OGANO	Dry Drilling	m to m						
Scale	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R. Q. D. (%)	Logon Value (Lu) Permeability, K (cm ² /s)	Result of Rock Tests	Rock Classification
								200 (100)	200 (100)	(Lu) 10 ¹ 10 ¹⁰		
				Light Gray to Brown	Quartzose Sandstone	Moderately Weathered	Very Cracky Iron Oxide Stained Crack	15	15			CL
		2400		Light Gray to Brown	Quartzose Sandstone	Moderately Weathered	Cracky Iron Oxide Stained Crack	7	35			CU
	13316.25-30			Gray to Brown	Quartzose Sandstone	Moderately Weathered	Very Cracky Iron Oxide Stained Crack	20				CL
		1620		Gray to Brown	Sandstone	Slightly Weathered	Cracky	17				CU
	12116	38.30		Gray	Sandstone	Weathered	Hard	25				CU
		39.30		Gray	Sandstone	Weathered	Hard	5				CU

R. Q. D. : Rock Quality Designation

Legend Result of Rock Tests

Depth

D : Density, Specimen in Air. (gr / cm³)

σ_c : Unconfined Compression Strength. (Kgf / cm²)

checked

Fig.4.11.3

Geological Log. of Borehole

Project Name		Tekel Hydro-electric Power Development Project			Site Name		Upper Tekel Dam Site								
Hole No	U-1 (3)	Elevation of Ground Level	159.46 m	Ground Water Level	- 372 m	Bit Size	76 (NX) %								
Date	Beginning	August 30th, 1981	Operator				Coring	m to m							
	Ending	September 14th, 1981	Supervisor	Tokuji SUBIMOTO Shiro OGANO			Dry Drilling	m to m							
Section	Elevation(m)	Depth(m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R Q D (%)	Logos Value. (L _v) Permeability. K (cm/s)			Result of Rock Tests	Rock Classification	
										(L _v) 10 ⁻²	10 ⁻³	10 ⁻⁴			
P	4030			Grey	Sandstone	Slightly Weathered	Hard	20 40 60 80	20 40 60 80						Cu
				Grey to Brown				Very Cracky Iron Oxide Stained Crack							
	4210			Light Grey	Sandstone	Slightly Weathered	Cracky								Cu
	4350			Light Grey				Hard							
	4600														

Legend: R. Q. D.: Rock Quality Designation
 Result of Rock Tests: Depth
 D: Density, Specimen in Air, (gr/cm³)
 σ_c: Unconfined Compression Strength. (Kg/cm²)
 checked

Fig. 4.11.4

Geological Log of Borehole

Project Name		Toku Hydro-electric Power Development Project			Site Name		Upper Toku Dam Site					
Hole No	U-2 (1)	Elevation of Ground Level		100.13 m	Ground Water Level	-23.80 m	Bit Size	76 (NX) %				
Date	Beginning	September 23rd, 1981		Operator				Core Log	m to m			
	Ending	October 1st, 1981		Supervisor	Tokuji SUGIMOTO Shiro OGANO			Dry Drilling	m to m			
Core	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R Q D (%)	Logon Value (Ly) Permeability K (cm/s)	Result of Rock Tests	Rock Classification
								20 (0) 80	20 (0) 80	(Lh) 10 ² 10 ³		
	99.43	0.70		Brown	Top Soil (Soil)		Containing Organic Material					
				Grey	Sandstone	Moderately Weathered	Cracky Iron Oxide Stained Crack					CM
	95.83	4.30		Light Grey	Quartzose Sandstone	Slightly Weathered	Hard					CH
	94.33	5.80		Light Grey	Quartzose Sandstone	Moderately Weathered	Cracky Iron Oxide Stained Crack					Q
	91.53	8.60		Light Grey	Quartzose Sandstone		Hard					CH
	88.63	11.50		Brown	Quartzose Sandstone	Slightly Weathered	Fractured zone Mainly Breccia Including Brownish Clay					D
	88.13	12.00		Light Grey	Quartzose Sandstone		Hard					CH
				Grey to Dark Grey	Shaly Sandstone	Slightly Weathered	Cracky					Q
	80.33	19.80		Black	Slate							

R. Q. D. : Rock Quality Designation

Legend Result of Rock Tests

Depth

D : Density, Specimen in Air. (g/cm³)

σ_c : Unconfined Compression Strength. (Kg/cm²)

checked

Fig.4.11.5

Geological Log. of Borehole

Project Name		Total Hydro-electric Power Development Project			Site Name		Upper Tabei Dam Site							
Hole No	U-2 (2)	Elevation of Ground Level		100.13 m	Ground Water Level	-2380m	Bit Size	76 (NX) %						
Date	Beginning	September 23rd, 1981		Operator				Casing	m to m					
	Ending	October 1st, 1981		Supervisor	Tokuji SUZUMOTO Shiro OGANO			Dry Drilling	m to m					
Scale	Elevation (m)	Depth (cm)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R Q D (%)	Logon Value. (Lu) Permeability. K (cm/sec)			Result of Rock Tests	Rock Classification
								20 10 0 80	20 0 0 80	(Lu) 10 ⁻¹ 1 10 10 ²	(K) 10 ⁻⁴ 10 ⁻⁵ 10 ⁻⁶			
	78.83	21.50		Grey to Dark Grey	Shaly Sandstone	Slightly Weathered	Cracky		3					Cu
	76.33	23.60		Dark Grey	C. Quartzose Sandstone and Conglomerate	Fresh	Hard		52					
		26.20		Dark Grey to Black	Shale	Fresh	Hard		72					Cu
		27.00		Dark Grey to Black	Shale	Fresh	Cracky		18					
				Dark Grey to Black	Shale	Fresh	Very Hard		73					
	70.13	30.00		Dark Grey	Shaly Sandstone	Fresh	Very Hard		55					B
	68.53	31.60		Black	Shale	Fresh	Very Hard		75					
				Dark Grey	Shaly Sandstone	Fresh	Hard		52					Cu
		36.80		Dark Grey	Shaly Sandstone	Fresh	Cracky		25					Cu
	64.33	35.60		Dark Grey	Sandstone	Fresh	Very Hard		75					Cu
				Dark Grey	Sandstone	Fresh	Very Hard		75					Cu

R. Q. D. : Rock Quality Designation
 Legend Result of Rock Tests
 D : Density, Specimen in Air. (g/cm³)
 σ_c : Unconfined Compression Strength. (Kg/cm²)

Fig.4.11.6

Geological Log. of Borehole

Project Name		Tehel Hydro-electric Power Development Project			Site Name		Upper Tehel Dam		Site						
Hole No		U-2 (3)		Elevation of Ground Level		100.13 m		Ground Water Level		-23.00 m	Bit Size		76 (NX) %		
Date		Beginning		September 23rd, 1981		Operator				Corelog		m to m			
		Ending		October 1st, 1981		Supervisor		Takeshi SUZUMOTO Shigeo GANO		Dry Drilling		m to m			
Scale	Elevation(m)	Depth(m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R Q D (%)	Logeo Value. (L _u) Permeability (K) (cm ² /m)			Result of Rock Tests	Rock Classification	
	55.13									44.00	(L _u) 10 ²	10 ¹⁰			(K) 10 ⁵
				Dark Gray	Sandstone	Fresh	Very Hard								CK

R. Q. D : Rock Quality Designation

Legend Result of Rock Tests

DEPTH

D : Density, Specimen in Air. (g/cm³)

σ_c : Unconfined Compression Strength. (Kg/cm²)

checked

Fig. 4. 11.7

Geological Log. of Borehole

Project Name		Takai Hydro-electric Power Development Project			Site Name		Upper Takel Dam Site					
Hole No	U-3 (1)	Elevation of Ground Level	72.69 m	Ground Water Level	0.0 m	Bis Size	76(NX)%					
Date	Beginning	August 26th, 1981	Operator	Takuji SUBIMOTO Shiro OGANO			Casing	m to m				
	Ending	September 11th, 1981	Supervisor	Takuji SUBIMOTO Shiro OGANO			Dry Drilling	m to m				
Scale	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R Q D (%)	Ingeco Value. (Lu) Permeability. K (cm/m)	Result of Rock Tests	Rock Classification
								20 (100%)	20 (100%)	(L) 10 ¹ 10 ² 10 ³		
	7179	0.90			River Bed Deposits		Muddy Gravel with Sand.					
		1.60		Greyish Brown	Sandstone	Highly Weathered	Very Cracky Iron Oxide Stained Crack.					CL
				Light Grey	Sandstone	Moderately Weathered	Cracky. Iron Oxide Stained Crack					CM
	6929	3.40		Grey to Yellow	Argill. Sandstone							
	6869	4.00		Grey to Brown	Sandstone	Highly Weathered	Very Cracky					CL
	6529	7.40		Black	Slate		Cracky					
	6509	7.80		Light Grey	Sandstone	Moderately Weathered	Very Cracky Iron Oxide Stained Crack					CM
		9.30		Grey to Brown	Sandstone		Very Cracky					CL
	6269	10.00		Light Grey	Sandstone	Slightly Weathered	Very Hard					CM
		10.80		Light Grey	Sandstone		Cracky					CM
		11.60		Light Grey	Sandstone	Slightly Weathered	Hard					CM
		13.10					Cracky					CM
	5919	13.50		Grey	Sandstone	Fresh	Very Hard					CM
	5679	15.90		Greyish Blue	Sandstone	Slightly Weathered	Cracky, Hard					CM
		18.00		Light Grey	Sandstone	Slightly Weathered	Hard					CM
		19.60		Grey			Cracky					CM

R. Q. D. : Rock Quality Designation
 Legend Result of Rock Tests
 D : Density, Specimen in Air. (g/cm³)
 σ_c : Unconfined Compression Strength. (Kg/cm²)

checked

Fig. 4.11.8

Geological Log. of Borehole

Project Name		Tekel Hydro-electric Power Development Project			Site Name		Upper Teppi - Dem Sili								
Hole No		U-3 (2)		Elevation of Ground Level		12.69 m		Ground Water Level		0-0 m		Bit Size		76 (NX) %	
Date		Beginning		August 26th, 1981		Operator				Cooling		m to m			
		Ending		September 11th, 1981		Supervisor		Tekuji SUGIMOTO Shiro OGANO		Dry Drilling		m to m			
Scale	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R Q D (%)	Logan Value (Ln) Permeability, K (cm ² /s)			Result of Rock Tests	Rock Q (Kcal/cm ² /min)	
										(K) 10 ⁴	10 ⁵	10 ⁶			
0	5129	2100	[Pattern]	Grey	Sandstone	Slightly Weathered	Crackly, including shale patch.	[Hatched]	[Hatched]	[Hatched]	[Hatched]	[Hatched]	[Hatched]	[Hatched]	[Hatched]
		2140													
5	4659	2610	[Pattern]	Grey	Sandstone and Conglomerate	Fresh	Hard	[Hatched]	[Hatched]	[Hatched]	[Hatched]	[Hatched]	[Hatched]	[Hatched]	[Hatched]
		3000													
10	4269	3150	[Pattern]	Dark Grey to Black	Sandy Shale	Very Fresh	No Crack	[Hatched]	[Hatched]	[Hatched]	[Hatched]	[Hatched]	[Hatched]	[Hatched]	[Hatched]
		4000													
15	3269	4000	[Pattern]	Dark Grey to Black	Sandy Shale	Very Fresh	No Crack	[Hatched]	[Hatched]	[Hatched]	[Hatched]	[Hatched]	[Hatched]	[Hatched]	[Hatched]
20		4000													

R. Q. D : Rock Quality Designation

Legend Result of Rock Tests

DEPTH

○ : Density, Specimen In Air. (gri/cm³)

⊕ : Unconfined Compression Strength. (Kgf/cm²)

checked

Fig. 4.11.9

Geological Log. of Borehole

Project Name		Tekel Hydro-electric Power Development Project			Site Name	Upper Tekel Dam Site								
Hole No	U-4 (1)	Elevation of Ground Level	99.35 m	Ground Water Level	-19.1 m	Bit Size	76 (NX)X							
Date	Beginning	September 15th, 1981	Operator				Coaling	m to m						
	Ending	September 29th, 1981	Supervisor	Tobeji SUGIMOTO Shiro OGANO			Dry Drilling	m to m						
Core	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R Q D (%)	Logan Value. (L _u) (Permeability, K) (cm ² /m)			Result of Rock Tests	Rock Classification
								20 40 60 80	20 40 60 80	(L _u) 10 ⁻¹ 10 ⁻² 10 ⁻³	(K) 10 ⁻⁵ 10 ⁻⁶ 10 ⁻⁷			
	98.05	1.30		Brown to Khaki	Clayey sand		Top soil. Containing organic material							
		2.70		Brown		Completely weathered	Sandy. Including breccia							
				Brown to Light grey	Sandstone	Highly weathered	Very cracky. Crack with iron oxide							D
	94.25	5.10		Light grey to Brown	Quartzose sandstone	Moderately weathered	Cracky. Iron oxide stained crack							
	91.95	7.40		Brown	Quartzose sandstone	Highly weathered	Cracky and soft. Crack with clay fractured zone							C
	90.65	8.70		Grey to Brown	Quartzose sandstone	Moderately weathered	Cracky. Crack with iron oxide							Cu
	89.65	9.70		Light grey	Quartzose sandstone	Slightly weathered	Hard however cracky.							Cu
		10.30		Grey to Brown			Cracky							Cu
		16.10												
	81.55	12.00		Light grey	Sandstone	Slightly weathered	Hard							Cu

R. Q. D : Rock Quality Designation

Legend Result of Rock Tests
 (a) Density, Specimen in Air. (g_r/cm³)
 (b) Unconfined Compression Strength. (Kg_f/cm²)

checked

Fig.4.11.10

Geological Log. of Borehole

Project Name		Tekel Hydro-electric Power Development Project			Site Name		Upper Tekel Dam Site								
Hole No	U-4 (2)	Elevation of Ground Level		99.35 m	Ground Water Level	-19.1 m	Bit Size	76 (NX) %							
Date	Beginning	September 15th, 1981		Operator				Logging	m to m						
	Ending	September 29th, 1981		Supervisor	Tokuji SUGIMOTO Shiro OKANO			Dry Drilling	m to m						
Scale	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R Q D (%)	Logan Value (L _v) Permeability (K)			Result of Rock Tests	Rock Classification	
										(cm ² /sec)	(L _v) 10 ⁻¹	10 ⁻²			10 ⁻³
				Light grey			Cracky								CM
		22.30		Light grey	Sandstone	Slightly weathered	Hard								CM
		23.60		Light grey			Cracky								CM
		25.00		Grey	Sandstone	Fresh	Hard								CM
		26.80		Black	Shale		Soft								
		27.20		Grey	Sandstone		Hard								
		27.60		Black	Shale		Soft								
		28.30		Grey	Sandstone	Fresh	Hard								
		28.60		Black	Shale		Soft								
		28.80		Grey	Sandstone		Hard								
		29.00		Black	Shale		Soft								
		30.60		Grey	Sandstone	Fresh	Hard								CM
		32.20		Black	Shale		Soft								
		31.30		Grey	Sandstone	Fresh	Cracky								CM
		32.70		Grey to Black	Conglomerate	Fresh	Hard								CM
				Grey	Sandstone	Fresh	Hard								CM
		36.00		Black	Shale	Fresh	Hard								
		36.70		Light grey			Hard								
		37.20		Light grey	Sandstone	Fresh	Very cracky Cracky zone								CM
		38.80		Grey			Very hard								CM

R. Q. D : Rock Quality Designation

Legend Result of Rock Tests

D_{sp} : Density

D : Density, Specimen in Air (g/cm³)

σ_t : Unconfined Compression Strength (Kgf/cm²)

Checked

Fig. 4.11.11

Geological Log of Borehole

Project Name		Tebaji Hydro-electric Power Development Project			Site Name		Upper Tebaji Dam Site							
Hole No	U-4 (3)	Elevation of Ground Level	99.35 m	Ground Water Level	-19.1 m	Bit Size	76 (NX) %							
Date	Beginning	September 15th, 1981	Operator				Coreing	m to m						
	Ending	September 29th, 1981	Supervisor	Tebaji SUGIMOTO Site OYANO			Dry Drilling	m to m						
Scale	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R Q D (%)	Logan Value (Ln) Permeability, K (cm ² /m)			Results of Rock Tests	Rock Classification
	49.35									50.00	20 10 5 5	20 10 5 5		
		45.00		Grey	Sandstone	Fresh	Very hard							CH
				Light grey to Grey	Sandstone	Fresh	Hard, however cracky							CN
														CS

R. Q. D: Rock Quality Designation

Legend Result of Rock Tests

DEPTH

D: Density, Specimen in Air (g/cm³)

UC: Unconfined Compression Strength (Kgf/cm²)

checked

Fig. 4.11.12

Geological Log. of Borehole

Project Name		Tegal Hydro-electric Power Development Project			Site Name		Upper Tegal Dam Site							
Hole No	U-5 (1)	Elevation of Ground Level	150.63 m	Ground Water Level	-19.7 m	Bit Size	76 (NX) %							
Date	Beginning	October 1st, 1981	Operator				Coring	m to m						
	Ending	October 11th, 1981	Supervisor	Tokuji SUGIMOTO Shige OAHO			Dry Drilling	m to m						
Seate	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R Q D (%)	Logan Value. (Ln) (Permeability, K) (cm/m)			Result of Rock Tests	Rock Classification
										(L)	(M)	(N)		
	149.73	0.90		Brown	Sandy B. Clayey soil		Top soil							
	148.73	1.90		White to Brown	Shale	Completely weathered	Clayey							
	147.33	3.30		Light grey	Shaly sandstone	Completely weathered	Soft							
	142.43	8.20		Brown	Shaly sandstone	Highly weathered	Very cracky and soft							
		9.80		White to Brown	Quartzose sandstone	Highly weathered	Very cracky Crack with clay							
				White to Brown	Quartzose sandstone	Highly weathered	Very cracky							
	133.03	17.60		Grey	Shale	Highly weathered	Fractured zone including breccia and clay							
	131.93	18.70		Light grey	Quartzose sandstone	Highly weathered	Very cracky							
	130.73	19.80			Shaly sandstone		Fractured zone							

R. Q. D : Rock Quality Designation

Legend Result of Rock Tests

Depth
 D : Density, Specimen in Air. (gr / cm³)
 FC : Unconfined Compression Strength. (Kgr / cm²)

checked

Fig. 4.11.13

Geological Log of Borehole

Project Name		Taket Hydro-electric Power Development Project			Site Name		Upper Takoy		Dom Sidé			
Hole No	U-5 (2)	Elevation of Ground Level	150.63 m	Ground Water Level	-19.7 m	Bit Size	75 (NX)%					
Date	Beginning	October 1st, 1981	Operator				Casing	m to m				
	Ending	October 11th, 1981	Supervisor	Tetsuji SUGIMOTO Shiro O'BANO			Dry Drilling	m to m				
Scale	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R Q D (%)	Ingron Value (Ln) (Permeability, K) (cm ² /m)	Result of Rock Tests	Rock Classification
								20 (0) 80	20 (0) 80	(Ln) 10 ⁻¹ 10 ⁻² 10 ⁻³		
	27.63	23.00		Grey to Brown	Shaly sandstone	Highly weathered	Fractured zone Soft and cracky. Including clay					D
		24.00		Grey to Brown	Sandstone	Moderately weathered	Cracky. Crack with iron oxide					Cu
		27.33		Grey	Sandstone	Slightly weathered	Cracky				26.40 26.55 0.2 648 R= 913	Cu
		28.70		Grey	Sandstone	Fresh	Very cracky					Cu
		30.30		Grey	Sandstone	Fresh	Cracky					Cu
		33.80		Grey	Sandstone	Fresh	Hard					Cu
		35.00		Grey	Sandstone	Fresh	Cracky					Cu Cu
		36.60		Grey	Sandstone	Fresh	Very hard					Cu
		39.60		Grey	Sandstone	Fresh	Hard, however cracky					Cu

R. Q. D. : Rock Quality Designation

Legend Result of Rock Tests

Depth
 D : Density, Specimen in Air. (g/cm³)
 R : Unconfined Compression Strength. (Kg/cm²)

checked

Fig. 4.11.14

Geological Log of Borehole

Project Name		Tekol Hydro-electric Power Development Project			Site Name		Upper Tekol Dam Site					
Hole No	U-5 (3)	Elevation of Ground Level	150.63 m	Ground Water Level	-19.7 m	Bit Size	76 (NX) %					
Date	Beginning	October 1st, 1981	Operator			Case	m to m					
	Ending	October 11th, 1981	Supervisor	Tekol SUBIMOTO Shiro OKANO		Dry Drilling	m to m					
Scale	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R Q D (%)	Logon Value (Ln) Permeability (K) (cm/m)	Result of Rock Tests	Rock Classification
								20 40 60 80	20 40 60 80	(Ln) 10 ⁻² 10 ⁻¹ 10 ⁰		
		46.00		Grey	Sandstone	Fresh	Hard, however cracky					CH
		49.00		Grey	Sandstone	Fresh	Hard					
	100.63	50.60		Grey	Sandstone	Fresh	Very hard					B

R. Q. D : Rock Quality Designation

Legend Result of Rock Tests

Depth

D : Density, Specimen in Air (g/cm³)

σ_c : Unconfined Compression Strength (Kg/cm²)

checked

Fig. 4.11.15

Geological Log of Borehole

Project Name		Tegal Hydro-electric Power Development Project			Site Name		Upper Tegal Dam Site								
Hole No	UP-1 ()	Elevation of Ground Level	75.83 m	Ground Water Level	-1.0 m	Bit Size	76 (NX) mm								
Date	Beginning	September 29th, 1982	Operator	Tokoshi TOYA	Casing	m to m									
	Ending	October 1st, 1982	Supervisor	Tokuji SUGIMOTO Shiro OGANO	Dry Drilling	m to m									
Scale	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	R.covery (%)	R. Q. D (%)	Logon Value. (Lw) Permeability. K (cm/s)			Result of Rock Tests	Rock Classification	
								20 (0.00)	20 (0.00)	(Lw) 10 ¹ 10 ² 10 ³					
	72.88	2.95		Brownish White	River Deposits		Boulder of Quartzose Sandstone								
				Brown		Mainly Pebbles including Sand and Clay									
	71.83	4.00		Brown			Medium Hard Cracky		2						
	70.83	5.00					Cracky Zone with Clay								
		7.00		Brownish White	Medium Quartzose Sandstone	Highly Weathered	Medium Hard Iron Oxide Stained Crack at 60°, 40°, 65°		0						
	67.83	8.00		Whitish Brown			Crack at 50°, 30° with Clay			13					
	67.33	8.50		Brown			Cracky Zone								
		10.00		Light Gray	Medium Quartzose Sandstone	Moderately Weathered	Hard Iron Oxide Stained Crack at 20°, 30°, 85°		10						
							Very Hard Clean Crack at 30°, 50° Iron Oxide Stained at 40°, 60°			9					
	62.53	13.30					12.20m Sand	Iron Oxide Stained Crack at 40°, 60°		8					
		14.80		Light Gray	Coarse Quartzose Sandstone		Very Hard Clean Crack at 40° Joint at 65°		10						
	60.83	15.00							12						
		19.00		Gray	Medium Quartzose Sandstone		Fractured Zone Soft Mainly Pebbles including Clay								
	56.83	19.00													
		20.00		Light Gray			Cracky Clean Crack at 60°, 90°		23						

317-332
0-2430
R=562

Ct

Cs

0

Cw
Cx

checked

R. Q. D : Rock Quality Designation
 Legend Result of Rock Tests
 Depth
 O : Density, Specimen in Air. (g/cm³)
 σt : Unconfined Compression Strength. (Kgf/cm²)

Fig. 4.11.16

Geological Log of Borehole

Project Name		Takes Hydro-electric Power Development Project			Site Name	Upper Total Dam Site							
Hole No	UD-2 ()	Elevation of Ground Level	7681 m	Ground Water Level	-10 m	Bit Size	76 (NX)%						
Date	Beginning	September 14th, 1982	Operator	Takeshi TOYA	Casing	00m 102.5 m							
	Ending	September 18th, 1982	Supervisor	Tokuji SUGIMOTO Shiro OBAKO	Dry Drilling	00m 100.5 m							
Scale	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R Q D (%)	Logeo Value (Ln) Permeability, K (cm ² /s)	Result of Rock Tests	Rock Classification	
								(%)	(%)	(K) 10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴			
	7646	0.35		Brown	River Bed Deposits		Sand	20.0 (100)	30 (100) 80				
		1.00		Brown			Highly Weathered Boulder						
					Boulder		2.20m with Pebble						
	7381	3.00					2.95 to 3.00m with Clay						
	7331	3.50		Light Grey	Medium Quartzite Sandstone		Very Hard Clean Crack at 30°					C ₁	
		4.00		Greyish Brown			Soft Iron Oxide						
				Yellowish Brown	Shale	Highly Weathered	Stained Joint at 15°						
	7166	5.15											
	7094	5.87		Light Grey	Medium Quartzite Sandstone	Moderately Weathered	Iron Oxide Stained Crack at 30°, 60° with Quartz					C _M	
	7061	6.20		Brownish Grey	Shale		6.20m Joint at 15°				6.32-6.47 0.2636 0.1630		
				Light Grey	703m Shale 7.20 to 7.30m Shale Medium Quartzite Sandstone	Moderately Weathered to Slightly Weathered	Hard Iron Oxide Stained Crack at 30° Iron Oxide Stained Joint at 15°						C _H
	6751	9.30			8.60 to 8.70 Shale								
	6721	9.60					Crack Zone						
				Light Grey	Medium Quartzite Sandstone	Slightly Weathered	Very Hard Iron Oxide Stained Crack at 60°, 70°, 75°						
		11.10											
		12.00					Very Hard Iron Oxide Stained Crack at 60°, 70°, 80°, 90°						
	6396	12.85		Light Brown									
		13.55		Light Brown									
		14.00		Light Grey	Coarse Quartzite Sandstone	Moderately Weathered	Very Hard Iron Oxide Stained Crack at 20° with Clay					C _H	
				Light Brown								C _M	
	6211	15.70					Very Hard Iron Oxide Stained Crack at 30°, 70° 15.80m Joint at 15°						
	6101	15.80		Grey	Shale								
	5966	17.15					Iron Oxide Stained Crack at 30°, 60°, 90° Fogged Zone with Clay						
	5921	17.60		Light Brown	Coarse Quartzite Sandstone		Very Hard Iron Oxide Stained Crack at 30°, 50°			3.50		D	
		18.70										C _M	
				Light Grey		Slightly Weathered	Very Hard Clean Crack at 70°, 80°, 60°					C _H	

R. Q. D : Rock Quality Designation

Legend Result of Rock Tests

Depth

ρ : Density, Specimen in Air. (g/cm³)

σ_c : Unconfined Compression Strength. (Kg/cm²)

checked

Fig. 4.11.17

Geological Log of Borehole

Project Name		Takai Hydro Electric Power Development Project			Site Name		Upper Takai Dam Site							
Hole No	UD-3 ()	Elevation of Ground Level	74.55 m	Ground Water Level	-1.0 m	Bit Size	76 (NX) %							
Date	Beginning	September 8th, 1982	Operator	Takeshi KOBAYASHI		Casing	m to m							
	Ending	September 10th, 1982	Supervisor	Tetsuji SUGIMOTO Shiro OGANO		Dry Drilling	m to m							
Scale	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R. Q. D (%)	Logan Value (Lb)			Results of Rock Tests	Rock Classification
0														
	72.55	2.00		Brownish White	Coarse Quartzite Sandstone	Moderately Weathered	Hard Iron Oxide Stained Crack at 40°, 50°, 70°							Cu
	71.95	2.80		Brownish White	Medium Quartzite Sandstone		Crack at 70° with Whitish Clay							
	71.75	2.80		Greyish White	Shale									
	71.25	3.30		Brownish White	Fine Sandstone		Soft joint at 35° with Clay							
		4.00		Brownish White	Coarse Quartzite Sandstone	Moderately Weathered	Hard Iron Oxide Stained Crack at 30°, 50°, 70°							Cu
	69.25	5.30		Brownish White	Shale		Joint at 35°							Cu
	68.60	5.95		Whitish Brown	Conglomerate		Soft to Medium Hard							Cu
	68.19	6.35		Brown	Shale	Moderately Weathered	Hard Iron Oxide Stained Crack at 40°, 60°							Cu
		7.20		Brownish White	Coarse Quartzite Sandstone		Iron Oxide Stained Joint at 35°							Cu
		8.00												
					80m-60m Stone		Very Hard Iron Oxide Stained Crack at 30°, 50°, 70°							
				Whitish Grey	Medium Quartzite Sandstone		Iron Oxide Stained Joint at 35°							
10	64.48	10.07		Brownish Grey	Clayey Shale	Slightly Weathered	10.5m Crack at 50°							Cu
	64.20	10.35		Whitish Grey	11.2m-11.27m Clayey Shale									
				Brownish Grey	12m-12.2m Shale	Moderately Weathered	Very Hard Iron Oxide Stained Joint at 30°							
		13.00		Brownish Grey	Medium Quartzite Sandstone		Iron Oxide Stained Crack at 20°, 40°, 50°							
	60.55	14.00		Light Grey										
	60.20	14.35		Brownish Grey	Conglomerate		Hard Iron Oxide Stained Crack at 40°, 50°							Cu
	59.95	14.60		Brown	Coarse Quartzite Sandstone	Moderately Weathered	Joint at 40°							Cu
15	59.30	15.25		Brown	Shale		Joint at 40° with Iron Oxide							Cu
	58.30	16.25		Dark Grey	Shale	Moderately Weathered	Joint at 40°							Cu
	57.95	16.60		Brown	Conglomerate									
	57.75	16.80		Light Grey	Shale									
	57.15	17.40		Light Grey	Medium Quartzite Sandstone		Hard Iron Oxide Stained Crack at 60°, 70°, 80°							
	56.35	18.20		Dark Grey	Shale		Joint at 40° with Iron Oxide							Cu
	56.15	18.40		Brownish Grey	Coarse Quartzite Sandstone	Slightly Weathered								
		19.00		Grey	Shale									
20	54.55	20.00		Dark Grey	Medium Sandstone									Cu

R. Q. D : Rock Quality Designation

Legend Result of Rock Tests

Depth

0 : Density, Specimen in Air (gr / cm³)

σ_c : Unconfined Compression Strength (Kg / cm²)

checked

Fig.4.11.18

Geological Log. of Borehole

Project Name		Taket Hydro Electric Power Development Project			Site Name		Upper Total Dam Site							
Hole No	UD-4 (1)	Elevation of Ground Level		173.40 m	Ground Water Level	-2900 m	Bit Size	76 (NX) %						
Date	Beginning	August 13th, 1982		Operator	Masami NARITA		Casing	00 m 1980 m						
	Ending	August 24th, 1982		Supervisor	Tokuji SUGIMOTO Shiro OGANO		Dry Drilling	00 m 1936 m						
Scale	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R. Q. D (%)	Logon Value. (Ln) Permeability. K (cm ² /s)			Result of Rock Tests	Rock Classification
												(K) 10 ⁻¹		
0	173.10	0.30	YY	Yellow Ocker	Soil		Containing Organic Material							
	172.45	0.95		Light Brown	Medium Quartzose Sandstone	Completely Weathered	Very soft, Sandy							
		3.40		Whitish Brown	Shale	Completely Weathered	Very Soft Clayey Shale including Breccia of Shale							
	168.95	4.45		Brown										
5	168.35	5.05		Reddish Brown	Clay		Fractured Zone							
				Brown	Fine Sandstone	Completely Weathered	Soft Iron Oxide Stained Crack. Crack with Clay							
	165.90	7.50		Whitish Brown	Medium Quartzose Sandstone	Highly Weathered	Medium Hard Crack with Clay							
	163.65	9.75		Brown		Highly Weathered	Fractured Zone							
10		10.00		Greyish White	Fine Sandstone	Moderately Weathered	Hard, Cracky Crack at 50°, 70° Crack with Iron Oxide							
	161.75	11.65		Greyish White	Fine Quartzose Sandstone	Moderately Weathered	Medium Hard Crack at 50°, 70° Iron Oxide Stained Crack. Joint at 40° to 45° Joint with Brownish Clay.							
				Brown	Fine Quartzose Sandstone		Fractured Zone Soft including Clay							
	157.80	15.60		Light Purple	Clayey Shale	Moderately Weathered	Very soft							
		18.00		Greyish White	Shale		Soft Clayey							
	154.40	19.00		Greyish White	Silty Sand		Medium hard. Crack at 30°, 60°							

R. Q. D. : Rock Quality Designation

Legend Result of Rock Tests

Depth

D : Density, Specimen in Air. (g/cm³)

σ_c : Unconfined Compression Strength. (Kgf/cm²)

1430, 1443
D: 2.646
σ_c: 92.4

checked

Fig. 11.19

Geological Log of Borehole

Project Name		Takai Hydro-electric Power Development Project			Site Name		Upper Takai Dam Site							
Hole No	UD-4 (2)	Elevation of Ground Level		173.40 m	Ground Water Level	-2900 m	Bit Size	76 (NX) %						
Date	Beginning	August 13th, 1982		Operator	Masumi NARITA		Casing	00m to 0 m						
	Ending	August 24th, 1982		Supervisor	Tatsuji SUGIMOTO Shiro OGANO		Dry Drilling	00m to 56 m						
Scale	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R. Q. D. (%)	Logon Value (L _v) Permeability K (cm/s)			Result of Rock Tests	Rock Classification
								20 (0.0) 40	20 (0.0) 40	(L _v) 10 ² 1 10 10				
		21.50		Grayish White	Silly Shale	Moderately Weathered	Medium Hard Crack at 30°, 60° Iron Oxide Stained Crack	0	25					CL
		22.30		Whitish Gray		Slightly Weathered	Hard Crack at 50°	5	55				CL secr	
	150.40	23.00		Whitish Gray									23.00-23.20 D = 2353 fr = 115	CH
	149.20	24.20		Whitish Gray	Sandy Shale	Slightly Weathered	Hard Crack at 50° with Calcite		55					CH secr
	148.40	25.00		Whitish Gray			Cracky		15					CL
	147.65	25.75		Purplish Brown	Silly Shale		Hard Crack at 50°		35					CH secr
	147.40	26.30		Light Gray					55					CL
		27.30		Brownish Gray	Sandy Shale		Medium Hard Cracky							CH
	145.45	27.95		Whitish Gray	Shale Interbedded with Sandstone	Moderately Weathered	Clayey Shale							CL
	144.15	29.25		Purplish Gray			Cracky Zone Iron Oxide Stained		20					CL
	143.40	30.00		Grayish White			Fractured Zone		3					CL
	142.40	31.00		Whitish Gray	Sandy Shale	Moderately Weathered	Medium Hard Cracky Cracky	0	0					CL secr
		32.00					Crack at 50°, 70° Iron Oxide Stained Crack		0					CH
	138.95	34.45		Brownish Gray			Cracky		42					CH
		35.40							50					CL
		36.80		Gray	Shale				50					CH secr
		37.20				Slightly Weathered	Hard Crack at 40°, 75° Crack with Calcite		57					CH
	133.90	39.50		Dark Gray										CH
	133.60	39.80		Gray	Hard Sandstone		Hard Crack at 80°		25					CH
				Dark Gray	Shale									CH

R. Q. D. : Rock Quality Designation

Legend Result of Rock Tests

Depth

D : Density, Specimen in Air. (g/cm³)

σ_c : Unconfined Compression Strength. (Kg/cm²)

checked

Fig. 4.11.20 Geological Log. of Borehole

Project Name		Tehel Hydro-electric Power Development Project			Site Name		Uppal, Tehel, Dem, Site							
Hole No.	UD-4 (3)	Elevation of Ground Level	173.40 m	Ground Water Level	-2900 m	Bit Size	76 (NX) %							
Date	Beginning	August 13th, 1982	Operator	Mesomi HARITA	Coring	ODM 108.0 m								
	Ending	August 24th, 1982	Supervisor	Tokaji SUDIMOTO Shiro OGANO	Dry Drilling	ODM 105.8 m								
Scale	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R. Q. D. (%)	Logos Value (L _v) Permeability (K (cm ² /s))			Result of Rock Tests	Rock Classification
								20 40 (H)	30 10 (B)	(K) 10 ⁻¹ 10 ⁻² 10 ⁻³	10 ⁻¹ 10 ⁻² 10 ⁻³			
	13195	41.45		Dark Grey	Shale	Slightly Weathered	Hard Crack at 60°		24					
	12850	44.90		Dark Grey	Sandy Shale	Fresh	Hard Crack at 70°		52					
	12740	46.00		Dark Grey	Shale	Slightly Weathered	Crack at 60° Iron Oxide Stained Crack		73					
	12340	50.00		Dark Grey	Sandy Shale	Fresh	Hard Crack at 45°, 60°		50					

R. Q. D. : Rock Quality Designation

Legend Result of Rock Tests

Depth

D : Density, Specimen in Air. (g/cm³)

σ_c : Unconfined Compression Strength. (Kgf/cm²)

checked

Fig. 4.11.21 Geological Log of Borehole

Project Name		Toku Hydro-electric Power Development Project		Site Name	Upper Toku Dam Site									
Hole No	UP-5 (1)	Elevation of Ground Level	116.32 m <th>Ground Water Level</th> <td>-43.00 m <th>Bit Size</th> <td>76 (NX) %</td> </td>	Ground Water Level	-43.00 m <th>Bit Size</th> <td>76 (NX) %</td>	Bit Size	76 (NX) %							
Date	Beginning	September 6th, 1982	Operator	Atsu SASAKI		Casing	00 m to 35 m							
	Ending	September 13th, 1982	Supervisor	Tokuji SUBIMOTO Shiro OGANO		Dry Drilling	00 m to 20 m							
Scale	Stratification (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R. Q. D. (%)	Logon Value (L _v) Permeability, K (cm/s)			Result of Rock Tests	Rock Classification
								(%)	(%)	(L _v) 10 ¹ 10 ² 10 ³	(K) 10 ⁸ 10 ⁹ 10 ¹⁰			
		1.00		Yellow Ochre	Clayey Soil		Containing Organic Material and Gravel							
	114.82	1.50			Silty Soil	Completely Weathered								
		2.45		Brown	Medium Quartzite Sandstone	Highly Weathered	Soft							
	113.27	3.15		Whitish Grey	Shale	Highly Weathered	Soft						D	
	112.32	4.00		Brownish Grey	Muddy Sandstone	Highly Weathered	Hard Iron Oxide Stained Crack at 50°						Cl	
	111.02	5.30		Brownish Grey	Medium Quartzite Sandstone	Highly Weathered	Hard Crack at 50°						Cu	
	110.32	6.00		Brownish Grey	Shaly Sandstone	Highly Weathered	Joint at 35°							
	109.92	6.40		Brownish Grey	Medium Quartzite Sandstone	Highly Weathered	Crack at 50°, 70°							
		7.00		Greyish Brown	Fine Quartzite Sandstone	Moderately Weathered	Hard Crack at 60°, 80° Iron Oxide Stained Crack Joint at 30°							
	106.02	10.30		Yellow Ochre	Mudstone	Moderately Weathered	Joint at 25°						9.4-9.30 D=2.605 R=1185	
	105.47	10.85		Greyish Brown	Fine Quartzite Sandstone	Moderately Weathered	Hard Cracks							
	104.42	11.90		Greyish Brown	Alteration of Sandstone and Shale	Moderately Weathered	Hard Joint at 25°							
	102.67	13.65		Silt	Shale	Highly Weathered	Hard							
	101.62	14.70		Greenish Grey	Shaly Sandstone	Slightly Weathered	Hard Crack at 70°, 45° Joint at 30°							
	98.82	17.50					Cracks Zone							
	98.32	18.00												
	96.52	19.80		Greenish Grey	Fine Sandstone		Hard Crack at 70°, 45° Joint at 30°							

R. Q. D.; Rock Quality Designation

Legend Result of Rock Tests

Ophi

D: Density, Specimen in Air (g/cm³)

σ_c: Unconfined Compression Strength (Kg/cm²)

checked

Fig. 4.11.22

Geological Log of Borehole

Project Name		Total Hydro-electric Power Development Project			Site Name	Upper Teter Dam Site								
Hole No	UD-5 (2)	Elevation of Ground Level	116.32 m	Ground Water Level	-4300 m	Bit Size	76 (NX) 7/8							
Date	Beginning	September 6th, 1982	Operator	Ats SA SAKI		Coasting	00m to 35 m							
	Ending	September 13th, 1982	Supervisor	Tetsuji SUGIMOTO Shiro OGANO		Dry Drilling	00m to 20 m							
Scale	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R Q D (%)	Logan Value (L.V) Permeability K (cm/s)			Result of Rock Tests	Rock Classification
								20 40 60 80	20 40 60 80	(L) 10 ¹ 10 ² 10 ³	(K) 10 ⁰ 10 ¹ 10 ²			
		20.00		Greenish Grey	Fine Sandstone	Slightly Weathered	Hard Joint at 30°							C _M
	94.92	21.40		Greenish Grey	Alteration of Sandstone and Silt	Slightly Weathered	Hard Crack at 50°							C _L
	94.12	22.20		Greenish Grey	Fine Sandstone	Moderately Weathered	Hard Crack at 60°, 40°							C _M
	93.27	23.05		Greenish Grey	Fine Sandstone	Moderately Weathered	Hard Crack at 60°, 40°							C _L
	92.17	24.15		Greenish Grey	Fine Sandstone	Moderately Weathered	Hard Crack at 60°, 40°							C _M
		27.10		Greenish Grey	Sandy Silt	Slightly Weathered	Very Hard Crack at 40°, 60°							C _M
	89.17	27.10		Greenish Grey	Sandy Silt	Slightly Weathered	Very Hard Crack at 40°, 60°							C _L
	88.67	27.65		Greenish Grey	Sandy Silt	Slightly Weathered	Very Hard Crack at 40°, 60°							C _L
		28.50		Greenish Grey	Interbedded with fine Sandstone	Slightly Weathered	Very Hard Crack at 40°, 60°							C _M
	86.32	30.00		Brownish Grey	Fine Sandstone	Slightly Weathered	Very Hard Crack at 40°, 60°							C _M
	85.72	30.60		Brownish Grey	Fine Sandstone	Slightly Weathered	Very Hard Crack at 40°, 60°							C _M
		31.10		Brownish Grey	Alteration of Sandstone and Silt	Slightly Weathered	Hard Crack at 35°							C _M
		32.20		Brownish Grey	Alteration of Sandstone and Silt	Slightly Weathered	Hard Crack at 35°							C _M
	83.47	32.85		Brownish Grey	Alteration of Sandstone and Silt	Slightly Weathered	Hard Crack at 35°							C _M
		32.85		Brownish Grey	Alteration of Sandstone and Silt	Slightly Weathered	Hard Crack at 35°							C _M
	82.27	34.05		Greenish Grey	Sandy Silt	Slightly Weathered	Iron Oxide Stained Crack							C _M
	81.56	34.76		Grey	Shaly Sandstone	Slightly Weathered	Joint at 35°							C _M
	81.32	35.00		Brownish Grey	Fine Sandstone	Slightly Weathered	Crack at 70° with Iron Oxide							C _M
		35.50		Greenish Grey	Fine Sandstone	Slightly Weathered	Crack at 70° with Iron Oxide							C _M
		37.00		Grey	Shaly Sandstone	Slightly Weathered	Very Hard Crack at 50° to 60°							C _M
	78.57	37.75		Dark Grey	Shaly Sandstone	Slightly Weathered	Very Hard Crack at 50° to 60°							C _M
	78.42	37.90		Brown	Coarse Sandstone	Slightly Weathered	Joint at 30°							C _M
	77.57	38.75		Grey	Shaly Sandstone	Slightly Weathered	Iron Oxide Stained Crack and Joint							C _M
	77.32	39.00		Greenish Grey	Crty Shale	Slightly Weathered	Fractured Zone							O
		39.00		Greenish Grey	Crty Shale	Slightly Weathered	Fractured Zone							O
	76.32	40.00		Brownish Grey	Coarse Quartzite Sandstone	Slightly Weathered	391m Iron Oxide Stained Crack							C _M

R. Q. D. : Rock Quality Designation

Legend Result of Rock Tests

DEPIA
 D : Density, Specimen in Air. (g/cm³)
 σ_c : Unconfined Compression Strength. (Kg/cm²)

checked

Fig. 4.11.23

Geological Log of Borehole

Project Name		Toku Hydro Electric Power Development Project			Site Name		Upper Toku Dam Site							
Hole No	UD-5 (3)	Elevation of Ground Level	116.52 m	Ground Water Level	-43.00 m	Bit Size	16 (NX) %							
Date	Beginning	September 6th, 1982	Operator	Akira SASAKI		Casing	00m to 35 m							
	Ending	September 13th, 1982	Supervisor	Tokuji SUGIMOTO Shiro O'BANO		Dry Drilling	00m to 20 m							
Scale	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R Q D (%)	Logan Value (L.V.) Permeability (K (cm/m))			Results of Rock Tests	Rock Classification
								20 (0.15) 100	30 (0.10) 100	(K) 10 ⁶ 10 ⁵ 10 ⁴				
	4030			Light Grey	Medium Quartzite Sandstone	Fresh	Very Hard Clean Crack at 80° Iron Oxide Stained Crack at 30°	27	62					CH
	4495			Black	Shale		Hard Joint at 30°	74	65				CH	
	4550			Light Grey	Medium Quartzite Sandstone		Hard Joint at 30°						CH	
	4600			Light Grey	Medium Quartzite Sandstone interbedded with Black Shale		Crack at 60, 70°	17					CH	
	4650			Grey	Fine Sandstone	Fresh		19					CH	
	4790			Black	Shale		Very Hard Crack at 40 and 50° with Calcite	20					CH	
	4820			Grey	Fine Sandstone								B	
	4970			Black	Shale			20					B	
	4900													
	4970													
	5000													

R. Q. D : Rock Quality Description

Legend Result of Rock Tests

Depth

D : Density, Specimen In Air. (g/cm³)

UC : Unconfined Compression Strength. (Kg/cm²)

checked

Fig. 4.11.24

Geological Log. of Borehole

Project Name		Tekel Hydro electric Power Development Project			Site Name		Upper Tekel Dam Site							
Hole No	UD-6 (1)	Elevation of Ground Level		7508 m	Ground Water Level	-2.2 m	Big Size	76 (NX)%						
Date	Beginning	August 12th, 1982		Operator	Akiyo SASAKI		Casing	0.0m to 1.8 m						
	Ending	September 4th, 1982		Supervisor	Tokuji SUGIMOTO Shiro OGANO		Dry Drilling	0.0m to 1.4 m						
Scale	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R Q D (1-3)	Logon Value (Lg)			Result of Rock Tests	Rock Classification
											Permeability (K)	(10 ⁻¹)		
	7388	1.20		Yellow Ocher	Talus		Containing Organic Material and Gravel							
		2.00		Light Grey	Shale	Highly Weathered	Soft Joint at 30°							C1
	743	3.65		Brownish Grey	Medium Sandstone	Moderately Weathered	Hard Crack at 60°						43-427 012618 01-2109	C2
		4.00		Light Grey	Medium Sandstone	Moderately Weathered	Hard Crack							C2
		5.00		Brownish Grey	Fine Sandstone	Moderately Weathered	Hard Crack							C2
		6.00		Brownish Grey	Fine Sandstone	Moderately Weathered	Hard Crack at 50°							C2
	6638	8.70		Grey	Medium Sandstone	Slightly Weathered	Iron Oxide Stained Crack							C2
				Dark Grey	Shaly Sandstone	Slightly Weathered	Hard Iron Oxide Stained Crack at 50°, 90° Crack at 60°, 80° with Calcite							C2
	6388	11.20		Grey	Medium Sandstone	Slightly Weathered	Very Hard Iron Oxide Stained Crack at 80°							C2
		13.10		Grey	Medium Sandstone	Fresh	Very Hard Crack at 50°, 60°							C2
		15.00		Black	Shale									C2
	5793	17.15		Grey	Sandstone									C2
		17.45		Black	Shale									C2
		18.20		Grey	Sandstone									C2
		18.50		Black	Shale									C2
		18.70		Grey	Sandstone									C2
	5608	19.00		Black	Shale	Fresh	Hard Joint at 30° with Quartz Vein							C2
		19.25		Grey	Sandstone									C2
		20.00		Black	Shale									C2
	5508	20.00		Grey	Medium Sandstone		Crack at 40°							C2

R. Q. D : Rock Quality Designation

Legend Result of Rock Tests

Depth
 ρ : Density, Specimen in Air. (g/cm³)
 σ_c : Unconfined Compression Strength. (Kg/cm²)

checked

Fig. 4. 11. 25.

Geological Log of Borehole

Project Name		Taka Hydro Electric Power Development Project			Site Name	Upper Taka Dam Site						
Hole No	UD-6 (2)	Elevation of Ground Level	75.08 m	Ground Water Level	-2.2 m	Bit Size	76 (NX) 1/2					
Date	Beginning	August 12th, 1982	Operator	A. Ito SASAKI		Casing	0.0m to 1.8 m					
	Ending	September 4th, 1982	Supervisor	Tokuji SUGIMOTO Shiro OGANO		Dry Drilling	0.0m to 4 m					
Scale	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R. Q. D (%)	Logan Value. (L _v) Permeability K (cm ² /m)	Result of Rock Tests	Rock Classification
								20 (D) (H)	20 (D) (S)	(K) 10 ¹ 10 ² 10 ³		
	20.50	20.50		Black	Shale							
	53.98	20.80		Black Grey	Med Sandstone	Fresh	Hard Joint at 35°		35			Ck sh
		21.10		Black Grey	Med Sandstone							Ck
	53.08	22.00				Fresh	Cracky Zone Crack with Calcite					CL
		22.65		Grey	Medium Sandstone	Very Fresh	Very Hard Clean Crack at 40° Joint at 30°		28			
	50.65	24.43		Dark Grey	Silty Shale				86			Ck sh
		25.30		Dark Grey	Shale							
		25.60		Grey	Silty Sandstone							
	49.08	26.00		Grey	Sandstone	Very Fresh	Very Hard Joint at 40° with Quartz Vein		87			B
				Grey	Fine Sandstone							
	42.83	22.25		Grey	Shale				87			
		27.63		Black	Shale							
		28.42		Grey	Medium Sandstone							
		28.65		Black	Shale	Very Fresh	Clean Crack at 50°		88			
		29.00		Grey	Medium Sandstone		Joint at 30°					
		29.95			Shale				35			Ck
	44.18	30.90		Grey	Medium Sandstone		Hard Joint at 30°		88			B
	43.78	31.30		Black	Shale	Fresh						
	43.08	32.00		Grey	Fine Sandstone		Interbedded with Shale		85			
		32.30		Black	Shale							
		32.55		Grey	Fine Sandstone		Cracky					Ck
	42.08	32.82			Shale to Medium Sandstone	Fresh	Hard					
	41.63	33.45		Grey	Shale to Medium Sandstone				82			
				Light Grey	Mudstone	Very Fresh	Hard Crack at 50°, 70°		81			Ck sh
	32.53	37.55		Light Grey	Silty Shale	Very Fresh	Very Hard		80			B

R. Q. D : Rock Quality Designation
 Legend Result of Rock Tests
 D : Density, Specimen in Air. (g/cm³)
 σ_c : Unconfined Compression Strength. (Kg/cm²)
 checked

Fig. 4.11.26

Geological Log. of Borehole

Project Name		Takai Hydro-electric Power Development Project			Site Name	Upper		Takai		Down		Site	
Hole No	UD-6 (3)	Elevation of Ground Level		7508 m	Ground Water Level	-2.2 m	Bit Size	75 (NX) %					
Date	Beginning	August 12th, 1982		Operator	Atsuo SASAKI		Casing	0.0m to 1.6 m					
	Ending	September 4th, 1982.		Supervisor	Takuji SUGIMOTO Shiro OGANO		Dry Drilling	0.0m to 1.4 m					
Scale	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R. Q. D (%)	Logan Value. (Ln) Permeability, K (m ² /s)		Result of Rock Tests	Rock Classification
								20 0 0 0 0 0	20 0 0 0 0 0	(K) 10 ¹ 10 ² 10 ³ 10 ⁴			
	31.38	43.70		Light Grey	Silty Shale	Very Fresh	Very Hard						
		45.00		Dark Grey	Sandy Shale		43.1m Crack at 40° with Calcite						
	28.58	46.50		Grey	Shaly Sandstone		Hard 44.8m Crack at 40° with Calcite						
		49.40		Dark Grey	Sandy Shale	Very Fresh	Very Hard						
		50.00		Grey	Fine Sandstone								
	24.28	50.80		Dark Grey	Sandy Shale								
		54.00		Grey	Shaly Sandstone		51.9m Crack at 60° with Calcite						
	21.08	54.00					53.9m Quartz Vein						
	19.58	55.50		Light Grey	Mudstone								
		57.00		Grey	Silty Shale	Very Fresh	56.1m Crack at 60°						
	18.08	57.00					57.25m Crack at 35°						
				Dark Grey	Sandy Shale		59.2m Crack at 60° with Calcite.						

R. Q. D : Rock Quality Designation

Legend Result of Rock Tests

Depth

0 : Density, Specimen In Air. (g/cm³)

σ_c : Unconfined Compression Strength. (Kg/cm²)

checked

Fig. 4.11.27

Geological Log. of Borehole

Project Name		Tehri Hydro-electric Power Development Project			Site Name		Upper Tehri Dam Site							
Hole No	U-6 (4)	Elevation of Ground Level	75.08 m	Ground Water Level	-2.2 m	Bit Size	16 (NX) %							
Date	Beginning	August 12th, 1982	Operator	A. Ito SASAKI		Casing	00m 101.8 m							
	Ending	September 4th, 1982	Supervisor	Toshiji SUGIMOTO Shiro OGANO		Dry Drilling	00m 103.4 m							
Scale	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R. Q. D (%)	Ingeos Value. (Lu)			Result of Rock Tests	Rock Classification
										Permeability. K (cm/sec)				
										(Lu) 10 ³	10 ¹⁰	10 ³		
	12.99	62.30		Dark Grey	Sandy Shale	Very Fresh	Hard	20.40 (0.80)	20.40 (0.80)					
		62.50			S. Sandstone									
		63.00		Grey	Fine Sandstone					0.0-4.0				
		63.50		Dark Grey	Sandy Shale		63.5m Crack at 65°							
		64.75		Grey	Silty Sandstone									
		65.05		Dark Grey	Silty Shale									
		6.08	69.00	Dark Grey	Shaly Sandstone	Very Fresh	Hard 66.7m Crack at 50° 66.5m Crack at 60°			0.147				B
	5.03	70.05		Dark Grey	Silty Shale									
		0.08	75.00	Dark Grey	Shaly Sandstone	Very Fresh	Hard 74.05m Crack at 40°			0.652				
		0.08	77.60	Dark Grey	Shale	Very Fresh	Hard Crack at 50° with Calcite							
	-2.72	77.80			Shaly Sandstone									
		78.00		Grey	Fine Sandstone		Very Hard with Quartz Vein							Cx
		79.75												
		80.00		Black	Shale									

R. Q. D: Rock Quality Designation

Legend Results of Rock Tests
 Depth
 D: Density, Specimen in Air (g/cm³)
 σ_c: Unconfined Compression Strength (Kg/cm²)

checked

Fig. 4. 11. 28

Geological Log. of Borehole

Project Name			Takes Hydro-electric Power Development Project		Site Name		Upper Takol : 0m Site									
Hole No	UD-6 (5)		Elevation of Ground Level	7508 m		Ground Water Level	- 2.2 m									
Date	Beginning	August 12th, 1982		Operator	Aki SASAKI		Core Log	00m to 1.8 m								
	Ending	September 4th, 1982		Supervisor	Tetsuji SUGIMOTO Shiro OGANO		Dry Drilling	00m to 1.4 m								
Scale	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R. Q. D. (%)	Logon Value. (Ln)				Result of Rock Tests	Rock Classification	
	Permeability. K									Permeability. K						
		8315		Grey	Flint Sandstone 82.2m with Rock Shale	Fresh	Very Hard Crack at 50°, 60°	60	60							Cx
		1247 8725		Grey	Medium Sandstone		Very Hard Clean Crack at 20° With Quartz Vein	40	40							Cx
		1267 8775		Greyish White	Conglomerate	Fresh	Cracky	20	20							Cx
		1342 8850					Cracky Zone	20	20							Cx
		5020		Grey	Medium Sandstone	Very Fresh	Crack at 35°, 40° Crack with Quartz	50	50							Cx
		2137 9645				Fresh	Joint at 30°	60	60							Cx
		2192 9700					Cracky Zone	50	50							Cx
		9785		Dark Grey	Shale			50	50							Cx
				Grey	Medium Sandstone	Very Fresh	Joint at 30° Crack at 50° with Quartz	60	60							Cx
		2492 10000						80	80							Cx

R. Q. D. : Rock Quality Designation

Legend Result of Rock Tests

Depth
D : Density, Specimen in Air. (g/cm³)
σ_c : Unconfined Compression Strength. (Kgf/cm²)

checked

Fig. 4.11.29

Geological Log of Borehole

Project Name		Yokai Hydro electric Power Development Project			Site Name		Upper Teah Dam Site							
Hole No	UO-7 (1)	Elevation of Ground Level	8679 m	Ground Water Level	-12.0 m	Bit Size	76 (NX)%							
Date	Beginning	August 12th, 1982	Operator	Masatoshi NARIYA		Casing	0.0m to 2.5 m							
	Ending	September 10th, 1982	Supervisor	Yokuji SUGIMOTO Satoru O'BANO		Dry Drilling	0.0m to 0.35 m							
Scale	Elevation(m)	Depth(m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Porosity (%)	R. Q. D (%)	Ingeon Value (In) Permeability, K (cm ² /s)			Result of Rock Tests	Rock Classification
										(1m) 10 ⁻¹	1	10		
	8643	0.30	YYY		Soil		Containing Organic Material							
				Yellowish Brown	Boulder of Quartzose Sandstone Clayey Soil Sand		Talus Deposits							
	8229	4.50		Reddish Brown	Clay		Talus Deposits							
	8179	5.00		Brownish Grey	Coarse Quartzose Sandstone								523-533 0.2459 0.580	
		5.70		Greyish Brown	2.4m with Clayey Sand		Medium Hard Crack at 40, 70° Joint at 30°							CL
		8.00		Brown to Brownish White	Medium Quartzose Sandstone	Highly Weathered	Crack at 60° Joint at 30° Iron Oxide Stained Crack with Clay							CU
		0.00		Greyish Brown										CL
		12.00		Brownish White	Coarse Quartzose Sandstone									
		13.00		Brown										
		13.30		Greyish White		Moderately Weathered	Medium Hard Iron Oxide Stained Crack at 40, 70° Joint at 55°							CU
		15.00		Light Grey to Brownish Grey	Medium Quartzose Sandstone	Slightly Weathered	Hard Iron Oxide Stained Crack at 60°							CU
		16.00												
		18.00		Whitish Brown		Moderately Weathered	Hard Crack Hard Iron Oxide Stained Crack at 60°							CU

R. Q. D : Rock Quality Designation

checked

Legend Result of Rock Tests

Depth

0 : Density, Specimen in Air. (g/cm³)

σ_c : Unconfined Compression Strength. (kg/cm²)

Fig. 4.11.30

Geological Log. of Borehole

Project Name		Takai Hydro-electric Power Development Project			Site Name		Upper Takai Dam Site						
Hole No	UD-7 (2)	Elevation of Ground Level	8679 m	Ground Water Level	-12.0 m	Bit Size	76(NX)%						
Date	Beginning	August 12th, 1982	Operator	Masatoshi NARITA		Casing	00m 102.5 m						
	Ending	September 10th, 1982	Supervisor	Takeshi SUGIMOTO Shiro OGANO		Dry Drilling	00m 100.55 m						
Scale	Deviation(m)	Depth(m)	Moisture of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R. Q. D (%)	Logon Value (LQ)	Permeability K (cm ² /s)	Result of Rock Tests	Rock Classification
								20 (0.7) 81	20 (0.0) 10	(L) 10 ⁻¹ 10 ⁻¹⁰	(K) 10 ⁻¹ 10 ⁻¹⁰		
		20.40		Brown	Shale								
		22.40		Brownish White	Coarse Quartzose Sandstone	Moderately Weathered	Medium Hard Joint at 30° Crack at 70° 50°						Cx
		23.00		Whitish Grey	Silly Shale		Soft						
		23.50		Whitish Brown	Coarse Quartzose Sandstone		Hard						Cx
		24.45		Greyish Brown	Medium Quartzose Sandstone	Slightly Weathered	Hard Iron Oxide Stained Crack at 60° 70° Clayey Sand						Cx
		24.60											Cx
		25.20		Dark Grey	Silly Shale								Cx
		26.70		Dark Grey	Sandy Shale	Very Fresh	25.3m Crack at 45° Hard						Cx
		29.70		Dark Grey	Alteration of Sandstone and Shale	Fresh	26.9m Crack at 70° Joint at 30° Hard						Cx
		31.00		Dark Grey	Silly Shale		Hard 30.5m Crack at 50°						Cx
		31.45		Grey	Breccia	Very Fresh							Cx
		31.67		Grey	Fine Sandstone								Cx
		32.00		Black	Shale		Crack at 70° with Calcite						Cx
		32.62		Dark Grey	Silly Shale Conglomerate								Cx
		35.00		Grey	Shaly Sandstone Shale	Fresh	Hard Crack at 40° 70° Crack at 40° with Calcite. With Quartz Vein.						Cx
		35.75											Cx
		36.20											Cx
		37.00		Grey	Fine Sandstone		Hard 36.95m						Cx
		37.25			Shaly Sandstone								Cx
		37.60			Fine Sandstone		Clear Crack at 60°						Cx
		38.10		Dark Grey	Shaly Sandstone	Very Fresh							Cx
		38.55			Fine Sandstone								Cx
		38.80		Dark Grey	Shale		Hard Crack at 60°						Cx
		39.00			Shaly Sandstone								Cx
				Dark Grey	Sandy Shale		Hard						Cx

R. Q. D : Rock Quality Designation

Legend Result of Rock Tests

Depth

D : Density, Specimen in Air (g/cm³)

dc : Unconfined Compression Strength (Kg/cm²)

checked

Fig. 4.11.31

Geological Log of Borehole

Project Name		Tobal Hydro-electric Power Development Project			Site Name	Upper Tobal Dam Site						
Hole No	UD-7 (3)	Elevation of Ground Level	8679 m	Ground Water Level	-12.0 m	Bit Size	76 (NX)%					
Date	Beginning	August 12th, 1982	Operator	Masahiro NARITA	Casing	0.0m to 2.5 m						
	Ending	September 10th, 1982	Supervisor	Tokuji SUGIMOTO Shiro OGANO	Dry Drilling	0.0m to 0.35 m						
Scale	Elevation(m)	Depth(m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R. Q. D (%)	Ingeon Value. (Lu) Permeability. K (cm/sec)	Result of Rock Tests	Rock Classification
								20 40 60 80	20 40 60 80	(Lu) 10 ⁻¹ 1 10 10 ²		
0		4085		Dark Grey	Sandy Shale	Very Fresh	4035m Joint of 30° with Calcite.					
		41.00			Fine Sandstone			411m Joint of 30° with Calcite				
		4280		Dark Grey	Shale		Hard					
		4360			Shaly Sandstone							
		4319	4360		Shale							
		4229	4450	Dark Grey	Silty Shale							
5		4495		Grey	Fine Sandstone	Very Fresh	Hard Green Crack at 50°					
		4520			with Silty Shale							
				Grey	Fine Sandstone		Interbedded with Shale Joint of 30°					
		3864	4815									
0				Dark Grey	Sandy Shale	Very Fresh	Hard Joint of 30°					
		3579	5100									
			5180	Dark Grey	Shaly Sandstone	Fresh	5155m Crack of 50° with Calcite.					
				Grey	Sandy Shale			Hard				
		3369	5280									
		3359	5320	Dark Grey	Sandy Shale							
		3264	5415	Whitish Grey	Medium Quartzose Sandstone	Fresh	Very Hard with Black Stain					
		3239	5440	Black	Shale							
15				Grey	Medium Sandstone	Fresh	Hard Joint of 30°					
		5800					579m Crack of 50 with Quartz					
		5670										
		2274	5905									
			5985	Dark Grey	Shale	Fresh	Hard Crack at 60, 45°					
				Grey	Fine Sandstone							

R. Q. D : Rock Quality Designation

Legend Result of Rock Tests

Depth

D : Density, Specimen in Air. (g/cm³)

σ_c : Unconfined Compression Strength. (Kg/cm²)

checked

Fig. 4.11.32 Geological Log. of Borehole

Project Name		Taket Hydro-electric Power Development Project			Site Name	Upper Taket Dam Site								
Hole No	UD-7 (4)	Elevation of Ground Level	86.79 m	Ground Water Level	-12.0 m	Bit Size	16(NX)X							
Date	Beginning	August 12th, 1982	Operator	Masahito NANTA		Coating	0.0m 102.5 m							
	Ending	September 10th, 1982	Supervisor	Takuji SUGIMOTO Shiro OGANO		Dry Drilling	0.0m 100.35 m							
Scale	Elevation(m)	Depth(m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R Q D (%)	Logan Values (Ls) Permeability, K (cm ² /m)			Result of Rock Tests	Rock Classification
								20 (0.6-0.8)	20 (0.6-0.8)	(Ls) 10 ²	10 ¹	10 ⁰		
	25.79	61.00		Dark Grey	Shale									
		61.50		Grey	M.O Sandstone		Hard Crack of 60°-45°							
		61.70			Shale									
	24.59	62.20		Grey	M.O Sandstone									
					Shale									
				Grey	Medium Sandstone	Fresh	Very Hard Crack of 50°-60° with Quartz with Quartz Vein Joint at 35°							
	17.29	69.50			69.3m with Block Shale									
		69.70												
		70.10		Grey	Medium Sandstone									
		70.35		Dark Grey	Shale									
		70.65												
	15.59	71.00		Grey	M Sandstone									
		71.20		Grey	M Sandstone									
	14.79	72.00		Dark Grey	Sandy Shale		Hard							
	14.29	72.50		Grey	Medium Sandstone		Hard Clastic Shales Crack at 50° Joint at 30°							
				Dark Grey	Shale	Fresh								
	12.69	74.10												
	11.79	75.00		Grey	Medium Sandstone		Very Hard							
	11.44	75.35		Dark Grey	Shale		With Quartz Vein							
		76.30		Light Grey	Fine Quartzitic Sandstone									
		77.60		Light Grey	Medium Quartzitic Sandstone	Very Fresh	Very Hard Clean Crack at 40°, 50°							

R. Q. D : Rock Quality Designation

Legend Result of Rock Tests
 D : Density, Specimen in Air (g/cm³)
 FC : Unconfined Compression Strength (Kgf/cm²)

checked

Fig. 4.11.33

Geological Log. of Borehole

Project Name		Takil Hydro-electric Power Development Project			Site Name		Upper Takol Dam Site						
Hole No	UD-7(5)	Elevation of Ground Level	86.79 m	Ground Water Level	-120 m	Bit Size	76 (NX) %						
Date	Beginning	August 12th, 1982	Operator	Masahito NARITA			Casing	00m to 2.5 m					
	Ending	September 10th, 1982	Supervisor	Tetsuji SUGIMOTO Shiro OGANO			Dry Drilling	00m to 0.35 m					
Scale	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R Q D (%)	Logeo Value. (Lu)	Permeability. K (cm/m)	Results of Rock Tests	Rock Classification
								20 (0.08)	20 (0.08)	(K) 10 ⁸ 10 ⁵ 10 ³			
							80.2m Clean Crack at 40°						
							Clean Crack at 75°						
				Light Grey	Medium Quartzose Sandstone	Very fresh							
		87.65					84.4m Clean Crack at 40°						
							Joint at 65°						
				Whitish Grey	Coarse Quartzose Sandstone								
				Light Grey	Quartzose Sandstone								
				Dark Grey	Shale								
				Light Grey	Medium Quartzose Sandstone	Very fresh							
				Dark Grey									
				Grey									
				Dark Grey	Shale								
				Dark Grey	Sandy Sandstone								
				Grey	Medium Quartzose Sandstone	Very Fresh							
				Black	Shale								
				Dark Grey	Shaly Sandstone								
				Grey	Medium Sandstone	Very Fresh							
				Dark Grey	Shale								
				Dark Grey	Sandy Shale								
				Dark Grey	Sandy Shale								
				Grey	M. Sandstone								

R. Q. D. : Rock Quality Designation

Legend Result of Rock Tests

Depth

D : Density, Specimen in Air. (gr / cm³)

σ_c : Unconfined Compression Strength. (Kg / cm²)

checked

Fig. 4.11.34

Geological Log. of Borehole

Project Name		Taki Hydro Electric Power Development Project			Site Name		Upper Taki Dam Site						
Hole No.	UD-8(1)	Elevation of Ground Level	138.92 m <th>Ground Water Level</th> <td>-325 m <th>Bit Size</th> <td>76 (NX) %</td> </td>	Ground Water Level	-325 m <th>Bit Size</th> <td>76 (NX) %</td>	Bit Size	76 (NX) %						
Date	Beginning	September 18th, 1982	Operator	Masaharu NARITA	Company	00m 1030 m							
	Ending	September 20th, 1982	Supervisor	Takaji SUGIMOTO Shiro OGANO	Dry Drilling	00m 1028 m							
Scale	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R Q D (%)	Logon V. (L)	Permeability, K (cm/m)	Result of Rock Tests	Rock Classification
								20/10 (DR)	20/10 (DR)	(L) 10 ¹ 10 ² 10 ³	(K) 10 ¹ 10 ² 10 ³		
	13862	0.30	LY		Sandy Soil		Containing Organic Material						
		1.45		Yellow Ochre									
		2.00		Reddish Brown	Medium Quartzose Sandstone	Completely Weathered	Very Soft Sandy Soil						
		2.65		Brown									
		3.25		Reddish Brown									
	13667	3.50		Yellow Brown	CO Sandstone	Highly Weathered	Soil						
	13512	3.80		Brownish Grey	Sandy Stone								
		6.40											
		7.70		Brownish White	Coarse Quartzose Sandstone	Moderately Weathered	Medium Hard Iron Oxide Stained Crack at 20° 70°					455-470 0-2579 fc:1565	Cl
		10.00											
		10.60			Medium Quartzose Sandstone	Moderately Weathered	Hard Iron Oxide Stained Crack at 40° 60° 70°						
		11.75		Whitish Grey									
	12662	12.30		Whitish Brown									
		12.60											
		13.00			Coarse Quartzose Sandstone		Cracky Zone Medium Hard Iron Oxide Stained Crack.						
		13.50		Whitish Brown									
	12492	14.00											
		14.70		Brown	Medium Quartzose Sandstone	Highly Weathered	Hard Crack at 40° 70°						
	12362	15.30											
	12322	15.70		Greyish Brown	Shale		Soil						
		16.00		Brown			Cracky						
		16.65											
	12192	17.00		Greyish Brown	16.65° 16.85° Shale		Hard Crack at 60°						
		17.50		Brown	Medium Quartzose Sandstone	Highly Weathered	Cracky Zone Iron Oxide Stained Crack.						
	12082	18.10		Brownish Grey	Shale								
		19.00		Brown	Medium Quartzose Sandstone	Highly Weathered	Hard Cracky						
	11942	19.50											
	11892	20.00		Dark Grey	Shale		Medium Hard						

R. Q. D. : Rock Quality Designation

Legend Result of Rock Tests

Depth

D : Density, Specimen in Air. (g/cm³)

σ_c : Unconfined Compression Strength. (Kg/cm²)

checked

Fig.4.11.35

Geological Log of Borehole

Project Name		Takai Hydro electric Power Development Project			Site Name		Upper Takai Dam Site					
Hole No	UD-8 (2)	Elevation of Ground Level	13892 m	Ground Water Level	-32.5 m	Bit Size	76 (NX) %					
Date	Beginning	September 11th, 1982	Operator	Motohisa NARITA		Casing	00 m to 30 m					
	Ending	September 20th, 1982	Supervisor	Takeshi SUGIMOTO Shiro OGANO		Dry Drilling	00 m to 28 m					
Scale	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R Q D (%)	Ingeon Value (Lw) Permeability K (cm/s)	Result of Rock Tests	Rock Classification
								2040 (0.8)	30 (0.8)	(K) 10 ⁻¹ 10 ⁻² 10 ⁻³		
		2045		Light Gray								
		2100		Light Brown								
		2200		Greyish Brown		Moderately Weathered	Hard Crack at 20°, 78° 60° Iron Oxide Stained					CN
		2300		Light Gray	Medium Sandstone							
		2400				Slightly Weathered	Very Hard Crack at 20°, 50° 70° Joint at 70°					CN
		2500										
		2580		Grey	Shale							
		2855			Medium Sandstone	Moderately Weathered	Very Hard Crack at 20°, 30° Iron Oxide Stained Crack Joint at 70°					CN
		2900		Brown			Fractured Zone					D
	10932	2960			Shale		Hard Joint at 70° Crack at 15°					CL
		3000		Grey	Medium Sandstone							
		3033		Light Grey	Shale							
	10292	3080		Grey	Medium Quartz Sandstone	Moderately Weathered	Hard Iron Oxide Stained Crack					CN
		3100			Shale							
	10237	3155		Brown	Conglomerate							CN
	10667	3225		Light Grey	M. Quartz Sandstone							
	10632	3260		Greyish Brown	Conglomerate		320m Crack at 50°					
				Light Grey	Medium Quartz Sandstone	Slightly Weathered	Very Hard Crack at 10°, 50° 70° Iron Oxide Stained Crack					CN
	10292	3600		Grey	Medium Sandstone							
	10687	3705					Very Hard Crack at 40°, 20°					
				Light Grey	Shale	Fresh	Very Hard 3865m Clean Crack at 40°					
		3805			Medium Quartz Sandstone							
		3933		Dark Grey	Shale		395m Clean Crack at 50°					
				Light Grey	Medium Quartz Sandstone							

R. Q. D : Rock Quality Description

Legend Result of Rock Tests

D : Density, Specimen in Air. (g/cm³)
 σ_c : Unconfined Compression Strength. (Kg/cm²)

checked

Fig. 4.11.36

Geological Log of Borehole

Project Name		Tekst Hydro-electric Power Development Project			Site Name		Upper Tabei Dam Site								
Hole No		UD-8 (3)		Elevation of Ground Level		138.92 m		Ground Water Level		-325 m		Bit Size		76 (NX)%	
Date		Beginning		September 10th, 1982		Operator		Masahisa NARITA		Casing		0.0m to 3.0 m			
		Ending		September 20th, 1982		Supervisor		Takeshi SUGIMOTO Shiro OGANO		Dry Drilling		0.0m to 28 m			
Scale	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R Q D (%)	Logcon Value. (Lu)			Result of Rock Tests	Rock Classification	
										Permeability. K (cm ² /m)					
										(Lu) 10 ⁻¹	1	10	10 ²		
	97.72	41.05		Light Gray	Medium Quartzite Sandstone	Fresh	Open Crack of 40°, 60°		3						
		41.20		Dark Gray	Slate				2						
				Grey	Fine Sandstone	Slightly weathered to Fresh	Very Hard Crack at 50°, 70° Iron Oxide Stained Crack Joint at 60°		5						
	93.92	45.00							6						
				Light Gray	Fine Quartzite Sandstone	Fresh	458m Clean Crack of 40°, 60°		6						
									6						
	89.27	49.65							6						
	88.92	50.00		Grey	Medium Sandstone		497m Joint at 70°		6						

R. Q. D. : Rock Quality Designation

Legend Result of Rock Tests

Depth

0 : Density, Specimen in Air. (g/cm³)

σ_c : Unconfined Compression Strength. (Kg/cm²)

checked

Fig. 4.11.37

Geological Log. of Borehole

Project Name		Takai Hydro-electric Power Development Project			Site Name		Upper Takai Dam Site							
Hole No	UD-9 ()	Elevation of Ground Level	72.00 m	Ground Water Level	10.2 m	Bit Size	76 (NX) %							
Date	Beginning	September 14th, 1982	Operator	Akio SASAKI <th>Casing</th> <td colspan="3">0.0m 105.5 m</td>	Casing	0.0m 105.5 m								
	Ending	September 15th, 1982	Supervisor	Tokuji SUGIMOTO Shiro OGANO	Dry Drilling	0.0m 104.8 m								
Scale	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R. Q. D (%)	Logcon Value. (Lp) Permeability. K (cm ² /s)			Result of Rock Tests	Rock Classification
								20 40 60 80	20 40 60 80	(L) 10 ¹ 10 ² 10 ³	(K) 10 ⁴ 10 ⁵ 10 ⁶			
	6800	400		Brown	River Bed Deposits		Mainly coarse Quartz Sand							
	6720	480		Brown										
		720		Dark Grey	Silty Shale	Moderately weathered to slightly weathered	Hard Iron Oxide Stained Crack at 10.80 Crack at 50.70 with Calcite.							
	6385	815		Dark Grey	Sandy Shale									
		890		Grey	Shaly Sandstone	Fresh	Hard Clean Crack at 50							
		900		Dark Grey	Sandy Shale		Crack at 75' with Calcite							
	6200	1000		Grey	Shaly Sandstone									
		1060		Dark Grey	Sandy Shale		Cracky Zone							
		1085		Grey	Shaly Sandstone		Medium Hard With Clay and Calcite.							
	6000	1200		Dark Grey	Silty Shale									
		1345		Dark Grey	Shaly Sandstone		Hard Clean Crack at 68° 80° Crack at 30° 60° with Calcite.							
		1380		Dark Grey	Shaly Sandstone	Slightly weathered								
	5700	1500		Dark Grey	Silty Shale		Fractured Zone Mainly Breccia Containing Clay							
		1640		Dark Grey	Shale		1690 ^m Iron Oxide Stained Crack at 70°							
		1710		Dark Grey	Shale		Hard Crack at 30° 50° with Quar Joint at 50' with Calcite.							
		1830		Grey	Shaly Sandstone									
		1980		Dark Grey	Sandy Shale									
	5220	2000		Dark Grey	Sandy Shale									
	5200	2000												

970-985
D: 2676
Gc: 563

R. Q. D : Rock Quality Designation

Legend Result of Rock Tests

Depth
D : Density, Specimen in Air. (g/cm³)
dc : Unconfined Compression Strength. (Kg/cm²)

checked

Fig. 4.11.38

Geological Log. of Borehole

Project Name		Tekel Hydro-electric Power Development Project			Site Name		Upper Teke Dam Site									
Hole No		UD-10 ()	Elevation of Ground Level		9612 m	Ground Water Level		-30 m	Bit Size		76 (NX)%					
Date		Beginning		September 23rd, 1982		Operator		Tokuomi KUBAYASHI		Casing		0.0m to 2.9 m				
		Ending		September 25th, 1982		Supervisor		Tokuji SUGIMOTO Shiro OGANO		Dry Drilling		0.0m to 16 m				
Scale	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)		R. Q. D. (%)		Logon Value (Lp) Permeability, K (cm/s)			Result of Rock Tests	Rock Classification
								20-40 (DR)	20-100 (DR)	(K) 10 ⁻¹	10 ⁻²	10 ⁻³				
	9552	0.60	Y-V	Yellowish Brown	Clayey Soil		Containing Organic Material									
		3.10		Reddish Brown	Medium Quartzose Sandstone	Completely Weathered	Very Soft Moistly Sand with Clay Including Breccia									D
	9237	3.75		Whitish Brown			Crackly Soil									C ₁
		4.50		Whitish Grey			Iron Oxide Stained Crack with Clay									
		5.00		Brownish Grey			Crackly Medium Hard									C ₂
		6.00		Brownish White			Crack at 50°, 70° with Brownish Clay Joint at 40° with Whitish Grey Clay									
		7.00		Brown	Medium Quartzose Sandstone	Highly Weathered	Medium Hard Iron Oxide Stained Crack at 30°, 60°, 80° with Brownish Clay									C ₃
		11.95		Greyish Purple	MSM to 200 Shale		1070m Crack at 20° with Brownish Clay Iron Oxide Stained Crack at 50°, 60°, 70°, 80° Joint at 30°									
	8332	12.80		Brown	M. Quartzose Sandstone											C ₄
	8312	13.00		Grey	Shale											
		13.40		Brown												C ₅
		14.00		Brownish Grey	Coarse Quartzose Sandstone		Hard Iron Oxide Stained Crack at 30°, 60°									
		16.00		Greyish White			Hard Iron Oxide Stained Crack at 30°, 40°, 50°, 60° Crack at 30°, 50° with Whitish Clay									C ₆
		17.00		Perplish White	Medium Quartzose Sandstone	Moderately Weathered										
		19.00		Greyish White			Hard Iron Oxide Stained Crack at 30°, 40°, 60°, 70°									C ₇
	762	20.00		Greyish White												

R. Q. D. : Rock Quality Designation

Legend Result of Rock Tests

Depth
 D : Density, Specimen in Air (gr/cm³)
 σ_c : Unconfined Compression Strength (Kgf/cm²)

checked

1560-1575
 0-2599
 K-1069

Fig.4.11.39

Geological Log. of Borehole

Project Name		Takai Hydro-electric Power Development Project			Site Name		Upper Takai Dam Site							
Hole No	UD-11 (1)	Elevation of Ground Level	126.96 m	Ground Water Level	-4.2 m	Bit Size	76 (NX)%							
Date	Beginning	September 12th, 1982	Operator	Takeshi KOBAYASHI		Casing	00m to 125 m							
	Ending	September 21st, 1982	Supervisor	Takeshi SUGIMOTO Shiro OGANO		Dry Drilling	00m to 130 m							
Scale	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R Q D (%)	Ingeco Value, (Lu) Permeability, K (cm/s)			Result of Rock Tests	Rock Classification
										(Lu) 10 ⁻¹ 10 ⁻² 10 ⁻³				
	126.60	0.30	Y	Brown	Clayey Soil		Containing Organic Material including Breccia							
		1.30		Yellowish Brown	Talus Deposits									
		2.60		Reddish Brown	Clay									
		2.80												
		3.65												
		7.00				Completely Weathered	Very Soil. Mainly Clayey Soil and Breccia of Completely Weathered Fine Sandstone							
	119.96	7.00												
		7.50		Light Brown	Clay									
		8.15			Talus Deposits									
				Reddish Brown	Clay									
		9.25			Talus Deposits		Very Soil. Clayey Soil including Breccia							
	119.71	9.25												
		10.65		Light Brown										
		12.00		Whitish Grey	Clayey Sand	Completely Weathered	Very Soil							
		13.35		Greyish Brown										
	119.61	13.35												
		14.00		Light Grey	Clayey Sandstone	Completely Weathered	Clayey and Very Cracky. With Clay							
		14.75		Brownish Grey										
		15.55		Light Grey	Sandstone		Iron Oxide Stained Crack at 60° N 15° E							
	119.44	15.55												
		16.00		Greyish Brown										
		18.00		Brownish Grey	Slate	Highly Weathered	Soft. Iron Oxide Stained Joint at 25° Cracky. Iron Oxide Stained Crack							
		19.00		Brownish Grey	18cm Fine Sandstone Sandy Slate	Highly Weathered	Very Cracky. Soft. Iron Oxide Stained Crack with Clay Joint at 30°							
		19.75		Light Grey										
	119.21	20.00			Sandstone									

R. Q. D. : Rock Quality Designation

Legend Result of Rock Tests

Depth
 ρ: Density, Specimen in Air (g/cm³)
 σ_c: Unconfined Compression Strength (Kg/cm²)

checked

Fig. 4.11.40

Geological Log of Borehole

Project Name		Taket Hydro-electric Power Development Project		Site Name		Upper Taket Dam Site						
Hole No	UD-II (2)	Elevation of Ground Level	126.96 m	Ground Water Level	+4.2 m	Bit Size	76 (NX) %					
Date	Beginning	September 12th, 1982	Operator	Takemi KOBAYASHI	Coaler	0.0m to 25 m						
	Ending	September 21st, 1982	Supervisor	Takaji SUBIMOTO Shiro OGANO	Dry Drilling	0.0m to 195.0m						
Scale	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R Q D (%)	Logch Value (Lp) Permeability K (m ² /s)	Result of Rock Tests	Rock Classification
								20.0 (100)	20.0 (100)	(ln) 10 ⁻¹ 1 10 10 ²		
		20.40		Light Gray	Shale							
		20.95		Reddish	Fine Sandstone							
		21.20		Purple	Shale							
		21.50		Brown	Shale							
		21.50		P. Brown	F. Sandstone							
		21.70		Purple	Shale	Highly Weathered						
		21.95		Brown	F. Sandstone		Joint at 15°					
		22.60		Brownish Grey	Shale							
		23.00		Brown	Shale		Crack Zone					
		24.10		Brownish Grey	Shale							
		24.85		Purplish Brown	Shale		Medium Hard					
		25.00		Brown	F. Sandstone	Moderately Weathered	Iron Oxide Stained					
		25.50		Greenish Brown	Shale		Crack of 50°, 60°, 70°					
		25.50		Brown	F. Sandstone		Joint at 10°					
		26.60		Brown	Shale		Joint at 5°					
		27.00		Light Brown	Fine Sandstone		Crack at 30°, 90°					
		28.00		Light Brown	Shale		Fractured zone including OGS					
		29.00		Brownish Grey	Shale		Medium Hard					
		29.25		Brown	Shale	Slightly Weathered	Joint at 5°					
		30.20		Light Brown	Shale		Crack of 60° with 10					
		32.00		Dark Grey	Sandy Shale	Fresh	Hard					
		32.40		Dark Grey	Shale		Joint at 5°					
		33.20		Light Grey	Medium Sandstone	Fresh	Crack at 20° with 10					
		34.00		Dark Grey	Shale		Very Hard					
		34.15		Coarse Quartzose Sandstone			Iron Oxide Stained					
		35.00		Light Grey	Coarse Quartzose Sandstone	Slightly Weathered	Crack of 40°					
		35.55		Medium Quartzose Sandstone			Very Hard					
		36.60		Brownish Grey	Coarse Quartzose Sandstone		Crack at 20°, 32°, 60°					
		37.25		Grey	Medium Sandstone	Slightly Weathered	Crack at 15° with 10					
		39.60		Whish Grey	C.O Sandstone		Crack of 60°					

R. Q. D : Rock Quality Designation

Legend Result of Rock Tests

Depth

D : Density, Specimen in Air. (g/cm³)

σ_c : Unconfined Compression Strength. (Kg/cm²)

checked

Fig.4.11.41

Geological Log. of Borehole

Project Name		Total Hydro electric Power Development Project			Site Name		Upper Tatoi Dam Site					
Hole No	UD-11 (3)	Elevation of Ground Level	126.96 m	Ground Water Level	-4.2 m	Bit Size	76 (NX) %					
Date	Beginning	September 12th 1982	Operator	Tokuomi KOBAYASHI		Coring	00m to 125 m					
	Ending	September 21st 1982	Supervisor	Tokuji SUGIMOTO Shiro OGANO		Dry Drilling	00m to 130 m					
Scale	Direction (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R Q D (%)	Logon Value (Lu) Permeability, K (cm/s)	Result of Rock Tests	Rock Classification
		4010		Whitish Grey	Medium Quartzose Sandstone	Slightly Weathered to Fresh	404m Iron Oxide Stained Crack at 60° Very Hard	20406070	20401080			
		4110		Black	Shale							
		4125		Grey	MQ Sandstone		Hard Joint at 20°					
	8481	4170		Black	Shale		Very Hard					
		4215		Whitish Grey	Coarse Quartzose Sandstone	Slightly Weathered	Iron Oxide Stained Crack at 30° 85°					
		4300										
		436m		Grey	Medium Sandstone	Slightly Weathered	Clean Crack at 25° Very Hard Iron Oxide Stained Crack at 20° 10°					
		4590										
		4605		Black	Shale							
		4700		Grey	Medium Sandstone	Fresh	Very Hard Clean Crack at 50° With Quartz Vein					
		4765					Very Hard Iron Oxide Stained Crack at 40°					
		4785		Black	Shale		Cracky With Iron Oxide					
		4800										
		4900		Grey	Medium Sandstone	Slightly Weathered	Very Hard Joint at 25°					
	77.68	4930										
	76.98	5000		Light Grey	Medium Quartzose Sandstone		Hard Cracky With Iron Oxide					CM

R. Q. D. : Rock Quality Designation

Legend Result of Rock Tests

DEPTH

D : Density, Specimen in Air. (gr / cm³)

σ_c : Unconfined Compression Strength. (Kg / cm²)

checked

Fig. 4.11.42

Geological Log of Borehole

Project Name		Takai Hydro-electric Power Development Project			Site Name		Upper Takai Dam Site									
Hole No	UD-12 (1)	Elevation of Ground Level	94.00 m	Ground Water Level	-01 m	Bill Size	T6(NX)%									
Date	Beginning	September 5th, 1982	Operator	Masami NARITA	Coating	00m 1014 m										
	Ending	September 8th, 1982	Supervisor	Takaji SUGIMOTO Shiro OGANO	Dry Drilling	00m 1014 m										
Scale	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R Q D (%)	Logon Value (Lp) Permeability K (cm/s)				Result of Rock Tests	Rock Classification	
										20-90	20-100	(K) 10 ⁻¹	10 ⁻²			10 ⁻³
	9300	100		Yellowish Brown	Sand Breccia		River Deposits Containing Organic material									
	9265	135		Brown	Clayey Sand											
		2.00		Brownish Grey												
	9120	2.80				Slightly Weathered	Very Hard Iron Oxide Stained Crack at 30°/70°/20°									Cu
	9065	3.35		Whitish Grey			Cracky Zone									
		4.00			Medium Quartzose Sandstone											
		6.00		Greyish White		Moderately Weathered	Hard Iron Oxide Stained Crack at 70°/20°									
	8770	6.30		Brown			Cracky Zone Medium Hard									Cu
	8200	7.00														
		9.20		Brownish White	Coarse Quartzose Sandstone	Moderately Weathered	Hard Iron Oxide Stained Crack at 20°/50°/70°									
		10.15		Whitish Brown		Moderately Weathered	Hard Iron Oxide Stained Crack at 40°									
		11.40		Light Grey	Medium Quartzose Sandstone											
	8260	11.40				Slightly Weathered	Very Hard Clean Crack at 20°									
	8180	12.00		Grey	Conglomerate		Joint at 60° with Calcite									
		13.20		Greenish Grey	Sandy Shale											
	7980	14.20		Greenish Grey	Shale	Fresh	Hard Clean Crack at 20° Joint at 60° with Calcite									
		15.75		Grey	Fine Sandstone											
	7785	16.15			Shale		Very Hard Clean Crack at 70° Joint at 60°									
	7700	17.00		Dark Grey	Shale											
		17.60														
				Dark Grey	Silty Shale	Very Fresh	Very Hard Clean Crack at 70°/50°									

R. Q. D. : Rock Quality Designation

Legend Result of Rock Tests

Depth

D : Density, Specimen in Air. (g/cm³)

σ_c : Unconfined Compression Strength. (Kg/cm²)

checked

Fig. 4.11.43

Geological Log. of Borehole

Project Name		Tokai Hydro-electric Power Development Project			Site Name		Upper Tokai Dam Site							
Hole No	UD-12 (2)	Elevation of Ground Level	94.00 m	Ground Water Level	-0.1 m	Bit Size	16 (NX) %							
Date	Beginning	September 5th, 1982	Operator	Masami NARITA		Casing	00m to 1.4 m							
	Ending	September 8th, 1982	Supervisor	Takeshi SUGIMOTO Shiro OGANO		Dry Drilling	00m to 1.4 m							
Seal	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R. Q. D (%)	Ingeon Valve. (L _v) Permeability. K (cm ² /m)			Result of Rock Tests	Rock Classification
										(L _v) 10 ¹	10 ⁰	10 ⁻¹		
								20 10 0 80	20 10 0 80	(K) 10 ²	10 ²	10 ²		
	72.45	21.55		Dark grey	Silty Shale	Very fresh	Very Hard Clean Crack of 70°/50°							
	22.05			Dark Grey	Sandy Shale	Slightly weathered	Very Hard Iron Oxide Stained Crack of 60°/50° Joint of 60°							
	22.25			Grey	Fine Sandstone	to Fresh								
	22.65			Dark Grey	Sandy Shale									
	71.00	23.00		Grey	Fine Sandstone									
				Dark Grey	Silty Shale	Very fresh	Very Hard 2535m Clean Crack of 150° Joint of 65°							
	69.00	25.00		Grey	Fine Sandstone									
	68.65	25.35											25.35-25.50 D=2.639 σ _c = 613	
				Dark Grey	Shaly Sandstone									
		26.95			Shale			26.95m to 27.00m						
	66.20	27.80												
	65.20	28.80		Grey	Fine Sandstone	Fresh	Very Hard Iron Oxide Stained Crack of 30°/50°/40° 50°							
		29.00					29.30m Clean Crack of 50°							
	64.00	30.00		Dark Grey	Shaly Sandstone									

R. Q. D : Rock Quality Designation

Legend Result of Rock Tests

D_{sp} : Density, Specimen in Air. (g/cm³)

σ_c : Unconfined Compression Strength. (Kg/cm²)

checked

Fig. 4.11. 44

Geological Log. of Borehole

Project Name				Takai Hydro-electric Power Development Project		Site Name		Upper Taki, Dop. Site							
Hole No	UO-13 ()		Elevation of Ground Level	96.66 m		Ground Water Level	-14.1 m		Bit Size	75 (NX) %					
Date	Beginning	September 12th, 1982		Operator	Masami NARITA		Casing	0.0m to 2.0 m							
	Ending	September 14th, 1982		Supervisor	Takuji SUBIMOTO Shiro OGANO		Dry Drilling	0.0m to 2.0 m							
Scale	Elevation (m)	Depth (m)	Mark of Sample	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R Q D (%)	Logon Value (Lw) Permeability K (cm ² /s)			Result of Rock Tests	Rock Classification	
								2000 (m)	2000 (m)	(Lw) 10 ⁻¹ 10 ⁻² 10 ⁻³	(K) 10 ⁻¹ 10 ⁻² 10 ⁻³				
	96.11	0.55	Y	Dark Brown	Sandy Silt		Containing Organic Material								
		1.00		Y Brown		Completely Weathered	Very Soft Sandy Silt With Clay								
		1.65		Whilish Brown	Medium Quartzose Sandstone										
		2.00		R Brown											
		3.00		Greyish White		Highly Weathered	Medium Hard Iron Oxide Stained Crack of 10°, 20°, 60° 70°, 80° All Crack With Clay								
		4.50		Brownish White	Medium Quartzose Sandstone										
		5.00		Whilish Grey											
		6.00		Greyish White		Moderately Weathered	Hard Iron Oxide Stained Crack of 40°, 30°, 70° Joint of 40°								
	89.46	7.20		Brown	Medium Quartzose Sandstone				Fractured Zone Crack With Clay						
	88.60	8.00							Cracky Zone Iron Oxide Stained Crack						
	87.66	9.00		Whilish Grey					Hard Iron Oxide Stained Crack of 4°, 70° Crack of 60° with Quartz						
		9.20													
	85.06	10.60				Slightly Weathered	Hard Iron Oxide Stained Crack of 60°, 30°								
		11.00		Dark Grey					Hard, Cracky Crack of 30° with Iron Oxide						
		12.00							Hard Iron Oxide Stained Crack of 50°, 20°, 30° Joint of 60° with Iron Oxide						
		13.00													
		14.00		Grey	Medium Sandstone										
		15.00		Black	Shale										
		15.55													
				Dark Grey			Hard Iron Oxide Stained Crack of 40°, 30°, 70°								
							17.55m Joint of 60° with Quartz								
							Joint of 65°								
							19.10m Crack of 20° with Iron Oxide								
	76.66	20.00													

R. Q. D. : Rock Quality Designation

Legend Result of Rock Tests

Depth

ρ: Density, Specimen In Air. (g/cm³)

σ_c: Unconfined Compression Strength. (Kg/cm²)

Checked

Fig. 4.11.45

Geological Log of Borehole

Project Name		Tebal Hydro-electric Power Development Project			Site Name		Upper Tekoi Dam Site							
Hole No	UD-14 ()	Elevation of Ground Level	109.68 m	Ground Water Level		Bit Size	76 (NX)%							
Date	Beginning	September 1st, 1982	Operator	Masomi HARITA		Case#	00m to 0.8 m							
	Ending	September 4th, 1982	Supervisor	Tokuji SUGIMOTO Saire GAGANO		Dry Drilling	00m to 0.6 m							
Scale	Elevation (m)	Depth (m)	Colour	Name of Sample	Weathering	Visual Description	Recovery (%)	R Q D (%)	Ingeon Valve (Lv) Permeability, K (cm ² /s)			Result of Rock Tests	Rock Classification	
							20 10 0 20	20 10 0 20	(K) 10 ⁻¹ 10 ⁻² 10 ⁻³					
	08.93	0.75	Brown	Topsoil Deposits		Mainly Breccia with Sand, Clay								
		1.00	Brown											
	108.33	1.55	Greenish Brown	Siltstone										D
		1.75	Brown	Fine Sandstone Shale										
	107.33	2.35	Brown	Fine Sandstone	Highly Weathered	Medium Hard Iron Oxide Stained Crack of 30° 40° 50° 60°								C _L
	106.63	3.05	Greyish Brown	Siltstone	Weathered	All Crack with Brownish Clay								
	105.88	3.60	Light Grey	Fine Sandstone										C _w
		4.00	Greyish White											
	102.48	5.00	Light Grey	Siltstone	Moderately Weathered	Hard Crack of 50° with Clay Iron Oxide Stained Crack of 30° 60°								
		5.25	Brown											
		6.00	Grey	Fine Sandstone		Hard Iron Oxide Stained Crack of 30° 20° Crack of 10° with Iron Oxide								
	102.48	7.20	Dark Grey		Slightly Weathered								630-647 D=2660 pc=456	
	101.68	8.00	Dark Grey	Shale		Hard, Iron Oxide Stained Crack of 50°								C _x
	100.53	9.15	Dark Grey	Sandy Shale		Hard Joint at 20° Iron Oxide Stained Crack of 35° 70° 80°								
			Dark Grey	Shale		Crack of 70° with Iron Oxide Joint at 25°								
	97.93	11.75	Grey	Fine Sandstone		11.75m Joint at 40°								
		12.05	Light Grey	Shale	Slightly Weathered									C _w
		13.35	Light Grey	Fine Sandstone		Medium Hard Cracks, Iron Oxide Stained Crack								C
		14.00	Brown			Fractured Zone								
		15.00	Brownish Grey	Medium Sandstone		Soft Moist Breccia with Clay Iron Oxide Stained Crack								D
	93.93	15.75	Grey			Cracks, with Calcite Joint at 50°								
		16.25	Dark Grey	Shale										
		16.85	Grey	Fine Sandstone										
	93.43	17.20	Dark Grey	Shale		Cracks Clean Crack of 40° 50° 60° with Quartz Vein								
		18.00	Grey	Fine Sandstone	Slightly Weathered to Fresh									C _w
	90.28	19.40				Cracks Clean Crack of 20° 50° 60°								
	89.68	19.95	Dark Grey	Shale										

R. Q. D.: Rock Quality Designation

Legend Result of Rock Tests

Depth

D: Density, Specimen in Air (g/cm³)

pc: Unconfined Compression Strength (kg/cm²)

checked